Course Structure and Syllabus

II BTech EIE I Semester

(From the admitted batch of 2016 – 2017 under CBCS Scheme)

I-Semester

Sub Code	Subject	Hrs/week		Max Marks		Total Marks	Credits
		Theory	Lab	Internal	External		
BTEIE301	DIGITAL LOGIC DESIGN	4	--	25	75	100	4
BTEIE302	FUNDAMENTALS OF INSTRUMENTATION	4	--	25	75	100	4
BTEIE303	OBJECT ORIENTED PROGRAMMING USING C++	4	--	25	75	100	4
BTEIE304	CIRCUIT THEORY	4	--	25	75	100	4
BTEIE305	ELECTRONIC MEASUREMENTS	4	--	25	75	100	4
BTEIE306	FOURIER AND COMPLEX ANALYSIS	4	--	25	75	100	4
BTEIE307	ELECTRONIC DEVICES AND CIRCUITS LAB	--	3	50	50	100	2
BTEIE308	OOP USING C++ LAB	--	3	50	50	100	2
TOTAL		**24**	**6**	**250**	**550**	**800**	**28**

BTEIE301: DIGITAL LOGIC DESIGN

Theory	**: 4 Hrs/week**	**Credits**	**: 4**
Int Marks	**: 25**	**Ext Marks**	**: 75**

UNIT-I

Digital Systems

Binary Numbers, Octal, Hexa Decimal And Other Base Numbers, Number Base Conversions, Complements, Signed Binary Numbers, Floating Point Number Representation, Binary Codes, Error Detecting And Correcting Codes, Digital Logic Gates (AND, NAND, OR, NOR, Ex-OR, Ex-NOR), Boolean Algebra, Basic Theorems and Properties, Boolean Functions, Canonical and Standard Forms.

UNIT-II

Logic Gates

Gate –Level Minimization and Combination Circuits, The K-Maps Methods, Three Variable, Four Variable, Five Variable, Sum of Products, Product of Sums Simplification, Don't Care Conditions, NAND and NOR Implementation and Other Two Level Implementation.

UNIT-III

Combinational Circuits (CC)

Design Procedure, Combinational Circuit for Different Code Converters and Other Problems, Binary Adder, Subtractor, Multiplier, Magnitude Comparator, Decoders, Encoders, Multiplexers, Demultiplexers.

UNIT-IV

Synchronous Sequential Circuits

Latches, Flip-Flops, Analysis of Clocked Sequential Circuits, Design of Counters, Up-Down Counters, Ripple Counters , Registers, Shift Registers, Synchronous Counters

Asynchronous Sequential Circuits

Reduction of State and Follow Tables, Role Free Conditions

TEXT BOOKS:

1. Digital Design- M. Morris Mano.

REFERENCE BOOKS:

1. Switching and Finite Automata Theory by Zvi. Kohavi, Tata McGraw Hill.
2. Switching and Logic Design, C.V.S. Rao, Pearson Education.
3. Digital Principles and Design – Donald D. Givone, Tata McGraw Hill, Edition.
4. Fundamentals of Digital Logic & Micro Computer Design, 5TH Edition, M. Rafiquzzaman John Wiley.

BTEIE302: FUNDAMENTALS OF INSTRUMENTATION

Theory	**: 4 Hrs/week**	**Credits**	**: 4**
Int. Marks	**: 25**	**Ext Marks**	**: 75**

UNIT - I

Introduction to Instruments and their Representation

Measurement systems, Significance of Measurements, Methods of Measurements: Direct and Indirect Methods; Classification of Instruments, Deflection and Null Type instruments, Elements of a Generalized Measurement System, Types of errors: Gross Error, Systematic Error, Random Error; Units: Fundamental and Derived Units, CGS System of Unit, Practical Units, M.K.S System, S.I Units; Standards and their Classification: Electrical Standards, Resistance Standards, Current Standards, Inductance Standards and Capacitance Standards.

UNIT - II

Static Characteristics of Instruments

Introduction, Error and Uncertainties in Performance Parameters, Propagation of Uncertainties in Compound Quantities, Static Performance Parameters, Impedance Loading and Matching, Specification of Instrument Static Characteristics, Selection of the Instrument

Dynamic Characteristics of Instruments

Introduction, Formulation of System Equations, Dynamic Response, Compensation

UNIT - III

Measurement of Displacement

Introduction, principles of Transduction, LVDT and RVDT, Digital Transducers Level Measurements

Measurement of Strain

Introduction, Factors affecting Strains Measurements, Types of Strain Gauges, Theory of Operation of Resistance Strain Gauges-Types of Electrical Strain gauges, Material for Strain Gauges, Gauging Techniques and Other Factors, Strain Gauge Circuits, Temperature Compensation, Applications.

UNIT -IV

Recent Developments in Instrumentation and Measurements

Introduction, Computer – aided Measurements, Fibre optic transducers, Micro sensors, Smart Sensors, Smart transmitters and field Bus.

Data Acquisition and Conversion

Introduction, Signal Conditioning of the inputs, single channel Data Acquisition System, Multi - channel Data Acquisition System, Data Conversion, Digital to Analog Converter, Analog to Digital Converter, Multiplexers and Sample – Hold Circuits.

TEXT BOOKS:

1. Instrumentation, Measurement and Analysis, B. C. Nakra, K. K. Chaudhry, Tata McGraw-Hill Education.
2. Instrumentation Devices and Systems By C S Rangan, G R Sarma, V S V Mani, Tata McGraw-Hill Education.

REFERENCES:

1. Electrical And Electronic Measurements And Instrumentation A.K.Sawhney, Dhanpat Rai & Sons
2. Measurement and Instrumentation Principles by Alan S Morris.
3. Electronic Instrumentation – HS Kalsi, Tata Mc Graw Hill, 2004.

BTEIE303: OBJECT ORIENTED PROGRAMMING USING C++

Theory : 4 Hrs/week **Credits : 4**

Int Marks : 25 **Ext Marks : 75**

UNIT- I

Principles of Object Oriented Programming: Software Evolution, Procedure- Oriented Programming, OOP Paradigm, Basic Concepts and applications of OOP.

Beginning with C++: A Simple C++ Program, Structure of a C++ Program, Creating the Source File, Compiling and Linking.

Tokens, Expressions and Control Structures: Tokens, Identifiers and Constants, Basic and User – Defined Data Types, Derived Data Types, Symbolic Constants, Type Compatibility, Declaration of Variables, Dynamic Initialization of Variables, Reference Variables, Operators in C++, Scope Resolution Operator, Member Dereferencing Operators, Memory Management Operators, Manipulators, Type Cast Operator, Expressions and Their Types, Implicit Conversions, Operator Overloading, Operator Precedence, Control Structures.

Functions In C++: The Main Function, Function Prototyping, Call By Reference, Return By Reference, Inline Functions, Default Arguments, Const Arguments, Function Overloading, Friend and Virtual Functions, Math Library Functions.

UNIT- II

Classes and Objects: A C++ Program with Class and member functions, Inline Functions, Private Member Functions, Arrays within a class, Memory Allocation for Objects, Static Data Members and Member Functions, Arrays of Objects, Object as Function Arguments, Friend Functions, Returning Objects, const Member Functions, Local classes.

Constructors and Destructors: Constructors, Parameterized Constructors, Multiple Constructors in a Class, Constructors with Default Arguments, Dynamic Initialization of Objects, Copy Instructor, Dynamic Constructors, Constructing Two-Dimensional Arrays, const Objects, Destructors

Operator Overloading : Overloading Unary and Binary Operators, Overloading using Friends, String Manipulation Using Operators, Rules for operator Overloading.

UNIT- III

Inheritance: Extending Classes: Defining Derived Classes, Single Inheritance, Inheriting a Private Member, Multilevel, Hierarchical and Hybrid Inheritance, Virtual Base Classes, Abstract Classes, Constructors in Derived Classes, Member Classes: Nesting of Classes

Pointers, Virtual Functions and Polymorphism: Introduction, Pointers to Objects, this Pointer, Pointers to Derived Classes, Virtual Functions, Pure Virtual Functions.

UNIT- IV

Managing Console I/O Operations: C++ Stream Classes, Unformatted I/O Operations, Formatted Console I/O Operations, Managing Output with Manipulators.

Working With Files: Classes for File Stream Operations, Opening and Closing a file, Detecting End-of File, More about Open(): File Modes, File Pointers and their Manipulations, Sequential Input and Output operations, Updating a File: Random Access, Error handling During File Operations, Command-Line Arguments.

Templates: Class Templates, Multiple Parameters, Function Templates, Multiple Parameters, Overloading of Template Functions, Member Function Templates

TEXT BOOKS:

1. Object Oriented Programming with C++, 6e by E Balagurusamy, TMH.

REFERENCE BOOKS:

1. Programming: Principles and Practice using C++, Bjarne Stroustrup,Addison-Wesley Professional; 2 edition
2. Mastering C++ KR Venugopal, RajKumar Buyya,2 Edition, McGraw Hill Education
3. The Complete Reference C++ Herbert Schildt, McGraw Hill Education; 4 edition

BTEIE304: CIRCUIT THEORY

Theory	**: 4 Hrs/week**	**Credits**	**: 4**
Int Marks	**: 25**	**Ext Marks**	**: 75**

UNIT–I

Introduction to Electrical Circuits

Circuit Concept – R-L-C parameters – Voltage and Current sources – Independent and dependent sources-Source transformation – Voltage – Current relationship for passive elements (for different input signals-square, ramp, saw tooth, triangular). Kirchhoff's laws –network reduction techniques – series, parallel, series parallel, star-to-delta or delta-to-star transformation. Nodal analysis, Mesh analysis, Super Node and Super Mesh analysis of Networks with Independent and Dependent voltage and current sources.

UNIT–II

Magnetic Circuits

Magnetic Circuits – Faraday's laws of electromagnetic induction – concept of self and mutual inductance – dot convention – coefficient of coupling – composite magnetic circuit – Analysis of series and parallel magnetic circuits

Single Phase A.C Circuits

R.M.S and Average values and form factor for different periodic wave forms, Steady state analysis of R, L and C (in series, parallel and series parallel combinations) with sinusoidal excitation – Concept of Reactance, Impedance, Susceptance and Admittance – Phase and Phase difference – concept of power factor.

UNIT–III

Locus Diagrams and Resonance

Locus diagrams – series R-L, R-C, R-L-C and parallel combination with variation of various parameters – Resonance – series, parallel circuits, concept of band width and Q factor.

UNIT–IV

Network Topology and Network Theorems

Definitions – Graph – Tree, Basic cutset and Basic Tieset matrices for planar networks -Duality and Dual networks. Superposition, Reciprocity, Thevenin's, Norton's, Maximum Power Transfer, Tellegen's, Millman's and Compensation theorems for d.c. and a.c.excitations.

TEXT BOOKS:

1. Engineering circuit analysis by William Hayt and Jack E. Kemmerly, Mc GrawHillCompany, 6th Edition.
2. Network Analysis by A. Sudhakar, ShyammohanPalli, Mc Graw Hill Company,
3. Circuit Theory by A. Chakrabarti, Dhanipat Rai and Co., 6th Edition.

REFERENCE BOOKS:

1. Network Analysis by M. E Van valkenburg, PHI.
2. Linear circuit analysis (time domain phasor, and Laplace transform approaches) byRAYMOND A.DECARLO and PEN-MIN-LIN, Oxford University Press.2nd Edition,2004.
3. Network Theory by N.C. Jagan and C.Lakshminarayana, B.S Publications.
4. Electrical Circuit theory by K. Rajeswaran, Pearson Education 2004.
5. Basic Circuit analysis by D.R, Cunningham and J.A Stuller, Jaico Publications.

BTEIE305: ELECTRONIC MEASUREMENTS

Theory	**: 4 Hrs/week**	**Credits**	**: 4**
Int Marks	**: 25**	**Ext Marks**	**: 75**

UNIT I

Introduction to Measurements

Physicalmeasurement.Forms and methods of measurements.Measurement errors.Statistical analysis of measurement data.Probability of errors. Limiting errors. Standards. Definition of standard units.International standards.Primary standards.Secondary standards.Working standards.Voltage standard.Resistance standard.Current standard.Capacitance standard.Time and frequency standards, Standards for Mass, Length and Volume, Standards of Temperature and Luminous Intensity, IEEE Standards.

UNIT II

Testing and Calibration

Traceability. Measurement reliability. Calibration experiment and evaluation of results. Primary calibration. Secondary calibration. Direct calibration. Indirect calibration. Routine calibration. Calibration of a voltmeter, ammeter and an oscilloscope: case study

UNIT III

Frequency Counters

Basic Principle, errors associated with counter, Different modes ofoperations: Frequency, Time, Time Period, Average time period, Totalizing, Frequency synthesizer, Wave meters, Wave Analyzers, Output Power meter.

Bridges

AC Bridges – measurement of inductance:- Maxwell's bridge, Anderson bridge, Hays Bridge measurement of capacitance:-Schering bridge, measurement of impedance: – Kelvin's bridge, Wheat Stone bridge, HF bridges, problems of shielding, and grounding, Q-meter.

UNIT IV

Oscilloscopes

CRO operation, CRT characteristics, probes, Time base sweep modes, Trigger generator, Vertical amplifier, modes of operation, A, B, alternate & chop modes, sampling oscilloscopes, storage oscilloscope, Standard specifications of CRO, Synchronous selector circuits.

Analyzers

Spectrum analyzers, Different types of spectrum analyzers, Display Devices and Display Systems, Logic Analyzers – State & time referenced data capture. Scalar and Vector network analyzers.

TEXT BOOKS:

1. Electronic Instrumentation – HS Kalsi, Tata Mc Graw Hill, 2004..
2. Electronic Instrumentation and measurements techniques by HelfrickandW.D.Cooper.,PHI publications.

REFERENCE BOOKS:

1. Principles of measurement systems, John P. Bentley: 3rd edition, Addison WesleyLongman, 2000.
2. Measuring Systems, Application and Design : E.O. Doebelin, McGraw Hill.
3. Electrical and Electronic Measurements :Shawney, Khanna Publ.
4. Electronic Instrumentation and measurements : David A. Bell, 2nd Edition,PHI,2003.

BTEIE306: FOURIER AND COMPLEX ANALYSIS

Theory	**: 4 Hrs/week**	**Credits**	**: 4**
Int Marks	**: 25**	**Ext Marks**	**: 75**

UNIT–I

Functions of a Complex Variable

Introduction, Continuity, Differentiability, Analyticity, properties, Cauchy, Riemann equations in Cartesian and polar coordinates**.** Harmonic and conjugate harmonic functions-Milne-Thompson method

UNIT-II

Complex Integration

Line integral, Cauchy's integral theorem, Cauchy's integral formula, and Generalized Cauchy's integral formula, Power series: Taylor's series- Laurent series, Singular points, isolated singular points, pole of order m – essential singularity, Residue, Cauchy Residue theorem (Without proof).

UNIT–III

Evaluation of Integrals

Types of real integrals:(a) Improper real integrals $\int_{-\infty}^{+\infty} f\ (x)dx$ (b)$\int_{c}^{c+2\pi} f\ (\cos\theta\ ,\sin\theta)d\theta$

Bilinear transformation- fixed point- cross ratio- properties- invariance of circles.

UNIT–IV

Fourier Series and Transforms

Introduction, Periodic functions, Fourier series of periodic function, Dirichlet's conditions, Even and odd functions, Change of interval, Half range sine and cosine series. Fourier integral theorem (without proof), Fourier sine and cosine integrals, sine and cosine, transforms, properties, inverse transforms, Finite Fourier transforms.

TEXT BOOKS:

1. Complex Variables and Applications by James Ward Brown,Ruel v. Churchill, McGraw Hill.
2. Higher Engineering Mathematics by Dr. B. S. Grewal, Khanna Publishers.
3. Advanced engineering Mathematics with MATLAB by Dean G. Duffy

REFERENCES:

1. Fundamentals of Complex Analysis by Saff, E. B. and A. D. Snider, Pearson.
2. Advanced Engineering Mathematics by Erwinkreyszig,Wiley-India.

BTEIE307: ELECTRONIC DEVICES AND CIRCUITS LAB

Lab	**: 3 Hrs/week**	**Credits**	**: 2**
Int Marks	**: 50**	**Ext Marks**	**: 50**

List of Experiments

1. P-N Junction Diode Characteristics
   - Part A: Germanium Diode (Forward bias & Reverse bias)
   - Part B: Silicon Diode (Forward Bias only)
2. Zener Diode Characteristics
   - Part A: V-I Characteristics
   - Part B: Zener Diode as Voltage Regulator
3. Rectifiers (without and with C-filter)
   - Part A: Half-wave Rectifier
   - Part B: Full-wave Rectifier
4. BJT Characteristics (CE Configuration)
   - Part A: Input Characteristics
   - Part B: Output Characteristics
5. FET Characteristics (CS Configuration)
   - Part A: Drain Characteristics
   - Part B: Transfer Characteristics
6. BJT Biasing
7. FET Biasing
8. CRO Operation and its Measurements
9. BJT as Switch
10. Frequency Response of BJT-CE Amplifier
11. Frequency Response of BJT-CC Amplifier
12. Frequency Response of FET-CS Amplifier
13. SCR Characteristics
14. UJT Characteristics

REFERENCES:

1. Integrated Electronics by Jacob Millman and Christos C.Halkias, McGraw Hill.

BTEIE309: OOP USING C++LAB

Lab	**: 3 Hrs/week**	**Credits**	**: 2**
Int Marks	**: 50**	**Ext Marks**	**: 50**

List of Programs

1. Write a Program in C++ that implements stack operations using classes and objects.
2. Write a Program in C++ for performing complex number addition using friend functions.
3. Write a Program in C++ for complex number addition using operator overloading.
4. Write a Program in C++ to perform string operations by overloading operators.
5. Write a Program in C++ on hierarchical inheritance showing public, private and protected inheritances.
6. Write a Program in C++ for computation of student's result using hybrid inheritance.
7. Write a Program in C++ implementing bubble-sort using templates.
8. Write a Program in C++ on virtual functions.
9. Write a Program in C++ for copying one file to another file using streams.
10. Write a Program in C++ for writing and reading a class object to a file.
11. Write a Program in C++ to implement one catch block and all Exceptions
12. Write a Program in C++ to implement Multiple Catch blocks.
13. Write a Program in C++ to implement pointers to a derived class and virtual base classes.
14. Write a Program in C++ to implement conversion of objects between different classes using conversion functions.
15. Write a Program in C++ to implement function overloading- with various data types, with different number of arguments.

REFERENCES:

1. Object Oriented Programming with C++, 6e by E Balagurusamy, TMH.
2. Mastering C++ KR Venugopal, RajKumar Buyya,2 Edition, McGraw Hill Education
3. The Complete Reference C++ Herbert Schildt, McGraw Hill Education; 4 edition
4. Programming: Principles and Practice using C++,Bjarne Stroustrup,Addison-Wesley Professional; 2 edition