STATE COUNCIL OF TECHNICAL EDUCATION AND VOCATIONAL TRAINING, ODISHA
TEACHING AND EVALUATION SCHEME FOR DIPLOMA IN ENGINEERING COURSES

DISCIPLINE: ELECTRONICS & TELECOMMUNICATION ENIGINEERING						**SEMESTER: 4TH**						
SL NO	**SUBJECT CODE**	**SUBJECT**	**PERIODS**			**EVALUATION SCHEME**						
			L	**T**	**P**	**INTERNAL EXAM**			**END SEM EXAM**	**TERM WORK**	**PRACTICAL EXAM**	**TOTAL MARKS**
						TA	**CT**	**Total**				
THEORY												
1	EET 421	ELECTRICAL MACHINE	4		-	10	20	30	70		-	100
2	ETT 401	ANALOG ELECTRONICS-II	4		-	10	20	30	70		-	100
3	ETT 402	MICROPROCESSOR & ITS INTERFACING (**COMMON TO ETC/AEI/CSE/IT)**	5		-	10	20	30	70		-	100
4	ETT 403	COMMUNICATION ENGG.-I	4		-	10	20	30	70		-	100
5	ETT 404	CONTROL SYSTEM ENGG.	4		-	10	20	30	70		-	100
PRACTICAL/TERM WORK												
6	EEP 421	ELECTRICAL MACHINE LAB			3	-	-			25	25	50
7	ETP 401	ANALOG ELECTRONICS –II LAB			4	-	-	-		25	25	50
8	ETP 402	MICROPROCESSOR &INTERFACING LAB(**COMMON TO ETC/AEI/CSE/IT)**			4	-	-	-		25	25	50
9	ETP 403	COMMUNICATION ENGG.-I LAB.			4	-	-	-		25	25	50
10	ETP 404	BASIC SIMULATION LAB USING MATLAB			3					25	25	50
GRAND TOTAL			**21**		**18**	**50**	**100**	**150**	**350**	**125**	**125**	**750**
Total Contact hours per week: 39												
Abbreviations: L- Lecture, T- Tutorial, P- Practical, TA- Teacher’s Assessment, CT- Class Test												
Minimum Pass Mark in each Theory subject is 35% and in each Practical subject is 50%												

ELECTRICAL MACHINE

Name of the Course: Diploma in Electronics &Telecomm. Engineering			
Course code:	EET 421	Semester	4th
Total Period:	60(45L+15T)	Examination	3 hrs
Theory periods:	3P/week	Class Test:	20
Tutorial:	1P/week	Teacher's Assessment:	10
Maximum marks:	100	End Semester Examination:	70

A: RATIONALE:

The application of Rotatory and Static Electrical machines find extensive use in modem industries is still in practice. The Electrical machine subject is intended to provide insight of different materials and in Electrical Engineering and the concept of different Electrical Machines with their operation and control. This subject also deals with the fundamental concept of single phase and three phase AC machines.

B: OBJECTIVES :

After Completion of the Subject students will be able to:

Understand property & use of Electrical conducting & insulating materials.

- Explain working principle & construction of DC generator.
- Explain construction & working principle of motor & speed control of DC motor.
- Discuss AC fundamentals.
- Explain Construction & principle of transformer.
- Describe principle of working of three-phase Induction motor.
- Describe principle of single-phase motor.

C: TOPIC WISE DISTRIBUTION OF PERIODS

SL NO.	TOPIC	PERIODS
1	ELECTRICAL MATERIAL	04
2	DC GENERATOR	10
3	DC MOTOR	10
4	AC CIRCUITS	10
5	TRANSFORMER	08
6	INDUCTION MOTOR	10
7	SINGLE PHASE INDUCTION MOTOR	08
	TOTAL-	60

D: COURSE CONTENT:

1. ELECTRICAL MATERIAL

1.1 Discuss properties & uses of different conducting material.

1.2 Discuss properties & use of various insulating materials used electrical engineering.

1.3 Explain various magnetic materials & their uses.

2.**DC GENERATOR**

2.1 Explain construction, Principle & application of DC Generator.

2.2 Classify DC generator including voltage equation.

2.3 Derive EMF equation & simple problems.

2.4 Define parallel operation of DC generators.

3.**DC MOTOR**

3.1 Explain Principle of working of a DC motor.

3.2 Explain concept of development of torque & back EMF in DC motor including simple problems.

3.3 Derive equation relating to back EMF, Current, Speed and Torque equation

3.4 Classify DC motors & explain characteristics, application.

3.5 State & explain three point & four point stator/static of DC motor by solid State converter.

3.6 Explain Speed of DC motor by field control and armature control method.
3.7 Explain power stages of DC motor & derive Efficiency of a DC motor.

4. **AC CIRCUITS**

4.1 State Mathematical representation of phasors, significant of operator "J"
4.2 Discuss Addition, Subtraction, Multiplication and Division of phasor quantities.
4.3 Explain AC series circuits containing resistance, capacitances, Conception of active, reactive and apparent power and Q-factor of series circuits & solve related problems.
4.4 Find the relation of AC Parallel circuits containing Resistances, Inductance and Capacitances Q-factor of parallel circuits.

5.**TRANSFORMER**

5.1 State construction & working principle of transformer & define connection of Ideal transformer.
5.2 Derive of EMF equation of transformer, voltage transformation ratio.
5.3 Discuss Flux, Current, EMF components of transformer and their phasor diagram under no load condition.
5.4 Discuss Phasor representation of transformer flux, current EMF primary and secondary voltages under loaded condition.
5.5 Explain types of losses in Single Phase (1-ø) Transformer.
5.6 Explain open circuit & short-circuit test (simple problems)
5.7 Explain Parallel operation of Transformer.

6.**INDUCTION MOTOR**

6.1 Explain construction feature, types of three-phase induction motor.
6.2 State principle of development of rotating magnetic field in the stator.
6.3 Establish relationship between synchronous speed, actual speed and slip of induction motor.
6.4 Establish relation between torque, rotor current and power factor.
6.5 Explain starting of an induction motor by using DOL and Star-Delta stator. State industrial use of induction motor.

7.**SINGLE PHASE INDUCTION MOTOR**

7.1 Explain construction features and principle of operation of capacitor type and shaded pole type of single-phase induction motor.
7.2 Explain construction & operation of AC series motor.
7.3 Concept of alternator & its application.

LEARNING RESOURCES:

Text Books

Sl.No	Name of Authors	Title of the Book	Name of the publisher
1	B.L.Theraja	Fundamental of Electrical Engg	S Chand
2	Dr.S.K.Bhattachary	Electrical Machines	TMH

Reference Books

Sl.No	Name of Authors	Title of the Book	Name of the publisher
1	H.Cotton	Electrical Technology	Pitman
2	V K Mehta & R Mehta	Principle of Electrical Machine	S Chand

ANALOG ELECTRONICS – II

Name of the Course: Diploma in Electronics &Telecomm. Engineering			
Course code:	ETT 401	Semester	4th
Total Period:	60(45L+15T)	Examination	3 hrs
Theory periods:	3P/week	Class Test:	20
Tutorial:	1P/week	Teacher's Assessment:	10
Maximum marks:	100	End Semester Examination:	70

A : RATIONALE:

This subject Analog Electronics II is the continuation subject of Analog Electronics II which deals with Analog Integrated Circuits and wave shaping Circuits for various applications in Electronics Engineering. The operational Amplifier will play vital role in day to day life of most of the Electronics equipment. The concept of operational Amplifier, IC voltage regulator has also been incorporated in this subject.

B: OBJECTIVES:

After completing the topic, the students will able to know

- Concept of Opto Electronics.
- Concept of Operational Amplifier
- Different Characteristics Op-Amp.
- Concept of IC Voltage Regulator.
- Idea of PCB Design.

C: TOPIC WISE DISTRIBUTION OF PERIODS

SL NO.	TOPIC	PERIODS
1	OPTO ELECTRONICS	08
2	INTEGRATED CIRCUITS	08
3	INTRODUCTION TO OP-AMP	08
4	OPERATIONAL AMPLIFIER CIRCUITS & FEEDBACK CONFIGURATIONS	12
5	APPLICATION OF OPERATIONAL AMPLIFIER & TIMER CIRCUITS	10
6	IC VOLTAGE REGULATORS	08
7	PRINTED CIRCUIT BOARD (PCB)	06
	TOTAL-	60

D : COURSE CONTENTS:

1. OPTO ELECTRONICS.

1.1 Define the concept of Photodiode, Photoconductivity cells and Photovoltaic cells.
1.2 Define the concept of Light sensing Devices & Photo active Devices.
1.3 Explain construction & working of LDR, LED, LCD, Phototransistor, Infrared transmitter and receiver.
1.4 Explain Opto-isolator & optical sensors.
1.5 What is Laser and basic light theory & Laser theory
1.6 Describe working of Laser Diodes

2 INTEGRATED CIRCUITS

2.1 Define the term IC and its uses &State the different types of ICs.
2.2 Describe the fabrication of monolithic IC(Epitaxial Growth, Masking and Etching. Diffusion of Impurities etc)
2.3 Discuss, the fabrication of monolithic resistors, capacitors, diodes & bipolar junction transistors, Integrated field Effect Transistors.
2.4 Explain briefly the difference between digital & linear ICs.

3 INTRODUCTION TO OP-AMP.

3.1 Define the term differential amplifier & explain its significance.

3.2 Draw the four differential amplifier configuration and show the no of Input signal used and the way the Output is measured voltage of each amplifier (no mathematical derivations)

3.3 Block diagram representation of a typical Op- Amp

3.4 Analyse a typical Op-Amp equivalent circuits and draw the schematic symbol.

3.5 Discuss the types of integrated circuits manufacturer's designations of ICs, Package types, pin identification and temperature and ordering information.

3.6 Device identification and the need of two power supply for ICs.

4. OPERATIONAL AMPLIFIER CIRCUITS & FEEDBACK CONFIGURATIONS.

4.1 Explain general information of data sheet of 741.

4.2 Define the following electrical characteristics input offset voltage, input offset current, CMMR, Large signal voltage gain, Slew rate .

4.3 Define Ideal operational amplifier and its equivalent circuits.

4.4 Draw and explain the Open Loop configuration (inverting, non-inverting Amplifier)

4.5 Draw the block representation of four feedback configurations.

4.6 Draw the circuit diagram of the voltage series feedback amplifier and derive the close loop Voltage gain, gain of feedback circuits input resistance, and output resistance, bandwidth and total output offset voltage with feedback.

4.7 Draw the circuit diagram of the voltage shunt feedback amplifier and derive the close loop Voltage gain, gain of feedback circuits, and input resistance, and output resistance, bandwidth and total output offset voltage with feedback.

5. APPLICATION OF OPERATIONAL AMPLIFIER & TIMER CIRCUITS

5.1 Discuss the summing scaling and averaging of inverting and non-inverting amplifiers Configuration.

5.2 Explain DC & AC Amplifies using OP-AMP.

5.3 Explain the operation of instrumentation amplifier using Transducer Bridge

5.4 Discuss the integrator and differentiator using op-amp.

5.5 Define active filter and describe the filter design of fast order low Pass Butterworth filter.

5.6 Describe the filter design of fast order High Pass Butterworth filter.

5.7 Explain the concept of Zero-Crossing Detector using Op-Amp

5.8 Draw the block diagram and operation of IC 555 timer &IC 565 PLL& its applications.

5.9 Explain the working of Wein Bridge Oscillator using operational Amplifier.

5.10 Explain Current to voltage Convertor using Operational Amplifier

5.11 Explain the Voltage to Frequency Convertor using Operational Amplifier.

5.12 Explain the Frequency to Voltage Conversion using Operational Amplifier.

6. IC VOLTAGE REGULATORS

6.1 Explain the operation of power supply using 78XX and 79XX Series (Fixed Voltage Regulator)

6.2 Draw the functional block diagram of IC regulator LM 723 &LM 317.

6.3 Explain the voltage power supply using LM 317 and LM 337.

6.4 Explain the voltage power supply using LM 723.

7. PRINTED CIRCUIT BOARD (PCB).

7.1 Discuss the different types of PCB : single sided double sided multi layer

7.2 Explain the PCB design principle (Brief description): The schematic Diagram, Layout design, Artwork, Manufacturing of film master.

7.3 Explain PCB fabrication procedure (Brief description): Cutting of PCB, Cleaning, Lamination, Exposing, Developing, Etching, Drilling, Solder Max, Tinning, Legend Printing and Finishing.

LEARNING RESOURCES:

Text Books

Sl.No	Name of Authors	Title of the Book	Name of the publisher
1	R.K. Geakward	Operational Amplifier & Linear Integrated Circuit	PHI
2	Jacob Milliman, C.Halkias&S.Jit	Electronics & Devices & Circuits	McGraw Hill
3	Walter Boshart	PCB Design Technology	TMH
4	Adel S. Sedra, Kenneth,C.Smith	Micro Electronics Circuits	Oxford

Reference Books

Sl.No	Name of Authors	Title of the Book	Name of the publisher
1		L.M. on PCB Fabrication	NTTF –Bangalore
2	L.K.Mahesnhwari& MMS Anand	Analog Electronics	PHI
3	J.B.Gupta	Linear Integrated circuits	Katson

MICROPROCESSOR & ITS INTERFACING

Name of the Course: Diploma in Electronics &Telecomm. Engineering			
Course code:	ETT 402	Semester	4th
Total Period:	75(60L+15T)	Examination	3 hrs
Theory periods:	4P/week	Class Test:	20
Tutorial:	1P/week	Teacher's Assessment:	10
Maximum marks:	100	End Semester Examination:	70

A: RATIONALE:

The Microprocessor control has taken predominance over other types of control quite some time past. Starting from Electrical Power plant to consumer electronics this tiny chip finds extensive uses. As such Microprocessors have made pervading influence on our lives. This field is developing so rapid that it is difficult to keep track with the changes. Under this subjects Architecture and instruction sets of 8 bit and 16 bit processor have been discussed. Some applications have been included through the interfacing chips.

B: OBJECTIVS:

On completion of the subject, the student will be able to:

- The students will able to differential between 8085 microprocessor &types of Bus.
- Describe the Architecture & pin diagram of 8085 microprocessor.
- Comprehend different instructions of 8085 microprocessor &addressing modes.
- Write instructions under different addressing modes.
- Discuss assembler & basic assembler directives.
- Describe types of assembly language programs and write programs.
- Explain the timing diagrams of different instructions.
- State the functions of the interfacing chips like 8255, etc.
- Explain the delay subroutine.& Calculate the delay by using one, two or three registers.
- Explain ADC & DAC?&use of ADC & DAC modules
- Write a program for traffic light control &stepper motor control.
- Know about 16-bit microprocessor.

C: TOPIC WISE DISTRIBUTION OF PERIODS

SL NO.	TOPIC	PERIODS
1	INTRODUCTION TO MICROPROCESSOR	05
2	BASIC ARCHITECTURE OF 8-BIT MICROPROCESSOR	15
3	INSTRUCTION SETS	10
4	PROGRAMMING TECHNICS	10
5	TIMING DIAGRAMS	10
6	INTERFACING I/O ,MEMORY & I/O PROGRAMMING	12
7	16-Bit MICROPROCESSOR	13
	TOTAL-	75

D: COURSE CONTENTS:

1 INTRODUCTION MICROPROCESSOR

1.1Discuss Microprocessor & its Application.
1.2 Distinguish between microprocessor & microcomputer.
1.3 Discuss Evolution of microprocessor.

2. BASIC ARCHITECTURE OF 8-BIT MICROPROCESSOR.

2.1 Discuss Architecture.
2.2 Describe address bus, data bus, control bus & System Bus
2.3 State & Explain general Bus structure
2.4 Describe pin structure of 8085 Microprocessor.

2.5 Describe internal Architecture of 8085 Microprocessor with a Block Diagram.
2.6 Describe three state registers & Concept of Multiplexing.
2.7 Study the data transfer using tri-state registers
2.8 Define registers of 8085 & Distinguish between SPR & GPR
2.9 State & explain stack pointer, stack & stack top.

3. INSTRUCTION SETS.

3.1 Explain need for addressing data & Differentiate between 1-adress, 2-adress & 3-adress instructions with examples.
3.2 Define addressing modes with suitable examples.
3.3 Explain different types of Instructions.(Data Transfer, Arithmetic, Logical, Branching, Stack& I/O Machine Control)
3.4 Simple Programs of 8085 Instructions.
3.5 Explain the basic assembler directives.

4. **PROGRAMMING TECHNICS**

Write the program based on

4.1 Logic Operations (AND,OR,Complement1's&2's) & Masking of bits.
4.2 Counters & Time delay (Single Register, Register Pair, More than Two Register)
4.3 Looping, Counting & Indexing (Call/JMP etc).
4.4 Stack & Subroutines.
4.5 Code conversion, BCD Arithmetic & 16Bit data Operation, Block Transfer.
4.6 Compare between two numbers
4.6 Array Handling (Largest number & smallest number in the array)

5.**TIMING DIAGRAMS**.

5.1 Define T-State, Fetch cycle, Machine Cycle, Instruction cycle & discuss the concept of timing diagram.
5.2 Differentiate between instruction cycle, machine cycle & T-state.
5.3 Draw timing diagram for memory read, memory write, I/O read, I/O write machine cycle.
5.4 Draw a neat sketch for the timing diagram for 8085 instruction (MOV, DCR, MVI, LDA, DCX).

6. INTERFACING I/O ,MEMORY & I/O PROGRAMMING

6.1 Define interfacing
6.2 Describe the pin diagram of 8255 chip and explain function of each pin.
6.3 Describe internal architecture of 8255. (PPI)
6.4 Define Mapping & Distinguish between Memory mapping & I/O Mapping.
6.5 Explain Memory interfacing with RAM & EPROM to Microprocessor
6.6 Explain Functional Block Diagram 8257 DMA controller.
6.7 Explain Functional Block Diagram 8259 Programming Interrupt Controller.
6.8 Explain the functional Block Diagram 8251(USART)
6.9 Describe ADC & DAC with Interfacing.
6.10 Design Interface a traffic light control system using 8255.
6.11 Write interfacing programme for stepper motor control.

7. 16-Bit MICROPROCESSOR

7.1 Explain the block diagram of a Microprocessor based system.
7.2 Explain the internal architecture of 8086-Programming model.
7.3 Explain pin details of 8086 / 8088.
7.4 Explain the basic 8086 system timing diagram.
7.5 Explain the Instruction format-Memory addressing machine.
7.6 Explain minimum and maximum mode of 8086 operation.
7.7 Explain addressing modes of 8086.
7.8 Discuss instruction set-Data transfer-Arithmetic and logical, Branching-loop control. &String control instruction
7.9 Write simple program using 8086 instructions.

LEARNING RESOURCES:

Text Books

Sl.No	Name of Authors	Title of the Book	Name of the publisher
1	R.S. Goankar	Microprocessor Arch, Programming & Application	PRI (India)
2	A.K.Roy and K.M.Bhurchand	Advanced microprocessor and peripherals, programmer	PHI
3	N.SenthliKumar,M.Sarvanan, S.Jeevananthan,S K Shah	Microprocessor & Interfacing	OXFORD

Reference Books

Sl.No	Name of Authors	Title of the Book	Name of the publisher
1	B.Ram	Microprocessor & its application	Dhanpat rai
2	M. Rafiquizaman	Microprocessor	PHI
3	S.P. Chowdhury & Sunetr Choudhury	Microprocessor &Peripherals	SCITECH
4	S.K. Sen	Understanding 8085/8086	New Age Int. Publication

COMMUNICATION ENGG-I

Name of the Course: Diploma in Electronics &Telecomm. Engineering			
Course code:	ETT 403	Semester	4th
Total Period:	60(45L+15T)	Examination	3 hrs
Theory periods:	3P/week	Class Test:	20
Tutorial:	1P/week	Teacher's Assessment:	10
Maximum marks:	100	End Semester Examination:	70

A: RATIONALE:

The subject Communication Engg-I deals with different types of Analog& Digital Electronics Communication System includes basic process, Principle & methods of different Analog& Digital Communication System including Transmitters & Receiver. Different modulation techniques have been discussed in this subject.

B: OBJECTIVES;

On completing the topic, the students will able to :

- Know need of modulation and classify modulation.
- Discuss modulation & balanced modulators,& Methods of generating SSB signal & Vestigial side band signal.
- Know the Principle of Frequency Division Multiplexing.
- Know the Principle of AM & FM demodulators & AM& FM Radio transmitter & receiver using block diagram.
- Know the Frequency modulation & expression for frequency-modulated signal.
- Discuss the generation and detection of PAM, PWM & PPM system.
- know quantization of signal & quantization error
- know generation & demodulation of PCM system & T carrier system.
- Know the operation of Time Division Multiplexing
- Know the generation & demodulation of Delta modulation & Adoptive Delta modulation.
- Discuss the generation and detection of binary ASK, FSK,PSK ,QPSK, QAM, MSK.
- Know the operation of Spread Spectrum Modulation Techniques.

C: TOPIC WISE DISTRIBUTION OF PERIODS

SL NO.	TOPIC	PERIODS
1	ELEMENTS OF COMMUNICATION SYSTEMS	05
2	AMPLITUDE MODULATION SYSTEM	10
3	FREQUENCY MODULATION SYSTEMS	10
4	AM & FM RECEIVER	08
5	ANALOG TO DIGITAL CONVERSION & PULSE MODULATION SYSTEM	12
6	DIGITAL MODULATION TECHNIQUES	15
7	TUNED AMPLIFIER	05
8	COMMON APPLICATION OF DIODE, TRANSISTOR & WAVE SHAPING CIRCUIT	08
	TOTAL-	60

D : COURSE CONTENTS:

1. Elements of communication systems.

1.1 Define Elements of Communication System
1.2 Define source of information &Communication Channels.
1.3 What are the Classification of Communication systems?
1.4 Define analog and digital Signals.
1.5 Define transformation Power and Chanel band width.

2. Amplitude Modulation System

2.1 Explain need of modulation and classify modulation.
2.2 State & explain Amplitude modulation derive the expression for amplitude modulation signal, power relation in AM wave& find Modulation Index.
2.3 State and explain AM demodulators (liner diode detector, square law detector & PLL)
2.4 State & explain SSB signal and DSBSC signal
2.5 State methods of generating & detection SSB signal (Indirect method & phasing method.)
2.6State the methods of generation DSB-SC signal (Ring modulator) and detection of DSB-SC signal (Synchronous detection)
2.7 Discuss modulation & balanced modulators
2.8 Discuss the concept of Multiplexing & Explain operation of Frequency Division multiplexing.

3. Frequency Modulation Systems.

3.1 State and explain frequency modulation and basic Principle.
3.2 Derive the expression for frequency-modulated Signal & find Modulation Index and sideband
3.3 Explain the frequency spectrum of FM signal.
3.4 State and explain phase modulation
3.5 Compare between AM and FM modulation
3.6 Discuss the methods of FM generation.(Parameter variation method, Armstrong method.)
3.7 Explain the principle of operation of FM demodulator.(Forster Seely Discriminator)

4. AM & FM RECEIVER

4.1 State and explain the terms Selectivity, Sensitivity, Fidelity and Noise Figure
4.2 Explain R.F amplifier mixer using transistor and I.F amplifier
4.3 State and explain image signal selection of I.F and alignment of receiver
4.4 State the working of FM Receiver with Block Diagram.
4.5 Explain the working of stereo phonics FM receiver.
4.6 State the working of super heterodyne radio receiver with block diagram

5. ANALOG TO DIGITAL CONVERSION & PULSE MODULATION SYSTEM.

5.1State and explain Sampling Theorem &Nyquist rate & Aliasing& classify Sampling,
5.2 Discuss the generation and detection of PAM, PWM & PPM system.
5.3 Explain Quantaization of signal & Quantization error.
5.4 Explain generation & demodulation of PCM system.
5-6 Define Companding in PCM &Vocoder
5.7 Explain the working of T-Carrier system.
5.8 Define Time Division Multiplexing & explain the operation of Time Division Multiplexing.
5.9 Explain the generation & demodulation of Delta modulation.
5.10 Explain the generation & demodulation of Adaptive Delta Modulation.

6. DIGITAL MODULATION TECHNIQUES.

6.1 State & explain Digital Communication.
6.2 State the advantages of digital communication system.
6.3 Classify digital modulation techniques.
6.4 Discuss the Generation and Detection of binary ASK, FSK, PSK, DPSK ,QPSK, QAM, MSK,GMSK.
6.5 Define Spread Spectrum & its applications
6.6 Explain the operation of Spread Spectrum Modulation Techniques (DS-SS & FH-SS).
6.7 Define bit, Baud, symbol & channel capacity formula.(Shannon Theorems)
6.8 List of Application of Different Modulation Schemes.
6.9 What are types of Modem & its Application?

LEARNING RESOURCES:

Text Books

Sl.No	Name of Authors	Title of the Book	Name of the publisher
1	G.Kennedy	Electronic Communication	MGH

2	Sanjay Sharma	Electronics Communication	KATSON
3	A.Singh &A.K.Chabra	Principle of Communication	S Chand
4	V. Chandrasekhar	Communication System	OXFORD Publication

Reference Books

Sl.No	**Name of Authors**	**Title of the Book**	**Name of the publisher**
1	LovisE.frenzel	Principle of Communication	TMG
2	G.K Mithal	Radio Engineering	Khanna Publications
3	R.N.Mutagi	Digital communication	OXFORD
4	Thomasi	Advanced Communication	PHI
5	CH KranthiRekha	Digital Communication	SCITECH

CONTROL SYSTEM ENGINEERING

Name of the Course: Diploma in Electronics &Telecomm. Engineering			
Course code:	ETT 404	Semester	4th
Total Period:	60(45L+15T)	Examination	3 hrs
Theory periods:	3P/week	Class Test:	20
Tutorial:	1P/week	Teacher's Assessment:	10
Maximum marks:	100	End Semester Examination:	70

A: RATIONALE:

Control System is a combination of devices and components connected or related so as to command, direct or regulate itself or another system. This subject has wide range of applications of control of DC motor, Temperature, Pressure, Liquid, Electrical Systems, position, Velocity, Flow, Pressure, acceleration etc.

B: OBJECTIVES;

On completing the topic, the students will able to know

- Know about control problems.
- Study of Feedback Control Systems.
- Analysis of Frequency Response.
- Know about State variables.
- To discuss Optimal control &Nonlinear control.

C: TOPIC WISE DISTRIBUTION OF PERIODS

SL NO.	TOPIC	PERIODS
1	FUNDAMENTAL OF CONTROL SYSTEM	07
2	TRANSFER FUNCTIONS	07
3	CONTROL SYSTEM COMPONENTS & MATHEMATICAL MODELLING OF PHYSICAL SYSTEM	04
4	BLOCK DIAGRAM & SIGNAL FLOW GRAPHS(SFG)	10
5	TIME DOMAIN ANALYSIS OF CONTROL SYSTEMS	07
6	FEEDBACKCHARACTERISTICS OF CONTROL SYSTEMS	08
7	STABILITY CONCEPT, & ROOT LOCUS METHOD	06
8	FREQUENCY-RESPONSE ANALYSIS&BODE PLOT	08
9	STATE VARIABLE ANALYSIS	03
	TOTAL-	60

D : COURSE CONTENTS&DISTRIBUTION OF PERIODS:

1: Fundamental of Control System

1.1 Classification of Control system
1.2 Open loop system & Closed loop system and its comparison
1.3 Effects of Feed back
1.4 Standard test Signals(Step, Ramp, Parabolic, Impulse Functions)
1.5 Servomechanism
1.6 Regulators

2. Transfer Functions

2.1Transfer Function & Impulse response,
2.2Properties,Advantages & Disadvantages of Transfer Function
2.3Poles & Zeroes of transfer Function
2.4 Simple problems of transfer function of network

3.Control system Components & mathematical modelling of physical System

3.1 Components of Control System
3.2 Potentiometer, Synchronous, Dc motors, Ac Servomotors
3.3 Modelling of Electrical Systems(R, L, C, Analogous systems)

4.**Block Diagram & Signal Flow Graphs(SFG)**

4.1 Defamation of Basic Elements of Block Diagram
4.2 Canonical Form of Closed loop Systems
4.3 Rules for Block diagram reduction
4.4 Procedure for of Reduction of Block Diagram
4.4 Simple Problem for equivalent transfer function
4.5 Basic Definition in SFG & properties
4.6 Mason's Gain formula
4.7 Simple problems in Signal flow graph for network

5. Time Domain Analysis of Control Systems

5.1 Definition of Time, Stability, steady-state response, accuracy, transient accuracy, In-sensitivity and robustness.
5.2 System Time Response
5.3 Analysis of Steady State Error
5.4 Types of Input & Steady state Error(step ,Ramp, Parabolic)
5.5 Parameters of first order system & second-order systems
5.6 Derivation of time response Specification (Delay time, Rise time, Peak time, Setting time,Peak over shoot)

6.**FeedbackCharacteristics of Control Systems**

6.1 Effect of parameter variation in Open loop System & Closed loop Systems
6.2 Introduction to Basic control Action& Basic modes of feedback control: proportional, integral and derivative
6.3 Effect of feedback on overall gain, Stability
6,4 Realisation of Controller with OPAMP

7.Stability concept, **& Root locus Method**

7.1 Effect of location of poles on stability
7.2 RouthHurwitz stability criterion.
7.3 Steps for Root locus method
7.4 Root locus method of design(Simple problem)

8. **Frequency-response analysis**&**Bode Plot**

8.1 Frequencyresponse,Relationship between time & frequency response
8.2 Methods of Frequency response
8.3 Polar plots & steps for polar plot
8.4 Bodes plot & steps for Bode plots
8.5 Stability in frequency domain, Gain Margin& Phase margin
8.6 Nyquist plots. Nyquiststabilitycriterion.
8.7 Simple problems as above

9: State variable Analysis-

9.1 Concepts of state, state variable, state model,
9.2 state modelsfor linear continuous time functions,

LEARNING RESOURCES::

Text Books

Sl.No	Name of Authors	Title of the Book	Name of the publisher
1	Samarajit Ghosh	Conrtol Systems	Pearson pub
2	Gopal. M	Control Systems: Principles and Design	Tata McGraw-Hill
3	Kuo, B.C	Automatic Control System	Prentice Hall
4	Ogata, K	Modern Control Engineering	Prentice Hall

Reference Books

Sl.No	Name of Authors	Title of the Book	Name of the publisher
1	Nagrath&Gopal	Modern Control Engineering	New Age International, New Delhi
2	P rameshBabu& R. Anandanatarajan	Control System Engg	SCITECH
3	S.K.Bhattacharaya	Control System Engg	Pearson
4	S.HasanSaeed	Automatic Control System	Katson

ELECTRICAL MACHINE LAB

Name of the Course: Diploma in Electronics & Telecomm. Engineering

Course code:	EEP 421	Semester	4th
Total Period:	45	Examination	4 hrs
Lab. periods:	3 P / week	Term Work	25
Maximum marks:	50	End Semester Examination:	25

A: RATIONALE:

This Lab gives understanding of different Electrical Machine i.e. DC Generator, DC Motor, Transformer, etc. The students will able to identify different parts and connections and test the equipment. Different types of Motors are discussed.

B: OBJECTIVS:

On completing of this Lab. Course the students will able to

- Run the DC Generator & DC Motor.
- Connection of above Machine.
- Find the losses of Transformer

C: COURSE CONTENT OF SPECIFIC OBJECTIVE:

1. Study different parts of DC Generator.
2. Run a DC shunt Generator
3. Connect and run DC Motor (series, shunt and compound motor with suitable stators connections & measure speed.).
4. Study 3 point & 4 point starter.
5. Study speed Control of DC shunt motor(field and armature control method)
6. Parallel operation of DC generators.
7. Connect & run a 3- I.M. with the help of DOL & star-delta stator.
8. Determine voltage regulation of transformer by direct loading.
9. Identify the terminals of a transformer perform short circuit & open circuit test & find the losses & efficiency.
10. Parallel operation of Transformers(only single Phase)
11. Construct switch board using cut-out, switches, plugs, holder and two ways Switch.

ANALOG ELECTRONICS-II LAB

Name of the Course: Diploma in Electronics & Telecomm. Engineering

Course code:	ETP 401	Semester	4th
Total Period:	60	Examination	4 hrs
Lab. periods:	4 P / week	Term Work	25
Maximum marks:	50	End Semester Examination:	25

A: RATIONALE:

This Lab. Based on the application of Operational Amplifier, IC Voltage Regulated & PCB Design. The students will use software & Circuit maker software at the end of the section is an introductory experimental laboratory that explores the design, construction, and debugging of analog electronic circuits. This subject covers diodes, transistors, JFETs, op-amps, and basic analog circuit design as applied to audio and radio frequency circuits. Students spend for some periods term designing their own projects. Projects vary in scope and breadth, depending on students' level of prior background and interest. Students will learn to understand and use a wide variety of analog circuits.

B: OBJECTIVS:

After Completing the Lab. The student will able to know

- The Characteristics of operational Amplifier.
- Construction of Timer Circuit.
- Construction of Power Supply IC based.
- Idea of PCB Design.

C: LIST OF PRACTICALS:

1. Construct and test voltage power supply using 78xx &79xx ICs (+5V, -5V,+9V,-9V)
2. Construct and test voltage power supply using LM723.
3. Study of Operational Amplifier 741 & draw its pin diagram
4. Determine the following characteristics of an OP-Amp.
   i) Input off-set voltage. ii) Slew rate iii) CMMR iv) Bandwidth v) Input bias current.
5. Construct and study inverting and non-inverting amplifier using OPAMP.
6. Construct and study integrator and differentiator using OPAMP.
7. Construct and study voltage comparator, V to F and F to V using OPAMP.
8. Construct and study performance of Instrumentation Amplifier.
9. Construct and study timer using IC 555 (Astable &Monostable)
10. Construct and study IC 565 PLL and find range & capture range.
11. PCB Design (Visit to Industry/ Local Industry)
12. (Do Sl 5 to 10 using p-spice / or -**WiringX** SOFTWARE, With this software you can create simple wiring layouts with the most common discreet electronic components or **TINA Design Suite-** A very nice and friendly circuit design and simulation program with 10,000+ built in components. Available in many languages)
13. Mini project: After PCB design place the component and test the Electronics Circuit and prepare a report at the end of session. At the end of Semester the Drafting, Simulation & design of PCB can be carried out using the following suitable software.
    a) DC Regulator Power Supply 2A, 0-30V.
    b) Clock Display (Hr.Min.Sec.) Format.
    c) Frequency Counter
    d) Counter & Display upto 999

Required Software:

1. B2-Spice + Eagle : Simulation & PCB design software.
2. Supper CAD.
3. Electronics work bench: Simulation.
4. CADSTAR/TINA : PCB Design.
5. P Spice/TIND : Simulation
6. Edwin : Simulation + PCB design.
7. ORCAD
8. Circuit Maker & etc.

MICROPROCESSOR & ITS INTERFACING Lab

Name of the Course: Diploma in Electronics & Telecomm. Engineering

Course code:	ETP 402	Semester	4th
Total Period:	60	Examination	4 hrs
Lab. periods:	4 P / week	Term Work	25
Maximum marks:	50	End Semester Examination:	25

A: RATIONALE:

The Microprocessor control has taken predominance over other types of control quite some time past. Starting from Electrical Power plant to consumer electronics this tiny chip finds extensive uses. As such Microprocessors have made pervading influence on our lives. This field is developing so rapid that it is difficult to keep track with the changes. Under this subjects Architecture and instruction sets of 8 bit and 16 bit processor have been discussed. Some applications have been included through the interfacing chips.

B: OBJECTIVE:

After Completing the Lab. Course the students will able to know

- The concept of Microprocessor 8085 (8Bit)
- Concept of 16 Bit Processor 8086
- Programming & Interfacing Concept
- Develop software for microcontroller systems using a high-level programming language
- Demonstrate familiarity with common microcontroller subsystems, such as timer modules
- Demonstrate an ability to use both polling and interrupt-driven approaches for interfacing a microcontroller with peripheral devices
- Develop and analyze software to interface a microcontroller with common peripheral devices, such as switches, visual displays, digital-to-analog converters, analog-to-digital converters, and flash memory to produce a system to accomplish a specified task
- Design interfaces to external devices connected to the microcontroller using a standard bus

C: LIST OF PRACTICALS:

1. Study microprocessor trainer kit & Draw the pin & internal Architecture structure of 8085
2. Write the Instruction of 8085 microprocessor
3. Write a program for 8-bit addition & subtraction.
4. Write a program for multi byte addition, subtraction, multiplication & division of two 8-bit numbers.
5. Write a program to find the maximum value in an array(2 bit, n bit)
6. Write a program for arranging the given data in ascending & descending order.
7. Write a program for BCD to Hex & ASCII to Binary & Vice Versa conversion.
8. Write a program for generating Delay subroutine using one resister, Two register & three register.
9. Write a program for Up counter & Down counter with one second delay.
10. Write a program for interfacing of Glowing of light (Moving) using 8255.
11. Write a program for Display your name (4bit using 8279)
12. Write a program for Traffic light controller
13. Write a program for Steeper Motor Controller & DC Motor Control
14. Write a program for 8-Bit ADC & DAC
15. Write the simple program using 8086 Microprocessor
    i. Addition,
    ii. Subtraction,
    iii. Division,
    iv. Multiplication,
    v. String Manipulation

COMMUNICATION ENGG-I LAB.

Name of the Course: Diploma in Electronics & Telecomm. Engineering

Course code:	ETP 403	Semester	4th
Total Period:	60	Examination	4 hrs
Lab. periods:	4 P / week	Term Work	25
Maximum marks:	50	End Semester Examination:	25

A: RATIONALE:

This Laboratory Is the based on Communication System based on Analog& Digital Communication The students will able to test and observe various communication equipment including Transmitter & Receiver.

B: OBJECTIVE:

After Completing the Lab. Course the students will able to know

- Concept of AM transmitter & Receiver.
- Concept of FM Transmitter & Receiver.
- Concept of Digital (PCM/ASK/FSK/PSK)
- Know super heterodyne Radio Receiver

C: COURSE CONTENTS IN TERM OF SPECIFIC OBJECTIVES:

1. Study of AM transmitter & Detector and observe the waveform at different test point &. Determine percentage of Modulation Index of AM.
2. Study of FM transmitter & Detector & observe the waveform at different section.
3. Study of SSB signal & observe the waveform at different section.
4. Study of sampling theorem & observe the waveform at different section.
5. Study of PCM transmitter & receiver & observe the waveform at Different section.
6. Study of ASK modulator & demodulator & observe the waveform at different section.
7. Study of FSK modulator & demodulator & observe the waveform at different section.
8. Study of PSK modulator & demodulator & observe the waveform at different section.
9. Study of Delta modulator & demodulator& observe the waveform at different section.
10. Study of Super heterodyne radio receiver &observe the waveform at different section
11. Study the principle of Stereophonic System
12. Construct Linear Diode Detector & observe the wave forms.
13. Mini project: The students will collect the detail specification and Catalogue of all equipment used and submit at end of session. Perform a transmitter & receiver using array modulation system.

BASIC SIMULATION LABORATORY USING MATLAB

Name of the Course: Diploma in Electronics & Telecomm. Engineering

Course code:	ETP 404	Semester	4th
Total Period:	45	Examination	4 hrs
Lab. periods:	3	Term Work	25
Maximum marks:	50	End Semester Examination:	25

A: RATIONALE:

Simulation Lab. Experiments may be carried out using MATLAB in the Electronics practicals. Various communication signals can be analysed using this software.

B: OBJECTIVE:

After Completing the Lab. Course the students will able to know

•Introduction to MATLABS & its various instructions.(Simulation Lab. Experiments may be carried out using MATLAB)

- Creating a One-Dimensional Array (Row / Column Vector)
  Creating a Two-Dimensional Array (Matrix of given size) and Performing Arithmetic Operations - Addition, Subtraction, Multiplication and Exponentiation.
- Performing Matrix Manipulations - Concatenating, Indexing, Sorting, Shifting, Reshaping, Resizing and Flipping about a different Axis
- Generating a set of Commands on a given Vector
- Evaluating a given expression and rounding it to the nearest integer value using Round, Floor, Ceil and Fix functions; Also, generating and Plots of Trigonometric Functions - sin(t), cos(t), tan(t), sec(t), cosec(t) and cot(t)
- Creating a vector X with elements,
- Generating a Sinusoidal Signal of a given frequency
- Creating A Structure, An Array of Structures and Writing Commands to Access Elements ;
- Generating normal and integer random numbers (1-D & 2-D)

C:LIST OF PRACTICALS:

Introduction to MATLABS & its various instructions.(Simulation Lab. Experiments may be carried out using MATLAB)

List of Practical

1: Creating a One-Dimensional Array (Row / Column Vector) Exercise – Creating a vector of even whole numbers between 31 and 75; Creating a Two-Dimensional Array (Matrix of given size) and (A). Performing Arithmetic Operations - Addition, Subtraction, Multiplication and Exponentiation. (B). Obtaining Modified Matrix - Inverse, Transpose, with Appended and Deleted Elements;

2: Performing Matrix Manipulations - Concatenating, Indexing, Sorting, Shifting, Reshaping, Resizing and Flipping about a Vertical Axis / Horizontal Axis; Creating Arrays X & Y of given size (1 x N) and Performing (A). Relational Operations->, <, ==, <=, >=, ~= (B). Logical Operations-~, &, |, XOR

3: Generating a set of Commands on a given Vector (Example: X = [1 8 3 9 0 1]) to

(A). Add up the values of the elements (Check with sum)

(B). Compute the Running Sum (Check with sum), where Running Sum for element j = the sum of the elements from 1 to j, inclusive.

(C). Compute the Sine of the given X-values (should be a vector). Also, Generating a Random Sequence using rand() / randn() functions and plotting them.

4: Evaluating a given expression and rounding it to the nearest integer value using Round, Floor, Ceil and Fix functions; Also, generating and Plots of

(A) Trigonometric Functions - sin(t), cos(t), tan(t), sec(t), cosec(t) and cot(t) for a given duration „t".

(B). Logarithmic and other Functions – log(A), log10(A), Square root of A, Real nth root of A.

5: Creating a vector X with elements, Xn = (-1)n+1/(2n-1) and Adding up 100elements of the vector, X; And, plotting the functions, x, x3, ex and exp(x2) over the interval $0 < x < 4$ (by choosing appropriate mesh values for x to obtain smooth curves), on

(A). A Rectangular Plot
(B). A Semi log Plot
(C). A log-log Plot

6: Generating a Sinusoidal Signal of a given frequency (say, 100Hz) and Plotting with Graphical Enhancements - Titling, Labelling, Adding Text, Adding Legends, Adding New Plots to Existing Plot, Printing Text in Greek Letters, Plotting as Multiple and Sub- Plots; Also, Making Non-Choppy and Smooth Plot of the functions,

$f(x) = \sin(1/x)$ for $0.01 < x < 0.1$ and $g(x) = (\sin x) / x$.

7: Creating A Structure, An Array of Structures and Writing Commands to Access Elements of the created Structure and Array of Structures; Also, Solving First Order Ordinary Differential Equation using Built-in Functions; And, Creating an M x N Array of Random Numbers using rand and setting any value that is < 0.2 to „0" and any value that is ≥ 0.2 to „1" by moving through the Array, Element by Element;

8: Generating normal and integer random numbers (1-D & 2-D) and plotting them;Also, Writing a Script (which keeps running until no number is provided to convert) that asks for Temperature in degrees Fahrenheit and Computes the Equivalent Temperature in degrees Celsius.

9: Writing brief Scripts starting each Script with a request for input (using input) to Evaluate the function h(T) using if-else statement, where
h(T) =(T – 10)for0 < T < 100=(0.45 T + 900)for T> 100.
Exercise : Testing the Scripts written using A). T = 5, h = -5 and B). T = 110, h = 949.5
Also, Creating a Graphical User Interface (GUI); And, Curve Fitting using (A) Straight line Fit (B). Least Squares Fit

10: Interpolation based on following Schemes (A). Linear (B). Cubic (C). Spline Also, Generating the first Ten Fibonacci numbers according to the relation Fn = Fn-1 + Fn-2 with F0 = F1 = 1, and Computing the ratio Fn / Fn-1 for the first 50 Fibonacci numbers.

11.Verifying that the computed ratio approaches the value of the golden mean (1 + sqrt(5)) / 2]; Also Generating Equivalent Square Wave from a Sine Wave of given Amplitude and Frequency; And,. Obtaining the Covariance & Correlation Coefficient Matrices for a given Data Matrix.

12: Program for Representation of Basic Signals (Unit impulse, Unit step, Ramp, Expontational, Sine, Cosine Matrics, Graphics, Tool Boxes & Simulation & Animation
13: Program for Sampling Theorem, Amplitude Modulation & frequency modulation
14: Program for Filters(Low pass, High Pass, Band Pass, Band stop& Butter worth)
15: Program for some experiments on Control system Study

Reference Books

Sl.No	Name of Authors	Title of the Book	Name of the publisher
1	RudraPratap	Getting Started with MATLAB - A Quick introduction for Scientists & Engineers	Oxford Univ. Press
2	Amos Gilat	MATLAB An Introduction with Applications	Wiley Student Edition
3	Stephen J. Chapman	MATLAB Programming for Engineers	Thomson Learning
4	William Palm III	Introduction to MATLAB 7 for Engineers	McGraw-Hill
5	Raj Kumar Bansal, Ashok Kumar Goel, Manoj Sharma	MATLAB and its Applications in Engineering	Pearson Education