B Tech. (Electronics and Instrumentation)

SUBJECT CODE	Category	SUBJECT NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		Th	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTMA 201		Applied Mathematics-2	60	20	20	0	0	3	1	0	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):
To introduce the students with the Fundamentals of the Calculus of Matrices, Differential Equations and Numerical Analysis

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. Understand and apply the basics of the calculus of matrices.
2. Solve the fundamental problems of the ordinary differential equations.
3. Apply the advanced techniques to find the solution of the ordinary differential equations.
4. Know the techniques of the numerical analysis.
5. Find the numerical solution of the ODE and PDE.

Syllabus

Unit-I

Calculus of Matrices: Systems of linear equations and their solutions. Matrices, determinants, rank and inverse. Linear transformations. Range space and rank, null space and nullity. Eigenvalues and eigenvectors. Similarity transformations. Diagonalization of Hermitian matrices. Bilinear and quadratic forms.

Unit-II

Differential Equation: Ordinary Differential Equations: First order linear and nonlinear ordinary differential equations, exactness and integrating factors. Ordinary linear differential equations of n-th order, solutions of homogeneous and non-homogeneous equations. Operator method. Method of undetermined coefficients and variation of parameters.

Unit-III

Differential Equation: Power series methods for solutions of ordinary differential equations. Legendre equation and Legendre polynomials, Bessel equation and Bessel functions of first and second kind.

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Board of Studies
Shri Vaishnav Vidyapeeth Vishwavidyalaya
Indore

Joint Registrar
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

Unit-IV

Interpolation and Curve Fitting: Introduction to Interpolation; Calculus of Finite Differences; Finite Difference and Divided Difference Tables; Newton-Gregory Polynomial Form; Lagrange Polynomial Interpolation; Theoretical Errors in Interpolation; Spline Interpolation; Approximation by Least Square Method.

Numerical Differentiation and Integration: Discrete Approximation of Derivatives: Forward, Backward and Central Finite Difference Forms, Numerical Integration, Simple Newton-Cotes Rules: Trapezoidal and Simpson's (1/3) Rules; Weddle's Rule, Gaussian Quadrature Rules: Gauss-Legendre, Gauss-Laguerre, Gauss-Hermite, Gauss-Chebychev.

Unit-V

Numerical Solution of ODE & PDE: Euler's Method for Numerical Solution of ODE; Modified Euler's Method; Runge-Kutta Method (RK2, RK4), Error estimate; Multistep Methods: Predictor-Corrector method, Adams-Moulton Method; Boundary Value Problems and Shooting Method; finite difference methods, numerical solutions of elliptic, parabolic, and hyperbolic partial differential equations.

Texts:

- *G. Strang, Linear Algebra And Its Applications, 4th Edition, Brooks/Cole, 2006*
- *S. L. Ross, Differential Equations, 3rd Edition, Wiley, 1984.*
- *E. A. Coddington, An Introduction to Ordinary Differential Equations, Prentice Hall, 1995.*
- *W.E. Boyce and R.C. DiPrima, Elementary Differential Equations and Boundary Value Problems, 7th Edition, Wiley, 2001.*
- *K. E. Atkinson, Numerical Analysis, John Wiley, Low Price Edition (2004).*
- *S. D. Conte and C. de Boor, Elementary Numerical Analysis - An Algorithmic Approach, McGraw-Hill,2005.*
- *B. S. Grewal, Higher Engineering Mathematics, Khanna Publishers, Delhi*

References:

- *E. Kreyszig, Advanced Engineering Mathematics, 9th Edition, Wiley, 2005.*
- *R. G. Bartle and D. R. Sherbert, Introduction to Real Analysis, 5th Ed, Wiley, 1999.*
- *J. Stewart, Calculus: Early Transcendentals, 5th Ed, Thomas Learning (Brooks/ Cole), Indian Reprint, 2003.*
- *J. Stoer and R. Bulirsch, Introduction to Numerical Analysis, 2nd Edition, Texts in Applied Mathematics, Vol. 12, Springer Verlag, 2002.*
- *J. D. Hoffman, Numerical Methods for Engineers and Scientists, McGraw-Hill, 2001.*
- *M.K Jain, S.R.K Iyengar and R.K Jain, Numerical methods for scientific and engineering computation (Fourth Edition), New Age International (P) Limited, New Delhi, 2004.*
- *S. C. Chapra, Applied Numerical Methods with MATLAB for Engineers and Scientists, McGraw-Hill 2008.*

Chairperson
Board of Studies
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Indore

Joint Registrar
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Vishwavidyalaya, Indore

B Tech. (Electronics and Instrumentation)

SUBJECT CODE	Category	SUBJECT NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		Th	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTCH101		Applied Chemistry	60	20	20	30	20	3	1	2	5

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 give basic knowledge of polymer science.
2. To understand and apply the knowledge of electrochemistry and its laws.
3. To give basic knowledge of corrosion and control over it.
4. To understand the various sophisticated instrumental techniques.
5. To give basic knowledge of water, lubricants and different properties of water.

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

6. Theoretical understanding of various high polymers and their properties.
7. Became aware of the importance of electrochemistry and its laws in the field of technology and dealing with its numerical approach.
8. Implementing instrumental techniques as powerful tool for qualitative and quantitative analysis of compounds.
9. Find the numerical solution of the ODE and PDE.
10. Analyzing boiler feed water for industrial use and drinking water for domestic use.

Syllabus

Unit-I

POLYMERS AND REINFORCED PLASTICS

Classification of polymers - types of polymerization reactions - mechanism of addition polymerization: free radical, ionic and Ziegler - Natta - effect of structure on the properties of polymers - strength, plastic deformation, elasticity and crystallinity -Preparation and properties of important resins: Polyethylene, PVC, PMMA, Polyester, Teflon, Bakelite and Epoxy resins - compounding of plastics - moulding methods - injection, extrusion, compression

Unit-II

ELECTROCHEMISTRY: Arrhenius theory of electrolytic dissociation, Transport number,

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Board of Studies
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Indore

Joint Registrar
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

Kohlrausch's law, Solubility product, Redox reaction, Electrochemical and concentration cells.

CORROSION AND ITS CONTROL:

Corrosion: Basic concepts - mechanism of chemical, electrochemical corrosion - Pilling Bedworth rule – Types of Electrochemical corrosion - galvanic corrosion - differential aeration corrosion - pitting corrosion - stress corrosion – Measurement of corrosion (wt. loss method only) - factors influencing corrosion.

Corrosion control: Cathodic protection - sacrificial anodic method – corrosion inhibitors. Protective coatings: surface preparation for metallic coatings - electro plating (copper plating) and electroless plating (Nickel plating) - chemical conversion coatings - anodizing, phosphating & chromate coating

Unit-III

BASIC INSTRUMENTAL TECHNIQUES: Basic principles, instrumentation and applications of potentiometry, UV - visible spectroscopy, infrared spectroscopy, atomic absorption spectroscopy and flame photometry.

ENGINEERING MATERIALS: Cement, Refractories etc.

Unit-IV

WATER TREATMENT:

Water quality parameters: Physical, Chemical & Biological significance - Hardness of water - estimation of hardness (EDTA method) - Dissolved oxygen – determination (Winkler's method), Alkalinity - determination - disadvantages of using hard water in boilers: Scale, sludge formation - disadvantages - prevention - treatment: Internal conditioning - phosphate, carbon and carbonate conditioning methods - External: Zeolite, ion exchange, Lime Soda methods & Numericals- desalination - reverse osmosis and electrodialysis - domestic water treatment.

Surface Tension: Introduction; Origin of Surface Tension; Surface energy; Laplace & Young-Laplace Equation, Capillarity; Contact Angle; Measurement of Surface Tension by Capillary rise method; Variation of Surface Tension of a liquid with Temperature and Concentration.

Lubricants: Mechanism of lubrication, Classification of lubricants, Properties & testing of lubricating oil. Definition of viscosity of a liquid; Determination of Viscosity; Shear Viscosity; Intrinsic Viscosity; Molecular weight from Viscosity measurement & Numerical problems based on viscosity index.

Unit-V

Metal in Industry

Structure of coordination compounds corresponding to coordination number up to 6, Types of ligands, Isomerism [geometrical, optical, ionization, linkage and coordination], Theories of bonding in coordination compounds- crystal field theory, Valence bond theory, Chelation.

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Board of Studies
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Vishwavidyalaya, Indore

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References:

1. *O.P. Viramani, A.K. Narula, Applied Chemistry – Theory and Practice, New Age Pub.*
2. *Ghosh, –Polymer Science, Tata McGraw Hill.*
3. *Sawyer, McCarty and Parkin –Chemistry for Environmental Engineering –McGraw Hill, International.*
4. *Alistair Cameron –Basic Lubrication theory*
5. *Dr. Jyoti Mitna -Engineering chemistry*
6. *Dr. Sunita Ratan -Engineering chemistry*
7. *S.M. Khopkar -Applied Chemistry*
8. *V.R. Gowawriker -Polymer Science*
9. *G.S. Mishra -Introduction of polymer science*

List of Experiments:

1. To estimate the strength of the given unknown solution of Mohr's salt (Ferrous ammonium sulphate ($FeSO_4(NH_4)_2SO_4.6H_2O$) using $KMnO_4$ solution as an intermediate.
2. Estimation of hardness by EDTA method.
3. Conductometric titration - determination of strength of an acid
4. Estimation of iron by potentiometry.
5. Determination of molecular weight of polymer by viscosity average method
6. Determination of Na / K in water sample by Flame photometry (Demonstration)
7. Determination of total alkalinity and acidity of a water sample
8. Estimation of calcium ions present in tap water. (TDS)
9. To determine the viscosity of a given liquid (30% sugar solution) at room temperature using Ostwald's viscometer.
10. Testing of Flash point of lubricating oil by Pensky Martins apparatus.
11. To determine the viscosity index by Red wood Viscometer 1 & 2.

Chairperson
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Indore

Joint Registrar
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

B Tech. (Electronics and Instrumentation)

SUBJECT CODE	Category	SUBJECT NAME	TEACHING &EVALUATION SCHEME								
			THEORY			PRACTICAL		Th	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTME 101		Engineering Drawing	60	20	20	30	20	3	0	4	5

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):

To familiarize with concepts of scale, conic sections and engineering curves.
To familiarize with the concepts related to the projections of points and line in all quadrants;construction of geometrical figures & solids, with its orientation on horizontal and vertical planes, and its projection; section of solid, development of solid and isometric projection view.

Course Outcomes (COs):

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

1. Student would be able to draw scale, conic sections and engineering curves.
2. Student would be able to draw projection of point and line; indentify the use of these concepts in practical life.
3. Students would be able to understand plain &3D model at various orientations and draw their projection.
4. Student would be able to draw the projections of with and without sectioning of solid models and surface development.
5. Students would be able to understand the difference between orthographic view and isometric projections.

Syllabus

UNIT I- **SCALES, CONIC SECTION & ENGINEERING CURVES**

SCALES- Representative Factor, types of scales, principle and construction of different scales
CONIC SECTION- Construction of ellipse, parabola and hyperbola by different methods; Normal and Tangent
ENGINEERING CURVES- Cycloid, Epicycloids, Hyper cycloid, Involutes, Archimedean and Logarithmic spirals.

UNIT II- **PROJECTION OF POINTS & LINE**

PROJECTION- Introduction to projection, Types of projection, terminology, first angle and third angle

Chairperson
Board of Studies
Shri Vaishnav Vidyapeeth Vishwavidyalaya
Indore

Joint Registrar
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

PROJECTION OF POINTS- Introduction of point, conventional representation
PROJECTION OF LINES- Introduction of straight line, orientation of straight line, true inclination and true length, concepts of end projectors, plan and traces and auxiliary planes

UNIT III- PROJECTION OF PLANES & SOLIDS

PROJECTIONS OF PLANES- Introduction of planes, types of planes, orientation of planes, projection of planes in different positions, traces of planes

PROJECTION OF SOLIDS- Introduction of solids, classification of solids, recommended naming of corners of solids, orientation of solids

UNIT IV- SECTION OF SOLIDS & DEVELOPMENT OF SURFACES

SECTION OF SOLIDS- Introduction of section of solids, terminology, types of section planes, section of prisms, section of pyramid and section of composite solids

DEVELOPMENT OF SURFACES- Introduction of development of surfaces, classification of surfaces, methods of development, development of prisms, pyramids, cylinder and cone, anti-development

UNIT V- ISOMETRIC PROJECTIONS

ISOMETRIC PROJECTIONS- Introduction of isometric projection, terminology, isometric projections and isometric views, isometric views of planes, right solids, truncated solids and composite solids.

Textbooks-

1. *Engineering Drawing by N.D. Bhatt.*
2. *Engineering Drawing by C. Agarwal&BasantAgarwal.*
3. *Engineering Drawing by P.S. Gill.*

Reference Books-

1. Engineering Drawing by LeonelZurbito
2 .Engineering Drawing by Nor AzlanRamli
3.Engineering Drawing by NinadWatve

LIST OF EXPERIMENTS-

1. Drawing various types of scales using representative fraction.
2. Drawing various conics section.
3. Drawing various engineering curves like Cycloid, Epicycloids, Hyper cycloid, Involutes, Archimedean and Logarithmic spirals.
4. Projection of points in all quadrants.
5. Projection of straight lines in all quadrants in various orientations.
6. Projection of geometrical planes with various orientations.
7. Projection of solid models with various orientations.
8. Projection of section of solids by using various types of cutting planes.
9. Drawing development of surface using various methods of prisms, pyramids, cone, cylinder, etc.
10. Drawing anti- development of surfaces.
11. Drawing isometric projections using various methods and isometric views.

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Indore

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Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

40

B Tech. (Electronics and Instrumentation)

SUBJECT CODE	Category	SUBJECT NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		Th	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTEI 101		Introduction to Electronics and Instrumentation	60	20	20	30	20	3	0	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):

Student should familiar with all Aspects of Electronics & Instrumentation and various measuring and sensing instruments by Identification and working point of view with good understanding as well.

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. Student will be able to design and testing of Electronic Circuits based on sensors on Breadboard and PCB as well.
2. Student will be able to understand various types of errors & detecting techniques.
3. Student will be able to know the working of Electronic Bridges to measure Electronic Parameters.
4. Student will be able to explain about the working of Display Devices like LCD, LED & Seven Segment Display.

Syllabus

Unit-I

Fundamentals Concepts: Identification of Electrical & Electronics Components, their values determination and Testing with CRO, Multimeter etc. Circuit designing on Breadboard, PCB, Transistor voltmeter circuits, AC electronic voltmeter, current measurement with electronic instruments, multimeter probes Digital voltmeter systems, digital multimeters, digital frequency meter system.

Unit-II

Unit, dimensions and standards: Scientific notations and metric prefixes. SI electrical units, SI temperature scales, other unit systems, dimension and standards. Measurement Errors: Gross error, systematic error, absolute error and relative error, accuracy, precision, resolution and significant figures, Measurement error combination, basics of statistical analysis. PMMC instrument, galvanometer, DC ammeter, DC voltmeter, series ohm meter.

Chairperson
Board of Studies
Shri Vaishnav Vidyapeeth Vishwavidyalaya
Indore

Joint Registrar
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

Unit-III

CRO: CRT, wave form display, time base, dual trace oscilloscope, measurement of voltage, frequency and phase by CRO, Oscilloscope probes, Oscilloscope specifications and performance. Delay time based Oscilloscopes, Sampling Oscilloscope, DSO, DSO, its applications, LED, LCD & seven segment Display.

Unit-IV

Instrument calibration: Comparison method, digital Multimeter as standard instrument, calibration instrument Recorders: X-Y recorders, plotters.

Unit-V

Voltmeter and ammeter methods: Wheatstone bridge, low resistance measurements, low resistance measuring instruments AC bridge theory, capacitance bridges, Inductance bridges, Q meter

References

1. Oliver and Cage, "Electronic Measurements and Instrumentation", TMH, 2009.
2. Alan S. Morris, "Measurement and Instrumentation Principles", Elsevier (Buterworth Heinmann), 2008.
3. A.K. Sawhney, A Course in Electrical and Electronic Measurements, Dhanpat Rai Publication.
4. Robert Boylestad & Nashetsky; Electronics Devices and Circuits Theory, Pearson Ed.
4. Salivahanan, Vallabhraj; Electronics Devices and Circuits, McGraw Hill Publication.

List of Experiments.

1. Identification of Electronic Components and determination of their values by Color, Digits & Terminals/Pins Coding.
2. Study of Function Generator, Waveforms, CRO, Multimeter and other measuring and Testing Equipments.
3. Practice of Circuits/Components Assembling on Breadboard and their Testing.
4. PCB Designing with Layouts, Soldering, Drilling process.
5. Circuit / Components Testing by Multimeter, CRO and other methods.
6. To measure Various Electrical parameters by Various Electronic Bridges.
7. To study the PMMC instruments.
8. To study the MI Instruments.
9. To study the LED, LCD and Seven Segment Display.
10. To study optocoupler and its application in designing electronics & instrumentation based circuits.

Chairperson
Board of Studies
Shri Vaishnav Vidyapeeth Vishwavidyalaya
Indore

Joint Registrar
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

B Tech. (Electronics and Instrumentation) w.e.f. July2017

SUBJECT CODE	Category	SUBJECT NAME	TEACHING &EVALUATION SCHEME								
			THEORY			PRACTICAL		Th	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTEC102		Fundamental of Electronics Engineering	60	20	20	30	20	3	1	2	5

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 Objectives:-
The subject aims to provide the student with:

- An understanding of basic Electronics Engg. abstractions on which analysis and design of electronic circuits and systems are based, basic devices(analog and digital) and instrumentation abstractions.
- The capability to use abstractions to analyze and design simple electronic circuits.
- The ability to formulate and solve the different logic circuits and Boolean equations.
- An understanding of how devices such as semiconductor diodes, rectifiers, and bi-polar junction transistors are working and how they are used in the design of useful circuits.

Course Outcomes:-
- Students will: Learn how to develop and employ circuit models for elementary electronic components, e.g., resistors, sources, inductors, capacitors, diodes and transistors;
- Become adept at using various methods of circuit analysis, including simplified methods such as series-parallel reductions, voltage and current dividers, etc.
- Develop the capability to analyze and design simple circuits containing non-linear elements such as transistors using the concepts of load lines, operating points and incremental analysis;
- Learn how the primitives of Boolean algebra are used to describe the processing of binary circuits and to use electronic components as building blocks in electronically implementing binary functions;

Syllabus

UNIT-I
Evolution and Impact of Electronics in industries and in society, Familiarization with Resistors, Capacitors, Inductors, Transformers and Electro mechanical components, PN Junction diode: Structure, Principle of operation, various types of Diode, Solar cell.

UNIT-II
Rectifiers: Half wave and full wave rectifiers, capacitive filter, Zener voltage regulator. Bipolar Junction Transistors: Structure, Principle of operation, and its CB, CC, CE configuration.

Chairperson
Board of Studies
Shri Vaishnav Vidyapeeth Vishwavidyalaya
Indore

Joint Registrar
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

UNIT-III

Basic electrical parameter measuring Instruments: voltmeters & ammeter, wattmeter, energy meter, Basics of CRO (analog & digital).

UNIT-IV

Number System: Introduction to binary, octal, decimal & hexadecimal systems, representation of negative numbers, 1's, 2's, 9's, 10's complement and their arithmetic. Introduction, Definitions, Principle of Duality, Basic Theorems, Applications of Boolean Algebra, Boolean Functions, Complement of Boolean Function. Logic Gates (Symbol, Truth Table, Logic Diagram): And, OR, NOT, NAND, NOR, XOR, XNOR. Universal Gates: NAND Gate and NOR Gate implementation.

UNIT-V

SIGNALS: Introduction, Representation of Discrete-time Signals: Graphical Representation, Functional Representation, Tabular Representation, and Sequence Representation. Elementary Signals: Unit Step Function, Unit Ramp Function, Unit Parabolic Function, Unit Impulse Function, Sinusoidal Signal, Real Exponential Signal, Complex Exponential Signal, Rectangular Pulse Function, Triangular Pulse Function and their energy and power calculation.

References

1. *Bell, D. A., Electronic Devices and Circuits, Oxford University Press*
2. *Boylested, R. L. and Nashelsky, L., Electronic Devices and Circuit Theory, Pearson Education*
3. *Digital Design M. Morris Mano and Michael D. Ciletti, Pearson Education*
4. *A Anand Kumar, Signals and Systems, PHI.*
5. *Vijay Baru, Rajendra Kaduskar, Sunil T. Gaikwad, Basics of Electronics Engineering, Wiley India Pvt. Ltd*
6. Rodger E. *Ziemer*/William H Tranter/D. R. Fannin *Signals and Systems: Continuous and Discrete (4th Edition)*
7. *A.K Sawhney, A Course on Electrical and Electronics Measurement and Measuring Instruments Dhanpat Rai pub.*

List of experiments

1. Familiarization with Laboratory Instruments (Oscilloscope, Function Generator, Digital Multimeter, DC Power Supply)
2. Characterization of Passive Circuit Elements (R, L, C)
3. Time & Frequency Response of RC and RL Circuits
4. V-I curve for P-N Junction Diodes.
5. V-I curve for Zener Diode.
6. Zener as a voltage regulator
7. Half-Wave and Full-Wave(Center tapped and Bridge) Rectifiers
8. Bipolar Junction Transistor (BJT) Circuits (Inverter, Common Emitter Amplifier)
9. Conversion of number system
10. Basic Combinatorial Circuits

Chairperson
Board of Studies
Shri Vaishnav Vidyapeeth Vishwavidyalaya
Indore

Joint Registrar
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

B Tech. (Electronics and Instrumentation) w.e.f July2017

SUBJECT CODE	Category	SUBJECT NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		Th	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTEI 103		Electronics Workshop	0	0	0	0	50	0	0	4	2

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit;
Q/A – Quiz/Assignment/Attendance, MST Mid Sem Test.

Course Objectives:-

1. To provide basic introduction of electronic and electrical hardware systems.
2. To provide hands-on training with familiarization, identification, testing and assembling.
3. To troubleshoot the PCB by making use of the various software tools and instruments available in the Electronics Workshop.

Course Outcomes:-

Students will be able to:

1. Learn and identify the active and passive electronic components.
2. Perform testing of electronic components
3. Analyze Inter-connection methods and perform soldering practice.
4. Use different software tools for PCB design.
5. Design of electronic circuits.

List of Experiments

1. Identification and introduction of various active and passive electronic components.
2. Demonstration of various measuring instruments (CRO, Multi-meter etc) and different power supplies.
3. Testing of different electronic components (Resistor, Capacitor, Diode, Transistor etc) using Multi-meter and CRO and draw the characteristics of these electronic components.
4. Demonstration of Breadboard, Introduction and Comparison of various types of PCBs.
5. Design of basic circuits using Breadboard (Rectifier, Clippers, and Clampers etc.).
6. Develop basic circuit layout using software tools.
7. Introduction and comparison of Software tools used for PCB design and study PCB design techniques (itching, drilling, and soldering).

Chairperson
Board of Studies
Shri Vaishnav Vidyapeeth Vishwavidyalaya
Indore

Joint Registrar
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8. Design of Power Supply.
9. Design of Various logic Gates.
10. Develop one mini project using all the above process.

Text Books:

1. Electronic Devices, Thomas L. Floyd, Pearson (9th Edition), 9-Jan-2011.
2. Electronic Devices and Circuits, David A. Bell, Oxford Press (5th Edition) 30- April-2008.

References:

1 Printed Circuit Boards: Design, Fabrication, Assembly and Testing R.S. Khandpur Tata McGraw-Hill Education, 24-Feb-2005.
2 Printed Circuits Handbook Clyde Coombs McGraw Hill Professional, 22-May-2007.

Chairperson
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Joint Registrar
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Shri Vaishnav Vidhyapeeth Vishvavidhyalaya, Indore

w.e.f. July2017

B Tech. (Electronics and Instrumentation)

SUBJECT CODE	Category	SUBJECT NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		Th	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTME 103		Workshop Practices	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):

1. To paraphrases with workshop technology, industrial safety, and understand material properties.
2. To paraphrases with carpentry shop, fitting shop, welding and sheet metal shops.

Course Outcomes (COs):

1. After completion of this course the students are expected to be able to demonstrate following knowledge, skills and attitudes.
2. Student would be able to understand the need of workshop, technology related to it, and industrial safety and precautions.
3. Student would be able to use carpentry tools, analyze various wood joints and their properties.
4. Students would be able to use fitting tools to make various shapes and design.
5. Student would be able to recognize various welding techniques and their needs.
6. Students would be able to design various shapes by using sheet metals and tools related to it.

Syllabus

Unit-I

INTRODUCTION TO WORKSHOP TECHNOLOGY & INDUSTRIAL SAFETY WORKSHOP TECHNOLOGY- Introduction, need of workshop and types of workshop

INDUSTRIAL SAFETY- Introduction, objective of industrial safety, causes of accidents, common sources of accidents, preventive measures, and common safety methods.

Unit-II

CARPENTARY SHOP

CARPENTRY- Introduction, types of timbers, defects in timbers, timber prevention, characteristics of good timber, common tools used in carpentry shop (marking and measuring tools; cutting tools and striking tools), and common wood joints (cross-lap, corner-lap, dovetail and bridle joints).

Unit-III

FITTING SHOP

FITTING- Introduction, tools used in fitting shop (measuring tools, holding tools, cutting tools, striking tools and supporting tools) and operation performed in fitting work.

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