Syllabus

PEOPLE'S UNIVERSITY, BHOPAL
(Applicable for Admitted from Academic Session 2019-20 onwards)

Programme: **Bachelor of Technology**   **Semester –III**

Subject Code	Subject Title	Credit			Theory			Practical		
		L	**T**	**P**	**External (70)**	**Internal (30)**	**Total (100)**	**External (Nil)**	**Internal (Nil)**	**Total**
BT-1301	**Engineering Mathematics-II**	3	1	-			Min: 40 (D Grade)			**Nil**

Duration of Theory (Externals): 3 Hours

Theory Internal- Max Marks: 30	Best of Two Mid Semester Test – Max Marks: 20	Assignment/Quiz/Attendance - Max. Marks: 10
Practical Internal Max Marks: Nil	Lab work & Session – Max Marks: Nil	Assignment / Quiz/Attendance - Max. Marks: Nil

Pre-Requisite	Fundamental knowledge of mathematics such as Algebra and Trigonometry.
Course Outcome	1. Experience mathematics outside of your regular course work.
	2. Use knowledge and skills necessary for immediate employment or acceptance into a graduate program.
	3. Maintain a core of mathematical and technical knowledge that is adaptable to changing technologies and provides a solid foundation for future learning.

Unit	Contents (Theory)	Marks Weightage
I	**Fourier Series:** Introduction of Fourier series, Fourier series for Discontinues Functions, Fourier series for even and odd function, half range sine and cosine series and Fourier transform.	**14**
II	**Laplace Transformations :** Introduction of Laplace Transform of elementary functions, Properties of Laplace transform ,Change of scale property, shifting property, Laplace transform of the derivative, Inverse Laplace transform and its properties, Convolution theorem and Applications of Laplace Transformation to solve the ordinary differential equations	**14**
III	**Second Order Linear Differential Equations With Variable Coefficients:** Methods one integral is known, removal of first derivative, changing of independent variable and variation of parameter, Solution by Series Method.	**14**
IV	**Linear & Non Linear Partial Differential Equations of First Order :** Formulation of partial differential equations, solution of equation by direct integration, Lagrange's Linear equation,Non linear partial differential equation and Charpit's method, Linear homogeneous and Non-homogeneous partial differential equation of second and higher order with constant coefficients.	**14**
V	**Vector Calculus :** Differentiation of vectors, scalar and vector point function, geometrical meaning of Gradient, Unit Normal vector and directional derivative, physical interpretation of divergence and curl, line integral, surface integral and volume integral, Green's Stroke's and Gauss divergence theorem.	**14**

Text Book/References Books/ Websites

1. D.C. Aggarwal; Engg. Mathematics – II;Sree Sai Prakashan.
2. BS Grewal ;Higher Engineering Mathematics; Khanna Publication
3. S.Arumungam ;Mathematics for Engineers by; SCITECH Publications
4. Erwin Kreyszig ;Advanced Engineering Mathematics ; Wiley India
5. S S Sastri;Engineering Mathematics ;. P.H.I.
6. Peter V.O'Neil ;Advanced Engineering Mathematics ; Thomson Learning
7. John Bird ;Higher Engineering Mathematics ; Elsevie.

Suggested List of Laboratory Practical (Expandable): Nil

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Subject Code	Subject Title	Credit			Theory			Practical		
		L	T	P	External (70)	Internal (30)	Total (100)	External (Nil)	Internal (Nil)	Total
ECT-1302	Computer System Organization	3	1	-			Min: 40 (D Grade)			Nil

Duration of Theory (Externals): 3 Hours

Theory Internal- Max Marks: 30	Best of Two Mid Semester Test – Max Marks: 20	Assignment/Quiz/Attendance – Max. Marks: 10
Practical Internal Max Marks: 15	Lab work & Sessional – Max Marks: 10	Assignment/ Quiz/Attendance – Max. Marks: 05

Pre-Requisite	Survey of various levels of computer architecture and design: microprogramming and processor architecture advanced assembly language programming, operating system concepts and input/output via the operating system.
Course Outcome	1. Student will be able to understand Basics of computer
	2. Ability to understand CPU and ALU organization.
	3. Ability to understand memory organization and all types of memory in computer system

Unit	Contents (Theory)	Marks Weightage
I	**Computer Basics and CPU**: Von Newman model, various subsystems, CPU, Memory, I/O, System Bus, CPU and Memory registers, Program Counter, Accumulator, Instruction register, Micro operations, Register Transfer Language, Instruction Fetch, decode and execution, data movement and manipulation, Instruction formats and addressing modes of basic computer. 8085 microprocessor organization.	14
II	**Control Unit Organization**: Hardwired control unit, Micro and nano programmed control unit, Control Memory, Address Sequencing, Micro Instruction formats, Micro program sequencer, Microprogramming, **Arithmetic and Logic Unit**: Arithmetic Processor, Addition, subtraction, multiplication and division, Floating point and decimal arithmetic and arithmetic units, design of arithmetic unit.	14
III	**Input Output Organization**: Modes of data transfer – program controlled, interrupt driven and direct memory access, Interrupt structures, I/O Interface, Asynchronous data transfer, I/O processor, 8085 I/O structure, 8085 instruction set and basic programming. Data transfer – Serial / parallel, synchronous/asynchronous, simplex/half duplex and full duplex.	14
IV	**Memory Organization**: Memory Maps, Memory Hierarchy, Cache Memory - Organization and mappings. Associative memory, Virtual memory, Memory Management Hardware.	14
V	**Multiprocessors**: Pipeline and Vector processing, Instruction and arithmetic pipelines, Vector and array processors, Interconnection structure and inter-processor communication.	14

Text Book/References Books/ Websites:-

1. Morris Mano; Computer System Architecture; PHI.
2. Gaonkar; Microprocessor Architecture, Programming, Applications with 8085; Penram Int.
3. William Stallings; Computer Organization and Architecture; PHI.

Suggested List of Laboratory Experiments :- (Expandable):Nil

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Subject Code	Subject Title	Credit			Theory			Practical		
		L	T	P	External (70)	Internal (30)	Total (100)	External (35)	Internal (15)	Total (50)
ECT-1303	Electronic Devices	3	1	1	External (70)	Internal (30)	Min: 40 (D Grade)	External (35)	Internal (15)	Min: 20 (D Grade)

Duration of Theory (Externals): 3 Hours

Theory Internal- Max Marks: 30	Best of Two Mid Semester Test – Max Marks: 15	Assignment/Quiz/Attendance – Max. Marks: 15
Practical Internal Max Marks: 15	Lab work & Sessional – Max Marks: 10	Assignment/ Quiz/Attendance – Max. Marks: 05

Pre-Requisite	To analyze the characteristics of different electronic devices such as diodes, transistors, thyristor.	
Course Outcome	1. Understand the working of diodes, transistors.	
	2. Understand the application of different electronic devices and simple circuits.	
	3. Understand the theory and applications of thyristor.	

Unit	Contents (Theory)	Marks Weightage
I	**Semiconductor:** Semiconductor intrinsic and extrinsic, p-type and n-type, energy band diagrams, majority and minority carrier, charge density in semiconductor, generation and recombination of charges, process of diffusion, diffusion and drift currents, Hall effects and its applications. p-n junction, depletion layer, potential barrier, electric field, forward and reverse biased junction, current components in p-n diode, current equation, V-I characteristics, cut in voltages of Si and Ge diode, transition and diffusion capacitance, power dissipation, p-n	14
II	**Optoelectronic and Miscellaneous Devices**: Characteristics, Equivalent Models and applications of Zener diode, Varactor diode, Schottky diode, Tunnel Diode, PIN diode, LED, photoconductor cells, photodiodes, solar cell, phototransistors,opto-couplers, thermistors, Seven segment displays.	14
III	**Bipolar Junction Transistor:** Construction, basic operation, current components, and equation. CB, CE and CC-configuration, input and output characteristics, Equivalent Model, Early effect, region of operation- active, cutoff and saturation region, Ebers-Moll model, power dissipation in transistor (Pdmax rating), Uni-junction Transistor (UJT) : Principle of operation, characteristics and Equivalent Model.	14
IV	**FET Construction**: Construction, n channel and p channel, characteristics, parameters, equivalent model and voltage gain, Enhancement and depletion MOSFET and its characteristics, analysis of FET in various configuration and Equivalent Model.	14
V	**Thyristor Family**: Silicon Controlled Rectifier, V-I Characteristics, Equivalent Model, Transistor Analogy, Turn-On and Turn-Off Mechanism, Series and Parallel Combination of SCR, Protection Circuits. Introduction to Diac, Triac, Power MOSFET, IGBT and GTO.	14

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Text Book/References Books/ Websites:

1. Boylestad and Nashelsky : Electronic Devices and Circuit Theory; Pearson Education.
2. Millman and Halkias; Integrated electronics; TMH
3. Graham Bell; Electronic Devices and Circuits; PHI.
4. Sendra and Smith; Microelectronics; Oxford Press.

Suggested List of Laboratory Experiments :- (Expandable):

1. To Study the V-I Characteristics of Silicon Diode
2. To Study the V-I Characteristics of Germanium Diode
3. To Study the V-I Characteristics of Zener Diode
4. To Study the V-I Characteristics of Light Emitting Diode (LED)
5. To Study the V-I Characteristics of Tunnel Diode
6. To Study the V-I Characteristics of Photo Diode
7. To Study the V-I Characteristics of BJT
8. To Study the V-I Characteristics of MOSFET
9. To Study the V-I Characteristics of JFET
10. To Study the V-I Characteristics of Power Electronic Devices

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		L	**T**	**P**	**External (70)**	**Internal (30)**	**Total (100)**	**External (35)**	**Internal (15)**	**Total (50)**
ECT-1304	**Electronic Instrumentation**	3	1	1			Min: 40 (D Grade)			Min: 20 (D Grade)

Duration of Theory (Externals): 3 Hours

Theory Internal- Max Marks: 30	Best of Two Mid Semester Test – Max Marks: 20	Assignment/Quiz/Attendance – Max. Marks: 10
Practical Internal Max Marks: 15	Lab work & Sessional – Max Marks: 10	Assignment/ Quiz/Attendance – Max. Marks: 05

Pre-Requisite	To know basics of various Instruments, transducers and working of electronic circuits used in electronic test and measuring instruments.
Course Outcome	1. To understand about Accuracy, Precision, Sensitivity & different types of meter.
	2. To known about CRO and different electronic components & their testing.
	3. Basic knowledge about generator, analyzer and beat frequency oscillator.

Unit	Contents (Theory)	Marks Weightage
I	**Measurement and Error**, Accuracy and Precision, Sensitivity, Linearity, Resolution, Hysterisis, Loading Effect. Measurements of Current, Voltage, Power and Impedance: DC and AC Ammeter, DC Voltmeter-Chopper type and solid-state, AC voltmeter using Rectifier, Average, RMS, Peak Responding voltmeters, Multi-meter, Power meter, Bolometer and Calorimeter.)	**14**
II	**Cathode Ray Oscilloscope (CRO):** Different parts of CRO, Block diagram, Electrostatic focusing, Electrostatic deflection, Post deflection acceleration, Screen for CRTs, Graticules, Vertical and Horizontal deflection system, Time base circuit, Oscilloscope Probes, Applications of CRO, Special purpose CROs-Multi input, Dual trace, Dual beam, Sampling, Storage (Analog and Digital) Oscilloscope. Different electronic component testing with CRO.	**14**
III	**AC Bridges**: Maxwell's bridge (Inductance and Inductance-Capacitance), Hay's bridge, Schering bridge (High voltage and Relative permittivity), Wein bridge, Wagner earth detector, Impedance measurement by Q-meter. **Non-Electrical Quantities (Transducer):** Classification of Transducers, Strain gauge, Displacement Transducer- Linear Variable Differential Transformer (LVDT) and Rotary Variable Differential Transformer (RVDT), Temperature Transducer-Resistance Temperature Detector (RTD), Thermistors, Thermocouple, Piezo-electric transducer, Optical Transducer- Photo emissive, Photo conductive, Photo voltaic, Photo-diode, Photo Transistor, Nuclear Radiation Detector.	**14**
IV	**Wave Analyzer** (Frequency selective and Heterodyne), Harmonic Distortion Analyzer, Spectrum Analyzer, Network Analyzer, Signal and Function Generators, Sweep Frequency Generator, Pulse and Square Wave Generator, Beat Frequency Oscillator.	**14**
V	**Digital Measurement and Instruments**: Advantages of Digital Instrument over Analog Instrument, Digital-to-analog conversion (DAC) - Variable resistive type, R-2R ladder Type, Binary ladder, Weighted converter using Op-amp and transistor, Practical DAC. Analog-to-digital Conversion (ADC) -Ramp Technique, Dual Slope Integrating Type, Integrating Type (voltage to frequency), Successive Approximations, digital voltmeters and multi-meters, Resolution and sensitivity of digital meter, PLC structure, principal of operation, response time and application.	**14**

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Text Book/References Books/ Websites

  1. H. S. Kalsi; Electronics Instrumentation; TMH.
  2. A.K. Sawhney; Instrumentation and Measurements; Dhanpat Rai and Co.
  3. Helfric and Cooper; Modern Electronic Instrumentation and Measurement Techniques; Pearson.

Suggested List of Laboratory Experiments :- (Expandable):

1. Study of CRO and Function Generator.

2. To Measure Phase difference between LVDT secondary winding.

3. To study input output Characteristics of LVDT

4. To Study the linear range of operation of LVDT

5. To Determine sensitivity of LVDT

6. To measure the value of unknown capacitance with the help of Schering bridge

7. To measure the value of unknown inductance with the help of Anderson bridge

8. To Study the operation of Maxwell's capacitance bridge and to measure the value of unknown inductance and Q factor.

9. To Measure the value of unknown resistance using Wheatstone bridge

10. Force measurement by strain gauge.

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Subject Code	Subject Title	Credit			Theory			Practical		
		L	T	P	External (70)	Internal (30)	Total (100)	External (35)	Internal (15)	Total (50)
ECT-1305	**Network Analysis**	3	1	1			Min: 40 (D Grade)			Min: 20 (D Grade)

Duration of Theory (Externals): 3 Hours

Theory Internal- Max Marks: 30	Best of Two Mid Semester Test – Max Marks: 20	Assignment/Quiz/Attendance – Max. Marks: 10
Practical Internal Max Marks: 15	Lab work & Sessional – Max Marks: 10	Assignment/ Quiz/Attendance – Max. Marks: 05

Pre-Requisite	To give the knowledge of analyzing any given electrical network and how to synthesize an electrical network from a given impedance/admittance function.
Course Outcome	1. Apply the knowledge of basic circuital law and simplify the network using reduction techniques
	2. Analyze the circuit using Kirchhoff's law and Network simplification theorems
	3. Obtain the maximum power transfer to the load , and Analyze the series resonant and parallel resonant circuit

Unit	Contents (Theory)	Marks Weightage
I	**Introduction to Circuit Elements**: R,L,C and their characteristics in terms of linearity & time dependant nature, voltage & current sources controlled & uncontrolled sources KCL and KVL analysis, Nodal & mesh analysis, analysis of magnetically coupled circuits, Transient analysis Transients in RL, RC&RLC Circuits, initial conditions, time constants. Steady state analysis- Concept of Phasor & vector, impedance & admittance, Network topology, concept of Network graph, Tree, Tree branch & link, Incidence matrix, cut set and tie set matrices, dual networks, Dot convention, coupling co-efficient, tuned circuits, Series & parallel resonance.	14
II	**Network Theorems for AC & DC Circuits**: Thevenin's & Norton's, Superposition's, Reciprocity, Compensation, Substitution, Maximum power transfer, and Millman's theorem, Tellegen's theorem, problems with dependent & independent sources.	14
III	**Frequency Domain Analysis**: Laplace transform solution of Integro-differential equations, transform of waveform synthesized with step ramp, Gate and sinusoidal functions, Initial & final value theorem, Network Theorems in transform domain.	14
IV	Concept of signal spectra, Fourier series co-efficient of a periodic waveform, symmetries as related to Fourier coefficients, Trigonometric & Exponential form of Fourier series.	14
V	**Network Function & Two Port Networks**: concept of complex frequency, Network & Transfer functions for one port & two ports, poles and zeros, Necessary condition for driving point & transfer function. Two port parameters – Z, Y, ABCD, Hybrid parameters, their inverse & image parameters, relationship between parameters, Interconnection of two ports networks, Terminated two port networks.	14

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Text Book/References Books/ Websites:-

1. M.E. Van Valkenburg; Network Analysis; PHI.
3. Mithal GK; Network Analysis; Khanna Publisher.
3. Hayt W.H. & J.E. Kemmerly; Engineering Circuit Analysis; TMH.
4. Roy Choudhary D; Network and systems; New Age Publication.
5. A.Chakraborti; Circuit theory; Dhanpat Rai Publication.

Suggested List of Laboratory Experiments :- (Expandable):

1. To verify Thevenin Theorem
2. To verify Superposition Theorem
3. To verify Reciprocity Theorem
4. To verify Maximum Power Transfer Theorem
5. To verify Millman's Theorem
6. To determine Open Circuit parameters of a Two Port Network
7. To determine Short Circuit parameters of a Two Port Network
8. To determine A,B,C,D parameters of a Two Port Network
9. To determine h parameters of a Two Port Network.
10. To find frequency Response of RLC Series Circuit.

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Subject Code	Subject Title	Credit			Theory			Practical		
		L	T	P	External Nil	Internal Nil	Total	External (35)	Internal (15)	Total (50)
BT-1306	C++ Programming	-	-	1			Nil			Min: 20 (D Grade)

Duration of Theory (Externals): Nil

Theory Internal- Max Marks: Nil	Best of Two Mid Semester Test – Max Marks: Nil	Assignment/Quiz/Attendance Max. Marks: Nil
Practical Internal Max Marks: 15	Lab work & Sessional – Max Marks: 10	Assignment/ Quiz/Attendance Max. Marks: 05

Pre-Requisite	Students have basic knowledge of programming
Course Outcome	1.An understanding of the concepts of inheritance and polymorphism
	2. An understanding basic concepts of C++ programming
	3.An ability to incorporate exception handling in object-oriented programs

Unit	*Contents (Theory)*	Marks Weightage
-	**C++ Basics:** Structure of a C++ program, Data types, Declaration of variables, Expressions, Operators, Operator Precedence, Evaluation of expressions, Type conversions, Pointers, Arrays, Strings, Structures, conditional statement, control structure, switch-case, break, go to statements. **OOPS: Introduction** to OOPS, differences Between OOP and Procedure Oriented Programming, Overview of OOP principles. **Function & Classes:** Scope of variables, Parameter passing, Default arguments, inline function, Recursive function, Dynamic memory allocation and reallocation, operators-new and delete, Preprocessor directives, **Classes:** Class Definition, Class Structure, Class Scope, object, Friends to a class, Static class members, Constructors and Destructors, Dynamic creation and destruction of objects, Data Abstraction. **Inheritance:** Inheritance, Defining a class hierarchy, Different forms of inheritance, Defining the Base and Derived classes, Access to the base class member. **Polymorphism:** Function overloading, Operator Overloading, Virtual Function Polymorphism: Static and Dynamic binding, Base and Derived class virtual functions, Pure virtual functions, Abstract classes, C++ Exception Handling and File Handling, Comparison of C++ with C, Java and C#.	50

Text Book/References Books/Websites:

1. E. Balaguruswamy;Object Oriented programming with C++; TMH, 2001
2. Yashwant Kanitkar; Let us C++
3. Radha Ganesan;Object Oriented Programming with C++"; Scitech Publication PVT.LTD. Chennai
4. Padam Gulwani & Anshuman Sharma;Elementary Concepts of Computer Design and Hardware

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Suggested List of Laboratory Experiments :- (Expandable):

1. Program to print any Message.
2. Program for Conditional Statements, Looping Statements and Switch Case.
3. Program to implement Arrays, Strings and Pointers.
4. Program to implement Functions and Dynamic Memory Allocation.
5. Program to implement Class and Objects.
6. Program to implement Friend Functions and Constructors.
7. Program for Inheritance.
8. Program for Polymorphism.
9. Program for File Handling.
10. Program for Exception Handling.

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Subject Code	Subject Title	Credit			Theory			Practical		
		L	T	P	External (Nil)	Internal (Nil)	Total	External (Nil)	Internal (50)	Total (50) Min: 20 (D Grade)
BT-1307	**Professional Skill-I**	-	-	1			Nil			

Duration of Theory (Externals): Nil

Theory Internal- Max Marks: Nil	Best of Two Mid Semester Test –Max Marks: Nil	Assignment/Quiz/Attendance – Max. Marks: Nil
Practical Internal Max Marks: 50	Lab work & Sessional – Max Marks: Nil	Assignment / Quiz/ Attendance – Max. Marks: 50

Pre-Requisite	Nil
Course Outcome	1. Team Work and Leadership qualities of a Leader.
	2. Business communication and its necessary skills.
	3. Report writing and its various formats.

Unit	Contents (Theory)	Marks Weightage
-	**Working in Teams** Understand and work within the dynamics of a groups. Tips to work effectively in teams, Establish good rapport, interest with others and work effectively with them to meet common objectives, Tips to provide and accept feedback in a constructive and considerate way, Leadership in teams, handling frustrations in group. **Task Management** Introduction to Task identification Task planning, organizing and execution, closing the task. **Business communication** Business communication covering, Role of communication in information age; concept and meaning of communication; skills necessary for technical communication; Communications in a technical organization; Barriers to the process of communication; Style and organization in technical communication covering, Listening, speaking, reading and writing as skills; Objectivity, clarity, precision as defining features of technical communication; Various types of business writing: Letters, reports, notes, memos; Language and format of various types of business letters; Language and style of reports; Report writing strategies; Analysis of a sample report.	**50**

Text Book/References Books/ Websites:

1. Covey Sean;Seven Habits of Highly Effective Teens;New York, Fireside Publishers, 1998.

2. Carnegie Dale; How to win Friends and Influence People; New York: Simon & Schuster, 1998.

3. Thomas A Harris; I am ok, You are ok; New York-Harper and Row, 1972

Suggested List of Laboratory Experiments :- (Expandable):Nil

Students should solve various problems and quiz on the above mention topics, and prepare an assignment.

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		L	T	P			Total	External (35)	Internal (15)	Total (50)
ECT-1308	Software Lab – I	-	-	1	External (Nil)	Internal (Nil)	Nil			Min: 20 (D Grade)

Duration of Theory (Externals): Nil

Theory Internal- Max Marks: Nil	Best of Two Mid Semester Test – Max Marks: Nil	Assignment/Quiz/Attendance – Max. Marks: Nil
Practical Internal Max Marks: 15	Lab work & Sessional – Max Marks: 10	Assignment/Quiz/Attendance – Max. Marks: 05

Pre-Requisite	Nil
Course Outcome	1. Basic Electronic circuits (examples rectifiers, clippers, clampers, diode, transistor characteristics etc).
	2. Transient and steady state analysis of RL/ RC/ RLC circuits, realization of network theorems.
	3. Study of designing of PCB layout software.

Unit	Contents (Theory)	Marks Weightage
-	**Study of circuit simulation software (any one-TINA-PRO/PSPICE/CIRCUIT MAKER/ GPSIM/SAPWIN/ Mentor PADS etc):** Overview and Study of the key features and applications of the software. Application of the software in the field of Electronic Devices, Electronic Instrumentation and Network Analysis. **Design, Optimization and simulation of:** 1. Basic Electronic circuits (examples rectifiers, clippers, clampers, diode, transistor Characteristics etc). 2. Transient and steady state analysis of RL/ RC/ RLC circuits, realization of network Theorems. 3. Use of virtual instruments built in the software. **Study of PCB layout software:** Overview and use of the software in optimization, designing and fabrication of PCB pertaining to above circuits simulated using above simulation software or other available. Students should simulate and design the PCB for at least two circuits they are learning in the current semester.	50

Text Book/References Books/ Websites: Nil

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Suggested List of Laboratory Experiments :- (Expandable):

1. To prepare the circuit of Half wave rectifier and study its characteristics.
2. To prepare the circuit of Full wave rectifier and study its characteristics.
3. To prepare the circuit of Bridge Full wave rectifier and study its characteristics.
4. To prepare the Clipper Circuit and study its characteristics.
5. To prepare the Clamper Circuit and study its characteristics.
6. To prepare the 5volt DC Power Supplier Circuit and study its characteristics.
7. To prepare the NPN Transistor as an amplifier and study its characteristics.
8. To prepare the Voltage Regulator Circuit and study its characteristics.
9. To prepare BJT CE, CB and CC Configuration Circuit and study its characteristics.
10. To prepare 7-Segment Display Circuit and study its characteristics.

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