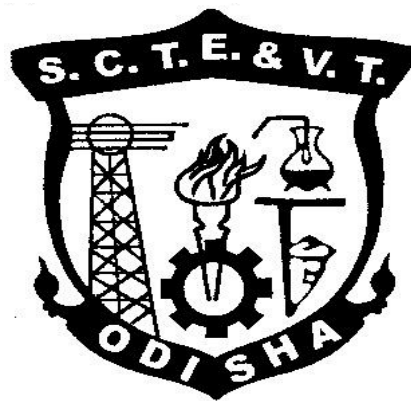# STATE COUNCIL FOR TECHNICAL EDUCATION AND VOCATIONAL TRAINING, ODISHA

TEACHING AND EVALUATION SCHEME FOR 4th Semester (Applied Electronics & Instrumentation) (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		ELECTRICAL MACHINE *	4	-	-	20	80	03	100
Th.2		Data Communication and Computer Network *	4	-	-	20	80	03	100
Th.3		MICROPROCESSOR & MICROCONTROLLER*	5	-	-	20	80	03	100
Th.4		Industrial Mesurement Instrumentation-1	5	-	-	20	80	03	100
		Total	*18*	-	-	*80*	*320*	-	*400*
		Practical							
Pr.1		ELECTRICAL MACHINE LAB	-	-	4	25	50	03	75
Pr.2		Networking Lab	-	-	4	25	50	03	75
Pr.3		MICROPROCESSOR & MICROCONTROLLER LAB	-	-	4	25	25	03	50
Pr.4		Industrial measurement and instrumentation- Lab-1	-	-	4	50	50	03	100
Pr.5		Technical Seminar	-	-	2	50	-	-	50
		Student Centred Activities(SCA)	-	-	3	-	-	-	-
		Total	-	-	*21*	*175*	*175*	-	*350*
		Grand Total	**18**	**-**	**21**	**255**	**495**	**-**	**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/SWAYAMetc. , 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 4th SEMESTER

For

DIPLOMA IN Applied Electronics & Instrumentation ENGINEERING

(Effective FROM 2019-20 Sessions)

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

Th.1 **ELECTRICAL MACHINE**

(Common to **ETC , AEIE,EEE, E&M**)

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.	ELECTRICAL MATERIAL	03
2.	DC GENERATOR	07
3.	DC MOTOR	10
4.	AC CIRCUITS	08
5.	TRANSFORMER	10
6.	INDUCTION MOTOR	07
7.	SINGLE PHASE INDUCTION MOTOR	06
	TOTAL	60

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.

Objective:

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

1. Understand property & use of Electrical conducting & insulating materials.
2. Explain working principle & construction of DC generator.

3. Explain construction & working principle of motor & speed control of DC motor.
4. Discuss AC fundamentals.
5. Explain Construction & principle of transformer.
6. Describe principle of working of three-phase Induction motor.
7. Describe principle of single-phase motor.

Detailed Contents:

Unit-1. ELECTRICAL MATERIAL

    1.1   Properties & uses of different conducting material.
    1.2   Properties & use of various insulating materials used electrical engineering.
    1.3   Various magnetic materials & their uses.

Unit-2. DC GENERATOR

    2.1   Construction, Principle & application of DC Generator.
    2.2   Classify DC generator including voltage equation.
    2.3   Derive EMF equation & simple problems.
    2.4   Parallel operation of DC generators.

Unit-3. DC MOTOR

    3.1   Principle of working of a DC motor.
    3.2   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 Three point & four point stator/static of DC motor by solid State converter.
3.6 Speed of DC motor by field control and armature control method.
3.7 Power stages of DC motor & derive Efficiency of a DC motor.

Unit-4. AC CIRCUITS

4.1 Mathematical representation of phasors, significant of operator "J"
4.2 Addition, Subtraction, Multiplication and Division of phasor quantities.
4.3 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.

Unit-5. TRANSFORMER

5.1 Ideal transformer.
5.2 Construction & working principle of transformer
5.3 Derive of EMF equation of transformer, voltage transformation ratio.
5.4 Discuss Flux, Current, EMF components of transformer and their phasor diagram under no load Condition.
5.5 Phasor representation of transformer flux, current EMF primary and secondary Voltages under loadedcondition.
5.6 Types of losses in Single Phase (1-∅) Transformer.
5.7 Open circuit & short-circuit test (simple problems)
5.8 Parallel operation of Transformer.
5.9 Auto Transformer

Unit-6. INDUCTION MOTOR

6.1 Construction feature, types of three-phase induction motor.
6.2 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.

Unit-7. SINGLE PHASE INDUCTION MOTOR

7.1 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.

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

Chapter 1,2,3,4

Books Recommended

1. Fundamental of Electrical Engg by B.L.Theraja,- S Chand
2. Electrical MachinesBy Dr.S.K.Bhattachary, TMH
3. Electrical TechnologyBy H.Cotton, Pitman
4. Principle of Electrical MachineBy V K Mehta & R Mehtam, S Chand
5. General Electrical energy by Dr. B.R. Gupta, S Chand
6. Electrical Machinery Fundamental by Stephen J. Chapman, MGH

TH-2 DATA COMMUNICATION & COMPUTER NETWORK

(Common to CSE/IT/ETC/AEI)

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	NETWORK& PROTOCOL	08
2	DATA TRANSMISSION & MEDIA	08
3	DATA ENCODING	08
4	DATA COMMUNICATION & DATA LINK CONTROL	08
5	SWITCHING & ROUTING	10
6	LAN TECHNOLOGY	10
7	TCP/IP	08
	TOTAL	**60**

RATIONALE:

Now a days the growth of data communication technology has become very fast in development of various application areas. This subject will expose the learner to have an idea about the architecture computer network and different protocols to be followed to communicate. Further they will have an idea about different mode of communication.

Objective:

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

1. Know the concepts of Data Communication, networking, protocols, and networking models
2. Know the various transmission Medias
3. Understand the concepts of switching
4. Understand various Error detection and correction methods
5. Know about data flow and error control
6. Know about data link control
7. Understand multiple access
8. Learn the concepts of wired LANs and Ethernet
9. Compare various connecting devices
10. Know the concepts of network layer, logical addressing, IP, Forwarding and routing
11. Understand brief concept on TCP/IP

Detailed Contents:
Unit-1. Network& Protocol

1.1 Data Communication

1.2 Networks

1.3 Protocol & Architecture, Standards, OSI, TCP/IP

Unit-2. Data Transmission & Media

2.1 Data transmission Concepts and Terminology

2.2 Analog and Digital Data transmission

2.3 Transmission impairments, Channel capacity

2.4 Transmission media, Guided Transmission, Wireless Transmission

Unit-3. Data Encoding

3.1 Data encoding,

3.2 Digital data digital signals,

3.3 Digital data analog signals

3.4 Analog data digital signals

3.5 Analog data analog signals

Unit-4. Data Communication & Data link control

4.1 Asynchronous and Synchronous Transmission

4.1 Error Detection

4.3 Line configuration

4.4 Flow Control,

4.5 Error Control

4.6 Multiplexing

4.7 FDM synchronous TDM

4.8 Statistical TDM

Unit-5. Switching & Routing

5.1 Circuit Switching networks

5.2 Packet Switching principles

5.3 X.25

5.4 Routing in Packet switching

5.5 Congestion

5.6 Effects of congestion, congestion control

5.7 Traffic Management

5.8 Congestion Control in Packet Switching Network.

Unit-6. LAN Technology

6.1. Topology and Transmission Media

6.2 LAN protocol architecture

6.3. Medium Access control

6.4 Bridges, Hub, Switch

6.5 Ethernet (CSMA/CD), Fiber Channel

6.6 Wireless LAN Technology..

Unit-7. TCP/IP

7.1 TCP/IP Protocol Suite

7.2 Basic Protocol functions

7.3 Principles of Internetworking

7.3 Internet Protocol operations

7.4 Internet Protocol

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

Chapter 1,2,3,4

Books Recommended:

Sl.No	Name of Authors	Title of the Book	Name of the publisher
01	W.Stallings	Data Communication &Computer Networks	PHI
02	M.Bhatia	Introduction to Comp. Network	Unv. S. Press
03	Forouzen	Data Communication & Network	TMH

Th.3 MICROPROCESSOR & MICROCONTROLLER

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

Theory	: 5 Periods per week	I.A.	:20 Marks
Total Periods	: 75 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.	Microprocessor(Architecture and Programming-8085(8-bit))	15
2.	Instruction Set and Assembly Language Programming(8 bit)	15
3.	TIMING DIAGRAMS	08
4.	Microprocessor Based System Development Aids	10
5.	Microprocessor (Architecture and Programming-8086-16 bit)	12
6.	Microcontroller (Architecture and Programming-8 bit)	15
	TOTAL	75

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. Microcontroller (MC) may be called computer on the chip since it has basic features of a microprocessor with internal ROM, RAM, Parallel and serial ports within a single chip. Or we can say microprocessor with memory and ports is called as a microcontroller.Microcontroller is a programmable digital processor with necessary peripherals. Both microcontrollers and microprocessors are complex sequential digital circuits meant to carry out job according to the program / instructions. Sometimes analog input/output interface makes a part of microcontroller circuit of mixed mode(both analog and digital nature).

Objective:

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

1. Know differential between 8085 microprocessor &types of Bus.
2. Describe the Architecture & pin diagram of 8085 microprocessor.
3. Comprehend different instructions of 8085 microprocessor &addressing modes.
4. Write instructions under different addressing modes.
5. Discuss assembler & basic assembler directives.
6. Describe types of assembly language programs and write programs.
7. Explain the timing diagrams of different instructions.
8. State the functions of the interfacing chips like 8255, etc.
9. Explain the delay subroutine &calculate the delay by using one, two or three registers.
10. Explain ADC & DAC?&use of ADC & DAC modules
11. Write a program for traffic light control &stepper motor control.
12. Know about 16-bit microprocessor.

Detailed Contents:

Unit-1:Microprocessor (Architecture and Programming-8085-8-bit)

1.1 Introduction to Microprocessor and Microcomputer & distinguish between them.
1.2 Concept of Address bus, Data bus, Control bus & System Bus
1.3 General Bus structure Block diagram.
1.4 Basic Architecture of 8085 (8 bit) Microprocessor

1.5   Signal Description (Pin diagram) of 8085 Microprocessor
1.6   Register Organizations,Distinguish between SPR & GPR, Timing & Control Module,
1.7   Stack, Stack pointer &Stack top.
1.8   Interrupts:-8085 Interrupts, Masking of Interrupt(SIM,RIM)

Unit-2: Instruction Set and Assembly Language Programming
2.1   Addressing data & Differentiate between one-byte, two-byte &three-byte instructions with examples.
2.2   Addressing modes in instructions with suitable examples.
2.3   Instruction Set of 8085(Data Transfer, Arithmetic, Logical, Branching, Stack& I/O , Machine Control)
2.4   Simple Assembly Language Programming of 8085
        2.4.1   Simple Addition & Subtraction
        2.4.2   Logic Operations (AND, OR, Complement 1's & 2's) & Masking of bits
        2.4.3   Counters & Time delay (Single Register, Register Pair, More than Two Register)
        2.4.4   Looping, Counting & Indexing (Call/JMP etc).
        2.4.5   Stack & Subroutine programes.
        2.4.6   Code conversion, BCD Arithmetic & 16 Bit data Operation, Block Transfer.
        2.4.7   Compare between two numbers
        2.4.8   Array Handling (Largest number & smallest number in the array)
2.5 Memory & I/O Addressing,

Unit-3: TIMING DIAGRAMS.
3.1   Define opcode, operand, T-State, Fetch cycle, Machine Cycle, Instruction cycle & discuss the concept of timing diagram.
3.2   Draw timing diagram for memory read, memory write, I/O read, I/O write machine cycle.
3.3   Draw a neat sketch for the timing diagram for 8085 instruction (MOV, MVI, LDA instruction).

Unit-4 Microprocessor Based System Development Aids
4.1   Concept of interfacing
4.2   Define Mapping &Data transfer mechanisms - Memory mapping & I/O Mapping
4.3   Concept of Memory Interfacing:- Interfacing EPROM & RAM Memories
4.4   Concept of Address decoding for I/O devices
4.5   Programmable Peripheral Interface: 8255
4.6   ADC & DAC with Interfacing.
4.7   Interfacing Seven Segment Displays
4.8   Generate square waves on all lines of 8255
4.9   Design Interface a traffic light control system using 8255.
4.10   Design interface for stepper motor control using 8255.
4.11   Basic concept of other Interfacing DMA controller,USART

Unit-5 Microprocessor (Architecture and Programming-8086-16 bit)
5.1   Register Organisation of 8086
5.2   Internal architecture of 8086
5.3   Signal Descriptionof 8086
5.4   General Bus Operation& Physical Memory Organisation
5.5   MinimumMode&Timings,
5.6   Maximum Mode&Timings,
5.7   Interrupts and Interrupt Service Routines, Interrupt Cycle, Non-Maskable Interrupt, Maskable Interrupt
5.8   8086 Instruction Sets & Programming: Addressing Modes, Instruction Set, Assembler Directives andOperators,
5.9   Simple Assembly language programmingusing 8086 instructions.

Unit-6 Microcontroller (Architecture and Programming-8 bit):-
6.1   Distinguish between Microprocessor & Microcontroller
6.2   8 bit & 16 bit microcontroller
6.3   CISC & RISC processor
6.4   Architectureof8051Microcontroller
6.5   Signal Descriptionof8051Microcontrollers
6.6   Memory Organisation-RAM structure, SFR
6.7   Registers,timers,interruptsof8051Microcontrollers
6.8   Addressing Modes of 8051
6.9   Simple 8051 Assembly Language ProgrammingArithmetic & Logic Instructions , JUMP, LOOP, CALL Instructions, I/O Port Programming

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

Books Recommended

1. *Microprocessor architecture, programming & application with 8085 by R.S. Gaonkar, PenramInternational Publishing. (India) Pvt. Ltd.*
2. *The 8051 Microcontroller & Embedded Systems by Mazidi&Mazidi, - Pearson publication*
3. *Advanced Microprocessor and Peripherals (Architecture, Programming & Interfacing) by A.K. Roy & K.M. Bhurchandi, - TMH Publication*
4. *Microprocessor & Microcontroller by N.SenthliKumar,M.Sarvanan,S.Jeevananthan,S K Shah- OXFORD*
5. *Microprocessor & Microcontroller by R.S. Kaler, IKI Publishing*
6. *Microprocessor & its application by   B.Ram,Dhanpat rai*
7. *Microcontroller, Theory and application by   Ajaya V. Deshmukh. TMH*

Th.4. INDUSTRIAL MEASUREMENT & INSTRUMENTATION -1

Course code		Semester	4th
Total period:	75	Examination	3 hours
Theory periods	5 P/week	IA	20
Total marks :	100	End semester examination	80

Chapter wise Distribution of periods with Total periods

SL NO.	TOPIC	PERIODS
1.	Measurement of temperature	15
2.	Measurement of pressure	15
3.	Measurement of flow & level	15
4.	Measurement of force, torque & shaft power	12
5.	Telemetry & Various Converters	10
6.	Aquastic measurement	08
	TOTAL	75

Rationale:

Industrial Measurement & Instrumentation will give details knowledge to the students about measurement of physical industrial process parameter such as pressure, temperature, level, flow, force, torque & shaft power measurement in terms of electrical parameter. This study will be useful to supervise the instrumentation work in the industry.

Objective:

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

1. To know about the skill about different physical parameter in terms of electrical quantity.
2. To identify various types of sensors & transducer for sensing & converting physical parameter so that if can process easily.
3. To know about conversion technique of different physical parameter into current & voltage.

Detailed Contents:
Unit-1 MEASUREMENT OF TEMPERATURE:

1.1 Classify methods of temperature measurements
1.2 Explain measurement of temperature by non-electrical methods.
  A. Liquid expansion type
  B. Solid expansion type.
  C. Gas &vapour expansion type.
1.3 Explain measurement of temperature by electrical methods of measurement.
  A. Resistance thermometer
    i. State advantage of resistance thermometers areother types.
    ii. Describe the method of measurement of change in resistance by null balance bridge method.
    iii. Compensation of lead resistance by 3-wire &4-wire method.
  B. Thermocouples.

       i.   Explain principle of thermoelectricity (Seeback, Pettier, Thompson effects).

       ii.   Classify thermocouples materials.

       iii.   Describe the function of thermocouple extension wires.

       iv.   Describe the methods of measurement of output of thermocouples state the types of thermocouples insulation materials & their function.

       v.   State the advantages &disadvantages of thermocouples types thermometer.

       vi.   Explain the cold junction compensation of thermocouple.

C. Thermistors.

       i.   Explain the basic principle & characteristics of thermistors.

       ii.   State the method of temperature measurement by thermistors & their uses.

D. Pyrometers.

       i.   Explain the principle & operation of radiation & optical pyrometer with suitable diagram & sketch.

E. Describe the function & use of temperature switch.

Unit -2. Measurement of pressure

2.1   Classify methods of pressure measurement.

2.2   Explain theworking principle& use of mechanical methods of measurements of pressure by:

       i.   manometers (U-tube, Well Type, Inclined type)

       ii.   Elastic type pressure gauge (Bourdon tube, Diaphragm, Bellows)

       iii.   Bell gauge

2.3   Explain the working principles& use of electrical methods of measurement of pressure by :
       i. Strain gauge pressure transducer
       ii. Capacitive pressure transducer
       iii. Reluctance pressure transducer
       iv. Piezoelectric pressure transducer

2.4   Describe the operation and Explain the working principle of vacuum gauge
       i. Thermal conductivity Gauge
       ii. Mcleod gauge
       iii. Hot filament ionization vacuum gauge

2.5   Explain the working principle of mechanical & pneumatic pressure transmitter, Pressure Switch (two wire   and four wire type of transmitter) and State their uses.

Unit -3. Measurement of flow and Level-:

3.1   Classify flow meters and explain the principle of operation with diagram.

3.2   Variable head type flow meter:

     Explain the principle of operation, advantages & disadvantages of

     i. Orifice plate, ii. Venturi tube, iii. Nozzles, iv. Dall tube, v. Elbow Taps

3.3   Explain variable area flow meter (Rota meter), Cylinder & Piston type &their uses.

3.4   Explain Non-hydraulic meter and State their industrial uses.
       i. Magnetic flow meter
       ii. Ultrasonic flow meter

3.5   Describe the construction and explain working principle of thermal flow meter.

3.6   Describe the construction and explain principle of Quantity flow meter

i. Positive displacement type

ii. Reciprocating piston type

3.7 Level Measurement

i. Classify level indication

ii. Explain the working of sight glass, float type of indicator and displacement level detector.

iii. Explain the construction and use of inductive, resistive level gauge.

iv. Explain the working of capacitive level detector and radiation level detector.

v. State and explain the function of different types of level switchs.

Unit -4 Measurement of Force, Torque & Shaft power-:

4.1 Define force, torque and shaft power.

4.2 Explain basic method of measurement of force.

4.3 State &Explain equal and non-equal arm balance.

4.4 Explain multiple level systems of force measurement.

4.5 Explain Hydraulic and Pneumatic load cell .

4.6 Explain methods of measurement of torque using strain sensor and magentostrictivetorque-

transducer.

4.7 Explain measurement of shaft power using rope break and prony brake.

Unit -5 Telemetry & Various Converters -:

5.1 Define telemetry.

5.2 General telemetry system.

5.3 Types of telemetry system.

5.4 Problems in telemetry system..

5.5 Pressure to current converter.

5.6 Pressure to voltage converter.

Unit -6 Aquastic measurement -:

6.1 define aquastic pressure.

6.2 Explain characteristic of sound pressure level & power level.

6.3 explain the function of typical sound system such as microphone.

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

Books Recommended

1. Industrial Instrumentation –Author---S. K. Singh–Publisher- McGraw Hill Eaducation.
2. Electrical Instrumentation & process control – *Author- Dr. J. P. Navari, E.R. SonalSapre*- Publisher –S. Chand.
3. Mechanical Measurement & control   - Author – R. K. Khedkar
4. Mechanical Measurement and measuring instrument –Author- R. K. Jain.
5. Electrical Electronics & Instrumentation Measurement- Author –A. K. Sahani-Publisher-DhanpatRai& Co.

Pr1. ELECTRICAL MACHINE LAB

(Common to ETC / AEI)

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:

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.

OBJECTIVS:

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

1. Run the DC Generator & DC Motor.
2. Connection of above Machine.
3. Find the losses of Transformer
4. Determine voltage Regulation

Skills to be developed:

Intellectual Skills:
  1. Identification and selection of components.
  2. Interpretation of circuits.
  3. Understand working of Regulated dc power supply.
Motor skills:
  1. Ability to draw the circuits.
  2. Ability to measure various parameters.
  3. Ability to test the components using multimeter.

List of Practicals:

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& Series Board using cut-out, switches, plugs, holder and two ways Switch.

Pr.2- NETWORKING LAB

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

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

LIST OF PRACTICALS:-

1. Recognize the physical topology and cabling (coaxial, OFC, UTP, STP) of a network.

2. Recognition and use of various types of connectors RJ-45, RJ-11,BNC and SCST

3. Making of cross cable and straight cable

4. Install and configure a network interface card in a workstation.

5. Identify the IP address of a workstation and the class of the address and configure the

IP Address on a workstation

6. Managing user accounts in windows and LINUX

7. Sharing of Hardware resources in the network.

8. Use of Netstat and its options.

9. Connectivity troubleshooting using PING, IPCONFIG

10. Installation of Network Operating System(NOS)

11. Create a network of at least 6 computers.

12. Study of Layers of Network and Configuring Network Operating System

13. Study of Routing and Switching, configuring of Switch and Routers, troubleshooting of networks

14. Study of Scaling of Networks, Design verities of LAN and forward of Traffic

15. Study WAN concepts and Configure and forward Traffic in WAN

16. Configure IPv4 and IPv6 and learn Quality, security and other services

17. Learn Network programming

18. Troubles shoot Networks.

Pr.3 - MICROPROCESSOR & MICROCONTROLLER LAB

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

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:

   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.

Objective:

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

1. The concept of Microprocessor 8085 (8-Bit)
2. Concept of 16 Bit Processor 8086 (16 –Bit)
3. Programming & Interfacing Concept
4. Develop software for microcontroller systems using a high-level programming language
5. Demonstrate familiarity with common microcontroller subsystems, such as timer modules
6. Demonstrate an ability to use both polling and interrupt-driven approaches for interfacing a microcontroller(8-bit) with peripheral devices
7. 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
8. Design interfaces to external devices connected to the microcontroller using a standard bus

List of Practicals

NOTE: Total 14 Experiments Have To Be Completed.

(4 from Gr - A ,3 from Gr - B , 4 from Gr - C, 3 from Gr - D)

Gr A) 8085(Compulsory)
   1. Addition, Subtraction, Multiplication, Division of two 8 bit numbers resulting 8/16 bit numbers.
   Optional (Any three)
   2. 1''s and 2's Complements
   3. Binary to Gray Code / Hexadecimal to decimal conversion.
   4. Logic Operations (AND, OR,) & Masking of bits
   5. Time delay (Single Register, Register Pair, More than Two Register)
   6. Compare between two numbers
   7. Smallest /Largest number among n numbers in a given data array
   8. Block Transfer of data
Gr B) 8086(Compulsory)
   1. Addition, subtraction, Multiplication, Division of 16 bit nos + 2's complement of a 16 bit no.
   Optional (Any two)
   2. Marking of specific bit of a number using look-up table.
   3. Largest /Smallest number of a given data array.
   4. To separate the Odd and Even numbers from a given data array.
   5. Sorting an array of numbers in ascending/descending order
   6. Finding a particular data element in a given data array.

Gr-C) INTERFACING (Compulsory-any one)
   1. Operation of 8255 using 8085 & 8051 microcontroller
   2. Generate square waves on all lines of 8255 with different frequencies (concept of delay program)
   OPTIONAL (Any Three) based on self-study
       1. Study of stepper Motor and its operations (Clockwise, anticlockwise, angular movement, rotate in various speeds)
       2. Study of Elevator Simulator
       3. Generation of Square, triangular and saw tooth wave using Digital to Analog Converter
       4. Study of 8253 and its operation (Mode 0, Mode 2, Mode 3)
       5. Study of Mode 0, Mode 1, BSR Mode operation of 8255.
       6. Study of 8279 (keyboard & Display interface)
       7. Study of 8259 Programmable Interrupt controller.
       8. Study of Traffic Light controller
       9. Steeper Motor Controller.

Gr-D)   8051 MICROCONTROLLER (Compulsory) by self-study
       1. Initialize data to registers and memory using immediate, register, direct and indirect addressing mode
   OPTIONAL (any two)
       2. Write a Program for
       2.1   Bit Digital Output-LED Interface
       2.2   8 Bit Digital Inputs (Switch Interface)
       3. Write a Programs for(Any one)
       3.1   4 x 4 Matrix Keypad Interface
       3.2   Buzzer Interface
       3.3   Relay Interface
       4. Write a Program for character based LCD Interface.
       5. Write a Program for Analog to Digital Conversion (On chip ADC& DAC)
       6. Interfacing With Temperature Sensor.
       7. Write a program Stepper Motor Interface
       8. Write a program   to Generate Delay Subroutine
       9. 805 Timer & Counter programming –Generate Square wave

Pr.4 Industrial Measurement and Instrumentation- Lab-1

Practical	: 4 Periods per week	Sessional	: 50 Marks
Total Periods	: 60 Periods	Term End Exam	: 50 Marks
Examination	: 3 Hours	TOTAL MARKS	: 100 Marks

Rationale

The study of industrial parameter measurement will be give an idea to the student about measurement Of ON LINE Process parameter such as stress and strain, Displacement ,velocity ,speed, Acceleration ,Humidity PH value, pulse, Moisture and some idea about virtual instrumentation Engineering process and also infrared Gas Analyzer.

Objectives:

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

1. acquire skill of operation & testing of sensors & transducers.
2. acquainted with the operation & maintenance of fundamental industrial measuring instruments.

Skills to be developed:

Intellectual Skills:
1. Identification and selection of components.
2. Interpretation of circuits.
3. Understand working of Regulated dc power supply.

Motor skills:
1. Ability to draw the circuits.
2. Ability to measure various parameters.
3. Ability to test the components using multimeter.

List of Practicals:

1. Measurement of temperature using thermometers.
2. Measurement of temperature using RTD.
3. Measurement of temperature using thermocouple.
4. Measurement of furnace temperature using optical pyrometer.
5. Measurement of liquid level.
6. Measurement of flow using rotameter.
7. Experiment with LVDT.
8. Measurement using stain gauge.
9. Study of piezo electric transducer.
10. Measurement of force using load cell.
11. Calibration of pressure gauge by dead weight pressure gauge.
12. Study of microphone.
13. Study of gas spectrum analyzer.

Pr.5 -TECHNICAL SEMINAR

Practical   : 2 Periods per week   Sessional   : 50 Marks
Total Periods : 30 Periods   TOTAL MARKS   : 50 Marks

RATIONALE:

The Technical Seminar will provide Motivation among the students to develop new Technology Based on Advances in Electronics & Provide Guidance for Carrier Growth. The student will enhance their skills through Group Discussion & Presentation. They are communication skills with Managerial capability will be enhanced.

1. Most of the diploma holders join industries. Due to globalization and competition in the industrial and service sectors the selection for the job is based on campus interviews or competitive tests.
2. While selecting candidates a normal practice adopted is to see general confidence, ability to communicate and attitude, in addition to basic technological concepts.
3. The purpose of introducing professional practices is to provide opportunity to students to under go activities which will enable them to develop confidence. Industrial visits, expert lectures, seminars on technical topics and group discussion are planned in a semester so that there will be increased participation of students in learning process.

OBJECTIVE:

After Completing the Technical Seminars the students will able to:

1. Develop reading skills
2. Use techniques of acquisition of information from various sources
3. Draw the notes from the text for better learning.
4. Apply the techniques of enhancing the memory power.
5. Develop assertive skills.
6. Prepare report on industrial visit.
7. Apply techniques of effective time management.
8. Set the goal for personal development
9. Enhance creativity skills.
10. Develop good habits to overcome stress
11. Face problems with confidence
12. To motivation the students in developing life skills for successful career growth.

Each student has to select a recent topic of latest technology in the area of Applied Electronics & Instrumentation Engg. and present a seminar in front of all students of the class. He/She has to prepare a PowerPoint presentation of the selected topic of minimum 10 slides are the total presentation will be approximately 10 minutes duration .There will be interactive session between the presenter and rest of the students including the faculty members of the dept at the end of presentation .A student has to present at least 2 nos.of seminar during a semester and to submit the report for evaluation.