Dr. Babasaheb Ambedkar Technological University,
Lonere - 402 103

Institute of Petrochemical Engineering

Curriculum

For

Second Year Diploma in Instrumentation Engineering

w. e. f. 2018-19

DEPARTMENT OF INSTRUMENTATION ENGINEERING

Dr. Babasaheb Ambedkar Technological University

First Year Diploma Program (Proposed Curriculum W. E. F. 2017-18)

Semester-I

Group B: Diploma in Chemical, Petrochemical, Polymer and Plastic Engineering, and Instrumentation Engineering

Sr. No.	Course Code	Course Title	Teaching Scheme/Contact Hours			Examination Scheme					
			TH	TU	PR	Credits	MSE	ESE	TW	PR/OR	Total
1	DEN1101	English	03	01	-	07	30	70	25	25	150
2	DMA1101	Basic Mathematics	04	03	-	11	30	70	-	-	100
3	DCY1101	Applied Chemistry	04	-	-	08	30	70	-	-	100
4	DEE1101 DEE1102	Basic Electrical Engineering (Instru) Electrical and Electronics Engg. (Chem/petro/poly)	04	-	-	08	30	70	-	-	100
5	DME1103	Workshop Practices (Lab)	01	-	04	06	-	-	50	50	100
6	DCY1102	Applied Chemistry (Lab)	-	01	03	04	-	-	25	25	50
7	DEE1103 DEE1104	Basic Electrical Engineering Lab(Instru) Electrical and Electronics Engg Lab (Chem/petro/poly)	-	-	02	02	-	-	25	25	50
		Total	**16**	**05**	**09**	**46**	**120**	**280**	**125**	**125**	**650**

Dr. Babasaheb Ambedkar Technological University

First Year Diploma Program (Proposed Curriculum W. E. F. 2017-18)

Semester-II

Group B: Diploma in Chemical, Petrochemical, Polymer and Plastic Engineering, and Instrumentation Engineering

Sr. No.	Course Code	Course Title	Teaching Scheme /Contact Hours			Examination Scheme					
			TH	TU	PR	Credits	MSE	ESE	TW	PR/OR	Total
1	DMA1201	Applied Mathematics	04	02	-	10	30	70	-	-	100
2	DPH1201	Applied Physics	04	-	-	08	30	70	-	-	100
3	DME1201	Engineering Drawing	03	-	-	06	30	70	-	-	100
4	DET1203 DCY1203	Elements of Electronics (Instru) Chemistry of Engineering Material (Chem/Petro/Poly)	03	-	-	06	30	70	-	-	100
5	DEN1201	Language Lab	-		02	02	-	-	25	25	50
6	DCE1201	Fundamentals of ICT (lab)	-	02	02	04	-	-	25	25	50
7	DPH1202	Applied Physics (Lab)	-	-	02	02	-	-	25	25	50
8	DME1202	Engineering Drawing (Lab)	-	--	04	04	-	-	50	-	50
9	DET1204 DCY1204	Elements of Electronics Lab (Instru) Chemistry of Engineering Material Lab (Chem/Petro/Poly)	-	-	02	02	-	-	25	25	50
		Total	**14**	**04**	**12**	**44**	**120**	**280**	**150**	**100**	**650**

** EE, ET, IN, CE, CH, PC, PP, IT

Examination Duration: MSE: 90 Min, ESE: 3Hrs, #ESE: 4Hrs

Sr. No.	Course Code	Course Title	Compulsory / Optional	Teaching Scheme/Contact Hours			Examination Scheme					
				TH	TU	PR	Credits	MSE	ESE	TW	PR/OR	Total
1	DIN 2101	Industrial Measurements	C	3	1	-	4	30	70	-	-	100
2	DIN 2102	Electronic Instruments and Measurements	C	3	1	-	4	30	70	-	-	100
3	DIN 2103	Applied Electronics	C	3	-	-	3	30	70	-	-	100
4	DIN 2104	Data Communication	C	3	1	-	4	30	70	-	-	100
5	DIN 2105	Industrial Measurements(Lab. Practice)	C	-	-	4	4	-	-	50	#50	100
6	DIN 2106	Electronic Instruments and measurements(Lab. Practice)	C	-	-	2	2	-	-	25	25	50

7	DIN 2107	Applied Electronics(Lab. Practice)	C	-	-	2	2	-	-	25	25	50
8	DIN 2108	Data Communication (Lab. Practice)	C	-	-	2	2	-	-	25	25	50
9	DIN 2109	Instrumentation Workshop Practice	C	1	-	4	5	-	-	50	#50	100
#: External Examination			**Total**	**13**	**03**	**14**	**30**	**120**	**280**	**175**	**175**	**750**

Industrial Measurements

(Course Code: DIN 2101)

Teaching Scheme and Credits			Examination Scheme		
TH	TU	Credits	MSE	ESE	Total
3	1	4	30	70	100

(Abbreviations:TH= Theory, TU=Tutorial, MSE=Mid Semester Examination, ESE=End Semester Examination)

Course Outcomes:

Students will able to:

1 Understand Instrumentation system, classify the transducers and select the transducers for specific applications.
2. Understand the importance of process measurement and its terminology.
3. Measure the process parameters for temperature.
4. Explain the working of temperature transducers.
5. Measure the process parameters for Flow.
6. Explain the working of different flow transducers.

UNIT 1

Instrumentation Fundamentals: General Block diagram of Instrumentation system, Transducers - Terminology and basic principles, classification of transducers, selection of transducers based on process conditions. **06 hrs**

UNIT 2

Process Measurement: -Introduction to Industrial Process, Introduction to the physical parameters, Units used for various parameters, Need of parameters monitoring. **06 hrs**

UNIT 3

Introduction to Temperature: Temperature, Temperature Scales: Celcius temperature scale (^oC), Kelvin, Fahrenheit , Rankine, International practical temperature scales, Temperature measuring methods- Bimetallic thermometer, helix, spiral; filled system thermometer- liquid, gas filled system and vapour pressure thermometer, Themocouple- types, cold junction compensation. **06 hrs**

UNIT 4

Temperature Measurement: Resistance temperature detector(RTD): 2 wire-system, 3 wire-system, metals used for resistance thermometers ,Thermister: types, comparison between NTC and PTC, comparison between thermister and RTD, Pyrometers: Radiation pyrometer, IR pyrometer, Optical Pyrometer. **06 hrs**

UNIT 5

Introduction to Flow: Types of flow, Reynolds number, flow-rate, flowmeters, classification of flowmeters, Bernoulli's principle, Orifice plate, venturi tube, pitot tube, Nozzle flowmeter, Rotameter, Electromagnetic flowmeter, principle and operation of annubar, mass flow meter. **06 hrs**

UNIT 6

Flow Measurement: Positive displacement Flow meters- Nutating disc type, lobed impeller type, sliding vane type, Vortex flow meter, ultrasonic flow meters- time difference type & Doppler type, turbine flow meters, Measurement of Gas flow- Hot wire Annemometer. **08 hrs**

Text Books:

1. Instrumentation devices and systems, Rangan, Mani, Sharma, TMH
2. Electrical & Electronic Measurements & Instrumentation, A.K.Sawhney, Dhanpat Rai & sons

Reference Books: -

1. Industrial Instrumentation and Control, S. K. Singh, TMH
2. Principles of Industrial Instrumentation, D. Patranabis, Tata McGraw – Hill Publishing Company limited, New Delhi, 1996.

Electronic Instruments and Measurements
(Course Code: DIN 2102)

Teaching Scheme and Credits			Examination Scheme		
TH	TU	Credits	MSE	ESE	Total
3	1	4	30	70	100

(Abbreviations:TH= Theory, TU=Tutorial, MSE=Mid Semester Examination, ESE=End Semester Examination)

Course Outcomes:

After studying this course,students will be able to

1. Know the principles of measurement, characteristics, errors, etc.
2. Know standards for Electrical parameters.
3. Understand the principles of different measuring instruments.
4. Know the AC/DC bridges and their applications in measurement.
5. Explain the function of measuring instrument using block diagram/Circuit diagram.
6. Select the appropriate equipment for measurement.

UNIT 1

Measurement & Error: Block diagram of measurement system, Static and Dynamic characteristics, Significant figures, types of errors, statistical analysis, Limiting Errors, Reversibility, range ability, turn/down ratio, static pressure effect and temperature effect. **08 hrs**

UNIT 2

Standards and standard specifications: Voltage, current, frequency, and resistance. **06 hrs**

UNIT 3

Bridges & their applications: Wheatstone Bridge, Kelvin's Bridge, Guarded wheat stone Bridge, Wagner Ground connection, A.C. Bridges & their application for induction & capacitive, Maxwell's Bridge, Wein Bridge. **08 hrs**

UNIT 4

Component Measuring Instrument: Q-Meter: Principle of Q meter, direct, series, parallel connection measurement Q-meter, L-C.R meters: block diagram of analog and digital L-C-R meter, panel diagram of L-C-R meter, L-C-R bridge, Numericals. **05 hrs**

UNIT 5

Instruments: Electronic Voltmeter, Transistor Tester, O/P Power meter, Multimeter, Ohm-meter (Series & shunt), Digital Multimeter, Digital frequency meter, Transistor curve tracer, Digital Voltmeter. **07 hrs**

UNIT 6

C.R.O: Block diagram, construction of CRT, applications, Storage oscilloscope. Recorders: X-Y recorders, Strip Chart recorder, Distortion factor meter. **07 hrs**

Text Books:

1. Electronic Instrument & Measurement Techniques, W.D. Cooper & A.D. Helfrick, PHI
2. Electrical & Electronic Measurements & Instrumentation, A.K.Sawhney, Dhanpat Rai & sons

Reference Books:

1. Elements of Electronic Instrumentation & Measurement, Joseph J.Carr, 3/e, Reston
2. Electronic Instruments, H. S. Kalsi, TMH

Applied Electronics
(Course Code: DIN 2103)

Teaching Scheme and Credits			Examination Scheme		
TH	TU	Credits	MSE	ESE	Total
3	-	3	30	70	100

(Abbreviations:TH= Theory, TU=Tutorial, MSE=Mid Semester Examination, ESE=End Semester Examination)

Course Outcomes:

Students will able to

1. Understand principles and working semiconductor devices.
2. Understand use of Filters.
3. Understand working of multivibrators.
4. Understand working of Feedback Amplifiers.
5. Understand working of Power Amplifiers.
6. Understand working of Oscillators.

UNIT 1

Semiconductor devices: Introduction to Special Semiconductor devices: - Constructional features, operating principle, characteristics specification and typical applications of following devices – SCR, Diac, Triac. **06 hrs**

UNIT 2

Filters: Filters- capacitors and inductors types and voltage regulation with different types of filters. Voltage doubler and voltage-multiplier- working and applications. **06 hrs**

UNIT 3

Multivibrators: Astable, bistable and monostable - circuit operation, waveforms and applications.Wave shaping Circuits: - differentiator, integrator, clipping circuits using diode and transistors, clamping circuits using diode. **06 hrs**

UNIT4

Feedback Amplifier: Negative feedback in amplifiers, types of negative feedback, Typical circuits of negative feedback amplifiers and applications. **06 hrs**

UNIT 5

Power Amplifiers: Introduction, Classification – Class A, Class B, Class AB & Class C, Push pull amplifiers- Class A, Class B, Class AB, Advantages of push pull amplifier. **06 hrs**

UNIT 6

Oscillators: Introduction to oscillator, block diagram of sine wave oscillator, requirement of oscillation, Barkhausen criterion, operating principles of LC oscillators– Crystal oscillators Circuit diagram. **06 hrs**

List of Text Books:-

1. Electronic Devices , circuits & integrated circuits- Dr. Mathur,
2. Electronic Devices & circuits Dr, Y. N. Bapat.
3. Electronic Engg. Fundamentals & Applications- J. Ryder.
4. Electronic Devices & circuits- Millman & Halkers- Mc Grow Hill Publicartion.
5. Electronic Principles- Malvino- Mc. Grow. Hill.

Reference Books:

1.Applied Electronics, G. K. Mittal, Khanna Publication New Delhi
2.Electronics Devices and Circuits, M. Mottershed, PHI New Delhi

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Data Communication
(Course Code: DIN 2104)

Teaching Scheme and Credits			Examination Scheme		
TH	TU	Credits	MSE	ESE	Total
3	1	4	30	70	100

(Abbreviations:TH= Theory, TU=Tutorial, MSE=Mid Semester Examination, ESE=End Semester Examination)

Course Outcomes:

Students will be able to -

1. Understand the principles of communication.
2. Understand principles of amplitude modulation.
3. Understand principles of frequency modulation.
4. Understand and explain telemetry systems.
5. Understand aspects of data communication.
6. Know various modern communication systems.

UNIT 1

Principles of Radio Communication: Introduction to Communication system, Radio Waves, Frequency allocation, Principles of Modulation, Need of modulation, Demodulation, Noise. **06 hrs**

UNIT 2

Amplitude Modulation: Generation of Sinusoids, low level A.M. transmitter and high level A.M. transmitter, low level A.M. modulator and high level A.M. modulator, Diode Detector, AM Receiver: Tuned Radio Frequency Receiver. **06 hrs**

UNIT 3

Frequency Modulation: Principles of Frequency Modulation, Block diagram of F. M. Transmitter, Generation of F.M. Signal, Varactor diode, F.M. Modulator, F.M. receiver, Pulse Code Modulation Transmitter and receiver, Ratio Detector Circuit, Foster – Seeley Discriminator. **06 hrs**

UNIT 4

Telemetry Systems: Methods of Data Transmission, General Telemetry System, Voltage Telemetry, Current Telemetry, Position Telemetry, Frequency Division Multiplexing, Time Division Multiplexing. **06hrs**

UNIT 5

Data Communication: Introduction to data formats, block diagram of date communication, Digital data, Introduction to Digital Data Communication, Serial and parallel Communication, RS 232 C Serial data Standard, IEEE 485 Bus standard& signal conversions from RS 232 to RS 485. **06 hrs**

UNIT 6

Modern Communication Systems: Introduction to Antenna and Radar, Basics of Optical Communication, Introduction to Satellite Communication, introduction to industrial grade data communication systems, how it is incorporated inn latest instrumentation system, wireless communication, gateways, IEC protocols. **06 hrs**

Text Book:

1.Electronic Communication, G. Kenedy, 3rd Edition, MGH

Reference Books:

1.Radio Engineering, G.K. Mittal, Khanna publication
2.Electronic Communication, Roody & Coolen, 4th Edition, PHI

Industrial Measurements (Lab Practice)

(Course Code: DIN 2105)

Teaching Scheme and Credits		Examination Scheme		
Practical	Credits	TW	PR/OR	Total
04	04	50	50	100

(Abbreviations:TW= Termwork, PR/OR=Practical/ Oral)

Course Outcomes:

Students will be able to -

Identify, use and demonstrate: temperature, flow sensors and plot their characteristics.

List of Experiments: (Any Eight)

1. To study flow measurement using Rotameter.
2. To study flow measurement using turbine type flowmeter.
3. Study of RTD (pt-100) and plot the characteristics.
4. Study of thermistor and plot the characteristics.
5. Study of J type thermocouples. To plot characteristics.
6. Study of K type thermocouples. To plot characteristics.
7. Study of orifice plate.
8. Study of electromagnetic flowmeter.
9. Study of Differential pressure transmitter used for flow measurement.

Electronic Instruments and Measurements (Lab Practice)

(Course Code: DIN 2106)

Teaching Scheme and Credits		Examination Scheme		
Practical	Credits	TW	PR/OR	Total
02	02	25	25	50

(Abbreviations: TW= Termwork, PR/OR=Practical/ Oral)

Course Outcomes:

Students will be able to -

1. Use various instruments for the measurement of electric parameters
2. Test components by using instruments.

List of Experiments: (Any Eight):

1. Use of analog multimeter to measure current, voltage(AC/DC), resistance.
2. Study of Digital Multimeter.
3. Testing of Diode, Transistors using Multimeter.
4. Use of L-C-R meter to find different L-C-R values & finding Q factor.
5. Study of Transistor Tester.
6. Study of Distortion factor meter.
7. Study of O/P power meter.
8. Study of Electronic Voltmeter.
9. Study of function generator.

10. Measurement of Inductance by Maxwell's Bridge.
11. Measurement of small resistance by Kelvin's Bridge.
12. Measurement of Capacitance by Schering Bridge.
13. Measurement of Frequency by Wein Bridge.
14. Measurement of medium resistance by Wheatstone's Bridge.
15. Study of C.R.O.

Applied Electronics (Lab Practice)

(Course Code: DIN 2107)

Teaching Scheme and Credits		Examination Scheme		
Practical	Credits	TW	PR/OR	Total
02	02	25	25	50

(Abbreviations:TW= Termwork, PR/OR=Practical/ Oral)

Course Outcomes:

Students will able to perform experiments on training kits for various electronics circuits and plot characteristics.

List of Experiments

1. To study characteristics of SCR.
2 .To study characteristics of TRIAC.
3. Diode applications in mode of clipping circuits.
4. Diode applications in mode of clamping circuits.
5. To study Monostable multivibrator circuit.
6 To study Astable multivibrator circuit.
7. To study Bistable multivibrator circuit.
8. To study LC oscillator.
9. To study sine wave oscillator.

Data Communication (Lab Practice)

(Course Code: DIN 2108)

Teaching Scheme and Credits		Examination Scheme		
Practical	Credits	TW	PR/OR	Total
02	02	25	25	50

(Abbreviations: TW= Termwork, PR/OR=Practical/ Oral)

Course Outcomes:

Students will able to perform experiments on data communication training kits for various methods of data communication.

List of Experiments

1. Calculation of Modulation index in A.M.
2. Calculation of Modulation index in F.M.
3. Study of A.M. Detector.

4. Study of F.M. Detector.
5. Study of Audio amplifier in radio receiver.
6. Fault finding in radio receiver.
7. Study of I.F. stage in radio receiver.
8. Study of Mixer stage in radio receiver
9. Study of Pulse Code Modulation.

Instrumentation Workshop Practice (Lab Practice)

(Course Code: DIN 2109)

Teaching Scheme and Credits			Examination Scheme		
TH	PR	Credits	TW	PR/OR	Total
01	04	05	50	50	100

(Abbreviations:TH= Theory,TW= Termwork, PR/OR=Practical/ Oral)

Course Outcomes:
Students will able to- use various tools, solder and de-solder components, prepare PCB, assembling of small circuits and its testing.

UNIT 1
Use of common tools like pliers, cutters, screwdrivers, soldering and desoldering tools and small machines like cutting and drilling.

UNIT 2
Soldering and desoldering practice- solder joints, problems of dry solders, component cleaning liquids, solder lubricants, desoldering tools.

UNIT 3
Preparation of PCB for regulated power supply using the PCB artwork.

UNIT 4
Fabrication of small aluminum or sheet metal chassis with front panel and base plate for regulated power supply,

UNIT 5
Assembly and testing of regulated power supply for +/- 5, 12 volts.

Text Book:
1. Printed circuit board design and technology by W. Bosschart, TMH New Delhi.

Course outcomes:
Students will be able to -
1. Identify different tools used in workshop.
2. Solder components on PCB.
3. Desolder components from PCB.

List of Experiments:

1. Introduction to tools in workshop practice.
2. Study of soldering and its techniques.
3. To study desoldering and its techniques.
4. Study of production of PCB
5. Study of PCB manufacturing
6. To study operational amplifier.
7. MINI PROJECT

Sr. No.	Course Code	Course Title	Compulsory / Optional	Teaching Scheme/Contact Hours			Examination Scheme					
				TH	TU	PR	Credits	MSE	ESE	TW	PR/OR	Total
1	DIN 2201	Linear Integrated Circuits	C	3	1	-	4	30	70	-	-	100
2	DIN 2202	Industrial Transducers	C	3	-	-	3	30	70	-	-	100
3	DIN 2203	Microprocessor and Microcontroller	C	3	1	-	4	30	70	-	-	100
4	DIN 2204	Digital Electronics	C	3	-	-	3	30	70	-	-	100
5	DIN 2205	Managerial Skills	C	3	-	-	3	30	70	-	-	100
6	DIN 2206	Linear Integrated Circuits(Lab Practice)	C	-	-	2	2	-	-	25	25	50
7	DIN 2207	Industrial Transducers (Lab Practice)	C	-	-	4	4	-	-	25	#25	50

8	DIN 2208	Microprocessor and Microcontroller (Lab. Practice)	C	-	-	2	2	-	-	25	#25	50
9	DIN 2209	Digital Electronics (Lab. Practice)	C	-	-	2	2	-	-	25	25	50
10	DIN 2210	Programming Techniques (C++) (Lab. Practice)	C	1	-	2	3	-	-	25	25	50
#: External Examination			**Total**	**16**	**02**	**12**	**30**	**150**	**350**	**125**	**125**	**750**

Linear Integrated Circuits
(Course Code: DIN 2201)

Teaching Scheme and Credits			Examination Scheme		
TH	TU	Credits	MSE	ESE	Total
3	1	4	30	70	100

(Abbreviations:TH= Theory, TU=Tutorial, MSE=Mid Semester Examination, ESE=End Semester Examination)

Course Outcomes:

Students will able to

1. Understand block diagram of op-amp, Define Op-Amp parameters (Characteristics).
2. Draw different analog circuits using Op-Amp.
3. Explain the operation of waveform generators.
4. Understand and explain op-amp comparators and timer 555.
5. Understand the principle & operation of PLL.
6. Understand IC voltage regulators.

UNIT 1

Operational Amplifiers: Basic block diagram, Op-Amp parameters and definitions parameters, Methods of CMRR improvements, introduction to IC741. Open loop Op-Amp configurations: differentiating, Inverting and Non-inverting. Negative Feedback In Op- Amp**:** Block diagram representation of feedback configurations, Voltage-series feedback Amplifier, Voltage shunt feedback amplifier, unity gain amplifier. **07 Hrs**

UNIT 2

Special Op-Amp Circuits: Adder, Scaling adder, subtractor, A.C. amplifier, instrumentation amplifier, V to I converter, I to V converter, Log amplifier, antilog amplifiers, Multiplier and divider circuits, sample and hold amplifier. Active filters, Low pass, High pass, Band pass, notch filter, Butterworth filter. **07 Hrs**

UNIT 3

Waveform Generators: Integrator, differentiator, sine wave oscillator, quadrature oscillator, Weinbridge Oscillator, square wave and triangular wave generator, Astable, Monostable and Bistable circuits using Op-Amps, Ramp and Pulse generator circuits, staircase generator. **07 Hrs**

UNIT 4

Comparators and Timers: Op-Amp as a comparator, slew rate, peak to peak detector, zero crossing detector, phase detector, Schmitt trigger. Study of Timer IC 555: Pin configuration, Block diagram, application of 555 as Monostable and AstableMultivibrator. **07 Hrs**

UNIT 5

Phase Locked Loops: Basic diagram of PLL, transfer characteristics of PLL, Lock range, capture range. Study of PLL ICs 565. Applications of PLL - frequency multiplier, AM demodulation, FM demodulation, frequency synthesizer. **07 Hr**

UNIT 6

Voltage Regulators: Fixed voltage regulators, Adjustable voltage regulators, study of IC 78XX, 79XX, IC 723. **05 Hrs**

Text Books:

1.Linear Integrated Circuits & applications, Ramakant Gaikwad, PHI, New Delhi.
2.Linear Integrated Circuits & applications, K.B.Botkar, Khanna Publications.

Reference Books:

1.Denton J. Dailey., " Operational Amplifiers and Linear Integrated Circuit", McGraw Hill, 1989.
2.Coughlin and Discol., " Operational Amplifiers and Linear Integrated Circuit", Prentice Hall of India Pvt., Ltd., 1992.

Industrial Transducers
(Course Code: DIN 2202)

Teaching Scheme and Credits			Examination Scheme		
TH	TU	Credits	MSE	ESE	Total
3	-	3	30	70	100

(Abbreviations:TH= Theory, TU=Tutorial, MSE=Mid Semester Examination, ESE=End Semester Examination)

Course Outcomes:

Students will be able to –

1. Measure the process parameters for pressure.
2. Explain the working of pressure transducers.
3. Measure the process parameters for Level and explain the working of level transducers.
4. Understand working of transducers used for mechanical parameter measurement.
5. Understand working and construction of transducers used for chemical parameter measurement.
6. Understand various intelligent sensors.

UNIT 1

Introduction to Pressure: Pressure, pressure units, different types of pressure: gauge pressure, absolute pressure, vaccum pressure, atmospheric pressure, relation between various pressures, Classification of pressure transducer, Elastic pressure measurement: Bourdon tube, Diaphragm, Bellows, Capsule type. **06 hrs**

UNIT 2

Pressure Measurement: Manometer: U tube manometer, Inclined tube, Well type manometer; Capacitive pressure transducer, McLeod Gauge, Pirani gauge, Piezoelectric effect, piezoelectric transducer, Dead weight tester. **06 hrs**

UNIT 3

Level Measurement: Float type, Hydrostatic pressure type, use of D.P. transmitters for level measurement, Ultrasonic and Nucleonic type level measurement, introduction to RADAR type

level measurement system- FMCW, guided wave, non-contact type. **05hrs**

UNIT 4

Mechanical measurement: Measurement of Speed: AC Tachometer, DC Tachometer, Photoelectric Tachometer and magnetic pickup type, vibrations, displacement: inductive, capacitive and resistive, strain: bonded and unbounded strain gauge. **07 hrs**

UNIT5

Chemical measurement: Measurement of pH, Conductivity, density, Viscosity, Humidity : Absolute humidity, relative humidity, dry and wet bulb psychometric chart, Resistive hygrometer, Turbidity measurement, ORP measurement. **07 hrs**

UNIT 6

Intelligent sensors: Introductionto Bio-sensor, Nano-sensor, Smart sensor, Advanced Instrumentation, Intelligent Instrumentation. **05 hrs**

Text Books:

1. Handbook of Analytical Instruments, R. S. Khandpur, TMH
2. Principles of Industrial Instrumentation, D. Patranabis, Tata McGraw – Hill Publishing Company Limited, New Delhi, 1996.

Reference Books: -

1. Electrical and Electronics Instrumentation, A. K. Shawney- Dhanpat rai and Co.

Microprocessor and Microcontroller
(Course Code: DIN 2203)

Teaching Scheme and Credits			Examination Scheme		
TH	TU	Credits	MSE	ESE	Total
3	1	4	30	70	100

(Abbreviations:TH= Theory, TU=Tutorial, MSE=Mid Semester Examination, ESE=End Semester Examination)

Course Outcomes:

Students will able to

1. Understand the architecture of the 8085 microprocessor.
2. Understand the instruction set of 8085 microprocessor.
3. Understand concept of interrupt, stack, subroutines in microprocessor.
4. To understand microprocessor applications.
5. To know the concept of micro controller, to understand the architecture of 8051 microcontroller.
6. To understand organization of Personal Computer.

UNIT 1

Microprocessors: 8085 Microprocessor Architecture, Buses, Registers and Flags, Review of MSI and LSI devices such as buffers, Tristate devices, Decoders and Latches, Use of these devices in

microprocessor based systems, Address decoding, memory interfacing and input output decoding in 8085 based systems. **07 Hrs**

UNIT 2

Introduction to 8085 Instruction Set: Data Transfer, Arithmetic, Logic, Rotate, Branch and Machine Control Instructions, Software development in 8085 microprocessor assembly language, Flowcharts and programs such as Addition and Subtraction block transfer, counter, binary, finding smallest and largest of the given numbers. **07 Hrs**

UNIT 3

Interrupts, Serial I/O, Stacks and Subroutines: Processor Status Word (PSW), Concept of Stack and Instructions related to Stack, 8085 Interrupts, Restart as Software Instruction, Interrupt Masks, SID, SOD Operations, Subroutines, Conditional CALL Instructions. **07 Hrs**

UNIT 4

Applications of Microprocessors: Interfacing of ADC and DAC with 8085, Stepper Motor Controller, Multi loop Temperature Controller using 8085. **07 Hrs**

UNIT 5

Introduction to 8051 Micro controller: Comparison of Microprocessor and Micro controller, Microcontroller architecture, Architecture of Intel 8051 – Special function registers, IO ports and pins. **07 Hrs**

UNIT 6

Programming of 8051: Addressing modes, Instruction set of 8051, assembly language programming, LCD and keyboard interfacing with 8051. **07 Hrs**

Text Books:

1.Microprocessor Architecture, Programming and Applications, R. S. Gaonkar, PIP Co, New Delhi
2.Introduction to Microprocessor, B. Ram.
3.Microprocessor Architecture, Programming and application with 8085 by Gaonkar
4.The 8051 Microcontroller architecture, programming & applications, Kenneth Ayala, PIP.

Reference Books:

1.Introduction to Microprocessor, Aditya Mathur.
2.Intel Manuals for Microprocessor and Microcontroller.
3. The 8051 Microcontroller and embedded Systems by Mazidi, Pearson Education.
4. Microprocessor Interfacing, programming and hardware by D. V. Hall

Digital Electronics

(Course Code: DIN 2204)

Teaching Scheme and Credits			Examination Scheme		
TH	TU	Credits	MSE	ESE	Total
3	-	3	30	70	100

(Abbreviations: TH= Theory, TU=Tutorial, MSE=Mid Semester Examination, ESE=End Semester Examination)

Course Outcomes:

The students will be able to

1. Understand number system and its conversion, different codes used in binary number system.
2. Understand the concept of boolean algebra
3. Understand principles of logic gates.
4. Explain the operation of different Flip flops.
5. Construct the circuits using logic devices
6. Understand ADC and DAC circuits.

UNIT 1

Number systems: Introduction, Conversion- Decimal to Binary, Binary to Decimal, Binary to octal, Binary to hexadecimal, octal to Binary. Binary addition, subtraction, multiplication, division, Use of Complements in binary arithmetic, 9's & 10'complement. BCD number system, ASCII and EBCDIC number system. **07 hrs**

UNIT 2

Boolean algebra: Fundamentals of Boolean algebra, Basic Laws, Demorgan's Theorem, Boolean algebra, K-map reduction techniques (up to 4 variable map), conversion from sum-of-products to product-of sums & Vice-versa. **07 hrs**

UNIT 3

Logic Gates: Study of basic AND, OR, NOT, NOR, EX-OR, EX-NOR, NAND logic gates.
Logic families – TTL, ECL, CMOS. Introduction to SSI, MSI, LSI, VLSI, & UVLSI circuits.
Study of ICs – 7400, 7402, 7404, 7408, 7432, 7486. **07 hrs**

UNIT 4

Flip–Flops: R-S, J-K, D, T & master-slave flip-flops. ICs related to above flip-flops. Shift registers, Synchronous & ripple counter, mod-n counter, ICs 7474, 7475, 7476, 7490, 7493, 7495. **07 hrs**

UNIT 5

Arithmetic Logic Unit & their Applications: Half & Full Adder, Half subtractor, full subtractor, addition & subtraction using 2's complement system. Encoder and decoders, IC 7483, 74138. **07 hrs**

UNIT 6

ADC & DAC: Analog to digital converters: Successive approximation and dual slope type, Digital to analog converters- weighted resistor type, R-2R ladder type. **05 hrs**

Text Book:

1. Digital Electronics, R.P. Jain, TMH Publication

Reference Books:

1. Digital Principles, Malvino, TMH Publication
2. Digital Electronids, W. Gothman, PHI Publication

Managerial Skills

(Course Code: DIN 2205)

Teaching Scheme and Credits			Examination Scheme		
TH	TU	Credits	MSE	ESE	Total
3	-	3	30	70	100

(Abbreviations:TH= Theory, TU=Tutorial, MSE=Mid Semester Examination, ESE=End SemesterExamination)

Course Objectives:

The students will able to:

1. Understand basic concepts of management.
2. Understand the different functions of management.
3. Know the management aspects related to quality control.
4. Know the financial aspects for business.
5. Understand cost and cost estimation.
6. Understanddepreciation and its types.

UNIT-1.

Basic concepts of Management: Introduction, Management classification, characteristics and importance of management, Management Objectives, Principles of Management, Activities of Manager, managerial economics and accounting. **07 Hrs**

UNIT-2.

Functions of Management: Different types, forecasting, planning, organising, staffing, directing, co-coordinating, controlling, motivation, leadership and decision making, introduction to project management: importance and various tools/ software's used. **07 Hrs**

UNIT-3.

Quality control- Definition, factors affecting quality, Objectives of Quality control, Introduction to ISI, Quality assurance, ISO 9000 Indian standards of quality, Quality management system. **07 Hrs**

UNIT-4.

Finance: Sources, raising of finance, Banks, Institution, leasing institution, shares, debentures, loan, credit, Convertible bonds. **07 Hrs**

UNIT-5.

Cost and cost estimation: cash flow direct and indirect cost, Breakeven point, cost index, cost and monopoly, profit and loss account, Balance sheet. Time Value of Money:- Interest, types of interest, interest and annuities. **07 Hrs**

UNIT-6.

Depreciation: Types of depreciation, service life, salvage value, Book value, Method of determining depreciation – straight line method, declining balance method, sum of years digit method, sinking fund method. **07 Hrs**

Text book:

1. Industrial Organisation and Engineering Economics by T. R. Banga and S. C. Sharma.

Reference Book:

1. Plant Design and Economics for chemical engineer by Peter and Timmerhaus.

Linear Integrated Circuits (Lab Practice)

(Course Code: DIN 2206)

Teaching Scheme and Credits		Examination Scheme		
Practical	Credits	TW	PR/OR	Total
02	02	25	25	50

(Abbreviations:TW= Termwork, PR/OR=Practical/ Oral)

Course Outcomes:

Students will be able to

1. Understand specification sheet of op-amp 741.
2. Measure op-amp parameters.
3. Study and design various application circuits using op-amp 741.

List of Experiment (ANY EIGHT):

1. Study of specifications of IC 741 from data book.
2. Measurement of Op-Amp parameters (Gain, Input offset voltage, Input Offset current, Bias current, CMRR, output voltage, slew rate).
3. Study and testing of Op-Amp as an inverting and non-inverting amplifier using IC 741.
4. Study and testing of Op-Amp as unity gain amplifier using IC 741.
5. Study and testing of Op-Amp as adder and subtractor.
6. Study of Instrumentation amplifier.
7. Study of Log amplifier and Antilog amplifier.
8. Study of multiplier and divider circuits.
9. Study of active fillers –Low pass and High pass.
10. Study of differentiator and integrator circuits.
11. Study of Op-Amp as comparator, Schmitt trigger.
12. Study of IC 555 as monostable multivibrator.

Industrial Transducers (Lab Practice)

(Course Code: DIN 2207)

Teaching Scheme and Credits		Examination Scheme		
Practical	Credits	TW	PR/OR	Total
04	04	25	25	50

(Abbreviations: TW= Termwork, PR/OR=Practical/ Oral)

Course Outcomes:

Students will be able to –

1. Identify, use and demonstrate: pressure and level sensors and plot their characteristics.
2. Perform experiment on LVDT trainer kit and plot its characteristics
3. Measure Speed using tachometer.
4. Understand and demonstration of pH, conductivity measurement.

List of Experiments: (Any Eight)

1. Study of LVDT transducer and to plot the characteristics.
2. Study of tacho-generator using photo-electrical pick-up.
3. Study of strain gauge and to plot the characteristics
4. Study of reference and measuring electrode of the PH meter and to plot the characteristics curve for pH between 0-14.
5. Study of conductivity meter and to plot the characteristics.
6. Study of characteristic of LDR and to plot the characteristics.
7. Study of Differential pressure transmitter used for level measurement.
8. To study primary pressure sensing transducers like bourdon tube, bellows, diaphragm.
9. Study of Capacitance method for open tank level measurement.
10. Study of Differential Pressure transmitter for level measurement.

Microprocessor and Microcontroller (Lab Practice)

(Course Code: DIN 2208)

Teaching Scheme and Credits		Examination Scheme		
Practical	Credits	TW	PR/OR	Total
02	02	25	25	50

(Abbreviations:TW= Termwork, PR/OR=Practical/ Oral)

Course Outcomes:

Students will be able to -

1. Understand and use of the single board 8085 microcomputer Kit.
2. Perform various experiments using 8085 kit and analyse the results.
3. Write and execute assembly language program and analyse results.
4. Write programs using 8085.
5. Able to interface ADC motor, DAC motor using 8085

List of Experiments(ANY EIGHT):

1. Study of 8085 Microprocessor Kit.
2. Write a program to add two 8-bit number using 8085 .
3. Write a program to add two 16-bit number using 8085 .
4. Write a program to subtract two 8-bit number using 8085 .
5. Write a program to subtract two 16-bit number using 8085 .
6. Write a program to multiply two 8 bit numbers by repetitive addition method using 8085.
7. Write a program for Block Move.
8. Write a program for Arranging numbers in Ascending and descending order.
9. Stepper motor interfacing using 8085.
10. ADC motor interface using 8085.
11. DAC motor interface using 8085
12. Write a program to add two 8-bit number using 8051.
13. Study of interfacing of LCD with 8051.

Digital Electronics (Lab Practice)

(Course Code: DIN 2209)

Teaching Scheme and Credits		Examination Scheme		
Practical	Credits	TW	PR/OR	Total
02	02	25	25	50

(Abbreviations:TW= Termwork, PR/OR=Practical/ Oral)

Course outcomes:

Students will be able to -

1. Identify ICs for Logic Gates and devices.
2. Verify truth tables for Logic gates and Flip flops.
3. Design and verify simple logic circuits.

List of Experiments: (Any Eight):

1. Study and verification of truth table of Logic gates.
2. Verification of DeMorgon's Theorem.
3. Design and verification of truth table of R S flip-flops using NAND and NOR gates.
4. Design and verification of truth table of J K flip-flops using NAND and NOR gates.
5. Study and verification of truth table of R S flip-flop (ICs 74 series).
6. Study and verification of truth table of M S- J K flip-flop (ICs 74 series).
7. Study of Ripple counter using J-K flip flop.
8. Study of Decade counter using 7490.
9. Study of Shift register using D flip- flop.
10. Study of Full adder and subtractor using 7483, 7486.

Programming Techniques (C++) (Lab Practice)

(Course Code: DIN 2210)

Teaching Scheme and Credits			Examination Scheme		
TH	PR	Credits	TW	PR/OR	Total
01	02	03	25	25	50

(Abbreviations:TH= Theory,TW= Termwork, PR/OR=Practical/ Oral)

Course Outcomes:

Students will able to understand salient features of C++, various variables and declarations, OOP.

Unit 1

Introduction, Salient features of C, C-tokens, data types of variables, declarations, type casting and expression Control flow-branching & looping.

Unit 2

Functions-pass by value, Pass by reference and program structure, string manipulation, pointer and array, passing pointers as arguments in function.

Unit 3

Structural input and output file and handing, UNIX system interfaces, special features of C

Unit 4

Object oriented programming, data encapsulating, inheritance and overloading.

Unit 5

File handing with C++, constructors, destructor, special features of C++

Text Books:

1. Object Oriented Programming in C++ Saurav Sahay Oxford UniversityPress.
2. Object Oriented Programming in C++ R Rajaram New AgeInternational Publishers 2nd.

Reference Books:

1. OOPS C++ Big C++ Cay Horstmann Wiley Publication
2. Robert Lafore, Galgotia publications, new Delhi: Object Oriented Programming in TURBO C++

Course Outcomes:

Students will be able to -

1. Understand how to run the program in C++
2. Write basic programs for arithmetic operations such as addition, subtraction, multiplication, division.

List of Experiments:

8. Write a program to print "Hello World".
9. Write a C++ program to find the number of vowels present in the given character array using pointer arithmetic.
10. Write a C++ program to print the given number in reverse order. Use functions with return type and without return type for reversing the number.
11. Write a C++ program to perform arithmetic operation such as addition using inline function.
12. Write a C++ program to perform arithmetic operation such as subtraction using inline function.
13. Write a C++ program to perform arithmetic operation such as division using inline function.
14. Write a C++ program to perform arithmetic operation such as multiplication using inline function.
15. Write a C++ program to find the sum of factorial of a given number using recursive function.

Dr. Babasaheb Ambedkar Technological University's Institute of Petrochemical Engineering

Third Year Diploma in Instrumentation Engg. (Proposed Curriculum W. E. F. 2019-20)

Semester-V

Sr. No.	Course Code	Course Title	Compulsory / Optional	Teaching Scheme/Contact Hours			Examination Scheme					
				TH	TU	PR	Credits	MSE	ESE	TW	PR/OR	Total
1	DIN 3101	Feedback Control Systems	C	3	1	-	4	30	70	-	-	100
2	DIN 3102	Process Instrumentation & Automation	C	3	1	-	4	30	70	-	-	100
3	DIN 3103	Power Electronics	C	3	1	-	4	30	70	-	-	100
4	DIN 3104	Elective I A. Analytical Instrumentation B. Opto-electronic Instrumentation C. Nonconventional energy generation D. Embedded system	C	3	-	-	3	30	70	-	-	100
5	DIN 3105	Entrepreneurship Development	C	3	-	-	3	30	70	-	-	100

6	DIN 3106	Feedback Control System(Lab Practice)	C	-	-	2	2	-	-	25	#25	50
7	DIN 3107	Process Instrumentation & Automation (Lab Practice)	C	-	-	2	2	-	-	25	25	50
8	DIN 3108	Power Electronics(Lab Practice)	C	-	-	2	2	-	-	25	25	50
9	DIN 3109	Seminar/ Project	C	-	-	4	4	-	-	50	#50	100
10	DIN 3110	Industrial Training	C	-	-	2	2	-	-	25	25	50
#: External Examination			**Total**	**15**	**03**	**12**	**30**	**150**	**350**	**150**	**150**	**800**

Dr. Babasaheb Ambedkar Technological University's Institute of Petrochemical Engineering

Third Year Diploma in Instrumentation Engg. (Proposed Curriculum W. E. F. 2019-20)

Semester-VI

Sr. No.	Course Code	Course Title	Compulsory/ Optional	Teaching Scheme/Contact Hours	Examination Scheme

				TH	TU	PR	Credits	MSE	ESE	TW	PR/OR	Total
1	DIN 3201	Advanced Process Control	C	3	1	-	4	30	70	-	-	100
2	DIN 3202	Biomedical Instrumentation	C	3	1	-	4	30	70	-	-	100
3	DIN 3203	Elective II A. Distributed Control Systems B. Building Automation C. Mechatronics	C	3	-	-	3	30	70	-	-	100
4	DIN 3204	Environmental Instrumentation & Energy Conservation	C	3	-	-	3	30	70	-	-	100
5	DIN 3205	Power Plant Instrumentation	C	3	1	-	4	30	70	-	-	100
6	DIN 3206	Advanced Process Control (Lab Practice)	C	-	-	2	2	-	-	25	#25	50
7	DIN 3207	Biomedical Instrumentation (Lab Practice)	C	-	-	2	2	-	-	25	25	50
8	DIN 3208	Environmental Instrumentation & Energy Conservation (Lab Practice)	C	-	-	2	2	-	-	25	25	50
9	DIN 3209	Power Plant Instrumentation (Lab Practice)	C	-	-	2	2	-	-	25	25	50
10	DIN 3210	Project	C	-	-	4	4	-	-	50	#50	100
#: External Examination			**Total**	**15**	**03**	**12**	**30**	**150**	**350**	**150**	**150**	**800**

VISION AND MISSION OF INSTITUTE

VISION

"To transform the Institute into a seat of learning and Contemplation so as to provide comprehensive technical education at Diploma and Post Diploma level and create world-class technicians oriented towards lifelong learning".

MISSION

We in this Institute Commit ourselves to realize our Vision through Continuous Quality Improvement of faculty and staff, Adopting a vibrant curriculum and scientific delivery and A culture of transforming appropriate technologies to rural areas the underprivileged people.

VISION AND MISSION

OF INSTRUMENTATION ENGINEERING DEPARTMENT

VISION

The aim of the Department is to impart quality education in Instrumentation Engineering to produce excellent technical manpower with modern knowledge and skills so that they can contribute in the development of the nation.

MISSION

Instrumentation Engineering Department aims -

- To provide quality Instrumentation Engineering education to prepare students for successful professional career and higher studies.
- To promote industry involvement in Inplant training, placement, student projects,etc.
- To disseminate the knowledge and the skills by organizing expert lectures and workshops in a planned manner.
- To mould students to work in multidisciplinary groups, lead teams and understand their professional responsibilities for serving the needs of the society.

Programme Educational Objectives

The Programme Educational Objectives of Diploma in Instrumentation Engg. at the Department of Instrumentation of Institute of Petrochemical Engineering are

formulated in accordance with the mission and vision of the Institute. The current PEOs have been developed to maintain the Diploma program that meets the needs of stake holders as mentioned below:

1. Produce technicians who will have the ability to apply the knowledge of basic sciences, Instrumentation Engineering to excel in a carrier.

2. Produce Diploma holders who will continue to enhance their knowledge.

3. Produce Diploma holders who are confident enough to take up diverse carrier paths. Diploma holders will be able to serve in core Instrumentation and allied process industries. They will persue their higher studies in the premier institutions, serve in educational institutions, engineering consultancy companies and/or become successful entrepreneurs.

4. Produce Diploma holders who will provide leadership and demonstrate the importance of professional integrity.

PEO1: Core Competency: **Diploma holders** will solve real world problems appropriate to the discipline using foundation of mathematics, science and Instrumentation Engineering.

PEO2: Breadth*:* Diploma holders will apply current industry accepted practices, new and emerging technologies to analyze, implement, and maintain state-of-art solutions.

PEO3: Learning Environment*:* Exhibit self- learning capabilities in the field of instrumentation Engineering, teamwork and effective communication skills.

PEO4: Professionalism*:* Inculcate professional and ethical attitude and ability to relate instrumentation technology issues to society.

PEO5: Preparation: **Be successfully employed or accepted into a graduate programme / higher studies, and demonstrate a pursuit of lifelong learning.**

Programme Outcomes

The programme outcomes of Diploma level Instrumentation Engineering are as follows:

1. An ability to apply knowledge of mathematics, Science and Engineering to Instrumentation Engg. discipline.

2. An ability to conduct experiments for measurement devices / elements, control system, variety of control algorithms, final control elements, etc., and ability to analyze and interpret data.

3. Be able to apply the principles and practices for instrument / system / equipment / device to real world problems adhering to safety and regulatory standards as applicable.

4. Be able to work effectively in a various groups (may be multidisciplinary groups).

5. An ability to identify, formulate and solve a problem in Instrumentation Engineering.

6. Understand the social impact of automation, safety aspects of automation, hazards associated with various processes, environmental issues, professional ethics, etc.

7. Understand the impact of Instrumentation technology in a global, economic, environmental, and social context.

8. Demonstrate the knowledge and capabilities necessary for pursuing a professional career or higher studies.

9. Understanding of contemporary and emerging technology for various processes and systems.

10. Demonstrate an understanding of sensors / transducers, control system, complete automation system.

Programme Specific Objectives

After completion of Diploma in Instrumentation Engg. Programme, the students will be able to:

PSO 1. Instrumentation equipment : Maintain various types of field instrumentation equipments.

PSO 2. Instrumentation Measuring Principles: Understanding measurement and sensor selection to specify, calibrate and troubleshoot various process instruments commonly used in Industries.

PSO 3. Instrumentation control systems: Maintain different types of process control systems.

PSO 4. Industrial controllers: Use programmable logic controllers, supervisory control systems for control of manufacturing and processing systems

INTRODUCTION TO GRADING SYSTEM

At the end of each semester, a student is awarded a grade based on his/her performance in examinations and/or assignments in every course registered by him/ her. These grades are described by letter grades and have a numerical equivalent given below.

Letter Grade	Numerical Equivalent

DIPLOMA GRADE SYSTEM	
EX	10.0
AA	9.5
AB	9.0
AC	8.5
BB	8.0
BC	7.5
BD	7.0
CC	6.5
CD	6.0
CE	5.5
DD	5.0
DE	4.5
EE	4.0
Other Grades	
AU	Audit
FF	Fail
FR	Fail and Reregister
XX	Not Eligible
PP	Pass
NP	Not Pass

The performance of a student in a semester is indicated by a number called the Semester Grade Point Average (SGPA). The SGPA is the weighted average of the grade points obtained in all the courses taken by the student during the semester.

An up-to-date assessment from the time the student entered the programme of study is obtained by calculating Cumulative Grade Point Average (CGPA). It is calculated in the same manner as the SGPA.

In Diploma Programmes performance is indicated by SGPA and yearly Grade Point Average (GPA).

Formula for percentage: Percentage = GPA * 10

RULES REGARDING ATTENDANCE

Following are the rules relating to attendance at classes:

1. Attendance in all classes (Lectures, tutorials, laboratories, workshops, EAA including its related camps and other publicized activities etc.) is compulsory. A student may be debarred from appearing at an examination on the ground of unsatisfactory attendance.

2. The teacher concerned may condone absence from classes for a very short period due to unavoidable reasons provided he/ she is satisfied with the explanation.
3. a) If the period of absence is for a short duration (of not more than two weeks) application for leave shall to be submitted to the Head of the Department concerned starting fully the reasons for the leave requested for along with supporting document (s). The Head of the Department will grant such leave.

   b) Absence for a period not exceeding two weeks in a semester due to sickness or any other unavoidable reason for which prior application could not be made may be condoned by the Head of the Department provided he is satisfied with the explanation.
4. If the period of absence is likely to exceed two weeks, a prior application for grant of leave will have to be submitted through the Head of the Department to the Principal with the supporting documents. The decision to grant or condone such leave shall be taken by the Principal after considering the recommendation of the Head of Department, if the attendance is above 75%.

   However, if the attendance is less than 75% but above 60% due to prolonged illness or a calamity in the family, condonation may be granted by Principal. In any case if the attendance is less than 60% he/ she will not be permitted to appear for the semester examination for that subject and he/ she has to re-register for that course when offered.
5. It will be the responsibility of the student to get his absence from classes condoned by the appropriate authority.
6. A student must intimate his/ her absence to the Warden of the Hostel in which he/ she is residing, before availing of any leave. Failing to do so will be construed as breach of discipline and will be dealt with as per provisions.

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