

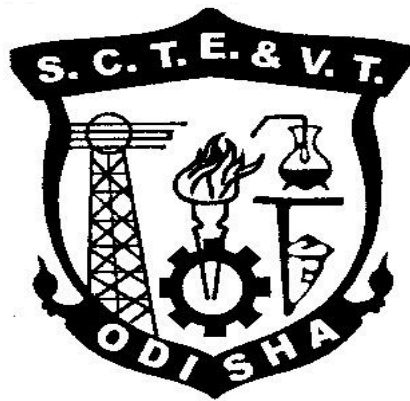
STATE COUNCIL FOR TECHNICAL EDUCATION AND VOCATIONAL TRAINING, ODISHA									
TEACHING AND EVALUATION SCHEME FOR 3rd Semester Electronics & Tele Communication Engg.(wef 2019-20)									
Subject Number	Subject Code	Subject	Periods/week			Evaluation Scheme			
			L	T	P	Internal Assessment/ Sessional	End Sem Exams	Exams (Hours)	Total
<b>Theory</b>									
Th.1		Engg Mathematics-III	4		-	20	80	3	100
Th.2		CIRCUIT THEORY	4		-	20	80	3	100
Th.3		DIGITAL ELECTRONICS	4		-	20	80	3	100
Th.4		ELECTRONICS MEASUREMENT & INSTRUMENTATION	4			20	80	3	100
Th.5		Environmental studies	4			20	80	3	100
		<i>Total</i>	20			100	400	-	500
<b>Practical</b>									
Pr.1		C programming & Web Page Design Lab	-	-	4	25	25	3	50
Pr.2		Circuit theory and Simulation Lab	-	-	4	25	50	3	75
Pr.3		DIGITAL ELECTRONICS LAB	-	-	4	25	50	3	75
Pr.4		ELECTRONICS MEASUREMENT & INSTRUMENTATION LAB			4	25	25	3	50
		Student Centered Activities(SCA)		-	3	-	-	-	-
		Total	-	-	19	100	150	-	250
		<b>Grand Total</b>	<b>20</b>	<b>-</b>	<b>19</b>	<b>200</b>	<b>550</b>	<b>-</b>	<b>750</b>
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%									
<b>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.</b>									
<b>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</b>									

# **CURRICULLUM OF 3<sup>RD</sup> SEMESTER**

**For**

## **DIPLOMA IN Electronics & Tele Communication 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	3 <sup>rd</sup>
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
<b>Total:</b>		<b>60</b>

### 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 Rouché'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  $(0 \leq x \leq 2\pi \text{ and } -\pi \leq x \leq \pi)$  .
- 5.6. Obtain F.S of continuous functions and functions having points of discontinuity

in (  $0 \leq x \leq 2\pi$  and  $-\pi \leq x \leq \pi$  )

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( $\Delta$ ).
- 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 1/3<sup>rd</sup> rule
- 7.6. Solve problems on 7.1- 7.5

**Syllabus to be covered up to I.A.**

Chapter: 1,2,3 and 4

<b>Learning Resources:</b>			
<b>Sl.No</b>	<b>Title of the Book</b>	<b>Name of Authors</b>	<b>Name of Publisher</b>
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

## Th.2 CIRCUIT THEORY

(Common to ETC, AE&I)

Theory : 4 Periods per week  
 Total Periods : 60 Periods  
 Examination : 3 Hours

I.A. :20 Marks  
 Term End Exam : 80 Marks  
 TOTAL MARKS : 100 Marks

### Chapter wise Distribution of periods with Total periods

Sl. No.	Topics	Periods
1.	CIRCUIT ELEMENTS & ENERGY SOURCES	06
2.	NETWORK THEOREMS (Applications in dc circuits)	12
3.	Power Relation in AC circuits & Transient Response of passive circuits(DC)	12
4.	RESONANCE AND COUPLED CIRCUITS	10
5.	LAPLACE TRANSFORM AND ITS APPLICATIONS	08
6.	Two Port Network Analysis	05
7.	FILTERS & ATTENUATORS	07
<b>TOTAL</b>		<b>60</b>

### Rationale:

A circuit may be called a DC circuit or AC circuit based on type of component and sources used. It play an important role in many diverse field of science and Engineering. Circuit laws provide a basis for analysing the circuit. The circuit analysis is the process of determining the values of the unknown quantities in a Dc or Ac circuit. The Circuit Theory will cover some the basics of electric circuit theory, circuit analysis, and will touch on circuit design. Topics covered include AC and DC circuits, passive circuit components, phasors, and RLC circuits. The focus is on students of an electrical/Electronic engineering under diploma program. Hobbyists would benefit more from reading Electronics instead.

### Objective:

**After completion of this course the student will be able to:**

1. Classification of different Network elements.

2. Understanding Star & Delta connections and their interconnection.
3. Know different Network theorems.
4. Know the AC fundamentals.
5. Know Different Network Functions & Laplace Transform.
6. Know different filters and attenuations.
7. Know the Resonance & coupled circuits.

**Detailed Contents:**

**Unit-1: CIRCUIT ELEMENTS& ENERGY SOURCES**

- 1.1 Circuit elements (Resistance, Inductance, Capacitance), Scope of network analysis & synthesize
- 1.2 Voltage Division & Current Division, Energy Sources
- 1.3 Electric charge, electric current, Electrical energy, Electrical potential, R-L-C parameters, Active& Passive Elements.
- 1.4 Energy Sources, Current and voltage sources and their transformation & mutual inductance
- 1.5 Star – Delta transformation

**Unit-2: NETWORK THEOREMS (Applications in dc circuits)**

- 2.1 Nodal & Mesh Analysis of Electrical Circuits with simple problem.
- 2.2 Thevenin's Theorem, Norton's Theorem, Maximum Power transfer Theorem, Superposition Theorem, Millman Theorem, Reciprocity Theorem-Statement, Explanation & applications
- 2.3 Solve numerical problems of above.

**Unit-3: Power Relation in AC circuits & Transient Response of passive circuits**

- 3.1 Definition of frequency, Cycle, Time period, Amplitude, Average value, RMS value, Instantaneous power & Form factor, Apparent power, Reactive power, power Triangle of AC Wave.
- 3.2 Phasor representation of alternating quantities
- 3.3 Single phase Ac circuits-Behaviors of A.C. through pure Resistor, Inductor & Capacitor.
- 3.4 DC Transients-Behaviors of R-L, R-C, R-L-C series circuit & draw the phasor diagram and voltage triangle
- 3.5 Define Time Constant of the above Circuit
- 3.6 Solve numerical simple problems of above Circuit.

**Unit-4: RESONANCE AND COUPLED CIRCUITS**

- 4.1 Introduction to resonance circuits & Resonance tuned circuit,
- 4.2 Series& Parallel resonance
- 4.3 Expression for series resonance, Condition for Resonance, Frequency of Resonance, Impedance, Current, Voltage, power, Q Factor and Power Factor of Resonance, Bandwidth in term of Q.
- 4.4 Parallel Resonance (RL, RC& RLC)& derive the expression

- 4.5 Comparisons of Series & Parallel resonance & applications
- 4.6 simple problems of above Circuit

#### **Unit-5: LAPLACE TRANSFORM AND ITS APPLICATIONS**

- 5.1 Laplace Transformation, Analysis and derive the equations for circuit parameters of Step response of R-L, R-C & R-L-C
- 5.2 Analysis and derive the equations for circuit parameters of Impulse response of R-L, R-C, R-L-C

#### **Unit-6: Two Port Network Analysis**

- 6.1 Network elements, ports in Network (One port, two port),
- 6.2 Network Configurations (T &  $\pi$ ).
- 6.3 Open circuit (Z-Parameter) & Short Circuit (Y-Parameter) Parameters- Calculate open & short Circuit Parameters for Simple Circuits & its conversion
- 6.4 h- parameter (hybrid parameter) Representation
- 6.5 Define T-Network &  $\pi$  – Network

#### **Unit-7: FILTERS & ATTENUATORS**

- 7.1 Ideal & Practical filters and its applications, cut off frequency, passband and stop band.
- 7.2 Classify filters- low pass, high pass, band pass, band stop filters & study their Characteristics.
- 7.3 Butterworth Filter Design
- 7.4 Attenuation and Gain, Bel, Decibel & neper and their relations.
- 7.5 Attenuators & its applications. Classification- T-Type &  $\pi$  – Type attenuators

#### **Coverage of Syllabus upto Internal Exams (I.A.)**

#### **Chapter 1, 2,3, 4**

#### **Books Recommended**

- 1. Circuit Theory by A.Chakbarti, Dhanpat Rai & Co Publication
- 2. Network Theory by Smarajit Ghosh, PHI Learning Private Limited
- 3. Circuit Theory by Ravish S Salivahanan & S Pravin Kumar, Vikas Publication
- 4. Circuit and Networks by Nagsarkar, Oxford Publication



## Th.3 - DIGITAL ELECTRONICS

(Common to ETC, AE&I, CSE, IT, EIC, Mechatronics)

Theory	: 4 Periods per week	I.A.	:20 Marks
Total Periods	: 60 Periods	Term End Exam	: 80 Marks
Examination	: 3 Hours	TOTAL MARKS	: 100 Marks

### Chapter wise Distribution of periods with Total periods

Sl. No.	Topics	Periods
1.	Basics of Digital Electronics	12
2.	Combinational logic circuits	12
3.	Sequential logic circuits	12
4.	Registers, Memories & PLD	08
5.	A/D and D/A Converters	07
6.	Logic Families	09
TOTAL		60

#### Rationale:

Today term digital has become a part of our everyday life. The tremendous power and usefulness of digital electronics can be seen from the wide variety of industrial and consumer products, such as automated industrial machinery, computers, microprocessors, pocket calculators, digital watches, microcontrollers, Digital life support machines, real time systems and clocks, TV games, etc. Which are based on the principles of digital electronics. The areas of applications of digital electronics have been increasing every day. In fact, digital systems have invaded all walks of life. This subject will very much helpful for student to understand clearly about the developmental concept of digital devices

#### Objective:

**After completion of this course the student will be able to:**

1. Explain Binary, Octal, Hexadecimal number systems and compare with decimal system.
2. Perform binary addition, subtraction, Multiplication and Division.
3. Write 1's complement and 2's complement numbers for a given binary number & Perform subtraction
4. Compare weighted and Un-weighted codes and its applications
5. State Boolean expressions for the given statement of the problem
6. State De-Morgan's theorems & Apply De Morgan's theorems and other postulates to simple Boolean expressions.
7. Use Karnaugh map to simplify Boolean Expression (upto 3 variables only).
8. Implement of Logic Gates, i.e. AND, OR, NOT operators with truth table.
9. Working of combinational logic circuits, function of the Half-adder, full-adder.

10. Explain 2's complement parallel adder/ subtractor circuit.
11. Working of Serial & parallel adder with block diagram/circuit diagram
12. Explain the Operation of 4x1 Multiplexer & 1x4 De-multiplexer, Decoders, Encoder, comparator.
13. Understanding the working of Sequential Logic circuits
14. Construct SR, JK, D, T, Master Slave Flip Flop .
15. Counters and different types and operations
16. Explain the working of Registers and memories & PLD
17. Explain various types of memories, Differentiate between ROM and RAM
18. Working of A/D and D/A converters & Necessity of A/D and D/A converters.
19. Explain Various logic families and Characteristics of Digital ICs

### **Detailed Contents:**

#### **Unit-1: Basics of Digital Electronics**

- 1.1 Number System-Binary, Octal, Decimal, Hexadecimal - Conversion from one system to another number system.
- 1.2 Arithmetic Operation-Addition, Subtraction, Multiplication, Division, 1's & 2's complement of Binary numbers & Subtraction using complements method
- 1.3 Digital Code & its application & distinguish between weighted & non-weight Code, Binary codes, excess-3 and Gray codes.
- 1.4 Logic gates: AND, OR, NOT, NAND, NOR, Exclusive-OR, Exclusive-NOR--Symbol, Function, expression, truth table & timing diagram
- 1.5 Universal Gates & its Realisation
- 1.6 Boolean algebra, Boolean expressions, Demorgan's Theorems.
- 1.7 Represent Logic Expression: SOP & POS forms
- 1.8 Karnaugh map (3 & 4 Variables) & Minimization of logical expressions, don't care conditions

#### **Unit-2: Combinational logic circuits**

- 2.1 Half adder, Full adder, Half Subtractor, Full Subtractor, Serial and Parallel Binary 4 bit adder.
- 2.2 Multiplexer (4:1), De-multiplexer (1:4), Decoder, Encoder, Digital comparator (3 Bit)
- 2.3 Seven segment Decoder

(Definition, relevance, gate level of circuit Logic circuit, truth table, Applications of above)

### **Unit-3: Sequential logic Circuits**

- 3.1 Principle of flip-flops operation, its Types,
- 3.2 SR Flip Flop using NAND,NOR Latch (un clocked)
- 3.3 Clocked SR,D,JK,T,JK Master Slave flip-flops-Symbol, logic Circuit, truth table and applications
- 3.4 Concept of Racing and how it can be avoided.

### **Unit-4: Registers, Memories & PLD**

- 4.1 Shift Registers-Serial in Serial -out, Serial- in Parallel-out, Parallel in serial out and Parallel in parallel out
- 4.2 Universal shift registers-Applications.
- 4.3 Types of Counter & applications
- 4.4 Binary counter, Asynchronous ripple counter (UP & DOWN), Decade counter. Synchronous counter, Ring Counter.
- 4.5 Concept of memories-RAM, ROM, static RAM, dynamic RAM,PS RAM
- 4.6 Basic concept of PLD & applications

### **Unit-5: A/D and D/A Converters**

- 5.1 Necessity of A/D and D/A converters.
- 5.2 D/A conversion using weighted resistors methods.
- 5.3 D/A conversion using R-2R ladder (Weighted resistors) network.
- 5.4 A/D conversion using counter method.
- 5.5 A/D conversion using Successive approximate method

### **Unit-6: LOGIC FAMILIES**

- 6.1 Various logic families & categories according to the IC fabrication process
- 6.2 Characteristics of Digital ICs- Propagation Delay, fan-out, fan-in, Power Dissipation ,Noise Margin ,Power Supply requirement & Speed with Reference to logic families.
- 6.3 Features, circuit operation & various applications of TTL(NAND), CMOS (NAND & NOR)

### **Coverage of Syllabus upto Internal Exams (I.A.)**

#### **Chapter 1,2,3**

#### **Books Recommended**

1. Modern Digital Electronics by RP JAIN TMH
2. Fundamental of Digital Electronics by Ananda Kumar-PHI Publication
3. Digital Electronics by P.RAJA ,SCITECH Publication
4. Digital Circuits Design by S.Salivahanan ,S.Arivazhagan –VIKAS Pub House
5. Digital logic and computer design by M. Morris Mano.
6. Digital Electronics by Dr. R. S. Sedha , S. chand

## Th4. ELECTRONICS MEASUREMENT & INSTRUMENTATION

(Common to ETC & AE&I)

Theory : 4 Periods per week  
 Total Periods : 60 Periods  
 Examination : 3 Hours

I.A. : 20 Marks  
 Term End Exam : 80 Marks  
 TOTAL MARKS : 100 Marks

### Chapter wise Distribution of periods with Total periods

Sl.No.	Topics	Periods
1.	Qualities of Measurement	05
2.	Indicating Instruments	10
3.	Digital Instruments	10
4.	Oscilloscope	08
5.	Bridges	11
6.	Transducers	11
7.	Signal Generator, Wave Analyser & DAS	05
TOTAL		60

### Rationale:

Measurement & Instrumentation serves of not only in science & technology but spread over to all bran of engineering. Measuring is basically used to monitor a process or operation as well as the controlling process. The basic concept& principle of working of measuring instrumentation are included in this subject. The Analog & Digital types of Instruments are discussed in this subject. The instruments used to measure any quantity are known as measuring instruments. If the instruments can measure the basic electrical quantities, such as voltage and current are known as basic measuring instruments.

### Objective:

**After completion of this course the student will be able to:**

1. Know about the Qualities of Measurement
2. Know about Indicating Instruments
3. Know about Digital Instruments

4. Study of Oscilloscope.
5. Know about different types of Bridges and working principles.
6. Know about Transducers & Sensors.
7. Know about Signal Generator & Wave Analyzer.
8. Know about various measurements using Electronics Devices

### **Detailed Contents:**

#### **Unit-1: Qualities of Measurement**

- 1.1 Discuss the Static Characteristics,
- 1.2 Accuracy, sensitivity, reproducibility & static error of instruments
- 1.3 Dynamic characteristics & speed of instruments.
- 1-4 Errors of an instrument & explain various types.

#### **Unit-2: Indicating Instruments**

- 2.1 Introduction to Indicator & Display devices & its types
- 2.2 Basic principle of meter movement, permanent magnetic moving coil movement & its advantages & disadvantages.
- 2.3 Operation of Moving Iron Instrument
- 2.4 Basic principle of operation of DC Ammeter and Multi range Ammeter
- 2.5 Basic principle of operation of AC Ammeter and Multi range Ammeter
- 2-6 Basic principle of operation of DC Voltmeter and its applications
- 2.7 Basic principle of operation of AC Voltmeter and its application
- 2.8 Basic principle of Ohm Meter (Series & Shunt type)
- 2.9 Basic principle of Analog Multimeter, its types & applications
- 2-10 Operation of Q meter and its essentials

#### **Unit-3: Digital Instruments**

- 3.1 Principle of operation of Ramp type Digital Voltmeter & applications
- 3.2 Operation of display of  $3 \frac{1}{2}$ ,  $4 \frac{1}{2}$ – Digital Multimeter & Resolution and Sensitivity
- 3.3 Basic principle of operation of working of Digital Multimeter its types & applications
- 3.4 Basic principle of operation of working of Digital Frequency Meter
- 3.5 Operation of working of Digital Measurement of Time
- 3.6 Measurement of Frequency.
- 3.7 Principle of operation of working of Digital Tachometer

3.8 Principle of operation of working of Automation in Digital Instruments (Polarity Indication, Ranging, Zeroing & Fully Automatic)

3.9 Block diagram of LCR meter & its working principle.

**Unit-4: Oscilloscope**

4.1 Basic principle of Oscilloscope & its Block Diagram

4.2 Basic principle & Block diagram of CRO, Dual Trace Oscilloscope & its specification

4.3 CRO Measurements, Lissajous figures

4.4 Applications of Oscilloscope (Voltage period & frequency measurement)

4.5 Operation of Digital Storage Oscilloscope & High frequency Oscilloscope

**Unit-5: Bridges**

5.1 Types of Bridges ( DC & Ac Bridges)

5.2 DC Bridges (Measurement of Resistance by Wheatstone's Bridge)

5.3 AC bridges (Measurement of inductance by Maxwell's Bridge & by Hay's Bridge)

5.3 Measurement of capacitance by Schering's Bridge & DeSauty Bridge.

5.5 Working principle of Q meter its circuit diagram & measurement of Low impedance

5.6 Measurement of frequency

5.7 LCR Meter & its measurements

**Unit-6: Transducers & Sensors**

6.1 Parameter, method of Selecting & advantage of Electrical Transducer & Resistive Transducer

6.2 Working principle of Strain Gauges, define Strain Gauge (No mathematical Derivation)

6.3 Working principle of LVDT

6.4 Working principle of capacitive transducers (pressure)

6.5 Working principle of Load Cell (Pressure Cell)

6.6 Working principle of Temperature Transducer (RTD, Optical Pyrometer, Thermocouple, Thermister)

6.7 Working principle of Current transducer and KW Transducer.

6.8 Working principle of Proximity & Light sensors.

**Unit-7: Signal Generator, Wave Analyser & DAS**

7.1 General aspect & classification of Signal generators

7.2 Working principle of AF Sine & Square wave generator .

- 7.3 Working principle of the Function Generator
- 7.4 Function of basic Wave Analyser & Spectrum Analyser
- 7.5 Basic concept of Data Acquisition System (DAS)

**Coverage of Syllabus upto Internal Exams (I.A.)  
Chapter 1,2,3,4**

**Books Recommended:**

1. Electronic Instrumentation by H S Kalsi –McGraw Hill
2. Electrical & Electronics Measurement & Instrumentation by A K Sawheny
3. Electrical and Electronic Measurements and Instrumentation by R.K.Rajput –S Chand
4. Electrical Measurement Instrumentation by J.B.Gupta – Katson books

## Th5. ENVIRONMENTAL STUDIES

(Common to all Branches)

Course code:		Semester	3 <sup>rd</sup>
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
	<b>Total:</b>	<b>60</b>

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**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 human health.

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.

<b>Learning Resources:</b>			
<b>Sl.No</b>	<b>Title of the Book</b>	<b>Name of Authors</b>	<b>Name of Publisher</b>
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. C programming & Web Page Design Lab (Common to ETC, AE&I)

Practical	: 4 Periods per week	Sessional	:25 Marks
Total Periods	:60 Periods	Term End Exam	: 25 Marks
Examination	: 3 Hours	TOTAL MARKS	: 50 Marks

### Rationale:

Web design encompasses many different skills and disciplines in the production and maintenance of websites. The different areas of web design include web graphic design; interface design; authoring, including standardised code and proprietary software; user experience design; and search engine optimization. Often many individuals will work in teams covering different aspects of the design process, although some designers will cover them all. The term web design is normally used to describe the design process relating to the front-end (client side) design of a website including writing mark up. Web design partially overlaps web engineering in the broader scope of web development. Web designers are expected to have an awareness of usability and if their role involves creating mark-up then they are also expected to be up to date with web accessibility guideline.

### Objective:

#### After completion of this course the student will be able to:

1. To exploring your business worldwide and makes strong impact image using active online presences with web site. And well-designed and aesthetically appealing website can give you a strong advantage over other online competitors.
2. To make an interesting to see graphic designers on one end, and web programmers on the other, arguing their respective positions active web page designing is today's need.
3. To get strong instantaneous recognition of relevance which leads to clarity and understanding at a glance a well-crafted brand strategy which provides context and perspective, and a detailed website plan that spells out specific objectives, target audiences, paths to conversion other critical elements of your site

### List of Assignments/Tutorial for C program:

Write a C program

Any one from 1 to 3

- 1) To display our College name twenty times on screen.
- 2) To display all even numbers from 1-100.

3) To perform addition of 1-100 numbers.

Any one from 4 and 5

4) To find smallest / largest number from array elements.

5) To sort array elements in ascending / descending order.

Any one from 6 to 8

6) To enter elements for 3X3 matrix and display them.

7) To calculate addition / subtraction of 2 dimensional matrix.

8) To calculate multiplication of 2 dimensional matrix.

9) To demonstrate output of standard library functions Strlen (), strcpy (), strcat (), strcmp ().

Any one from 10 and 11

10) To calculate area of circle using function.

11) To calculate factorial of any given number using recursion.

12) To demonstrate call by reference, call by value

13) To maintain and manipulate student data using structure.

14) To perform 4 arithmetic functions on pointers.

#### **List of Assignments/Tutorial for web page design:**

- 1 Browse different search engines and search different topics & Create an e-mail account & use attachment facility
- 2 Design a general webpage Design a general website.
- 3 Design multimedia page which includes Text, Audio, video, images, Animation
- 4 Design a general website & multimedia page which includes
- 5 Upload the website on college server & load website on public internet.
- 6 Designs Web page and apply some block level tags and some text level tags & Include Horizontal Rules and special characters in a Web page.
- 7 Design Web page and include different lists & various links in a Web page & Include images with different alignments and wrapped text in Web page. Also include image as a link in the Web page.
- 8 Design a web page and set background colour and document wide text colour.

- 9 Design a web page with background image, different text colour for different Paragraphs, and set colors for links, active links and visited links.
- 10 Create HTML table, format contents in table cells and span the rows and columns.
- 11 Create basic frameset and format the frames within the frameset using different attributes. Also use frame targeting.
- 12 Create a basic form using different input controls and pull down menu.

### **Books Recommended**

1. Programming in C by Balgurusamy, Tata MGH
2. Web page Design -TMG/Oxford/BPB publications

### **Develop programming concepts of students reference Websites:**

1. <http://cplus.about.com/od/beginnerctutorial/a/blctut.htm>
2. <http://computer.howstuffworks.com/c.htm>
3. Objective questions: [www.google.com](http://www.google.com)
4. <http://www.indiastudycenter.com/studyguides/sc/objtest/default.asp>

***Demo lectures with power point presentations using LCD projector should be arranged to.***

## Pr2. CIRCUIT THEORY LAB

(Common to ETC, AE&I)

Practical	: 4 Periods per week	Sessional	:25 Marks
Total Periods	:60 Periods	Term End Exam	:50 Marks
Examination	: 3 Hours	TOTAL MARKS	: 75 Marks

### Rationale:

The Circuit Theory Lab can provide knowledge of measurements of various parameters, verification of different circuits and measuring instruments. Using p-spice software / TINA software student can able to analyse the circuits in the computer and simulate the DC/AC analysis easily for efficient outputs. This lab involved principles of operation of electrical and electronic test equipment and applications to measurement of circuit parameters with transient and steady state response of RLC networks & applications of laws and theories of circuits. Design, prototyping, and testing of electronic devices and circuits

### Objective:

**After completion of this course the student will be able to:**

1. Measurement of Resistance, Voltage, Current, Voltage, Current in A.C & D. C.
2. Measurement of Circuit Parameters by LCR meter
3. Verification of Theorems
4. Determine resonant frequency of series R-L-C circuit.
5. Study of High Pass & low pass filter, Band pass Filter and Band Elimination Filter and determination of its cut-off frequency.
6. Know circuit diagram and explain response of series & parallel resonant circuit
7. Analysis the charging and discharging of an R-C & R-L circuit with oscilloscope.
8. Know rise time, overshoot, damping factor
9. Know Circuit simulation using P-SPICE software. &Construct different circuits using P-SPICE software and compare the measurements and wave forms.

### List of Practicals (Any 08 including sl no 11)

1. Measurement of Resistance, Voltage, Current in A.C & D. C. Circuit by using digital Multimeter & Clamp meter
2. Verification of
  - (a) Super positions Theorem
  - (b) Thevenin's Theorem
  - (c) Norton's Theorem
  - (d) Milliman's Theorem

(e) Maximum power theorem

3. Determine resonant frequency of series R-L, R-C, R-L-C circuit and study the quality factor and bandwidth.
4. Determine the resonant frequency, Q factor & Band width of parallel resonant circuit
5. Determine the time constant of R-L-C circuit and analysis the transient response (rise time, overshoot, and damping factor from the oscilloscope)
6. Study of Low Pass filter and determination of cut-off frequency.
7. Study of HighPass filter and determination of cut-off frequency.
8. Study of Band pass Filter and Band Elimination Filter and determination of its cut-off frequency.
9. Determination of Parameters of Two Port Network (T & Y)
10. Design attenuator circuit (pi or T)
11. Mini Project using P-SPICE software: To collect data of catalogues and specification sheet of all the equipment & components used for performing experiment and submit the project on P-SPICE software into Analysis and Plot the graph of each measurement at the end of semester e.g. Butter Worth Filter



## Pr3. DIGITAL ELECTRONICS LAB

(Common to ETC, AE&I, CSE, IT, Mechatronics)

Practical	: 4 Periods per week	Sessional	:25 Marks
Total Periods	:60 Periods	Term End Exam	:50 Marks
Examination	: 3 Hours	TOTAL MARKS	:75 Marks

### Rationale:

The Digital Electronics Laboratory can play a vital role in wide variety applications in the field of microprocessor, microcontrollers & household appliances, among others. It is the inter connection among the digital components and modules. Various digital ICs are discussed. This lab include combinational logic & sequential logic circuits and its implementations.

### Objective:

**After completion of this course the student will be able to:**

1. Familiarization of Digital Trainer Kit, logic Pulser Logic Probe & Digital ICs
2. Verify truth tables of Digital gates
3. Implement various gates by using universal properties
4. Implement Half adder, Full adder, Half subtractor and Full subtractor using logic gates.
5. Know about Flip Flop, Counters, Registers
6. Study Multiplexer and Demultiplexer.
7. Study 8-bit D/A and A/D conversion.
8. Study display devices, LED, LCD, 7-segment displays.

List of Practical ( Any 10 and Mini project Compulsory)

1. Familiarization of Digital Trainer Kit & Digital ICs IE 7400, 7402, 7404, 7408, 7432 & 7486.(draw their pin diagram and features)
2. Verify truth tables of AND, OR, NOT, NOR, NAND, XOR, XNOR gates using ICs& simplifications of Boolean gates
3. Implement various gates by using universal properties of NAND & NOR gates verify and truth table tabulate data.
4. Construct & verify operation of Half adder and Full adder using logic gates.
5. Construct & verify operation of Half Subtractor and Full Subtractor using logic gates.
6. Design &Implement a 4-bit Binary to Gray code converter.

- 7 Design & Implement a Single bit/ two bit digital comparator circuit
- 8 Design Multiplexer (4:1) and De-multiplexer (1:4).
- 9 Study the operation of flip-flops (i)S-R flip flop (ii) J-K flip flop (iii) D flip flop (iv) T flip flop
- 10 Realize a 4-bit asynchronous UP/Down Counter.
- 11 Study shift registers -4 bit Registers
- 12 Verify the operation 8-bit D /A and A/ D conversion & test its performance
- 13 Study display devices LCD, 7-segment displays.
- 14 Mini Project using Software: To collect data like pin configurations, display devices, Operational characteristics, applications and critical factors etc. on all digital ICs studied in theory and compile a project report throughout and submit at the end of the semester. To assemble and tests circuits using above digital ICs with test points e.g. Digital Clock / Frequency Counter / Running Glow Light upto 999/Solar cell &Opto coupler applications.

(All the above experiments are to be conducted by through study of ICs)

15. **Digital Works 3.04/** higher version is a graphical design tool that enables you to construct digital logic circuits and to analyse their behaviour through real time simulation. Its intuitive, easy to use interface makes it the ideal choice for learning or teaching digital electronics.

## Pr4. ELECTRONICS MEASUREMENT & INSTRUMENTATION LAB

Practical	: 4 Periods per week	Sessional	:25 Marks
Total Periods	:60 Periods	Term End Exam	:25 Marks
Examination	: 3 Hours	TOTAL MARKS	:50 Marks

### Rationale:

This lab aims to help students to better understand measuring devices and their operating principles, Measurement of Circuit Parameters, Power, Power Factor, Phase Angle, Frequency and Time, DC and AC Bridges, Characteristics of Discrete and Integrated Devices, Digital Instrumentation, Transducers.

### Objective:

**After completion of this course the student will be able to:**

1. Measurement of Current and Voltages by Low range ammeter and voltmeter respectively with shunt and multiplier.
2. Construct Bridges to measure R,L, & C.
3. Observe the wave forms of different frequency by using Function generator and draw its diagram. & measure the amplitude and frequency using dual trace CRO.
4. Measure the unknown frequency and phase angle using CRO by lissajous pattern.
5. Measure the different parameters using Transducer.

### List of Practicals: ( any 10 including Mini project)

1. Study and construction of moving coil and moving iron instruments & calibrate.
2. Study of static and dynamic characteristic of PMMC & moving iron instruments
3. Study of Resolution, Sensitivity of Digital Instrument
4. Measurement of Current and Voltages by Low range ammeter and voltmeter respectively with shunt and multiplier.
5. Observe the wave forms of different frequency by using Function generator and draw its diagram measure the amplitude and frequency & calculates average & R.M.S. Values, frequency, Time Periods using CRO.
6. Measure the unknown frequency and phase angle using CRO by Lissajous figure.
7. Measurement of resistance using Wheatstone's Bridge
8. Measure the inductance by Maxwell's Bridge & Hay's Bridge

9. Measure the capacitance by Schering's Bridge
10. Measure the Resistance, Capacitance of circuit (Series & parallel ) by using LCR meter and find the Q factor of the coil.
11. Measure displacement using LVDT Transducer.
12. Measure the temperature using RTD & Thermister.
13. Construct & Test the performance of Proximity Sensor.
14. Mini Project : To collect data like base configuration, Operational characteristics, applications and critical factors etc. on all measuring devices & studied in theory and compile a project report through out and submit at the end of the semester