# Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

## B Tech. (Electronics and Instrumentation)

| SUBJECT CODE | Category | SUBJECT NAME | TEACHING & EVALUATION SCHEME | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | THEORY | | | PRACTICAL | | Th | T | P | CREDITS |
| | | | University Exam | Two Term Exam | Teachers Assessment* | University Exam | Teachers Assessment* | | | | |
| BTMA 301 | | Applied Mathematics - 3 | 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 Objective

To introduce the students with the Fundamentals of the Calculus of the Complex Variable, Random Variable and Fourier analysis.

### Course Outcomes

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

1. Understand and apply the basics of the Calculus of the Complex variables.
2. Know the fundamentals of the Probability Theory and Random Process.
3. Apply the concepts of the Fourier Analysis
4. Know the techniques of the Fourier Transform.
5. Find the solution of the PDE.

Course Content:

**UNIT – I**
**Complex Analysis**
Complex numbers, geometric representation, powers and roots of complex numbers. Functions of a complex variable: Limit, Continuity, Differentiability, Analytic functions, Cauchy-Riemann equations, Harmonic functions, Harmonic conjugates. Elementary Analytic functions (polynomials, exponential function, trigonometric functions), Complex integration, Cauchy's integral theorem, Cauchy's integral formula. Taylor series and Laurent series. Zeros, Singularities and its classifications, Residues, Residue theorem and its applications.

**UNIT – II**
**Probability Theory and Random Process**

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Axiomatic construction of the theory of probability, independence, conditional probability, and basic formulae, random variables, binomial, poisson and normal random variable, probability distributions, functions of random variables; mathematical expectations, Definition and classification of random processes, discrete-time Markov chains, Poisson process, Correlation and Regression; Expectation and Variance

**UNIT – III**

**Fourier series**

Fourier Integral, Fourier series of 2p periodic functions, Fourier series of odd and even functions, Half-range series, Convergence of Fourier series, Gibb's phenomenon, Differentiation and Integration of Fourier series, Complex form of Fourier series.

**UNIT – IV**

**Fourier Transformation**

Fourier Integral Theorem, Fourier Transforms, Properties of Fourier Transform, Convolution and its physical interpretation, Statement of Fubini's theorem, Convolution theorems, Inversion theorem

**UNIT – V**

**Partial Differential Equations**

Introduction to PDEs, basic concepts, Linear and non-linear first order PDE, Higher order linear homogeneous PDE, Separation of variable and its application to the one dimensional wave and heat equation.

**Texts:**


1. R. V. Churchill and J. W. Brown, Complex Variables and Applications, 5th Edition, McGraw-Hill, 1990.
2. K. Sankara Rao, Introduction to Partial Differential Equations, 2nd Edition, 2005.
3. G. R. Grimmett and D. R. Stirzaker, Probability and Random Processes, Oxford University Press, 2001.
4. P. G. Hoel, S. C. Port and C. J. Stone, Introduction to Probability Theory, Universal Book Stall, 2000.
5. W. Feller, An Introduction to Probability Theory and its Applications, Vol. 1, 3rd Edition, Wiley, 1968.
6. K. S. Trivedi, Probability and Statistics with Reliability, Queuing, and Computer Science Applications, Prentice Hall of India, 1998.
7. Papoulis and S. Unnikrishna Pillai, Probabilities, Random Variables and Stochastic Processes, 4th Edition, Tata McGraw-Hill, 2002.
8. S.M. Ross, Stochastic Processes, 2nd Edition, Wiley, 1996.
9. J. Medhi, Stochastic Processes, New Age International, 1994.
10. B. S. Grewal, Higher Engineering Mathematics, Khanna Publishers, Delhi


**References:**


1. J. H. Mathews and R. W. Howell, Complex Analysis for Mathematics and Engineering, 3rd Edition, Narosa, 1998.


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2. N. Sneddon, Elements of Partial Differential Equations, McGraw-Hill, 1957.
3. E. Kreyszig, Advanced Engineering Mathematics, 5th / 8th Edition, Wiley Eastern / John Wiley, 1983/1999

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**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* | | | | |
| BTEI401 | | Microprocessor & Microcontroller | 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 gain knowledge of basics of Microprocessor & microcontroller & Learn development of assembly language programs.
2. To learn the programming skills of 8086 microprocessor & 8051 microcontroller.
3. To learn the interfacing of external devices (LED, LCD, ADC, DAC) with the microcontroller 8051.

**Course Outcomes (COs):**

The students will be able to

1. Apply the concept of buses, microprocessor & microcontroller architecture and interrupts.
2. Interface memory and I/O devices with 8051 microcontroller
3. Program assembly language / C programming of 8051 & 8086.
4. Design microcontroller based small system
5. Interface 8051 with LED, LCD, ADC, DAC etc.

**Syllabus**

**UNIT I** **08hr.**

**Introduction to 8086 Microprocessor**

Overview of 8086 microprocessor. Architecture of 8086, Signals and pins of 8086 microprocessor, Concept of Memory Segmentation in 8086. Maximum Mode , Minimum Mode, Timing diagram, Comparative study of Salient features of 8086, 80286 & 80386.

**UNIT II** **10hr.**

**Microprocessor 8086 programming**

8086 Instructions set . Addressing mode of 8086, Assembly directives. Stack , Interupts of 8086, Assembly language programs of 8086.

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**Input-Output interfacing:** Peripherals I/O. PPI 8255 Architecture and modes of operation, Interfacing to 16-bit microprocessor and programming, DMA controller (8257) Architecture, Programmable interval timer 8254, USART 8251.

**UNIT III** **08hr.**

**Introduction to 8051 Microcontroller**

Introduction, Difference between Microprocessors and Microcontrollers. Overview of 8051 Microcontroller family, Architecture of 8051 Microcontroller, The program counter and ROM space in the 8051, registers, 8051 register banks

**UNIT IV** **10hr.**

**8051 Assembly Language Programming**

Introduction to 8051 assembly programming, Structure of Assembly language, Assembling and running an 8051 program, 8051 data types and directives, interrupts

**8051 Addressing Modes & Instruction set**

Addressing modes, Accessing memory using various Addressing modes, Bit addresses for I/O and RAM, Arithmetic instructions, Signed number concepts and arithmetic operations, Logic and compare instructions, Rotate instruction, Jump, Loop, And Call Instructions, Call instructions time delay for various 8051 chips.

**UNIT V** **10hr.**

**8051 Programming in C**

Data types and time delay in 8051 C, I/O programming in 8051 C, Logic operations in8051 C, Data conversion programs in 8051 C, Accessing code ROM space in 8051 C, Interfacing with LEDs, LCDs ADCs, DACs.

**Text Books:**

1.A.K. Ray & K.M.Bhurchandi, Advanced Microprocessors and peripheral-Architecture, Programmingand Interfacing, Tata McGraw –Hill, 2012(Third Edition)

2.The 8051 Microcontroller and Embedded Systems Using Assembly and C, 2/e by Muhammad Ali Mazidi, Janice Gillispie Mazidi and Rolin McKinlay,2008(SecondEdition,PearsonEducation)

3.The 8051 Microcontroller & Embedded Systems using Assembly and C By Kenneth J. Ayala, Dhananjay V. Gadre, 2008 (Cengage Learning , India Edition).

**Reference Books:**

1.Hall Douglas V.,Microprocessor and interfacing, Revised second edition 2006, Macmillan, McGraw Hill

2.Using the MCS-51 Microcontrollers By Han Way Huang Oxford Uni Press,2000

3. Programming and Customizing the 8051 Microcontroller by Myke Predko Tata McGraw Hill,1999

4. Microcontrollers Architecture, programming, interfacing and system design by Rajkamal Pearson education,2009

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**List of Experiment:**

1. Introduction to 8086 & 8051 kit, hardware features & modes of operationand Technique of programming & basic commands of kit.

2. Design programs for Arithmetic Operations.
3. Develop a program to find 1's complement and then 2's complement of a 16-bit numbers.
4. Develop a program to find larger of two numbers.
5. Write a program to shift an 8-bit number left by 2-bits.
6. Write a program to generate a square wave of 2 KHz Frequency on input pin.
7. Introduction to IDE and Assembler directives.
8. Develop 8051 Assembly language programs using Arithmetic/ Logical instructions.
9. 8051 Assembly language programming for block data transfer between internal and external memory including overlapping blocks.
10. 8051 Assembly language programming for
    a. code conversions
    b. Timers in different modes.
    c. I/O port programming in embedded C.
    d. Programming of LCD in embedded C.

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## 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-402 | | SENSORS & TRANSDUCERS | 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):**

- Student will be able to understand the structural and functional principles of sensors and transducers used for various physical and nonelectric quantities.
- Explain the principles of operation of the sensor.
- Interpretation of the measurement results by using transducers.
- Development of measurement schemes for different non electrical quantities
- Assimilating knowledge about the implementation of sensors and transducers into a control system structure.

**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 sensors and transducer.
2. To identify, formulate, and solve engineering problems
3. Demonstrate various types of force transducer and their analysis.
4. Demonstrate various types of pressure transducer and their analysis.

**Syllabus**

**Unit-I**

**Motional and Dimensional measurement:**

Introduction, Aim of measurement, Roll of sensors in engineering, classification of transducers,

Fundamental Standards, units , Resistive Potentiometers, stain gauge, LVDT, Hall Effect sensors, magnetostricitive, magnetoresisitive, Optical displacement sensor fiber optic sensor, Ultrasonic distance

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Sensor,Piezoresistive, Linear encoder, Proximity sensors RVDT, DC tachometer, AC tachometer , eddy current , drag cup type tachometer, magnetic, gyroscope.

**Unit-II**

**Force, Torque measurement:**
Standards and Calibration, Strain gauge: basic principal, gauge factor, types of strain gauge, materials and their properties, bonding material compensation techniques, bridge configuration, Rosettes, Tactile sensors, Piezoelectric sensors, LVDT as secondary sensor
**Torque:** Flat Spiral Spring, Magenetostrictive Torsion Transducer, Dynamometers.

**Unit-III**

**Pressure Measurement:**
Standards and calibration Units and relations. Positive Pressure Sensors
**Pressure and sound measurement: Moderate pressure** Bourdon tube, Bellows &diaphragms, High pressure measurement, Piezo electric, Electric resistance, Low pressure measurement, Mcleod gauge, Knudsen gauge, Viscosity gauge, Thermal conductivity, Ionization gauge, Dead weight gauge, sound level measurement using different types of microphone

**Unit-IV**

**Flow measurement: Obstruction meter:** Orifice, Nozzle, venturi, Pitot tube, Annubar tubes, Target, rotameter, Turbine, Electromagnetic, Vortex, Positive displacement, Anemometers, Weirs & flumes, Laser Doppler, Anemometer, Ultrasonic flow meter, fluidic oscillator, Mass flow meter, Flow visualization, Level measurement: Visual lev el indicators, Ordinary float type, Purge method, Buoyancy method, resistance, Capacitance and inductive Probes, Ultrasonic, Laser, Optical fiber. Thermal, Radar radiation.

**Unit-V**

**Temperature measurement:**

Bimetallic thermometers, Liquid in glass, Pressure thermometer, thermocouples, RTD, Thermistors, Semiconductor sensors, Digital thermometers,Pyrometers, Miscellaneous Measurement: Humidity, Dew point, Viscosity, Thermal and nuclear radiation measurements.

**Text Book**

1. *H.N. Norton "Handbook of transduc*ers".
2. E.O. Doebelin "Measurement systems applications and design"

**Reference Book**

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1. DVS Murthy "Transducers and instrumentation"
2. Nakra and Chaudhry "Instrumentation measurement and analysis *& Co*

**List of experiments**

1. Calibration of pressure gauge using dead weight pressure tester and preparation of report for the same.
2. Characterization of strain gauge indicator and weight measurement using load cell.
3. Measurement of displacement using LVDT.
4. Study of linear and rotary encoder as displacement sensor.
5. Measurement of Pressure using Bellows, Bourdon gauge, Diaphragm.
6. Calibration of vacuum gauge using vacuum gauge tester and preparation of the report.
7. Characterization of Thermocouples (J/T/K/R/S)
8. Characterization of RTD.
9. To study characteristics of thermistor.
10. Calibration of Rotameter.

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## B.Tech.(Electronics & 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* | | | | |
| BTEC401 | | Linear Integrated Circuit | 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 course intends to provide an overview of the Principles, operation & design of Integrated circuits, operational amplifiers, Multivibrator , A/D & D/A Converters, Waveform Generators and Some special function ICs..

**Course Outcomes:**

1. To impart knowledge about the basics of Linear Integrated Circuits.
2. Students will learn about Operational amplifiers.
3. To impart knowledge to students about different types of Multivibrator.
4. Students will learn about different types of D/A & A/D Converters, Waveform Generator and ICs.

**Syllabus**

**UNIT I**

**IC FABRICATION AND CIRCUIT CONFIGURATION FOR LINEAR IC**

Advantages of ICs over discrete Components, Manufacturing process of Monolithic ICs. Current mirror and current sources,Voltage sources,BJT Differential amplifier with active loads, General operational amplifier stages and internal circuit diagrams of IC 741,DC & AC performance characteristics

**UNIT II**

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## APPLICATIONS OF OPERATIONAL AMPLIFIERS

Adder, Subtractor, Integrator, Differentiator, V-to-I and I-to-V converters, Instrumentation amplifier, Logarithmic& Antilogarithmic amplifier, Comparators, Schmitt trigger, Low-pass, high-pass and band-pass filters.

## UNIT III

## ANALOG MULTIPLIER AND PLL

Analog multiplier ICs and their applications, Operation of the basic PLL, Closed loop analysis, Voltage controlled oscillator, Monolithic PLL IC 565, application of PLL for AM detection, FM detection, FSK modulation and demodulation and Frequency synthesizing.

## UNIT IV

### A/ D&D/A CONVERTER

A/D Data Conversions, D/A converter, Specifications, weighted resistor type, R-2R Ladder type, Voltage Mode and Current-Mode $R-2R$ Ladd – switches for D/A converters, high speed Sampleand Hold circuits, A/D Converters, Specifications, Flash type Successive Approximation type ,Single &Dual Slope type – A/D Converter using Voltage-to-Time Conversion, Over-sampling A/D Converters.

## UNIT V

### WAVEFORM GENERATORS AND SPECIAL FUNCTION ICs

Function Generator, Multivibrators, Timer IC 555, IC Voltage regulators – Three terminal fixed and adjustable voltage regulators – IC 723 general purpose regulator – Monolithic switching regulator, Audio Power amplifier, Video Amplifier.

## TEXT BOOKS:


1. RamakantA.Gayakwad, OP-AMP and Linear ICs, Prentice Hall / Pearson Education, 4th Edition.
2. S.Salivahanan& V.S. KanchanaBhaskaran, Linear Integrated Circuits, TMH.


## REFERENCE:


1. B.S.Sonde, System design using Integrated Circuits , New Age Pub, 2nd Edition.
2. Gray and Meyer, Analysis and Design of Analog Integrated Circuits, Wiley International.
3. J.Michael Jacob, Applications and Design with Analog Integrated Circuits, Prentice Hall of India.
4. William D.Stanley, Operational Amplifiers with Linear Integrated Circuits, Pearson Education.
5. K Lal Kishore, Op. Amplifier and Linear Integrated Circuits, Pearson Education.
6. S Salivahanan, N Suresh Kumar; Electronic Devices and Circuits; McGraw- Hill


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**List of Experiments**

1. Design & Realize inverting, Non Inverting and Buffer amplifier using 741 Op Amps.
2. Verify the operation of an Adder Circuit using Op AmpsIC 741.
3. Verify the operation of a Differentiator circuit using Op AmpsIC 741.
4. Verify the operation of an Integrator circuit using Op Amps741.
5. Design & Verify the operation of Subtractor circuit using Op Amps741.
6. Plot frequency response of AC coupled amplifier using Op Amps741
7. Study of IC 555 as Astable and MonostableMultivibrator.
8. To study ofAnalog to Digital converter.
9. To study of Digital to Analog converter.
10. To study the working of Wein Bridge Oscillator.(Content beyond syllabus)
11. To study the working of Wein Bridge Oscillator.(Content beyond syllabus)

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## 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* | | | | |
| BTEC408 | | Signals & Systems | 60 | 20 | 20 | 30 | 20 | 3 | 1 | 2 | 5 |

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

**.Course Objectives:**

The objective of this course is to have an introduction to approaches of signals & systems analysis with an increased emphasis on the frequency response and Analysis of system with continuous signal and discrete time signal. To enable the students to understand the fundamentals of Signals, their Time & Frequency characteristics.

**Course Outcomes:** Upon completion of this course students will be able to

1. Classify both continuous and discrete time signals and systems.
2. Analyze continuous signals in complex plain.
3. Understand Laplace transform
4. Analyze Z transform
5. Understand the random signals and systems.

**Syllabus**

**UNIT-I**

**Introduction to signal and systems**: Continuous and discrete time signals: Classification of Signals Periodic aperiodic even odd energy and power signals Deterministic and random signals complex exponential and sinusoidal signals periodicity unit impulse unit step Transformation of independent variable of signals: time scaling, time shifting. System properties: Linearity, Causality, time invariance and stability, Dirichlet's conditions, Determination of Fourier series coefficients of signal.

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**UNIT-II**

**Signal Transformation**: Fourier transformation of continuous and discrete time signals and their properties, Laplace transformation-analysis with examples and properties. Parseval's theorem; Convolution in time (both discrete and continuous) and frequency domains with magnitude and phase response of LTI systems

**UNIT-III**

**The Laplace Transform.** The Region of Convergence for Laplace Transforms. The Inverse Laplace Transform. Geometric Evaluation of the Fourier Transform from the Pole-Zero Plot. Properties of the Laplace Transform. Analysis and Characterization of LTI Systems Using the Laplace Transform. System Function Algebra and Block Diagram Representations. The Unilateral Laplace Transform.

**UNIT-IV**

**Z-Transforms:** Basic principles of z-transform, z-transform definition, Relationship between z-transform and Fourier transform, region of convergence properties of ROC, Properties of z-transform, Poles and Zeros, inverse z-transform using Contour integration, Residue Theorem, Power Series expansion and Partial fraction expansion

**UNIT-V**

**Random Signals & Systems:** Definitions, distribution & density functions, mean values & moments, function of two random variables, concepts of correlation, random processes, spectral densities, response of LTI systems to random inputs.

**Text books:**

1. Signals and Systems 2/E, 1996 Alan V. Oppenheim, Alan S. Willsky, with S. Hamid Prentice Hall .
2. Digital signal processing –Principles, algorithms and applications 3rd Edition, 1996 J. G. Proakis, D. G. Manolakis PHI

**Reference books:**

1. Outline of Signals and Systems 1st, 1995 Hwei Hsu,Schaum's McGraw-Hill
2. Signals & Systems 2nd Edition, 2002 Simon Haykin and Van Veen Wiley

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3. Signals & Systems Analysis Using Transformation Methods & MAT Lab 2003 Robert TMH
4. Signals, Systems and Transforms 3rd Edition, 2004. C. L. Philips, J.M.Parr and Eve A.Riskin Pearson education
5. Signals & Systems 2001. I. J. Nagrath, S.N.Sharan, R.Ranjan, S.Kumar

**List of Experiments:**

1. Introduction to MATLAB.
2. Write a program to generate continuous time signals (i) Sine wave (ii) Cosine Wave (iii) Square wave (iv) Triangular wave
3. Write a program to generate the discrete sequences (i) unit step (ii) unit impulse (iii) ramp (iv) periodic sinusoidal sequences. Plot all the sequences.
4. Find the Fourier transform of a square pulse .Plot its amplitude and phase spectrum.
5. Write a program to convolve two discrete time sequences. Plot all the sequences. Verify the result by analytical calculation.
6. Generate a discrete time sequence by sampling a continuous time signal.
7. Write a program to find the autocorrelation and cross correlation of sequences.
8. Write a program to generate a random sinusoidal signal and plot four possible realizations of the random signal.
9. To develop program modules based on operation on sequences like signal shifting, signal folding, signal addition and signal multiplication.
10. To develop program for computing Z-transform and Inverse Z-transform.

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## 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* | | | | |
| BTEI403 | | PCB Designing Lab-II | 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 (CEO's): -**

1. To be familiar with PCB design and to develop and improve the PCB from design phase.
2. To provide in depth knowledge of PCB fabrication.
3. To provide the knowledge in assembling of the PCB based electronic circuits continues through material selection, testing and implementation.

**Course Outcomes (CO's):-**

Students will be able to:

1. Apply basic electronics component knowledge along with the functional understanding of electronic circuits so as to design and conduct experiments.
2. Identify, formulate, and solve engineering problems related to PCB design.
3. Design and simulate various PCB circuits using industry standard PCB design software tools like Eagle, Orcad, Power PCB and TINA packages.
4. Identify, formulate, and solve engineering problems associated with assembly and testing of electronic circuits and also understand the process of PCB manufacturing
5. Design and simulate various electronic PCB's required for prototyping and testing using software tools and testing equipments.
6. Know the concept of EMI/EMC and take precautionary steps in the design of PCB's.

**List of Experiments:**

1. Familiarization/Identification of all electronic components with their specifications (Functionality, type, size, package, symbol, cost etc).

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2. Introduction to PCB design software (OrCAD schematic capture tool) and Industry standard PCB design software tools like Eagle, Power PCB and TINA packages.
3. To simulate simple electronic circuit, Schematic to layout transfer, Layout Printing.
4. Etching the PCB, Cleaning, drying, drilling holes, identification of components and its location on the PCB, soldering the components on PCB and testing the assembled circuit for correct functionality.
5. To check and verify connection of electronic components using conductive pathways, tracks or signal traces etched from copper sheets.
6. To understand various PCB techniques - Soldering techniques, drill-size, minimum track-width, minimum track-to-track and track-to-pad distance, tolerances, etc.
7. To understand and implement PCB assembly and PCB design control techniques – Routing, Partitioning, Board stack-up, Board level shields, Use of isolating lines.
8. Case study on Single and double sided plated through hole (PTH) and multi-layered PCBs.
9. To study High-density interconnect (HDI) and flexible PCBs, used in liquid crystal displays (LCDs) and touch screens.
10. Develop one mini project using all 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 The PCB Design Magazine – an iConnect007 publication.

3 PCB Design, Device Handling and Assembly Guidelines AN-001 mCube Inc.

4 Printed Circuits Handbook Clyde Coombs McGraw Hill Professional, 22-May-2007.


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## 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* | | | | |
| BTPD102 | | Personality Development-2 | 0 | 0 | 0 | 0 | 50 | 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 develop inter personal skills and be an effective goal oriented team player.
2. To develop professionals with idealistic, practical and moral values.
3. To develop communication and problem solving skills.
4. To re-engineer attitude and understand its influence on behavior

**UNIT I - INTERPERSONAL SKILLS:**

Gratitude Understanding the relationship between Leadership Networking & Team work. Assessing Interpersonal Skills Situation description of Interpersonal Skill. Team Work: Necessity of Team Work Personally, Socially and Educationally

**UNIT II - LEADERSHIP** Skills for a good Leader, Assessment of Leadership Skills

**UNIT III - STRESS MANAGEMENT:** Causes of Stress and its impact, how to manage & distress, Circle of control, Stress Busters. Emotional Intelligence What is Emotional Intelligence, emotional quotient why Emotional Intelligence matters, Emotion Scales. Managing Emotions.

**UNIT IV - CONFLICT RESOLUTION:** Conflicts in Human Relations – Reasons Case Studies, Approaches to conflict resolution.

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**UNIT V - DECISION MAKING:** Importance and necessity of Decision Making, Process and practical way of Decision Making, Weighing Positives & Negatives.

**TEXT BOOK:**

1. SOFT SKILLS, 2015, Career Development Centre, Green Pearl Publications.

**REFERENCE:**

1. Covey Sean, Seven Habit 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 4. Daniel Coleman, Emotional Intelligence, Bantam Book, 2006

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