### Scheme of Teaching & Examination

**BE (Applied Electronics & Instrumentation Engineering) III Semester**

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Board of Studies</th>
<th>Subject Code</th>
<th>Subject Name</th>
<th>Periods Per Week</th>
<th>Scheme of Exam. (Theory/ Practical)</th>
<th>Total Marks</th>
<th>Credit L+T/P/2</th>
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<tbody>
<tr>
<td>1</td>
<td>Applied Mathematics</td>
<td>312351(14)</td>
<td>Mathematics - III</td>
<td>4 1 -</td>
<td>80 20 20 120</td>
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<tr>
<td>2</td>
<td>Electronics and Instrumentation</td>
<td>312352(27)</td>
<td>Basic Electronics</td>
<td>3 1 -</td>
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<tr>
<td>3</td>
<td>Electronics and Instrumentation</td>
<td>312353(27)</td>
<td>Measurement &amp; Instruments</td>
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<td>Electronics and Instrumentation</td>
<td>312354(27)</td>
<td>Network Analysis &amp; Synthesis</td>
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<td>5</td>
<td>Electronics and Instrumentation</td>
<td>312355(27)</td>
<td>Programming with 'C'</td>
<td>3 1 -</td>
<td>80 20 20 120</td>
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<td>6</td>
<td>Electronics and Telecomm.</td>
<td>312356(28)</td>
<td>Digital Logic Design</td>
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<td>7</td>
<td>Electronics and Instrumentation</td>
<td>312361(27)</td>
<td>Programming with 'C' Laboratory</td>
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<td>40 - 20 60</td>
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<td>Electronics and Instrumentation</td>
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<td>Basic Electronics Laboratory</td>
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<td>9</td>
<td>Electronics and Instrumentation</td>
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<td>Measurement &amp; Instruments Laboratory</td>
<td>- - 3</td>
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<td>Electronics and Instrumentation</td>
<td>312364(27)</td>
<td>Digital Logic Circuit Laboratory</td>
<td>- - 3</td>
<td>40 - 20 60</td>
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<td>Humanities</td>
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<td>Value Education</td>
<td>- - 2</td>
<td>- - 40 40</td>
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<td><strong>19</strong></td>
<td><strong>6</strong></td>
<td><strong>15</strong></td>
<td><strong>640</strong></td>
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</tbody>
</table>

*L: Lecture, T: Tutorial, P: Practical, ESE: End Semester Exam, CT: Class Test, TA: Teachers Assessment*

**Note:** Duration of all theory papers will be of Three Hours.
Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of program: Bachelor of Engineering
Branch: Applied Electronics & Instrumentation
Subject: Mathematics – III

Semester: III  Code: 312351 (14)

Total Theory Periods: 40  Total Tutorial Periods: 10
Class Tests: Two (Minimum)  Assignments: Two (Minimum)
ESE Duration: Three Hours  Maximum Marks: 80  Minimum Marks: 28

Course Objectives:
1. To make the students understand that Fourier series analysis is a powerful method where the formulas are integrals and to have knowledge of expanding periodic functions that explore variety of applications of Fourier series.
2. To equip with the concepts of Fourier transform and calculate elementary Fourier transform and its properties.
3. To provide knowledge of Laplace transform of elementary functions including its properties and applications to solve ordinary differentials equations.
4. To provide a sound background of complex analysis to perform a thorough investigation of major theorems of complex analysis and to apply these ideas to a wide range of problems that include the evaluation of both complex line integrals and real integrals.
5. To provide tools to investigate the strength and direction of a relationship between two variables by collecting measurements and using suitable statistical analysis.

UNIT- I
FOURIER SERIES:
Periodic functions, Definition of Fourier series, Euler's formulae, Dirichlet conditions, Change of interval, Even and odd functions, Half range Fourier Sine & Cosine series, Parseval’s identity, Practical harmonic analysis.

UNIT-II
FOURIER TRANSFORM:

UNIT- III
LAPLACE TRANSFORM:
Definition, Linearity, shifting & scaling properties, Transform of elementary functions, Transform of derivatives and integrals, Multiplication by t & division by t. Inverse Laplace transform, Convolution theorem, Transform of periodic functions, Unit step function & Dirac delta function, Initial value & final value theorems, Application to solution of ordinary differential equations.

UNIT- IV
COMPLEX VARIABLES:

UNIT-V
CORRELATION AND REGRESSION:
Linear correlation, Measures of correlation, Karl Pearson’s coefficient of correlation, Spearman’s rank correlation coefficient, Bivariate frequency distribution, Regression, lines of regression & coefficients of regression, Standard error estimate.

Text Books:

Reference Books:
3. Applied Mathematics for Engineers & Physicists by Louis A. Pipes- TMH.

Course outcomes: Students will be able to
1. Define Fourier series including half range series, Harmonic analysis and variety of its applications.
2. To know the definition of Fourier Transform, its properties, concepts of rapidly decreasing function and apply convolution theorem.
3. Define (mathematically) Unit step, Unit impulse, Laplace transforms, its properties, Inverse and applications to solve ordinary differential equations.
4. Solve difficult problems using theorems of complex analysis and apply Residue theorem to evaluate real integrals.
5. Able to evaluate and interpret Karl Pearson’s correlation coefficient and Spearman’s correlation coefficient and also find equation of regression line and use them where appropriate.
Name of program: **Bachelor of Engineering**  
Branch: **Applied Electronics & Instrumentation**  
Semester: **III**  
Subject: **Basic Electronics**  
Code: **312352 (27)**  
Total Theory Periods: **40**  
Total Tutorial Periods: **10**  
Class Tests: **Two (Minimum)**  
Assignments: **Two (Minimum)**  
ESE Duration: **Three Hours**  
Maximum Marks: **80**  
Minimum Marks: **28**

**Course Objectives:**
1. To develop a basic understanding of semiconductors, V – I Characteristics.  
2. To give a basic knowledge of rectifying circuits filters circuits for power supply & voltage regulator.  
3. To understand the concept of bipolar junction transistor & its characteristics.  
4. To develop understanding of transistor biasing & methods of thermal Stability.  
5. To understand the basic working of FET, MOSFET & its characteristics.

**UNIT-I**  
**Introduction:** Introduction, Mobility & conductivity, Intrinsic & Extrinsic Semiconductor, Charge Densities in Semiconductors, Generation & recombination of charges, Diffusion, Potential Variation within a graded Semiconductor, Open circuited p-n Junction, Current component in p-n diode, Diode equation, V-I Characteristics, Temperature dependence of V-I characteristics, Diode Resistance, Diode Capacitance: Transition & Diffusion.

**UNIT-II**  

**UNIT-III**  
**Transistor:** Introduction, Construction, Types: NPN & PNP, current components, Transistor as an amplifier, Input & Output Characteristics of common base, common emitter, & common collector transistor configuration, Early effect, Ebers Moll Model, Reach through.

**UNIT-IV**  
**Transistor Biasing & Thermal Stabilization:** The operating point, Bias stability, Fixed bias, collector to base bias & Emitter Bias, Stabilization against variation in $I_{c0}$, $V_{BE}$, & $\beta$. Bias compensation, Thermistor &sensistor compensation.

**UNIT-V**  
**FET & MOSFET:** Field Effect Transistor (FET): Introduction, Construction, Operation, Drain& Transfer Characteristics, FET small signal model, Metal Oxide Semiconductor Field Effect Transistor (MOSFET): Operation, Characteristics of Enhancement & Depletion Type MOSFETs.

**Text Books:**
1. Integrated Electronics: Analog & Digital Circuit Systems – Jacob Millman&Halkias, TMH.  

**Reference Books:**
1. Electronic Devices and Circuit Theory – Boylestad&Nashelsky, 8th Ed. PHI.  

**Course outcomes:**
1. Student should be able to understand the operating principles of major electronic devices, circuit models and connection to the physical operation of device  
2. Student should able to apply this knowledge to the analysis and design of basic circuits.
Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of program: Bachelor of Engineering
Branch: Applied Electronics & Instrumentation
Subject: Measurement & Instruments
Code: 312353 (27)

Semester: III
Total Theory Periods: 40
Total Tutorial Periods: 10
Class Tests: Two (Minimum)
Assignments: Two (Minimum)
ESE Duration: Three Hours
Maximum Marks: 80
Minimum Marks: 28

Course Objectives:
1. To provide knowledge about various types of measuring instruments and their working principle.
2. To provide knowledge about resistance, capacitance and inductance measurements.
3. To provide knowledge about power measuring equipments.


UNIT-II Potentiometer: DC Potentiometer: - Basic potentiometer circuit, Laboratory type potentiometer, Multiple Range Potentiometer, Constructional Details of Potentiometer, Precision type potentiometer, Volt ratio Box, Application of D.C. Potentiometer, Self balancing potentiometer. AC Potentiometer: Standardizing AC potentiometer & use of Transfer instruments, Types of AC Potentiometers, Quadrature Adjustment of Currents and Application of AC Potentiometer.


Text Books:
2. D.S. Kumar, “Mechanical Measurements & Control”, Metropolition Publication

Reference Books:
1. Albert Helfrik& Cooper, “Modern Electronic Instrumentation & Measurement Technique”, Prentice Hall Of India

Course outcomes:
1. Students should be able to know about the basics of instrumentation.
2. Students should be able to gain knowledge about measurement and calibration.
3. Students should be able to know about the basic types of bridges.
4. Students should be able to gain knowledge about basic potentiometer circuits.
Name of program: Bachelor of Engineering  
Branch: Applied Electronics & Instrumentation  
Semester: III  
Subject: Network Analysis and Synthesis  
Code: 312354 (27)  
Total Theory Periods: 40  
Class Tests: Two (Minimum)  
ESE Duration: Three Hours  
Total Tutorial Periods: 10  
Assignments: Two (Minimum)  
Maximum Marks: 80  
Minimum Marks: 28

Course Objectives:
- To differentiate between network analysis and synthesis.
- To provide knowledge about the Laplace transformation.
- To provide knowledge about various network theorems.
- To provide knowledge about various types of Two Port Parameters.
- To make familiar the students about network graph theory.

<table>
<thead>
<tr>
<th>UNIT</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>II</td>
<td><strong>Network Theorems</strong>: Introduction, Thevenin’s Theorem, Norton’s Theorem, Superposition Theorem, Maximum Power Transfer Theorem, Milliman’s Theorem, Reciprocity Theorem, Substitution Theorem, Compensation Theorem, Tellegen’s Theorem.</td>
</tr>
<tr>
<td>III</td>
<td><strong>Two Port Network Analysis</strong>: Introduction, Network Configurations, Z-Parameters, Y-Parameters, Hybrid Parameters, ABCD Parameters, Condition of Reciprocity and Symmetry in two port parameter representation, Inter-relationship between parameters of two port networks, Expression of input and output impedances in terms of two port parameters, Different types of Interconnections of two port networks, Modeling of network components.</td>
</tr>
<tr>
<td>IV</td>
<td><strong>Network Graph Theory</strong>: Introduction, Concept of a Network Graph, Terminology Used in Network Graph, Relation between Twigs and Links, Properties of a Tree in a Graph, Formation of Incidence Matrix, Properties of Incidence Matrix, Reduced Incidence Matrix, Number of Trees in a Graph, Fundamental Tie-set Matrix, Tie-set Matrix, Fundamental Cut-set Matrix, Cut-set Matrix, KVL in Topological form, KCL in Topological form.</td>
</tr>
</tbody>
</table>

Text Books:
2. Network Analysis by M.E. Van Valkenbarg, PHI

Reference Books:
1. Network Theory: Analysis & Synthesis – SmarjitGhosh, PHI
2. Network Synthesis – T. Lapatra, TMH
3. Circuits and Networks: Analysis and Synthesis – A. Sudhakar&Shyam Mohan S. Palli, TMH

Course outcomes:
1. The undergraduates should have ability to apply the concepts of the electrical circuit.
2. They should be able to solve networks using topology principles, network theorems and transient analysis.
Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of program: **Bachelor of Engineering**
Branch: **Applied Electronics & Instrumentation**
Semester: **III**

Subject: **Programming with C**
Code: **312355 (27)**

Total Theory Periods: **40**
Total Tutorial Periods: **10**
Class Tests: **Two (Minimum)**
Assignments: **Two (Minimum)**
ESE Duration: **Three Hours**
Maximum Marks: **80**
Minimum Marks: **28**

### Course Objectives:
1. Graduate can able to learn a programming language.
2. Graduate can write programs in C to solve problems.
3. Graduate can learn linear and nonlinear data structures.

### UNIT-I  
**Introduction to C Language:** History and development, C compilers, data types, types of instructions, input/output functions, operators, precedence and associativity of operators, type casting, developing simple programs, compilation, debugging and testing of programs. Relevance of C language.

### UNIT-II  
**Conditional Constructs:** if statement, if-else statements, nested if-else, forms of if. Conditional operator, Switch case constructs. Loop control structures, nested loops, break and continue statements. goto statement. Arrays: Syntax and definition, one and multidimensional arrays, reading and writing an array.

### UNIT-III  
**Pointers & Functions:** Concepts and types of pointer, Declaring and defining functions, storage classes, call by value, introduction to pointer data types, call by reference, using library functions in programs, macro definitions. Preprocessor directives - #if, #elif, #define etc. Passing arrays in to functions, Recursion.

### UNIT-IV  
**Strings:** reading and writing strings, passing a string into a function, using library functions to manipulate strings. Array of strings, Structures: Declaring and using structures. Array of structures, passing structures in to function. Unions and enums, Pointers to structures, Bit fields.

### UNIT-V  

### Text Books:
1. Let us C – YashwantKanetkar BPB Publication

### Reference Books:

### Course outcomes:
1. Students should be able to learn a programming language.
2. Students should be able to write programs in C to solve problems.
Name of program: **Bachelor of Engineering**  
Branch: **Applied Electronics & Instrumentation**  
Subject: **Digital Logic Design**  
Code: **312356 (28)**  
Total Theory Periods: **40**  
Class Tests: **Two (Minimum)**  
ESE Duration: **Three Hours**  
Total Tutorial Periods: **10**  
Assignments: **Two (Minimum)**  
Maximum Marks: **80**  
Minimum Marks: **28**

**Course Objectives:**
1. To Design, Analyze and Interpret Combinational Circuits
2. To Design, Analyze and Interpret Sequential Circuits

**UNIT-I**

**UNIT-II**
**MINIMIZATION TECHNIQUES:** Expansion of a Boolean expression to SOP form; Expansion of a Boolean expression to POS form; Two, Three & Four variable K-Map: Mapping and minimization of SOP and POS expressions; Completely and Incompletely Specified Functions- Concept of Don't Care Terms; Quine – McClusky Method (Up to 5 variable); Synthesis using AND-OR, NAND-NOR and XOR forms; Design Examples; Programmable Logic Devices: PAL, PLA’s & PROMS.

**UNIT- III**
**COMBINATIONAL CIRCUITS:** Adder & Subtractor: Half adder, Full adder, half subtractor, Full subtractor; Binary Parallel Adder; The Look Ahead Carry Adder; Serial Adder; BCD Adder; Code Converters; Parity Bit Generators/Checkers; Comparators; Decoders: 3-Line to 8-Line Decoder, 8-4-2-1 BCD to Decimal Decoder, BCD to Seven Segment Decoder; Encoders: Octal to Binary and Decimal to BCD Encoder; Multiplexers: 2- InputMultiplexer,4-Input Multiplexer, 16-Input Multiplexer; Demultiplexers: 1-Line to 4-Line & 1-Line to 8-Line Demultiplexer; Applications of Multiplexers.

**UNIT-IV**
**SEQUENTIAL CIRCUITS:** Flip-Flops: S-R Latch; Gated S-R Latch; D Latch; Edge Triggered Flip-Flops: S-R,D,J-K and T Flips-Flops; Master-Slave J-K Flip-Flop; Asynchronous Inputs; Shift Registers: SISO, SIPO, PISO,PIPO, Bi-Directional Shift Registers, Universal Shift register; Counters: Asynchronous Counters: Design of Asynchronous Counters; Effects of Propagation Delay in Ripple Counters; Synchronous Counters: Design of Synchronous Counters, 3-bit Synchronous Up counter, 3-bit Synchronous Down Counter, 3-bit Synchronous Up-down Counter, Design of Modulo-9 Synchronous Counter, Design Of Synchronous BCD Counter, Design of Synchronous Mod-6 Counter; Shift Register Counters; Pulse Train Generators, Design of Sequence Generators; Design of Finite State Machine: Mealy and Moore Model.

**UNIT-V**
**DIGITAL LOGIC FAMILIES:** Introduction; Simple Diode Gating and Transistor Inverter; Digital IC Specification Terminology; Logic Families: TTL: Open collector gates, TTL subfamilies; IIL; ECL; MOS Logic; CMOS Logic; Dynamic MOS Logic; Interfacing: TTL to ECL, ECL to TTL, TTL to CMOS, CMOS to TTL; Comparison Among Various Logic Families, Manufacturer’s Specification.

**Text Books:**
1. FundamentalsofDigitalCircuits:A.AnandKumar,PHI

**Reference Books:**
1. DigitalFundamentals:Floyd&Jain:PearsonEducation
3. DigitalCircuits&LogicDesign--LEE,PHI.

**Course outcomes:**
1. Students will be able to gain knowledge about various codes, employ Boolean algebra and circuit minimization techniques.
2. Students gain knowledge to interpret the operation of logic circuit such as adders, subtractors, multiplexers, flip-flops, shift registers and counters.
3. Students will be able to design asynchronous, synchronous sequential circuits and finite state machines.
4. Gain knowledge about various logic families and select a suitable one for a specific application.
**List of Experiments:** *(At least ten experiments are to be performed by each student)*

1. Write a program to take the radius of a sphere as input and print the volume and surface area of that sphere.
2. Write a program to take a 5-digit number as input and calculate the sum of its digits.
3. Write a program to take three sides of a triangle as input and verify whether the triangle is an isosceles, scalene or an equilateral triangle.
4. Write a program that will take 3 positive integers as input and verify whether or not they form a Pythagorean triplet or not.
5. Write a program to print all the Prime numbers between a given range.
6. Write a program to define a function that will take an integer as argument and return the sum of digits of that integer.
7. Write a program to define a macro that can calculate the greater of two of its arguments. Use this macro to calculate the greatest of 4 integers.
8. Write a program to define a recursive function that will print the reverse of its integer argument.
9. Write a program to print the sum of first N even numbers using recursive function.
10. Write a program to sort an array using Bubble sort technique.
11. Write a program that will take the elements of two integer arrays of 5 element each, and insert the common elements of both the array into a third array (Set intersection)
12. Write a program to take 5 names as input and print the longest name.
13. Write a program to define a structure Student that will contain the roll number, name and total marks of a student. The program will ask the user to input the details of 5 students and print the detail of all the students whose total marks is greater than a given value.
14. Write a program to define a union Contact that will contain the members Mobile no and Email id. Now define a structure Employee that will contain name, roll number, mode of contact (mob/e-mail) and a variable of type Contact as members. The program will ask the user to give the details of two Employees including mode of contact and the contact num/ Email. Print the details of both the Employees.
15. Write a program that will ask the user to input a file name and copy the contents of that file into another file.
16. Write a program that will take any number of integers from the command line as argument and print the sum of all those integers.

**Equipment/Machines/Instruments/Tools/Software Required:**

PCs, C-Compiler

**Recommended Book:**

List of Experiments: (At least Ten experiments are to be performed by each student)

1. To draw the characteristics of a semiconductor diode and to find cut-in voltage, reverse resistance, static resistance and dynamic resistance.
2. To draw the characteristics of a zener diode
3. To design a half wave rectifier and to determine its efficiency and ripple factor.
4. To design a full wave rectifier and determine the ripple factor and efficiency with filter.
5. To design a full wave rectifier and determine the ripple factor and efficiency without filter.
6. To draw the characteristics of FET using BFW – 10
7. To draw the characteristics of CE configuration of a transistor amplifier.
8. To draw the characteristics of CB configuration of a transistor amplifier.
9. To draw the characteristics of CC configuration of a transistor amplifier.
10. To design a Zener regulator circuit and to find the regulation characteristics.
11. To draw the load line of a transistor amplifier under CE configuration.
12. To design and verify the self bias circuit operation.
13. To design and verify the voltage divider biasing circuit.
14. To verify the effect of emitter bypass capacitor.
15. To design a regulator circuit using Zener diode.

Equipment/Machines/Instruments/Tools/Software Required:
Circuit components, Breadboard, Hook-up wire, Power supply, CRO, Function generator

Recommended Book:
Laboratory Manual for Electronic Devices and Circuits, 4th Ed., David A. Bell, PHI
Name of program: Bachelor of Engineering  
Branch: Applied Electronics & Instrumentation  
Subject: Measurement & Instruments Laboratory  
Batch Size: 30  
Code: 312363 (27)  
Maximum Marks: 40  
Minimum Marks: 20  
Total Lab Periods: 36  
Semester: III

List of Experiments: (At least Ten experiments are to be performed by each student)

1. Measurement of Resistance by Kelvin’s Double Bridge
2. Measurement of resistance by wheat stone bridge
3. Measurement of unknown induction coil by Maxwell’s inductance capacitance Bridge
4. Measurement of unknown inductance of coil by Hay’s bridge
5. Measurement of unknown capacitance by modifiable Desauty’s bridge
6. Measurement of unknown inductance of coil by Anderson Bridge
7. Measurement of unknown capacitance by shearing bridge
9. Study of Moving iron & Moving coil voltmeter
10. Study of single phase wattmeter
11. Study of single phase Energy meter
12. Potentiometer calibration
13. Study of 1 - $\varphi$ power factor meter
14. Study of frequency meters
15. Study of moving iron & moving coil ammeter
16. Measurement of high Resistance using loss of charge method
17. Measurement of high Resistance using Megger Method

Equipment/Machines/Instruments/Tools/Software Required:

Bread Board, multimeter, CRO, connecting wires, function generator, patch cords, resistors, capacitors, inductors, frequency generator, and power supply.

Recommended Books:

Name of program: **Bachelor of Engineering**
Branch: **Applied Electronics & Instrumentation**
Semester: **III**

Subject: **Digital Electronic Circuits Laboratory**
Code: **312364 (27)**
Batch Size: **30**
Minimum Marks: **20**

**Total Lab Periods:** 36

**Maximum Marks:** 40

**List of Experiments: (At least Ten experiments are to be performed by each student)**

1. To verify the properties of NOR & NAND gates as universal building block.
2. Realization of Boolean expression using NAND or NOR gates.
3. To construct XOR gate using only NAND or NOR gates only.
4. To construct a half adder circuit and logic gates and verify its truth table.
5. To construct a full adder circuit and verify its truth table (using two XOR and 3 NAND gates).
6. To construct a half subtractor circuit by using basic gates and verify its truth table.
7. To construct a full subtractor circuits by using basic gates and verify its truth table.
8. To construct a circuit of 4 - bit parity checker & verify its truth table.
9. To construct a programmable inverter using XOR gates & to verify its truth table.
10. To design a comparator circuit & verify its truth table.
11. To construct a RS flip flop using basic & universal gates (NOT, NOR & NAND).
12. To construct a JK master slave flip flop & verify its truth table.
13. To verify the operation of a clocked SR flip flop and JK flip flop.
14. To construct a T & D flip flop using JK flip flop and verify its operations & truth table.
15. To verify the operation of a synchronous decade counter.
16. To verify the operation of various decoding and driving devices.
17. To perform the operation of BCD counter using 7490.

**Equipment/Machines/Instruments/Tools/Software Required:**

Circuit components, Power supply, CRO, Function generator

**Recommended Book:**

Fundamentals of Digital Circuits: A. Anand Kumar, PHI
Name of program: **Bachelor of Engineering**  
Branch: **Applied Electronics & Instrumentation**  
Subject: **Value Education**  
No. Of Periods: 2 Periods/Week  
Maximum Marks: 40

<table>
<thead>
<tr>
<th>Course Objectives:</th>
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<tbody>
<tr>
<td>1. This course is designed to provide the importance of education with why, what &amp; how.</td>
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<tr>
<td>2. To impart students with an understanding of fundamental humanitarian viewpoint and its outcomes.</td>
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<tr>
<td>3. To provide the knowledge about whole existence and its impact on values.</td>
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<tr>
<td>4. To bring the awareness about life long exercise so that they can fulfill their responsibility towards themselves, the family, the society, the planet.</td>
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**UNIT- I Aim of Education and Necessity for Value Education:** Education in values/wisdom/etc and education in traits/technologies/etc as the two fundamental strands of education; Answer to the frequently asked questions such as “Why to do studies”, “What studies to do in overall”, “How to do studies in a proper way”, “How to think systematically and talk systematically”

**UNIT-II Humanitarian Viewpoint and Basic Human Objective:** Meaning and concept of happiness, Need for a fundamental viewpoint to judge things in all cases of human concerns, Proposal of the natural path of humanitarian coexistentialism; Consciousness development and its expression; Fundamental want of sustainable happiness in human being; Understanding the distinct activities and needs of self (I) and body in human being; Fundamental goal of human being; Sustainable-solution in individual (At the place of delusion); Sustainable-prosperity in family (At the place of poverty); Sustainable-cooperation in society (At the place of competition); Sustainable-coexistence in planet (At the place of struggle)

**UNIT- III Elements of Holistic and Systematic Perspective:** Need for study of fundamental information categories to develop holistic perspective; Particular-time actions and general-time laws; Need for fundamental information sequence to develop systematic perspective, Some examples for systematic study sequence

**UNIT-IV Elements of Society-friendly and Environment-friendly Goals:** Elements of Knowledge of whole existence; Elements of Knowledge of human being; Elements of fundamental Values and Wisdom; Value spectrum with reference to general relationships and particular relationships of the objects in nature; Elements of History and Contemporarity used to set current goals; Elements of Sciences and Techniques to formulate methods to achieve goals; Elements of Motoricity and Mattericity to make actions to execute the methods

**UNIT-V Lifelong Exercise for All-round Sustainability:** Collecting information for sustainability issues; Motivating people towards sustainable life-style; Ability to identify and develop appropriate technologies and management patterns for society-friendly and environment-friendly systems for production /protection/ utilization/ experimentation ; Ability to establish and execute the fundamental five-fold system in order to ensure sustainable peace-and-prosperity worldwide.

**Text Books:**  

**Reference Books:**  
1. International Research Handbook on Values Education and Student Wellbeing by Terence Lovat, Ron Toomey, Neville Clement (Eds.), Springer 2010, ISBN: 978-90481-86747  
3. Fundamentals of Ethics for Scientists and Engineers by E G Seebaur and Robert L Berry, 2000, Oxford University Press