



# Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

## B.Tech (Electronics and Instrumentation)

SUBJECT CODE	Category	SUBJECT NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		L	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTEC402	EC	Digital Electronics	60	20	20	30	20	2	1	2	4

**Legends:** L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit;

\***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

### Course Educational Objectives(CEOs):-

The objective of this course is to-

1. Use of Boolean algebra and Karnaugh Map to simplify logic function.
2. Describe the operation of different Combinational and Sequential Logic Circuits.

### Course Outcomes(COs):-

After completion of this course the students will be able to-

1. Design an optimal digital logic circuit to meet the given specifications.
2. Evaluate the performance of the given digital logic circuit based on specific criteria for reliable system implementation.

## Syllabus

### UNIT 1

9 Hrs.

#### Logic Function Optimization and Arithmetic Circuits

Logic Function, Sum of Product and Product of Sum form, Karnaugh Map minimization, Incompletely specified functions. Arithmetic Circuits- Half Adder, Full Adder, Half Subtractor, Full Subtractor, Parallel Adders/Subtractors- Ripple Carry Adder, Carry Look Ahead Adder, Serial Adders /Subtractors.

### UNIT 2

9 Hrs.

#### Combinational Circuits

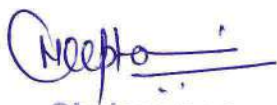
Multiplexers, Demultiplexers, Encoders- Binary Encoders, Priority Encoders, Decoders, Synthesis of logic functions using Multiplexers and Decoders. Structural modeling of higher order circuits using lower order circuits, Code converters.

### UNIT 3

#### Sequential Design Elements

10 Hrs.

S-R Latch, D- Latch, Flip Flops- Master Slave and Edge Triggered, S-R, D, J-K, T , State Table, State Equation, Timing Diagram, Excitation Table, Flip Flop Conversions, Setup and Hold Time. 555 Timer chip and its application in multivibrators.



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## UNIT 4

### Sequential Circuits

9 Hrs.

Registers, Shift Registers, Counters- Synchronous and Asynchronous counters, Design Examples, Synchronous Sequential Circuits, State Machines, Mealy and Moore Model, State Diagram, State Table, State Assignment, State Minimization, Design Examples.

## UNIT 5

### Logic Families

8 Hrs.

Characteristics of Digital ICs- Voltage Levels, Speed, Power, Noise Margin, Fan In, Fan Out. Logic Families- TTL, MOS- NMOS, PMOS, CMOS, ECL, IIL.

### Text Books:

1. M. Morris Mano: Digital Logic Design, Pearson Education
2. Salivahanan and Ari Vahagan: Digital Circuits and Design, Vikas Publishing House

### References:

1. Anand Kumar: Fundamentals of Digital Circuits, PHI.
2. Floyd and Jain: Digital Fundamentals, Pearson Education.
3. Roland J. Tocci, Widmer, Moss: Digital Systems Principles and Applications, Pearson Education.
4. Stephen Brown I Zvanko Vranesic: Fundamentals of Digital Logic Design, The Mc Graw Hill

### List of experiments

1. Implementation of Adders and Subtractors.
2. Realization of multiplexers and demultiplexers.
3. Synthesis of logic function using multiplexer.
4. Design and analysis of Encoder and Decoders.
5. Analysis of various flip flops with Preset and Clear capability.
6. Design of Astable, Monostable and Bistable multivibrator using 555 Timer.
7. Design of various Shift registers.
8. Design of Johnson and Ring counter.
9. Design of synchronous and asynchronous up/down counters.
10. Design of logic functions using PLDs.
11. Design of some minor projects based on digital circuits to solve real life problems.

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			THEORY			PRACTICAL		Th	T	P	CRE-DITS
			END SEM University Exam	Two Term Exam	Teachers As- sessment*	END SEM University Exam	Teachers As- sessment*				
BTEI302	EI	Measurement and Instrumentation	60	20	20	30	20	2	1	2	4

**Legends:** L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit;

\***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

### Course Educational Objectives (CEOs):

1. To introduce the basic functional elements of measurement
2. To educate on different types of signal generator.
3. To introduce various storage and display devices
4. To introduce various Environmental Pollution Monitoring Instruments

### Course Outcomes (COs):

After completion of this course the students are expected to be able to demonstrate following knowledge, skills and attitudes

The students will be able to

1. To apply knowledge of measurement system.
2. To identify, formulate, and solve the different types of Ammeter & Voltmeter
3. Demonstrate various types of of signal generator instrument.
4. Demonstrate various types of environmental pollution monitoring instruments.

### Syllabus

#### Unit-I

**8 Hours**

Measurement and error, Accuracy and precision, sensitivity resolution, Error & Error analysis, Effect of temperature, Internal friction, Stray field, Hysteresis and Frequency variation & method of minimizing them, Loading effects, due to shunt connected and series connected instruments, calibration curve, Testing & calibration of instruments

#### Unit-II

**10 Hours**

Different types of Ammeter & Voltmeter – PMMC, MI, Electrodynamometer, Hotwire, Electrostatic, Induction, Rectifier, Ferro dynamic & Electro-thermal, Expression for control & deflection torque, their advantages, disadvantages & error, Extension of range of instruments using shunt & multiplier. Introduction to A/D and D/A converters. Various types of Analog Digital & Digital to Analog converters.

  
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## Unit-III

10 Hours

Miscellaneous Instruments & Measurements: Frequency meter – Vibrating reed, Resonance type & Weston type, Synchronoscope, Ohmmeter – series & stunt type, Multi-meter, Megger & Ratio meter. Signal generator: Function generator, sweep frequency generator, Pulse and square wave generator, Wave Analysers, Harmonic Distortion Analyser, Spectrum Analysers, frequency counter.

## Unit-IV

11 Hours

R, L, C Measurement: Bridges: Measurement of resistance using Wheatstone bridge, Kelvin's double bridge, Loss of charge method, ohm meter, Measurement of inductance and capacitance by A.C. bridges: Maxwell's bridge, Anderson bridge, Schering bridge, Hay's bridge, Wein's bridge, Shielding and grounding, Q meter.

## Unit-V

9 Hours

Gas Analysis: Gas chromatography, Thermal conductivity method, Heat of reaction method Zirconia-probe oxygen analyser. Paramagnetic oxygen meters, electrochemical reaction method. Environmental Pollution Monitoring Instruments: Air pollution monitoring instruments, Water pollution monitoring instruments.

## Text Book

1. A.K. Sawhney; Electrical & Electronic Measurements & Instrument; Dhanpat Rai & Sons Pub.

## Reference Book

1. Patranabis D-Principles of Industrial Inst. TMH Publication
2. Electronic Instrumentation – Kalsi – TMH

## List of Experiments:

1. Study of CRO and DSO.
2. Perform component testing using Measuring Devices.
3. Demonstration of CRO.
4. Study of phase & frequency using Lissajous pattern with help of CRO.
5. Measurement of high resistance by loss of charge method
6. Study of function generator with its application.
7. To study and find out the balance condition for the Maxwell's bridge.
8. To study and find out the balance condition for the Schering bridge.
9. To study and find out the balance condition for the Hay's Bridge.
10. To study and find out the balance condition for the Wein's bridge.
11. To study and find out the balance condition for the Anderson's Bridge.

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BTEC302	EC	Network Analysis & Synthesis	60	20	20	30	20	3	1	2	5

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### Course Educational Objectives (CEOs):

Being one of the fundamental courses of Electronics stream its prime objective is to make the students capable of analyzing given electrical network composed by passive element and some active element. To make the students learn how to synthesize an electrical network from a given impedance/admittance function.

### Course Outcomes (COs):

After completion of this course the students are expected to be able to demonstrate following knowledge, skills and attitudes:

1. Apply the fundamental concepts in solving and analyzing different Electrical networks.
2. Select appropriate and relevant technique for solving the Electrical network in different conditions.
3. Apply mathematics in analyzing and synthesizing the networks in time and frequency domain.
4. Estimate the performance of a particular network from its analysis.

### Syllabus

#### UNIT I

9 Hrs

**Network Theorems:** Preliminaries of Electrical elements R, L, C, and circuits; Kirchhoff's laws Basic elements: Voltage and current sources, Linearity of elements, Power and energy in electrical elements. Circuit Analysis Methods: Nodal analysis, Mesh analysis, Circuit Theorems: Thevenin's theorem, Norton's theorem, Maximum power transfer theorem, Superposition theorem, Reciprocity theorem.

#### UNIT II

8 Hrs

**Transient Analysis:** Source free RL and RC circuits, Elementary function unit step, unit ramp, unit impulse function and synthesis from source free parallel and series RLC circuit, complete response of the RLC circuit, lossless LC circuit.

#### UNIT III

8 Hrs

**Frequency Domain Analysis:** The phasor concept, sinusoidal steady state analysis; Resonance, Network theorem in ac domain. AC circuit power analysis, Laplace transform: Application in circuit analysis, frequency response of simple passive filters.

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## UNIT IV

9 Hrs

**Two Port Networks:** Z, Y, h and ABCD parameters, analysis of interconnected (magnetically coupled) two port networks. Transfer function, immittance function.

## UNIT V

10 Hrs

**Network Synthesis:** Positive real function, Hurwitz polynomial LC, RL, RC, and RLC network synthesis, Foster and Cauer network realization, Brune's method, Synthesis-Coefficient.

### Text Books:

1. M.E. Van Valkenburg, Network Analysis, Pearson Education India; 3<sup>rd</sup> edition. 2015.
2. S P Ghosh A K Chakraborty, Network Analysis & Synth. Tata McGraw-Hill Education, 7<sup>th</sup> edition 2015.
3. Franklin F. Kuo, Network analysis and synthesis, Wiley publication, 2<sup>nd</sup> Edition 2013.

### References:

1. Gordon J. Alexander and Matthew N.O. Sadiku, Fundamentals of Electric Circuits, McGraw-Hill Education; 5<sup>th</sup> edition. 2013
2. Jack Ellsworth Kemmerly and William H. Hayt, Engineering Circuit Analysis, McGraw-Hill Education; 8<sup>th</sup> edition. 2013
3. Pen-Min Lin and Raymond A DeCarlo, Linear Circuit Analysis, Oxford university press, 2<sup>nd</sup> edition 2012
4. <http://www.nptelvideos.in/2012/11/networks-and-systems.html>

### List of Experiments:

1. Introduction of Simulation software Tina-TI.
2. To verify Thevenin's Theorem and Norton's Theorem.
3. To verify Superposition Theorem and Reciprocity Theorem.
4. To verify Maximum Power Transfer Theorem.
5. To determine Open Circuit and Short Circuit parameters of a Two Port Network.
6. To determine A, B, C, D parameters of a Two Port Network.
7. To determine h-parameters of a Two Port Network.
8. To find Frequency Response of RLC Series Circuit RLC parallel Circuit.
9. To determine resonance and 3dB frequencies.
10. To determine charging and discharging times of Capacitors.

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BTEC305	EC	Electronic Circuits	60	20	20	30	20	3	1	2	5

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P - Practical; C - Credit;

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### Course Educational Objectives (CEOs):

The objective of this course is to-

- 1) Use abstractions to analyze and design simple electronic circuits.
- 2) Design and construct circuits, take measurements of circuit behavior and performance, compare with predicted circuit models and explain discrepancies.

### Course Outcomes (COs):

Students who are successful in this class will be able to:

1. Understand the basic physics of carrier transport in bulk semiconductors and real device structures.
2. Understand the fundamentals of operation of the main semiconductor electronic devices.
3. Understand the basic parameters of electronic devices, their performance, and limiting factors.
4. Understand the basic principles of electronic device.

## SYLLABUS


### Unit-I

**Physical Electronics:** Electrons and holes in semiconductors, Carrier Statistics, Energy bands in intrinsic and extrinsic silicon; Mechanism of current flow in a semiconductor; Carrier transport: diffusion current, drift current, mobility and resistivity; Generation and recombination of carriers; Poisson and continuity equations, Hall Effects.

### Unit-II

**PN junction diode:** PN junction diode in forward and reverse bias, temperature dependence of V-I characteristics, diode resistances, diode junction capacitance. Types of diodes: Zener Diode, Varactor Diode, Tunnel Diode, PIN Diode, Schottky Diode, LED and Photo Diodes, Switching characteristics of diode.

**Bipolar junction transistor:** Construction, basic operation, current components and equations, CB, CE and CC configuration, input and output characteristics, Early effect, Region of operations: active, cut-off and saturation region. BJT as an amplifier. Ebers-Moll model, Power dissipation in transistor (Pd, max rating), Photo transistor.



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## Unit-III

**Transistor biasing circuits and analysis:** Introduction, various biasing methods: Fixed bias, Self bias, Voltage Divider bias, Collector to base bias, Load-line analysis: DC and AC analysis, Operating Point and Bias Stabilization and Thermal Runaway. Transistor as a switch.

## Unit-IV

**Small Signal analysis:** Small signal Amplifier, Amplifier Bandwidth, Hybrid model, analysis of transistor amplifier using h-parameter, Multistage Amplifier: Cascading amplifier, Boot-strapping Technique, Darlington amplifier and cas-code amplifier, Coupling methods in multistage amplifier, Low and high frequency response, Hybrid  $\pi$  model, Current Mirror circuits.

**Large Signal analysis and Power Amplifiers:** Class A, Class B, Class AB, Class C, Class D, Transformer coupled and Push-Pull amplifier

## Unit-V

**FET:** JFET- Construction, n-channel and p-channel transistors, drain and transfer characteristics, parameters, Equivalent model and voltage gain, analysis of FET in CG, CS and CD configuration. Enhancement and Depletion MOSFET drain and transfer Characteristics.

**Uni-junction Transistor (UJT):** UJT - Principle of operation, characteristics, UJT relaxation oscillator, PNP Diode and its characteristics,

**Thyristors:** Silicon controlled rectifier: V-I characteristics, DIAC and TRIAC, Thyristors parameters and applications.

### Text Books:

1. Boylestad and Nashelsky: Electronic Devices and Circuit Theory, Pearson Education
2. Sedra and Smith: Microelectronics, Oxford Press.

### Reference Books:

1. Ben G. Streetman, Sanjay Bannerjee, Solid State Electronic Devices.
2. Graham Bell: Electronic Devices and Circuits, PHI.
3. Millman and Halkias: Integrated electronics, TMH
4. Donald A Neamen: Electronic Circuits Analysis and Design.
5. Robert F. Pierret, Semiconductor Device Fundamentals.

### LIST OF EXPERIMENTS:

1. To determine and analyze the V-I characteristics of PN Junction diode.
2. To determine and analyze the V-I characteristic of Zener diode and its load regulation capability.
3. To design clipper and clamper circuits.
4. To determine input and output characteristics of transistor amplifiers in CE configurations.
5. To determine input and output characteristics of transistor amplifiers in CC configurations.
6. To determine input and output characteristics of transistor amplifiers in CB configurations.
7. To determine the frequency response of CE amplifier, direct coupled and RC coupled amplifier.
8. To determine Drain and Transfer Characteristics of JFET Amplifier.
9. To determine Drain and Transfer Characteristics of MOSFET Amplifier.
10. To determine characteristics of class A and B power amplifiers.

  
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## Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

### ML-301 ENVIRONMENT AND ENERGY STUDIES

SUBJECT CODE	CATEGORY	SUBJECT NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		L	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assesse nt*	END SEM University Exam	Teachers Assesse nt*				
ML-301	Compulsory	Environme nt and Energy Studies	60	20	20	0	0	4	0	0	4

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P - Practical; C - Credit;

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#### Course Objectives :

1. Understand sources of information required for addressing environmental challenges.
2. Identify a suite of contemporary tools and techniques in environmental informatics.
3. Apply literacy, numeracy and critical thinking skills to environmental problem-solving.


#### Course Outcomes


1. Apply the principles of ecology and environmental issues that apply to air, land and water issues on a global scale.
2. Develop critical thinking and/or observation skills, and apply them to the analysis of a problem or question related to the environment.
3. Demonstrate ecology knowledge of a complex relationship between predators, prey, and the plant community.

**Unit I: Environmental Pollution and Control Technologies** - Environmental Pollution & Control: Classification of pollution, Air Pollution: Primary and secondary pollutants, Automobile and industrial pollution, Ambient air quality standards. Water pollution: Sources and types, Impacts of modern agriculture, degradation of soil. Noise Pollution: Sources and Health hazards, standards, Solid Waste management composition and characteristics of e - Waste and its management. Pollution control technologies: Wastewater Treatment methods: Primary, Secondary and Tertiary.

**Unit II: Natural Resources** - Classification of Resources: Living and Non - Living resources, water resources: use and over utilization of surface and ground water, floods and droughts, Dams: benefits and problem, Mineral resources: use and exploitation, environmental effects of extracting and using mineral resources, Land resources: Forest resources, Energy resources:

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Growing energy needs, renewable energy source, case studies.

**Unit III: Ecosystems:** Definition, Scope and Importance ecosystem. Classification, Structure and function of an ecosystem, Food chains, food webs and ecological pyramids. Energy flow in the ecosystem, Biogeochemical cycles, Bioaccumulation, Ecosystem Value, Devices and Carrying Capacity, Field visits.


**Unit IV: Biodiversity and its Conservation** - Introduction - Definition: genetic, species and ecosystem diversity. Bio-geographical classification of India - Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values - Biodiversity at global, National and local levels. - India as a megadiversity nation - Hot-spots of biodiversity - Threats to biodiversity: habitat loss, poaching of wildlife, man wild life conflicts; Conservation of biodiversity: In-situ and Ex-situ conservation, National Biodiversity Act.

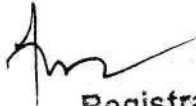
**Unit V: Environmental Policy, Legislation & EIA** - Environmental Protection act, Legal aspects Air Act- 1981, Water Act, Forest Act, Municipal solid waste management and handling rules, biomedical waste management and handling rules, hazardous waste management and handling rules. EIA: EIA structure, methods of baseline data acquisition, Overview on Impacts of air, water, biological and Socio- economical aspects. Strategies for risk assessment, Concepts of Environmental Management Plan (EMP)

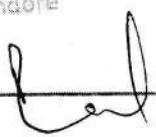
### Recommended Readings:

1. Agarwal, K.C. (2001). *Environmental Biology*. Bikaner: Nidi Pub. Ltd.
2. Brunner, R.C. (1993). *Hazardous Waste Incineration*. New Delhi: McGraw Hill Inc.
3. Clank, R.S. (2001). *Marine Pollution*. New York: Oxford University Press.
4. De, A.K. (2001). *Environmental Chemistry*. New Delhi: Wiley Western Ltd.
5. Bharucha, Erach (2005). *Environmental Studies for Undergraduate Courses*. New Delhi: University Grants Commission.
6. Rajagopalan, R. (2006). *Environmental Studies*. New York: Oxford University Press.
7. AnjiReddy, M. (2006). *Textbook of Environmental Sciences and Technology*. BS Publication.
8. Wright, Richard T. (2008). *Environmental Science: towards a sustainable future*. New Delhi: PHL Learning Private Ltd.
9. Gilbert M. Masters and Wendell P. Ela (2008). *Environmental Engineering and science*. University Kindom: PHI Learning Pvt Ltd.
10. Botkin Daniel B. & Edwards A. Keller (2008). *Environmental Science*. New Delhi: Wiley INDIA edition.
11. Kaushik, Anubha (2009). *Environmental Studies*. New Delhi: New age international publishers.

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01/07/19





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			THEORY			PRACTICAL		Th	T	P	CRED-ITS
			END SEM University Exam	Two Term	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTCS207		Computer Programming-II	0	0	0	30	20	0	0	2	1

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P - Practical; C - Credit;

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### Course Objectives:

1. To understand Object oriented concepts.
2. To understand programming using object oriented techniques.
3. To understand the use of various system libraries.
4. To have the knowledge of important topics and principles of software development.
5. To write a computer program & to solve specified problems.
6. To use the Java SDK environment to create, debug and run simple Java programs.
7. To study event driven Graphical User Interface (GUI) programming

### Course Outcomes:

1. Students should be able to explain the object oriented concepts.
2. Students should be able to write programs using object-based programming techniques including classes, objects and inheritance.
3. Able to use of various system libraries.
4. Be aware of the important topics and principles of software development.
5. Have the ability to write a computer program to solves pecified problems.
6. Be able to use the Java SDK environment to create, debug and run simple Java programs.
7. Introduce event driven Graphical User Interface (GUI) programming

### UNIT-I


Java Fundamentals: Features of Java, OOPs concepts, Java virtual machine, Byte code interpretation Data types, variable, arrays, expressions, operators, and control structures, Objects, Introduction to Class: Instance members and member functions, constructors, constructor overloading, Static Method, Static classes, Inner classes

### UNIT-II

Introduction to Java classes and objects: Java features: Java syntax, data types, data type conversions, control statements, operators and their precedence. Introduction to Class: Instance members and member functions. Inner Classes, String Handling, Wrapper classes

### UNIT-III

Inheritance, Polymorphism and Collection: Class relationships: Inheritance and its types, Merits and Demerits. Association, Association inheritance, Polymorphism: Dynamic method dispatch, Runtime polymorphism, Abstract classes, Interfaces and packages, Collections.



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## UNIT-IV

Exception Handling and Multithreading: Exceptions: Need for exceptions, Exception hierarchy: Checked Unchecked exceptions, Try, catch, finally, Throw, throws, creating exceptions. Multithreading: Thread Life cycle, Multi threading advantages and issues, Simple thread program, Priorities and scheduling, Thread Synchronization.

## UNIT-V

Java I/O, Applets, Event Handling, and Database Connectivity: Basic concept of streams I/O stream & reader-writer classes. File handling. Applet and its Life Cycle, Basic GUI elements, Event Delegation Model and event handling Swing components: Applet, JButton, JFrame, etc. Sample swing programs JDBC architecture, establishing connectivity and working with connection interface working with statements, Creating and executing SQL statements, working with Result Set

### References:

1. Java- Head First 2nd edition Kathy Sierra , Bert Bates.
2. Programming with Java A Primer, E. Balaguruswamy Tata McGraw Hill Companies.
3. Java Programming John P. Flynt Thomson 2nd.
4. Java Programming Language Ken Arnold Pearson.
5. The complete reference JAVA2, Hervert schildt. TMH.
6. Big Java, Cay Horstmann 2nd edition, Wiley India Edition.
7. Java – Balaguruswamy.

### Practical's List:

1. Installation of J2SDK -
2. Write a program to show Scope of Variables
3. Write a program to show Concept of CLASS in JAVA
4. Write a program to show Type Casting in JAVA
5. Write a program to show How Exception Handling is in JAVA
6. Write a Program to show Inheritance
7. Write a program to show Polymorphism
8. Write a program to show Access Specifiers (Public, Private, Protected) in JAVA
9. Write a program to show use and Advantages of CONTRUCTOR
10. Write a program to show Interfacing between two classes
11. Write a program to Add a Class to a Package
12. Write a program to show Life Cycle of a Thread
13. Write a program to demonstrate AWT.
14. Write a program to Hide a Class
15. Write a Program to show Data Base Connectivity Using JAVA
16. Write a Program to show "HELLO JAVA" in Explorer using Applet
17. Write a Program to show Connectivity using JDBC
18. Write a program to demonstrate multithreading using Java.
19. Write a program to demonstrate applet life cycle.
20. Write a program to demonstrate concept of servlet.

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			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTMT302		PCB Designing Lab	0	0	0	30	20	0	0	2	1

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit;

\*Teacher Assessment shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

### Course Educational Objectives (CEOs):

The subject aims to provide the student with:

1. Familiarization of PCB Circuit Terminology and able to design a circuit and create a schematic Capture
2. Become proficient with computer skills for drawing Schematic and PCB Layout

### Course Outcomes (COs):

Student will be able to:

1. Apply the process of PCB manufacturing, assembling and testing.
2. Demonstrate various electronic components.
3. Use circuit design tools, PCB manufacturing and assembling knowledge.
4. Design Basic Electronic circuits.

### List of Experiments

1. Identification and introduction of various electronics components(R, L, C etc).
2. Introduction and Comparison of various types of PCBs.
3. Demonstration of various measuring instruments(CRO, Multimeter etc).
4. Design of basic circuits using Breadboard (Rectifier, Clippers, Clampers etc.).
5. Introduction and comparison of Software tool s used for PCB Designing.
6. Designing of basic circuit layout using software tools.
7. Study of PCB design technique.
8. Design of Power Supply
9. Design of Various logic Gates.
10. Design of basic circuits using PCB.

### References:

1. Printed Circuit Boards: Design, Fabrication, Assembly and Testing R. S. Khandpur Tata McGraw-Hill Education, 2005
2. Printed Circuits Handbook Clyde Coombs McGraw Hill Professional, 22-May-2007

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