

PROPOSED CURRICULAR STRUCTURE FOR PART- III (3RD YEAR) OF THE FULL TIME DIPLOMA COURSES IN ENGINEERING AND TECHNOLOGY

WEST BENGAL STATE COUNCIL OF TECHNICAL EDUCATION												
TEACHING AND EXAMINATION SCHEME FOR DIPLOMA IN ENGINEERING COURSES												
COURSE NAME: DIPLOMA (3 YEARS)												
DURATION OF COURSES: 6 SEMESTERS												
SEMESTER: FIFTH												
BRANCH: ELECTRONICS AND INSTRUMENTATION ENGINEERING												
SR. NO.	SUBJECT	CREDIT	PERIODS			EVALUATION SCHEME						
			L	TU	PR	INTERNAL SCHEME			ESE	PR		TOTAL
						TA	CT	TOTAL		INT	EXT	
1	Process Instrumentation - II	4+2	3	1	3	10	20	30	70	50	50	200
2	Advance Process Control	4	3	1		10	20	30	70	----		100
3	Industrial Electronics	3+1	3		2	10	20	30	70	25	25	150
4	Microprocessor	3+1	3		2	10	20	30	70	25	25	150
5	Analytical Instrumentation	2	2			5	10	15	35	----		50
6	Process Control Lab	2			4	--	--	--	--	50	50	100
7	Industrial Project & Entrepreneurship Development	2			3	--	--	--	--	25	25	50
8	Professional Practice - III	1			2	--	--	--	--	50	--	50
TOTAL		25	14	2	16	45	90	135	315	400		850
STUDENT CONTACT HOURS PER WEEK: 32												
Theory and Practical Period of 60 Minutes each.												
L - Lecture, TU – Tutorial, PR- Practical, TA- Teachers Assessment, CT- Class Test, ESE – End Semester Exam, INT – Internal, EXT- External												

Syllabus for PROCESS INSTRUMENTATION - II

Name of the Course : Diploma in Electronics & Instrumentation Engineering			
Name of the Subject : Process Instrumentation II			
Subject Code:		Semester: Fifth	
Duration: 6 months		Maximum Marks: 100	
Teaching Scheme: Theory : 3hrs/week Tutorial : 1hrs/week Practical :		Examination Scheme: Internal Scheme : Teachers Assessment: 10 Class Test : 20 End Semester Exam : 70	
Credit: 4			
Aim:			
Sl No.			
1	To control process parameters, precise measurement of those is the most important part.. The subject deals with measurement principles and techniques of process parameters like force, pressure, velocity, acceleration , torque, density viscosity		
2			
3			
Objective:			
Sl No.	The Student will able to		
1	Know the principle of operation, advantages, disadvantages of different process parameter like Temperature, Level, Flow etc		
2	Choose the proper measuring instrument for specific measurement		
3	Compare the different instruments used for a specific operation		
4	Know the specification of different measuring instruments		
5	Know the instrumentation system for hazardous location		
	Know the protocols for industrial data communication		
Pre-requisite:			
Sl No.			
1	Fundamental idea of Instrumentation system		
2	Basics of electronics		
3	Basics of physics		
Contents			
Module	Chapter	Name of the topics	Hrs / Module
A	1	Temperature Measurement 1.1 Temperature scale-ITS 90, Different types of Thermometers- liquid in glass, liquid in metal, bimetallic thermometer 1.2 Thermocouple -- construction, composition of thermocouple materials, cold junction compensation, range and types of different thermocouples, thermowell, 1.3 RTD -- construction & composition of RTD, Pt100, Two wire, three wire & four wire RTD, Self heating error. 1.4 Thermistor --construction & composition of thermistor, types of thermistor. 1.5 Non contact type temperature measurement-- Radiation & Optical Pyrometer. 1.6 Semiconductor type temperature sensor	12
	2	Level measurement: 2.1 Gauge glass, float & displacer type. 2.2 Differential Pressure type.	10

		2.3 Capacitive & Conductivity type. 2.4 Radar, ultrasonic & nuclear type.	
	3	Flow measurement: 3.1 Bernoulli's theorem, turbulent & laminar flow, Reynolds number. 3.2 Orifice, Venturi, Flow Nozzle, & Rotameter. 3.3 Electromagnetic, Turbine, Ultrasonic & Vortex Flow Meter. 3.4 Coriolis mass flow meter, Thermal mass flow meter, Positive displacement flow meter, Open channel flow meter.	15
B	4	Instrumentation in Hazardous location: 4.1 Definition of Hazardous area & Safe area, Area classification, Material classification 4.2 Explosion proof enclosure, Pressurization, Intrinsic safety. 4.3 Brief idea on PHA (Process Hazards Analysis),SIS,SIF,SIL,PDF,SFF	8
	5	Industrial Communication and Field Buses 5.1 Industry standard 4 – 20 mA analog communication 5.2 Introduction to smart sensor 5.3 Fieldbuses: What is a Fieldbus, Topologies, Terminators, Benefits 5.4 Highway Addressable Remote Transducer (HART): Evolution and Adaptation of HART Protocol, HART Encoding and Waveform, HART Character, Addressing, Communication Modes, HART Networks 5.5 Foundation Fieldbus: Features, Architecture, H1 Benefits, HSE Benefits, Interoperability of Subsystems, Function Blocks, The Communication Process, OSI Reference Model, Technology of Foundation Fieldbus, Link Active Scheduler, Device Description 5.6 Profibus: The Profibus Family, Transmission Technology, Communication Protocols, Device Classes, Profibus SP and PA, Foundation Fieldbus and Profibus – A Comparison 5.7 Wireless Fieldbuses: WHART and ISA100.11a	15

Books:

Title	Author	Publisher
Introduction to Measurement & Instrumentation	Ghosh	PHI
Principles of Industrial Instrumentation	D.Patranabis	TMH
Measurement System Application & Design	E.O.Doeblin	Mc Graw Hill
Instrument Transducer	H K P Neubert	Oxford University Press
Mechanical Measurements	Beckwith, Buck & Marangoni	Narosa Pub. House
The Essence of Measurement	Allan Morris	PHI
A Course in Electrical & Electronics Measurement & Instrumentation	J.B. Gupta	S. K. Kataria Pub. Co.
Industrial Instrumentation & Control	S K Singh	TMH
Sensors & Transducers	D. V. S. Murty	PHI
Instrumentation & Control	Reddy, P S R Krishnudu	Scitech
Mechanical & Industrial Measurement	R. K. Jain	Khanna Publisher
Instrument Technology, Vol I	E. B. Jones	Butterworth
Computer Aided Process Control	S K Singh	PHI

End Semester Examination Scheme									
Maximum Marks: 70					Time: 3 Hrs				
Group	Module	Objective Questions				Subjective Questions			
		To be set	To be answered	Marks per question	Total Marks	To be set	To be answered	Marks per question	Total Marks
A	1	12	Any 20	1	1 x 20 =20	4	Any 5 taking at least 2 from each group	10	10 x 5 =50
	2								
	3								
B	4	13				4			
	5								

Syllabus for ADVANCED PROCESS CONTROL

Name of the Course : Diploma in Electronics & Instrumentation Engineering			
Name of the Subject : Advanced Process Control			
Subject Code:	Semester: Fifth		
Duration: 6 months	Maximum Marks: 100		
Teaching Scheme: Theory : 3 hrs/week Tutorial : 1 hrs/week Practical:	Examination Scheme: Internal Scheme : Teachers Assessment: 10 Class Test : 20 End Semester Exam : 70		
Credit: 4			
Aim:			
Sl No.			
1	Monitoring and control of process is the most important part of industry. The subject deals with advanced control system strategies used for process control.		
2	With knowledge of this subject students will be able to control the process parameter as per the desired value for the optimization of the process.		
3			
Objective:			
Sl No.	The Student will able to		
1	Learn to draw P&I diagram..		
2	Design different control techniques like Cascade, Ratio, Feed forward, Adaptive, Split range etc		
3	Learn different control schemes for different specific plant operation		
4	Learn function of SCADA, PLC, DCS etc		
Pre-requisite:			
Sl No.			
1	Knowledge of basic control principles		
Contents			
Module	Chapter	Name of the topic	Hrs / Module
A	1	Process Drawing 1.1 Idea on Block Flow, Process Flow Diagram (PFD), Piping & Instrumentation Diagram (P&ID), Equipment Mechanical Drawing, Three Dimensional	12

		Layout 1.2 P&I diagram of different control scheme	
	2	Advanced Control Techniques: 2.1 Cascade control. 2.2 Ratio control. 2.3 Feed forward control. 2.4 Adaptive control 2.5 Split range control	14
	3	Process Plant Control Schemes: 3.1 3-element boiler drum level control in Thermal Power Plant. 3.2 Combustion control of Furnace in Thermal power plant. 3.3 Any basic control scheme in steel plant. 3.4 Paper-pulp preparation & control in paper plant. 3.5 Control scheme of distillation column—overhead and bottom product. 3.6 Reactor temperature control in Nuclear power plant. (In all cases the basic scheme, necessary PI diagram & their illustration are required only.)	11
	4	Evaluation of Computer in Control Techniques: 4.1 Control system before computer entered into control system. 4.2 Chronological evaluation of computer in control system starting from DDC to artificial intelligence or more. 4.3 Block diagram, advantage, disadvantage, operation of DDC (Direct Digital Control)	11
B	5	Multiloop Control System: 5.1 SCADA: simple block architecture, operation. 5.2 Definition of PLC, Relevance of sequential control 5.3 Block architecture of PLC, Operation of PLC, Language used in PLC 5.4 Knowledge of programming in Ladder, FBD, STL 5.5 DCS- Definition, Block architecture, Functioning, Comparison with PLC, Redundancy	12

Books:

Title	Author	Publisher
Process Control Principle & Application	S Bhanot	Oxford University Press
Process Control; Concept Dynamics & Application	S. K. Singh	PHI
Principles of Process Control	D.Patranabis	TMH
Modern Control Engineering:	K.Ogata	PHI
Principles of Industrial Process Control	D.P.Eckman	J. Wiley & Sons
Industrial Automation	Pessen	Wiley India
Automatic Process Control	D.P.Eckman	J. Wiley & Sons
Nice's Control System Engineering	Gupta	Wiley India
Basic Instrumentation & PLC	U Rathore	S K Khataria
Process Control Instrumentation Technology	Curtis Johnson	PHI
Automatic Control System	Kuo	Wiley India

Modern Control System					Ogata		PHI		
Control System Theory					S Dasgupta		Khanna		
End Semester Examination Scheme									
Maximum Marks: 70					Time: 3 Hrs				
Group	Module	Objective Questions				Subjective Questions			
		To be set	To be answered	Marks per question	Total Marks	To be set	To be answered	Marks per question	Total Marks
A	1	13	Any 20	1	1 x 20 =20	4	Any 5 taking at least 2 from each group	10	10 x 5 =50
	2								
	3								
B	4	12				4			
	5								

Syllabus for INDUSTRIAL ELECTRONICS

Name of the Course : Diploma in Electronics & Instrumentation Engineering			
Name of the subject : Industrial Electronics			
Subject Code:	Semester: Fifth		
Duration: 6 months	Maximum Marks: 100		
Teaching Scheme: Theory : 3hrs/week Tutorial : Practical :	Examination Scheme: Internal Scheme : Teachers Assessment: 10 Class Test : 20 End Semester Exam : 70		
Credit: 3			
Aim:			
Sl No.			
1	This subject intends to teach operating principle and application of different electronic power devices		
2	The subject knowledge is required in control, Instrumentation and communication system		
3	Understanding of the subject will provide the student for assembling, trouble shooting & testing of circuits & devices		
Objective:			
Sl No.	The Student will able to		
1	To know about Power diode, Power MOSFET ect		
2	To know the application of SCR, DIAC, TRIAC etc		
3	To know operation & application of rectifier, converter		
4	To design power supplies		
Pre-requisite:			
Sl No.			
1	Basic Electronic Engineering		
2	Basics on different active and passive components		
Contents			
Group	Module	Name of the topic	Hrs / Module

A	1	Power Devices: <ul style="list-style-type: none"> • Basic difference between normal electronic devices and power devices • Operation & characteristics of power diode, power transistor & power MOSFET. • Rectifier & Filter circuit: Half wave & Full wave rectifier, performance analysis, circuit design & analysis with capacitor filter. 	5
	2	Switching & Pulse circuit: <ul style="list-style-type: none"> • Transistor, FET as switch, switching principle, its practical applications. • Non linear circuit - Clipper, diode series & shunt, positive & negative biased & unbiased & combinational clipper • Clamper- positive & negative clamper • Voltage doubler circuit. • Pulse wave & Square wave generator, Duty cycle of pulse wave & square wave,. • Multivibrator- basic principle, classification, Circuit, working, frequency, application of astable, mono-stable, bi-stable multivibrator 	6
	3	Introduction to Thyristors and other power electronics devices <ul style="list-style-type: none"> • Construction, Working principles of SCR, two transistor analogy of SCR, VI characteristics of SCR. SCR specifications & ratings. Different methods of SCR triggering. Different commutation circuit for SCR. Series & parallel operation of SCR. • Construction & working principle of DIAC, TRIAC & their V-I characteristics. • Construction, working principle of UJT, VI characteristics of UJT. UJT as relaxation oscillator. • Brief introduction to Gate Turn off thyristor (GTO), • Programmable unijunction transistor (PUT), MOSFET, IGBT. • Basic idea about the selection of Heat sink for thyristors. • Application such as light intensity control, fan regulator, battery charger. 	7
	4	Controlled Rectifiers / Converter <ul style="list-style-type: none"> • Single phase Fully Controlled Half Wave Converter with load (R, R-L) • Single Phase Fully Controlled Full Wave Converter with load (R, R-L) • Single phase Fully Controlled Bridge Converter with load (R, R-L) • Single phase Fully Controlled centre tap Converter with load (R, R-L) 	7
B	5	Inverters, Choppers, Dual Converters and Cyclo converters. <ul style="list-style-type: none"> • Principle of operation of basic inverter circuits, concepts of duty cycle • Operation of basic series, parallel & bridge Inverters & their application. • Choppers: Introduction, Chopper principle, types of choppers (Class A, Class B, Class C, and Class D). Step up and step down choppers. • Dual Converters & cyclo converters: Introduction, types & basic working principle of dual converters & cyclo converters & their application. 	8
	6	Voltage Regulator, SMPS,UPS <ul style="list-style-type: none"> • Voltage Regulator: percentage regulation, Series & Shunt voltage regulator, Three terminal IC regulator, • Buck regulator • SMPS : Explanation with diagram. 	6

		<ul style="list-style-type: none"> UPS: Online, Offline & line Interactive UPS 	
7	Power Electronics Application 7.1 DC Drives: <ul style="list-style-type: none"> Speed control of DC series motor with single phase half and full controlled converter Introduction to DC servo motor, Speed control of DC servomotor 7.2 AC Drives: <ul style="list-style-type: none"> Open/ close loop control of stepper motor Introduction to AC servo motor. Speed control of AC servomotor 		6

Books:

Title	Author	Publisher
Power Electronics	Gupta, Singhal	S K Khataria
Industrial Electronics & control	B N Pal	PHI
Industrial Electronics	Zaber	TMH
Power Electronics: Circuits, Devices & Applications	Rashid	PHI
Industrial Electronics	Chute & Chute	
Industrial Electronics	G.K.Mithal	Khanna
Industrial Electronics	Noel Morris	
Modern Power Electronics	P.C.Sen	TMH
Linear Integrated Circuit	Ganesh Babu, Suseela B.	
Industrial Electronics:	F.D.Petruzella	TMH
Engineering Electronics	Ryder	TMH
Thyristors and its Applications	M R Murthy	East West

End Semester Examination Scheme

Maximum Marks: 70						Time: 3 Hrs			
Group	Module	Objective Questions				Subjective Questions			
		To be set	To be answered	Marks per question	Total Marks	To be set	To be answered	Marks per question	Total Marks
A	1	10	Any 20	1	1 x 20 =20	3	Any 5 taking at least 2 from each group	10	10 x 5 =50
	2								
	3								
	4								
B	5	15	Any 20	1	1 x 20 =20	4	Any 5 taking at least 2 from each group	10	10 x 5 =50
	6								
	7								

Syllabus for MICROPROCESSOR

Name of the Course : Diploma in Electronics & Instrumentation Engineering			
Name of the subject : Microprocessor			
Subject Code:		Semester: Fifth	
Duration: 6 months		Maximum Marks: 100	
Teaching Scheme: Theory : 3hrs/week Tutorial : Practical :		Examination Scheme: Internal Scheme : Teachers Assessment: 10 Class Test : 20 End Semester Exam : 70	
Credit: 3			
Aim:			
Sl No.			
1	Today microprocessors and microcontrollers have become an integral part of all automatic and semi automatic machines. Therefore there is a growing need of engineers / technicians in this field. Hence, it is necessary to study microcontroller basics, hardware and its programming.		
2	This subject covers microprocessor 8085 architecture, its instruction set, programming and applications. After completing this subject the student can write and execute programs for microprocessor based applications.		
3			
Objective:			
Sl No.	Students will able		
1	Describe architecture and operation of microprocessor 8085		
2	Develop assembly language programs using instruction set of 8085		
3	Design and develop microcontroller based systems		
4	Explain various applications of microcontrollers		
Pre-requisite:			
1	knowledge of digital electronics		
2			
Contents			
Group	Module	Name of the topic	Hrs / Module
A	1	Introduction to Microprocessor 1.1 Microprocessor definition 1.2 Operation of ALU 1.3 Van Numan, Haward architecture 1.4 Evaluation of Microprocessor 1.5 Block diagram of Microprocessor based system 1.6 Machine Language, Assembly language, High level Language, Assembler, Compiler	5
	2	Microprocessor Architecture & memory Interfacing 2.1 8085 architecture and its functional block 2.2 Pin details of Intel 8085 chip 2.3 De-multiplexing address and data bus, generation of control signals 2.4 Machine cycles and timing diagram of instructions 2.5 Types of memory, Memory interfacing.	8
B	3	Programming of 8085 Microprocessor	10

		3.1 Instruction set of 8085 3.2 Addressing modes 3.3 Writing assembly language program- looping, counting, indexing, BCD arithmetic, stack and subroutine, Delay, conditional call & return instruction	
	4	Interfacing 4.1 Basic interfacing concept, interfacing input and output devices, memory mapped I/O and I/O mapped I/O 4.2 8155 interfacing and programming 4.3 8255 Interfacing and programming 4.4 Keyboard and display interfacing and programming 4.5 ADC (0801/0808) and DAC(0808/0809) interfacing and programming 4.6 Interfacing with Stepper Motor	13
		Interrupt, DMA and Serial Communication 5.1 Interrupt structure of 8085, RST instruction, vectored interrupts, interrupt process 5.2 8259 interrupt controller 5.3 Data transfer techniques 5.4 8257 DMA controller 5.5 Serial I/O lines of 8085 and implementation of serial data communication using SID, SOD lines	9

Books:

Title	Author	Publisher
Microprocessor architecture, programming & applications	R.S.Gaonkar	Wiely
Microprocessor& Microcontroller	N Senthil	Oxford University press
Microprocessor and Microcontroller	Kumar, Saravanan, Jeevananthan	Oxford University Press
Introduction to Microprocessor	A.P. Mathur	TMH
Digital Circuits & Microprocessors	Herbert taub	TMH Pub.
Microprocessor Interfacing & Microcontroller	Azeez, Shemeena	Scitech
Computer system Architecture	Morris Mano	PHI India
Computer organization & Design	P.Pal Choudhuri	PHI
The 8085 Microprocessor: Architecture, Programming & Interfacing	Udaykumar	Pearson
The 8085 Basic, Programming & Interfacing	Kulkarni, Sontakke	SadhuSudha Prakasan
Microprocessor and Interfacing	D. Hall	TMH
Microprocessor & Peripherals	Chowdhury et al	Scitech

End Semester Examination Scheme

Maximum Marks: 70						Time: 3 Hrs			
Group	Module	Objective Questions				Subjective Questions			
		To be set	To be answered	Marks per question	Total Marks	To be set	To be answered	Marks per question	Total Marks
A	1	10	Any 20	1	1 x 20 =20	3	Any 5 taking at least 2 from each group	10	10 x 5 =50
	2								
	3								
B	4	15				4			

	5								
	6								

Syllabus for ANALYTICAL INSTRUMENTATION

Name of the Course : Diploma in Electronics & Instrumentation Engineering			
Name of the Subject : Analytical Instrumentation			
Course Code:		Semester: Fifth	
Duration: 6 months		Maximum Marks: 50	
Teaching Scheme: Theory : 2 hrs/week Tutorial : Practical:		Examination Scheme: Internal Scheme : Teachers Assessment: 05 Class Test : 10 End Semester Exam : 35	
Credit: 2			
Aim:			
Sl No.			
1	Analysis of different parameter in Industry is most important to maintain best quality of product. This subject will develop students about different analyzers		
Objective:			
Sl No.	The Student will able to		
1	Know operation & application of Gas analysers		
2	Know operation & application of liquid analyser		
3	Know operation & application of solid analysers		
4	Know different sampling system		
10			
Pre-requisite:			
Sl No.			
1	Idea on basic analog and digital electronics		
2	Idea on basic chemistry		
Contents			
Group	Module	Name of the topic	Hrs/ Module
A	1	Gas Analyzer: <ul style="list-style-type: none"> • Spectroscopic techniques- IR absorption spectroscopy, single channel & dual channel IR spectrometer, different components of IR spectrometer- source, detector, monochromator. • Thermal conductivity type. • Paramagnetic oxygen analyzer- Magneto dynamic type, Magnetic wind type. • Zirconia cell for oxygen analysis. • Humidity & moisture measurement. 	7

	2	Liquid Analyzer: <ul style="list-style-type: none"> • UV & Visible spectroscopy techniques, sources, detectors, monochromators. • Colorimeter, Lambert-Beer's law, its applications & limitations. • Emission & Fluorescence spectroscopy. • Measurement of pH. • Measurement of conductivity & Salinity. • Measurement of dissolved oxygen. 	8
B	3	Solid Analyzer: <ul style="list-style-type: none"> • X-ray analysis: concept only 	3
	4	Special Types of Analyzers: <ul style="list-style-type: none"> • Gas chromatography, Liquid chromatography. • Mass spectrometer • Basic idea of NMR – only schematic diagram and working principles, applications 	7
	5	Sampling Systems: <ul style="list-style-type: none"> • Gas sampling. • Steam & Water analysis system. 	5

Books:

Title	Author	Publisher
Handbook of Analytical Instruments	R S Khandpur	TMH
Instrumental Methods of Analysis	Willard, Merrit, Dean & Settle	CBS Pub.Co.
Analysis Instrumentation	R.P.Khare	CBS
Analytical Instrumentation	Skoog & Larry	Saunders Pub. Co.
Instrumentation Handbook	B. Liptak	Butterworth-Heinmann .
Principle of Industrial Instrumentation	D Patranabis	TMH

End Semester Examination Scheme

Maximum Marks: 35						Time: 2 Hrs			
Group	Module	Objective Questions				Subjective Questions			
		To be set	To be answered	Marks per question	Total Marks	To be set	To be answered	Marks per question	Total Marks
A	1	6	Any 10	1	1 x 10 = 10	4	Any 5 taking at least 2 from each group	5	5 x 5 = 25
	2								
B	3	7	Any 10	1	1 x 10 = 10	4	Any 5 taking at least 2 from each group	5	5 x 5 = 25
	4								
	5								

Syllabus for PROCESS INSTRUMENTATION - II LAB

Name of the Course : Diploma in Electronics & Instrumentation Engineering	
Name of the subject : Process Instrumentation -II Lab	
Subject Code:	Semester: Fifth
Duration: 6 months	Maximum Marks: 100
Teaching Scheme: Theory : Tutorial : Practical: 3 hrs/week	Examination Scheme: Continuous Internal Assessment Performance of job : 30 Notebook / viva : 20 External Assessment On spot Job : 30 Viva Voce : 20
Credit: 2	
Skill to be developed:	
Intellectual Skill;	
1	Identification & selection of equipments
2	Selection of transducers
Motor Skill:	
1	Accuracy of measurement
2	Proper connection
List of Practical:	
SI No.	Experiment
1	Measurement of temperature using Thermocouple, RTD, Thermistor, AD950
2	Characteristics of LVDT
3	Level measurement by conductivity gage
4	Level measurement by capacitive gage.
5	Flow measurement using Orifice, Rotameter, & D/P transmitter
6	Measurement of Linear displacement by LVDT & plotting of characteristics curve
7	Study the different parts of control valve
8	Stroke checking of control valve.
9	Calibration of Transmitter
10	
11	

Syllabus for INDUSTRIAL ELECTRONICS LAB

Name of the Course : Diploma in Electronics & Instrumentation Engineering	
Name of the subject : Industrial Electronics Lab	
Subject Code:	Semester: Fifth
Duration: 6 months	Maximum Marks: 50
Teaching Scheme: Theory : Tutorial : Practical: 2 hrs/week	Examination Scheme: Continuous Internal Assessment Performance of job : 15 Notebook / Viva : 10 External Assessment On spot Job : 15 Viva Voce : 10
Credit: 1	
Skill to be developed:	
Intellectual Skill	
1	To locate fault in circuit
2	Interpret the waveform
Motor Skill	
1	Ability to sketch circuits
2	Ability to interpret circuit
3	
List of Practical	
Sl No.	Experiments (at least 10)
1	Study of Half wave & Full wave rectifier using diode.
2	To plot VI characteristic of an SCR.
3	Observation of wave shape of voltage at relevant point of single-phase half wave controlled rectifier and effect of change of firing angle.
4	Observation of wave shapes of voltage at relevant point of single phase full wave controlled rectifier and effect of change of firing angle
5	Speed control of motor using SCRs
6	To study series inverter using SCR
7	To study chopper using SCR
8	To plot VI characteristic of DIAC
9	To plot VI characteristic of TRIAC
10	To plot VI characteristic of UJT.
11	Study of UJT relaxation oscillator. And observe I/P and O/P wave forms
12	Design of a power supply with three terminal IC regulator – design part only
13	Study of transistor circuit as a switch to drive a relay with snubber circuit for protection.
14	To perform speed control of DC series motor by static armature voltage control using single phase half/full controlled converter

Syllabus for MICROPROCESSOR LAB

Name of the Course : Diploma in Electronics & Instrumentation Engineering	
Name of the subject : Microprocessor Lab	
Subject Code:	Semester: Fifth
Duration: 6 months	Maximum Marks: 50
Teaching Scheme: Theory : Tutorial : Practical: 2 hrs/week	Examination Scheme: Continuous Internal Assessment Performance of job : 15 Notebook / Viva : 10 External Assessment On spot Job : 15 Viva Voce : 10
Credit: 1	
Skill to be developed:	
Intellectual Skill	
1	To learn the architecture of Microprocessor
2	To learn programming
Motor Skill	
1	Ability to write program
2	Ability to run it to find output
3	
List of Practical	
Sl No.	Experiments
1	Study of pin configuration of 8085
2	Study of Bus organization of Microprocessor kit (8085) & identification of Different Components and their functions.
3	Microprocessor Programming:
	3.1 16 bit arithmetic (addition and subtraction)
	3.2 8 bit multiplication
	3.3 Hex to BCD conversion
	3.4 BCD arithmetic
	3.5 Finding largest & smallest no. From given series
	3.6 Program using stack and subroutine
	3.7 Generation of square wave on SOD pin of 8085
	3.8 Generation of square wave using 8155 timer
	3.9 Program for interfacing of 8255 (keyboard and 7 segment display)
	3.10 Interfacing of ADC
	3.11 Generation of different types of signal using DAC
	3.12 Stepper motor control
	3.13 Serial communication with PC

Syllabus for PROCESS CONTROL LAB

Name of the Course : Diploma in Electronics & Instrumentation Engineering	
Name of the subject : Process Control Lab	
Subject Code:	Semester: Fifth
Duration: 6 months	Maximum Marks: 100
Teaching Scheme: Theory : Tutorial : Practical: 4 hrs/week	Examination Scheme: Continuous Internal Assessment Performance of job : 30 Notebook / viva : 20 External Assessment On spot Job : 30 Viva Voce : 20
Credit: 2	
Skill to be developed:	
Intellectual Skill;	
1	Identification & selection of equipments & transducer for control
2	
Motor Skill:	
1	Accuracy of measurement
2	Proper connection and tuning for control
List of Practical:	
SI No.	Experiment
1	Temperature control using ON OFF controller, and temperature sensor
2	Level control using D/P transmitter, Single loop controller & control valve
3	Level control using level switch, and controller
4	Flow control using orifice, D/P transmitter, single loop controller, and control valve.
5	Flow control using mass flowmeter, single loop controller and control valve
6	Draw P&I diagram of a specific control loop using ISA symbols
7	Different programming in Ladder for PLC
	Response of P, I, D and PID Controller for various test inputs (May perform it in simulation)
	Tuning of controller (May perform it in simulation)

Syllabus for INDUSTRIAL PROJECT & ENTREPRENEURSHIP DEVELOPMENT

Name of the Course : Diploma in Electronics & Instrumentation Engineering			
Name of the Subject : Industrial Project & Entrepreneurship Development			
Course Code:		Semester: Fifth	
Duration: 6 months		Maximum Marks: 50	
Teaching Scheme: Theory : 3 hrs/week Tutorial : Practical:		Examination Scheme: Continuous Internal Assessment : 25 External Assessment : 25	
Credit: 2			
Aim:			
Sl No.			
1	To develop hands on practice		
2	To develop the mentality to be an entrepreneur		
Objective:			
Sl No.	The Student will able to		
1	Prepare action plan for project work		
2	Identify entrepreneurship opportunity		
3	Acquire entrepreneurial values and attitude		
4	Use the information to prepare project report for business venture		
	Develop awareness about enterprise management		
Pre-requisite:			
Sl No.			
1	Idea on electronics & electric components		
2	Idea to search internet		
	Idea to visit field		
Contents			
Group	Module	Name of the topic	Hrs/ Module
A	1	Industrial Project: <ul style="list-style-type: none"> Following activities related to project are required to be dealt with, during this semester. Form project batches & allot project guide to each batch. (Max. 5 students per batch) Each project batch should select topic / problem / work by consulting the guide & / or industry. Topic/ Problem / work should be approved by Head of department. Each project batch should prepare action plan of project activities & submit the same to respective guide. Each project batch should submit the action plan and abstract of the project along with list of materials required if project involves fabrication or other facilities required in other kinds of project. Action Plan should be part of the project report. Action Plan/ part of project work/full work should be submitted at the end of semester Rest part of project work should be done in sixth semester. Student might complete two projects in two semesters also <p>Project may be ---</p> <ul style="list-style-type: none"> Electronics based 	

- Microprocessor/ Micro controller Based
- PC Based
- Simulation

Here are some example---

- 1 Regulated power supply
- 2 Timers using 555 and other oscillators
- 3 Touch plate switches – transistorized or 555 based
- 4 Door bell/cordless bell
- 5 Clapping switch and IR switch
- 6 Blinkers
- 7 Sirens and hooters
- 8 Single hand AM or FM
- 9 Electronic toy gun, walker, blinkers
- 10 Electronic dice
- 11 Cell charger, battery charger, mobile charger
- 12 Fire/smoke/intruder alarm
- 13 Liquid level controller
- 14 Counters
- 15 Combination locks
- 16 Electronics musical instruments
- 17 Telephone handset
- 18 Audio amplifiers
- 19 Tape recorders
- 20 Automatic stabilizer/CVT
- 21 Emergency light
- 22 Control-panel designing, fabrication and installation
- 23 PC based temperature measurement, display and control using sensor
- 24 Interfacing of various devices with PC and their switching through relays
- 25 Design a parallel port-data acquisition card
- 26 PC as a function generator
- 27 PC based automatic jar filling system
- 28 PC based pressure measurement and control system
- 29 Tele-medicare
- 30 Microprocessor based rolling display/bell and calendar
- 31 Microprocessor based stepper motor control.
- 32 Speed control of DC Machines by Microprocessors.
- 33 Temperature monitoring using microprocessor based systems.
- 34 Microprocessor based liquid level indicator and control/solar tracking system
- 35 Fabrication and assembling of digital clock.
- 36 Design and fabrication of timing circuits using 555 and counters.
- 37 Design and fabrication of amplifiers and oscillators circuits.
- 38 Fabrication of demonstration type Radio receiver
- 39 Fabrication of PCB circuits using ORCAD/Fagu Software.
- 40 Fabrication of ON line/OFF line UPS of different ratings and inverters
- 41 Repair of X-Ray Machines, ECG, EEG, EMG, Calorimeter and Centrifuge etc.
- 42 Repair and fault location of telephone exchanges and intercom system.
- 43 Repair of oscilloscope, function generator, Power supply
- 44 Design and developing web sites of organizations
- 45 Installation of computer network (LANS).
- 46 Microprocessor based solar tracking system
- 47 Car or home security system
- 48 Bank token display
- 49 Printer sharing unit
- 50 Caller Identification unit for phone

		51 LCR-Q meter and frequency meter 52 MP-Based A/D converter 53 MP-Based D/A converter	
	2	Seminar: Seminar on any relevant latest technical topic based on latest research, recent trends, new methods and developments in the field of sensors & transducers, control, Electronics, Microprocessor & Microcontroller or on any other topics on Instrumentation .	
B	3	Entrepreneurship, Creativity & Opportunities 3.1 Concept, Classification & Characteristics of Entrepreneur 3.2 Creativity and Risk taking. a. Concept of Creativity & Qualities of Creative person. b. Risk Situation, Types of risk & risk takers. 3.3 Business Reforms. a. Process of Liberalization. b. Reform Policies. c. Impact of Liberalization. d. Emerging high growth areas. 3.4 Business Idea Methods and techniques to generate business idea. 3.5 Transforming Ideas in to opportunities transformation involves Assessment of idea & Feasibility of opportunity 3.6 SWOT Analysis	
	4	Information And Support Systems 4.1 Information Needed and Their Sources: Information related to project, Information related to support system, Information related to procedures and formalities 4.2 Support Systems a. Small Scale Business Planning, Requirements. b. Govt. & Institutional Agencies, Formalities c. Statutory Requirements and Agencies.	
	5	Market Assessment 5.1 Marketing -Concept and Importance 5.2 Market Identification, Survey Key components 5.3 Market Assessment	
	6	Business Finance & Accounts 6.1 Business Finance a. Cost of Project i. Sources of Finance ii. Assessment of working capital iii. Product costing iv. Profitability v. Break Even Analysis vi. Financial Ratios and Significance 6.2 Business Account a. Accounting Principles, Methodology i. Book Keeping ii. Financial Statements iii. Concept of Audit	
	7	Business Plan & Project Report 7.1 Business plan steps involved from concept to commissioning Activity Recourses, Time, Cost	

		<p>7.2 Project Report</p> <p>a. Meaning and Importance</p> <p>b. Components of project report/profile (Give list)</p> <p>7.3 Project Appraisal</p> <p>a. Meaning and definition</p> <p>b. Technical, Economic feasibility</p> <p>c. Cost benefit Analysis</p>	
	8	<p>Enterprise Management And Modern Trends</p> <p>8.1 Enterprise Management:</p> <p>a. Essential roles of Entrepreneur in managing enterprise</p> <p>b. Product Cycle: Concept and importance</p> <p>c. Probable Causes Of Sickness</p> <p>d. Quality Assurance: Importance of Quality, Importance of testing</p> <p>8.2 E-Commerce: Concept and Process</p> <p>8.3 Global Entrepreneur</p> <p>a. Assess yourself-are you an entrepreneur?</p> <p>b. Prepare project report and study its feasibility.</p>	

Books:

Title	Author	Publisher
Entrepreneurship Theory and Practice	J. S. Saini, B. S. Rathore	Wheeler Publisher
Entrepreneurship Development	E. Gorden, K. Natrajan	Himalaya Publishing
Entrepreneurship Development	Prepared by Colombo plan staff college for Technician Education.	TMH
A Manual on How to Prepare a Project Report	J.B.Patel, D.G.Allampally	EDI STUDY MATERIAL Ahmadabad (Near Village Bhat , Via Ahmadabad Airport & Indira Bridge), P.O. Bhat 382428 , Gujrat, India Ph. (079) 3969163, 3969153 E-mail : ediindia@sancharnet.in/olpe@ediindia.org Website : http://www.ediindia.org
A Manual on Business Opportunity Identification & Selection	J.B.Patel, S.S.Modi	
National Directory of Entrepreneur Motivator & Resource Persons.	S.B.Sareen, H. Anil Kumar	
New Initiatives in Entrepreneurship Education & Training	Gautam Jain, Debmuni Gupta	
A Handbook of New Entrepreneurs	P. C. Jain	

Video Cassetts

Five success Stories of First Generation Entrepreneurs	EDI STUDY MATERIAL Ahmadabad (Near Village Bhat , Via Ahmadabad Airport & Indira Bridge), P.O. Bhat 382428 , Gujrat,India P.H. (079) 3969163, 3969153 E-mail : ediindia@sancharnet.in/olpe@ediindia.org Website : http://www.ediindia.org
Assessing Entrepreneurial Competencies	
Business Opportunity Selection and Guidance	
Planning for completion & Growth	
Problem solving-An Entrepreneur skill	

Glossary:

Industrial Terms

Terms related to finance, materials, purchase, sales and taxes.

Components of Project Report:

1. Project Summary (One page summary of entire project)
2. Introduction (Promoters, Market Scope/ requirement)

3. Project Concept & Product (Details of product)		
4. Promoters (Details of all Promoters- Qualifications, Experience, Financial strength)		
5. Manufacturing Process & Technology		
6. Plant & Machinery Required		
7. Location & Infrastructure required		
8. Manpower (Skilled, unskilled)		
9. Raw materials, Consumables & Utilities		
10. Working Capital Requirement (Assumptions, requirements)		
11. Market (Survey, Demand & Supply)		
12. Cost of Project, Source of Finance		
13. Projected Profitability & Break Even Analysis		
14. Conclusion.		

Syllabus for PROFESSIONAL PRACTICE III

Name of the Course : Diploma in Electronics & Instrumentation Engineering	
Name of the Subject : Professional Practice III	
Subject Code:	Semester: Fifth
Duration: 6 months	Maximum Marks: 50
Teaching Scheme: Theory : Tutorial : Practical: 2 hrs/week	Examination Scheme: Continuous Internal Assessment: 50
Credit: 1	
Aim:	
1	To acquire information from different sources
2	To present given topic in a seminar
3	To Prepare a report on industrial visit, expert lecture
4	To introduce FOSS
Objective:	
Sl No.	The Student will able to
1	Prepare a report on industrial visit
2	Acquire information from different sources.
3	Prepare notes for given topic.
4	Present given topic in a seminar.
5	Interact with peers to share thoughts.
6	Prepare a report on industrial visit, expert lecture.
Pre-requisite:	
1	Knowledge on basic electrical & electronic engineering
2	Knowledge on Instrumentation engineering
3	Knowledge of basic computer operation

4	Idea of industrial visit	
Contents		
Unit	Name of the activity	Hrs/Unit
1	Aptitude and Reasoning Practice 1.1 General Aptitude 1.1.1 Arithmetic Aptitude 1.1.2 Data Interpretation 1.2 Verbal & Reasoning 1.2.1 Verbal Ability 1.2.2 Logical Reasoning 1.2.3 Verbal Reasoning 1.2.4 Non Verbal Reasoning	
2	Field Visit/ Training 2.1 One or two week Vocational Training / Industrial Training to any industry like cement industry, Chemical Industry, Petrochemical Industry, Oil Refinery, Water Treatment Plant etc. 2.2 One copy of training report should be submitted to the department of the college	
3	Lecture by Professional / Industrial experts / Student Seminar based on following areas (any two) <ul style="list-style-type: none"> • Environmental pollution and control • Renewable energy sources • Safety in Industry • Health Awareness- AIDS • Basic Touch Sensor Screen System • Fieldbus technology • Bluetooth technology • Any other suitable topic 	
4	Group Discussion The student should discuss in a group of six to eight students. Two topics for group discussions may be selected by the faculty members. Some of the suggested topics are- <ul style="list-style-type: none"> • Sports • Current news items • Child labor • Child abuse & exploitation against women • Road safety rules awareness • Balance between professionalism and family • Rain water harvesting • Globalization • Commercialization of Health care • Can Business and Ethics run together? • To save our culture Fashion show and New year party should be banned • Ethics should be taught as a general subject • Any other suitable topic 	
05	Free & Open Source Software Introduction and Installation Of LaTeX and Compilation 5.1 Installation Of Miktex in the Windows Operating Systems	

	5.2 Installation of TeXnicCenter in Windows OS 5.3 Compilation 5.4 How to use TeXnic Center help while compiling a file. 5.5 Letter writing in LaTeX 5.6 Report Writing in LaTeX 5.7 Mathematical Typesetting in LaTeX 5.8 Equations in Latex 5.9 Report Writing in LaTeX 5.10 Table and Figures in LaTeX 5.11 How to create references in LaTeX document	
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Books:

Title	Author	Publisher
Quantitative Aptitude & Reasoning	R. V. Praveen	PHI
Microprocessor& Microcontroller	N Senthil	Oxford University press
Microprocessor and Microcontroller	Kumar, Saravanan, Jeevananthan	Oxford University Press