TULSIRAMJI GAIKWAD-PATIL College of Engineering & Technology

Mohgaon, Wardha Road, Nagpur - 441 108

An Autonomous Institute

DEPARTMENT OFELECTRONICS & COMMUNICATION ENGINEERING

B.Tech. Electronics & Communication Engineering

Syllabus

From

Academic Year 2022-23

Tulsiramji Gaikwad-Patil College of Engineering & Technology, Nagpur

(An Autonomous Institution Affiliated to RTM Nagpur University, Nagpur)

Programme: Electronics & Communication Engineering

Scheme of Instructions: Second Year B.Tech. in Electronics & Communication Engineering

Semester – III

Sr. No.	Course Category	Course Code	Course Title	L	T	P	Contact Hrs/Wk	Course Credits	EXAM SCHEME				
									CT-1	CT-2	TA/CA	ESE	TOTAL
1	BSC	BEC2301	Electrical and Electronics Engineering Mathematics	3	-	-	3	3	15	15	10	60	100
2	ESC	BEC2302	Instrument and Measurement	3	-	-	3	3	15	15	10	60	100
3	PCC	BEC2303	Object Orientated Programming Structure	3	-	-	3	3	15	15	10	60	100
4	PCC	BEC2304	Network Analysis and Synthesis	3	1	-	4	4	15	15	10	60	100
5	PCC	BEC2305	Digital Electronics & Memories	3	-	-	3	3	15	15	10	60	100
6	ESC	BEC2306	Electronic Devices & Circuits	3	1	-	4	4	15	15	10	60	100
7	PCC	BEC2307	Object Orientated Programming Structure Lab	-	-	2	2	1	-	-	25	25	50
8	ESC	BEC2308	Electronic Devices & Circuits Lab	-	-	2	2	1	-	-	25	25	50
9	PCC	BEC2309	Digital Electronics and Memories Lab	-	-	2	2	1	-	-	25	25	50
10	ESC	BEC2310	Instrument and Measurement Lab	-	-	2	2	1	-	-	25	25	50
11	MCC	BAU2310	Environmental Science	2	-	-	2	Audit	-	-	-	-	-
			Total	**20**	**2**	**8**	**30**	**24**	**90**	**90**	**160**	**460**	**800**

L- Lecture T-Tutorial P-Practical

CT1- Class Test 1 TA/CA- Teacher Assessment/Continuous Assessment

CT2- Class Test 2 ESE- End Semester Examination (For Laboratory End Semester performance)

Course Category	HSMC (Hum., Soc. Sc, Mgmt.)	BSC (Basic Sc.)	ESC (Engg. Sc.)	PCC (Programme Core Courses)	PEC (Programme Elective Courses)	OEC (Open Elective courses from other discipline)	Project / Seminar /Industrial Training	MCC (Mandatory Courses)
Credits	--	03	09	12	--	--	--	Yes
Cumulative Sum	5	18	15	-	--	--	--	--

PROGRESSIVE TOTAL CREDITS : 35+24 =59

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Second Year (Semester-III) B.Tech. Electronics & Communication Engineering

BEC2301: Electrical and Electronics Engineering Mathematics

Teaching Scheme	
Lectures	3Hrs/week
Tutorial	-
Total Credit	3

Examination Scheme	
CT-1	15 Marks
CT-2	15 Marks
TA	10 Marks
ESE	60 Marks
Total	100 Marks
Duration of ESE: 02 Hrs 30 Min.	

Course Outcomes:

Student will be able to

1	**Analyze** numerical techniques to find the roots of equations different types of equations.
2	**Apply** the concept of Laplace Transform for Solving differential equation
3	**Apply** the knowledge of Fourier series and Transform for understanding periodic signals and solve integral equations.
4	**Solve** Partial Differential Equation using appropriate method
5	**Apply** the concept of Z-Transform for solving difference equation

Course Contents

Unit I	**NUMERICAL METHODS:**Error in numerical calculations, Errors in series approximation, Rounding of errors, Solution of Algebraic and Transcendental Equation: Bisection method, False position method, Newton –Raphson method and their convergence, Solution of system of simultaneous linear equations: Gauss elimination method, Gauss Jordon method. Gauss Seidel method, Crout's method.
Unit II	**Laplace Transform**: Definition, Properties, Evaluation of integrals by Laplace Transform, Inverse Laplace Transform and its Properties, Convolution theorem (statement only), Laplace Transform of Periodic Functions (statement only), Unit Step Function and Unit Impulse Function, Applications of Laplace Transform to solve Ordinary Differential Equations.
Unit III	**Fourier Series & Fourier Transform**: Periodic functions and their Fourier Expansions, Even and Odd functions, Change of interval, Half Range Expansions. Fourier Transform: Definition and Properties (excluding FFT), Fourier Integral Theorem, Relation with Laplace Transform, Applications of Fourier Transform to Solve Integral Equation.
Unit IV	**Partial Differential Equations**: Partial Differential Equations of First Order First degree i.e.Lagrange's form, Linear Homogeneous Equations of Higher order with constant coefficients, Method of separation of variables, Applications of Partial Differential Equations **Introduction to Mathematical Modelling**
Unit V	**Z-TRANSFORM** Definition, Convergence of Z-transform and Properties, Inverse Z-transform by Partial Fraction Method, Residue Method (Inversion Integral Method) and Power Partial Fraction Method, Convolution of two sequences. Solutions of Difference Equations with Constant Coefficients by Z- transform.

Text Books	
1	Higher Engineering Mathematics by B.S. Grewal, 40th Edition, Khanna Publication
2	Advanced Engineering Mathematics by Erwin Kreysizig, 8th Edition, Wiley India
3	Applied Mathematics for Engineers & Physicist by L.R. Pipes and Harville.
Reference Books	
1	A Text Book of applied Mathematics, Volume II , by P.N. Wartikar& J.N. Wartikar, Poona VidyarthiGrihaPrakashan
2	Introductory methods of Numerical Analysis, by S.S. Sastry, PHI
3	Mathematics for Engineers by Chandrika Prasad John wiley& son

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Second Year (Semester III) B. Tech. Electronics & Communication Engineering

BEC2302: Instrument and Measurement

Teaching Scheme	
Lectures	3 Hrs/week
Tutorial	0Hrs/week
Total Credit	3

Examination Scheme	
CT-1	15 Marks
CT-2	15 Marks
TA	10 Marks
ESE	60 Marks
Total	100 Marks
Duration of ESE: 03 Hrs 00Min.	

Course Outcomes (CO)

Students will be able to

1	**Examine** the measuring methods and electrical quantities.
2	**Analyze** the ammeters and voltmeters using PMMC
3	**Illustrate** the bridges using ac and dc supply.
4	**Determine** the physical parameters using active and passive transducers.
5	**Analyze** CRO, signal generator, wave analyzer and data acquisition system.

Course Contents

Unit I	Block diagram of electronic measurement system, Types of Measurements, Applications of measurement system, Theory of errors, Types of errors, Statistical analysis, and probability of errors, Limiting errors Accuracy and Precision, Standards of measurement.
Unit II	Construction, Torque and deflection of Galvanometer, PMMC mechanism, DC voltmeter; AC voltmeters; Peak, average and true rms; Digital Multimeters; Block diagram and specifications Ammeters, Ohm-meters and their design' AC indicating instruments, Watt-hour meter; Power factor meter.
Unit III	DC Bridges : Wheatstone Bridge, Kelvin Bridge AC Bridges and their applications : Maxwell's Bridge, Hay's Bridge, Anderson bridge, Schering Bridge, Desauty's Bridge, Wein Bridge, Detectors for AC bridges.
Unit IV	Static and dynamic characteristics, Classification of transducers, Capacitive transducer, Inductive transducer, Resistive transducer, RVDT, Strain Gauge, RTD, Resistors, Optical Transducers, Hall effect transducer, Piezoelectric transducers, Transducers for measurement of Pressure, Temperature, Level, Displacement, Flow.
Unit V	Oscilloscope: Dual trace, Digital storage oscilloscopes, Applications of CRO. Signal Generators: Sine-wave, standard, AF, RF generator, Pulse generator, Function generator. Signal Analyzer: Wave, Harmonic Distortion, Spectrum, Logic, digital Fourier analyzer. Data Acquisition System: Necessity, process & Functions of Signal conditioning, AC/DC Conditioning systems, ADC, DAC, single channel and multi-channel DAS.

Text Books	
1	A.D. Helfrick and W.D. Cooper: “Modern Electronic Instrumentation and Measurement Techniques”, PHI Publications.
2	A.K. Sawhney : “Electrical and Electronic Measurement and Instrumentation”, Dhanpat Rai &; Sons Publications.
3	S.S. Kalsi : “Electronics Measurements”, Mc Graw Hill Publications.
ReferenceBooks	
1	Joseph J. Carr : “Elements of Electronic Instrumentation and Measurement”, Pearson Education Publications.
2	R.K. Rajput : “ Electrical And Electronic Measurement”, PHI Publications.
3	DVS Murthy : “ Transducers and Instrumentation”, PHI Publications.
UsefulLinks	
1	https://nptel.ac.in/courses/108/108/108108147/
2	https://nptel.ac.in/courses/108/105/108105153/

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Second Year (Semester-III) B.Tech.Electronics & Communication Engineering

BEC2303: Object Oriented Programming Structure

Teaching Scheme	
Lectures	3Hrs/week
Tutorial	0Hrs/week
Total Credit	3

Examination Scheme	
CT-1	15 Marks
CT-2	15 Marks
TA	10 Marks
ESE	60 Marks
Total	100 Marks
Duration of ESE: 03 Hrs 00 Min.	

Course Outcomes (CO)

Students will be able to

1. **Apply** the concept of OOPS and its importance.
2. **Analyze** the key features of Java & control statements for efficient programming solutions.
3. **Integrate** Java's object-oriented programming concepts in practical scenarios.
4. **Illustrate** the application of inheritance and polymorphism principles in Java .
5. **Illustrate** the knowledge to handle exceptions using concepts of exception handling

Course Contents

Unit I	Basic concepts of object oriented programming-Benefits of OOPs-Application OOP Structure of Java Programming.
Unit II	Features of Java, Byte Code and Java Virtual Machine, JDK, Data types, Operator, Control Statements – If , else, nested if, if-else ladders, Switch, while, do-while, for, for-each, break, continue, Methods.
Unit III	Class, Object, Object reference, Constructor, Constructor Overloading, Method Overloading, Recursion, Passing and Returning object form Method, new operator, this and static keyword, finalize() method, Access control, modifiers, Nested class, Inner class, Anonymous inner class, Abstract class.
Unit IV	Use of Inheritance, Inheriting Data members and Methods, constructor in inheritance, Multilevel Inheritance – method overriding, Handle multilevel constructors – super keyword, Stop Inheritance - Final keywords. Polymorphism: dynamic binding, method overriding, abstract classes and methods
Unit V	Exception Handling: Benefits of exception handling, the classification of exceptions , exception hierarchy, checked exceptions and unchecked exceptions, usage of try, catch, throw, throws and finally, re-throwing exceptions, GUI components in Java, Introduction to Database Connectivity. I/O Streams: Concepts of I/O streams, Reading console Input and Writing Console output, File Handling.

Text Books

1	Java: The Complete Reference" by Herbert Schildt
2	Programming with Java" by Balagurusamy
3	Core Java for the Impatient" by Horstmann

Reference Books

1	Thinking in Java by Bruce Eckel
2	Java 9 for Programmers by Paul Deitel, Harvey Deite
3	Beginning Java Programming: The Object-Oriented Approach by Bart Baesens, Aimee Backiel,

	and Seppe vanden Broucke
Useful Links	
1	https://nptel.ac.in/courses/106/102/106102064/
2	https://nptel.ac.in/courses/106/106/106106145/
3	https://nptel.ac.in/courses/106/105/106105085/

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Second Year (Semester-III) B.Tech. Electronics & Communication Engineering

BEC2304: Network Analysis & Synthesis

Teaching Scheme	
Lectures	3 Hrs/week
Tutorial	1 Hrs/week
Total Credit	4

Examination Scheme	
CT-1	15 Marks
CT-2	15 Marks
TA	10 Marks
ESE	60 Marks
Total	100 Marks
Duration of ESE: 03 Hrs 00 Min.	

Course Outcomes (CO)

Students will be able to

Apply the knowledge of electrical circuits with nodal and mesh analysis
Apply networks theorem for electrical circuit.
Examine AC circuit and significance of quality factor, Bandwidth Selectivity
Analyze Steady state and transient analysis with laplas transform.
Analyze working of Filter and Attenuators.

Course Contents

Unit I	Basics of electric circuits, circuit elements and their voltage – current relationship, concept of equivalent sources, source transformation, Mesh & Nodal Analysis, Duality, Mutual coupled circuits, Dot Convention in coupled circuits
Unit II	Superposition Theorem, Thevenin's Theorem, Norton's Theorem, Maximum Power Transfer Theorem
Unit III	Ac circuit analysis with dependent current and voltage sources, Series and parallel resonant circuits, Significance of Quality factor, Bandwidth, Selectivity, Effect of Rg on BW & Selectivity, Magnification factor.
Unit IV	Laplace transforms and properties, partial fractions, singularity functions, waveform synthesis, analysis of RC, RL, and RLC networks with and without initial conditions with Laplace transforms, Evaluation of initial conditions.
Unit V	Two port network and interconnections, Behavior of series and parallel resonant circuits, Introduction to band pass, low pass, high pass and band reject filters.

Text Books

1	M.E. Van Valkenburg : Network Analysis, PHI
2	D. Roy Choudhary : Network and systems, New Age Publication.
3	Linear Network Theory : Kelkar and Pandit, Pratibha Publications.

Reference Books

1	Circuit Theory : Chakraborti , Dhanpat Rai
2	Engineering Circuit Analysis : Hayt W.H. & J.E. Kemmerly , TMH
3	Network analysis with Applications : William D Stanley, Pearson Education

Useful Links

1	https://nptel.ac.in/courses/108/105/108105159/
2	https://nptel.ac.in/courses/108/102/108102042/
3	https://onlinecourses.nptel.ac.in/noc20_ee46/preview

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Second Year (Semester-III) B.Tech. Electronics & Communication Engineering

BEC2305: Digital Electronics & Memories

Teaching Scheme	
Lectures	3 Hrs/week
Tutorial	-
Total Credit	3

Examination Scheme	
CT-1	15 Marks
CT-2	15 Marks
TA	10 Marks
ESE	60 Marks
Total	100 Marks
Duration of ESE: 03 Hrs 00 Min.	

Course Outcomes (CO)

Students will be able to

Analyze the fundamental principle of basic gates and conversion of number system.
Solve the logical functions using minimization techniques.
Design flip flops with the help of logic gates.
Structure memories by utilizing digital electronics methodologies.
Implement finite state machines for solving sequential logic problems.

Course Contents

Unit I	Introduction Analog & Digital Signals, Number system, Number system Conversions,Code Conversion, Digital Logic Gates, Universal Gates, Exclusive-OR & NOR, Boolean Algebra, De morgan's Theorem Binary Arithmetic, One's and Two's complement
Unit II	Standard representations for logic functions, k map representation of logic functions (SOP & POS forms), minimization of logical functions for min-terms and max-terms (upto 4 variables), don't care conditions, Design Examples: Arithmetic Circuits, BCD - to – 7 segment decoder, Code converters. Adders and their use as substractor, ALU, Digital Comparator, Multiplexers and their use in combinational logic designs, multiplexer trees, Demultiplexers, Encoders & Decoders
Unit III	Bit Memory Cell, Clocked SR, JK, MS J-K flip flop, D and T flip-flops. Use of preset and clear terminals, Excitation Table for flip flops. Conversion of flip flops. Registers, Shift registers, Counters (ring counters, twisted ring counters), Sequence Generators, rippleCounters, up/down counters, synchronous counters. Asynchronous counters.
Unit IV	Types of Memory commonly used memory chips. Programmable Logic Devices: ROM as Programmable logic devices (PLD), Programmable logic array, Programmable array logic, complex Programmable logic devices (CPLDS), Field Programmable Gate Array (FPGA)
Unit V	Basic design steps- State diagram, State table, State reduction, State assignment, Mealy and Moore machines representation, Implementation, finite state machine implementation, Sequence detector.

Text Books	
1	Morris Mano : " An approach to digital Design", Pearson Publications.
2	Herbert Taub, Donald LSchilling "Digital Integrated Electronics", McGraw Hill, 1977
3	W. Fletcher : "Engg. Approach to Digital Design", PHI Publications.
Reference Books	
1	Wakerly Pearon : "Digital Design: Principles and Practices", Pearon Education Publications.
2	Mark Bach : "Complete Digital Design", Tata MCGraw Hill Publications
3	R.P. Jain : "Modern digital electronics" , TMH Publications.
Useful Links	
1	https://nptel.ac.in/courses/117/106/117106114/
2	https://nptel.ac.in/courses/117/106/117106086/
3	https://nptel.ac.in/courses/117/106/117106114/

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Second Year (Semester-III) B.Tech. Electronics & Communication Engineering

BEC2306 : Electronic Devices and Circuits

Teaching Scheme	
Lectures	3 Hrs/week
Tutorial	0 Hrs/week
Total Credit	3

Examination Scheme	
CT-1	15 Marks
CT-2	15 Marks
TA	10 Marks
ESE	60 Marks
Total	100 Marks
Duration of ESE: 03 Hrs 00 Min.	

Course Outcomes (CO)

Students will be able to

1	**Describe** the applications and operating principles of the diode and Zener diode semiconductor devices.
2	**Explain** the operation and configuration of BJT transistors in CB, CE, and CC, biasing and stability concerns
3	**Examine** the characteristics of FET's and Power devices, and analysis of FET using small signal model
4	**Analyze** Power amplifier circuits using transistor, and operation principal of a Class A, Class B, Class AB, and Class C power amplifier circuits with cross over distortion.
5	**Examine** the operation and characteristics of Enhancement and Depletion type MOSFETs and their analysis using small signal model.

Course Contents

Unit I	**Semiconductor Diodes** : PN junction diode and its application, Physics and structure of diodes, Characteristics, resistance, capacitance and its application, Diode small signal model, Rectifier circuits, Clipping and clamping circuits, Zener diode, voltage regulator, Schottky diode, Varactor Diode, Tunnel Diode.
Unit II	**Bipolar Junction Transistors:** Bipolar junction transistor (BJT), V-I characteristics, Biasing, Small signal low frequency amplifier. Physical structure and operation modes, Ebor-Moll model, Current voltage characteristics of CE, CB, CC configuration, Low frequency analysis of transistors, miller's theorem, load line, stability factors..
Unit III	**Junction Field-effect Transistor**: JFET parameters, V-I characteristics, Biasing of JFET, Low frequency model of JFET and its analysis, Power devices, power diode, IGBT, SCR TRIAC, Switching Devices , DIAC, UJT characteristics and applications
Unit IV	**Power Amplifier:** Class A, Class B, Class AB and Class C, Power Efficiency, Power Dissipation, Cross-Over Distortion in Class AB Circuits, negative and positive feedback, Barkhausen criteria, RC, LC, Crystal Oscillators.
Unit V	**MOSFET**: Device Structure and Physical Operation of MOSFET, Finite Output Resistance in Saturation, Current voltage characteristics of the MOSFET, Biasing in MOSFET Amplifier Circuits, Small Signal Operation and Models, Overview of Depletion type-MOSFET, Enhancement type-MOSFET.

Text Books

T.1	"Electronic Devices and Circuits", "Millman Halkias", "TMH", 2000
T.2	"Electronic Devices and Circuits", "David A. Bell", "PHI", 4th Edition
T.3	Electronics Devices and Circuit-Jimmie J.Cathey, McGraw – Hill Education

Reference Books	
R.1	Electronic Devices and Theory - BoyleStad, Nashelsky 9th. Edition May 2010 PHI
R.2	Electronic Devices and Circuits - S Salivahanan, N Suresh Kumar 3rd Edition Tata McGraw Hills
R 3	Electronic Devices and Theory – V.K. Mehta 3rd Edition McGraw – Hill
Useful Links	
1	https://nptel.ac.in/courses/108/104/108104139/
2	http://nptel.ac.in/courses/117107095
3	http://nptel.ac.in/courses/117103064

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Second Year (Semester-III) B.Tech.Electronics & Communication Engineering

BEC2307: Object Oriented programming Structure Lab

Teaching Scheme		Examination Scheme	
Practical	2Hrs/week	**CA**	25 Marks
Total Credit	1	**ESE**	25 Marks
		Total	50 Marks
		Duration of ESE:02Hrs00Min.	

Course Outcomes(CO)

Students will be able to

1	**Execute** the setup for Java programming.
2	**Implement** programs that demonstrate the use of the 'if' statement & 'for' loop .
3	**Execute** Java programs on method overloading, class constructors and this keyword.
4	**Execute** single and multilevel inheritance, as well as multiple inheritance.
5	**Develop** I/O stream and file stream classes for data handling & exception handling techniques.

Sr.No.	List of Experiment	CO
1	Implement Setup for Java programming development environment and test using small program.	CO1
2	Implement a programs to demonstrate use of ”if “ statement and its different forms.	CO2
3	Develop programs to demonstrate use of looping statement'for'	CO2
4	Execute a program using Method overloading	CO3
5	Execute a program for the concept of class constructor and its types in JAVA	CO3
6	Develop a program to implement this keyword in Java	CO3
7	Execute a program for implementation of Single and Multilevel inheritance.	CO4
8	Execute a program for implementation of multiple inheritance.	CO4
9	Develop a program for implementation of I/0 stream and file stream classes.	CO5
10	Implement program for exception handling	CO5

Text Books

1	Java: The Complete Reference” by Herbert Schildt
2	Programming with Java” by Balagurusamy
3	Core Java for the Impatient” by Horstmann

Reference Books

1	Thinking in Java by Bruce Eckel
2	Java 9 for Programmers by Paul Deitel, Harvey Deite
3	Beginning Java Programming: The Object-Oriented Approach by Bart Baesens, Aimee Backiel, and Seppe vanden Broucke

Useful Links

1	https://nptel.ac.in/courses/106/102/106102064/
2	https://nptel.ac.in/courses/106/106/106106145/

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Second Year (Semester-III) B.Tech. Electronics & Communication Engineering

BEC2308: Electronic Devices and Circuits Lab

Teaching Scheme		Examination Scheme	
Practical	2 Hrs/week	**CA**	25 Marks
Total Credit	**2**	**ESE**	25 Marks
		Total	50 Marks
		Duration of ESE: 02 Hrs 00 Min.	

Course Outcomes (CO)

Students will be able to

1	**Examine** the V-I Characteristics of PN Junction and Zener Diode and its Applications.
2	**Analyze** the V-I Characteristics of Bipolar Junction Transistor For configuration CE,CB & CC.
3	**Examine** the Characteristics of FET's and Power Devices.
4	**Verify** the Operation of Power Amplifiers and Oscillators Circuits.
5	**Analyze** the Operation and V-I Characteristics of MOSFET.

Sr. No.	List of Experiment	CO
1	Examine the V- I characteristics of PN junction diode (Si and Ge).	CO1
2	Calculate Voltage Regulation of a Zener diode voltage regulator.	CO1
3	Examine the Operation of Full Wave Rectifier with Filters.	CO1
4	Analyze the I/P & O/P Characteristics of BJT Common Base Transistor Configuration.	CO2
5	Analyze the I/P & O/P Characteristics of BJT Common Emitter Transistor Configuration.	CO2
6	Plot the I/P & O/P Characteristics of Junction Field Effect Transistor.	CO3
7	Verify the Class B Power Amplifier and observe Cross Over Distortion.	CO4
8	Verify the operation of Class C Power Amplifier	CO4
9	Demonstrate the operation of the LC, RC phase shift and Crystal Oscillators.	CO4
10	Plot the Transfer characteristics of Metal Oxide Semiconductor Field Effect Transistor	CO5

Text Books

T.1	Engineering Circuit Analysis - William H. Hayt, 8th Edition McGraw – Hill
T.2	Electronics Devices and Circuit-Jimmie J.Cathey, McGraw – Hill Education

Reference Books

R.1	Electronic Devices and Theory - BoyleStad, Nashelsky 9th. Edition May 2010 PHI
R.2	Electronic Devices and Circuits - S Salivahanan, N Suresh Kumar 3rd Edition Tata McGraw Hills

Useful Links

1	https://nptel.ac.in/courses/108/104/108104139/
2	http://nptel.ac.in/courses/117107095

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Wardha Road, Nagpur-441 108
NAAC Accredited (A+ Grade)
An Autonomous Institute affiliated to RTMNU Nagpur

Second Year (Semester-III) B.Tech. Electronics & Communication Engineering

BEC2309: Digital Electronics & Memories Lab

Teaching Scheme		Examination Scheme	
Practical	2 Hrs/week	**CA**	25 Marks
Total Credit	1	**ESE**	25 Marks
		Total	50 Marks
		Duration of ESE: 02 Hrs 00 Min.	

Course Outcomes (CO)

Students will be able to

1	**Verify** the truth table for a universal gate and De Morgan's theorem using logic gates.
2	**Demonstrate** the outputs of a multiplexer and de-multiplexer using a truth table.
3	**Design adder and subtractor circuits using logic gates..**
4	**Implement** a BCD to 7-segment decoder.
5	**Design** flip-flops using logic gates.

Sr. No.	List of Experiment	CO
1.	Verify the truth table of logic gates(Basic gates, Universal gates and Exclusive gates).	CO1
2.	Implement Universal gate using basic gates.	CO1
3.	Verify truth table for De-Morgan's Theorem.	CO1
4.	Verify truth table of Multiplexer.	CO2
5.	Verify truth table of De-Multiplexer.	CO2
6.	Execute Full Adder Circuit using Logic gates.	CO3
7.	Execute Full Subtractor Circuit using Logic gates.	CO3
8.	Verify BCD to 7 segment decoder.	CO4
9.	Demonstrate D & T flip flop.	CO5
10.	Demonstrate JK flip flop.	CO5

Text Books

T.1	Morris Mano : " An approach to digital Design", Pearson Publications
T.2	Ramesh Gaonkar : " Microprocessor Architecture, Programming and Applications with the 8085", Penram International Publications

Reference Books

1	Wakerly Pearon : "Digital Design: Principles and Practices", Pearon Education Publications.
2	R.P. Jain : "Modern digital electronics" , TMH Publications.

Useful Links

1	https://nptel.ac.in/courses/117/106/117106114/
2	https://nptel.ac.in/courses/117/106/117106086/

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Second Year (Semester-III) B.Tech. Electronics & Communication Engineering

BEC2310: Instrument and Measurement Lab

Teaching Scheme		Examination Scheme	
Practical	2 Hrs/week	**CA**	25 Marks
Total Credit	1	**ESE**	25 Marks
		Total	50 Marks
		Duration of ESE: 02 Hrs 00 Min.	

Course Outcomes (CO)

Students will be able to

1	**Verify** measurement technique of digital voltmeter.
2	**Identify** unknown value of resistance using direct & indirect method.
3	**Calculate** unknown parameters resistance, inductance & capacitance using dc & ac bridges
4	**Analyze** working principle of transducer like potentiometer & LVDT.
5	**Demonstrate** frequency & phase measurement using Lissagious pattern

Sr. No.	List of Experiment	CO
1	To Examine the function of Analog Meter & Digital Multimeter.	**CO2**
2	To Measure Medium Resistance by using voltmeter ammeter method and by colour coding.	**CO3**
3	To Measure Medium Resistance by using Wheatstone bridge method.	**CO3**
4	To Measure Low Resistance by using Kelvin Bridge Method.	**CO3**
5	To Measure Unknown inductance by using Hay's Bridge / Maxwell Bridge Method.	**CO3**
6	To Measure Unknown Capacitance by using Schering Bridge/Desauty bridge Method	**CO3**
7	To Measure Temperature & control using RTD / Thermocouple / Thermistor.	**CO4**
8	To Measure Displacement using LVDT, Level measurement using capacitive / resistive transducer	**CO4**
9	To determine the frequency of unknown signal using Lissagious Pattern Method To Determine DC Voltage, AC voltage and phase by using CRO	**CO5**
10	To Measure signal parameters using Digital Storage Oscilloscope & Study of Data Acquisition system & Feature extraction of Some standard signal using Spectrum Analyzer	**CO5**

Text Books

1	A.D. Helfrick and W.D. Cooper: "Modern Electronic Instrumentation and Measurement Techniques", PHI Publications.

2	A.K. Sawhney : “Electrical and Electronic Measurement and Instrumentation”, Dhanpat Rai & Sons Publications.
Reference Books	
1	Joseph J. Carr : “Elements of Electronic Instrumentation and Measurement”, Pearson Education Publications.
2	R.K. Rajput : “ Electrical And Electronic Measurement”, PHI Publications.
Useful Links	
1	https://nptel.ac.in/courses/108/108/108108147/
2	https://nptel.ac.in/courses/108/105/108105153/

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