

## Tulsiramji Gaikwad-Patil College of Engineering & Technology, Nagpur

### SCHEME OF INSTRUCTION

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	EC2301	Electrical and Electronics Engineering Mathematics	3	-	-	3	3	15	15	10	60	100
2	ESC	EC2302	Instrument and Measurement	3	-	-	3	3	15	15	10	60	100
3	PCC	EC2303	Object Orientated Programming Structure	3	-	-	3	3	15	15	10	60	100
4	PCC	EC2304	Network Analysis and Synthesis	3	1	-	4	4	15	15	10	60	100
5	PCC	EC2305	Digital Electronics & Memories	3	-	-	3	3	15	15	10	60	100
6	ESC	EC2306	Electronics Devices & Circuit	3	1	-	4	4	15	15	10	60	100
7	PCC	EC2307	Object Orientated Programming Structure Lab	-	-	2	2	1	-	-	25	25	50
8	ESC	EC2308	Electronics Devices & Circuit Lab	-	-	2	2	1	-	-	25	25	50
9	PCC	EC2309	Digital Electronics and Memories Lab	-	-	2	2	1	-	-	25	25	50
10	ESC	EC2310	Instrument and Measurement Lab	-	-	2	2	1	-	-	25	25	50
11	MCC	AU2310	Environmental Science	2	-	-	2	Audit	-	-	-	-	-
<b>Total</b>				<b>20</b>	<b>02</b>	<b>08</b>	<b>30</b>	<b>24</b>	<b>90</b>	<b>90</b>	<b>160</b>	<b>460</b>	<b>800</b>

L- Lecture

CT1- Class Test 1

CT2- Class Test 2

T-Tutorial

TA/CA- Teacher Assessment/Continuous Assessment

ESE- End Semester Examination (For Laboratory End Semester performance)

P-Practical

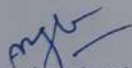
Course Category	HSMC (Hum., Soc. Sc, Mgmt.)	BSC (Basic Sc.)	ESC (Engg. Sc.)	PCC (Programme Core Courses)	PEC (Programme Elective Courses)	OEC (Open Elective courses from other discipline)	Project / Seminar /Industrial Training	MCC (Mandatory Courses)
Credits	--	03	09	12	--	--	--	Yes
Cumulative Sum	5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

**PROGRESSIVE TOTAL CREDITS: 35+24=59**

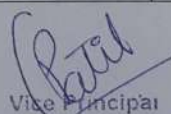


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Second Year (Semester-III) B.Tech. Electronics & Communication Engineering

BEC2301: Electrical and Electronics Engineering Mathematics

Teaching Scheme			Examination Scheme	
Lectures	3Hrs/week		CT-1	15 Marks
Tutorial	1Hrs/week		CT-2	15 Marks
Total Credit	4		TA	10 Marks
			ESE	60 Marks
			Total	100 Marks
			Duration of ESE: 02 Hrs 30 Min.	

Course Outcomes:

Student will be able to

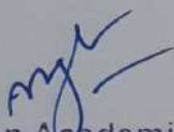
1	Analyze numerical techniques to find the roots of equations different types of equations.
2	Apply the concept of Laplace Transform for Solving differential equation
3	Apply the knowledge of Fourier series and Transform for understanding periodic signals and solve integral equations.
4	Solve Partial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

Course Contents		Hours
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 Jordan method. Gauss Seidel method, Crout's method.	(9)
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.	(9)
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.	(9)

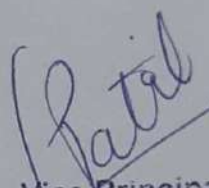
Unit IV	Partial Differential Equations: Partial Differential Equations of First Order First degree i.e. Lagrange's form, Linear Homogeneous Equations of Higher order with constant coefficients, Method of separation of variables, Applications of Partial Differential Equations Introduction to Mathematical Modelling	(9)
Unit V	UNIT – III: 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.	(9)
Text Books		
1	Higher Engineering Mathematics by B.S. Grewal, 40th Edition, Khanna Publication	
2	Advanced Engineering Mathematics by Erwin Kreyszig, 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 Vidyarthi Griha Prakashan	
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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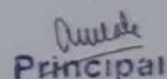
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**Program: B. Tech Electronics & Communication Engineering**

Semester	Course Code	Name of Course	L	T	P	Credits
III	EC2302	Instrument and Measurement	3	1	-	4

**Course Contents**

<b>Unit I</b>	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.
<b>Unit II</b>	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.
<b>Unit III</b>	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.
<b>Unit IV</b>	Static and dynamic characteristics, Classification of transducers, Capacitive transducer, Inductive transducer, Resistive transducer, RVDT, Strain Gauge, RTD, Sensistors, Optical Transducers, Hall effect transducer, Piezoelectric transducers, Transducers for measurement of Pressure, Temperature, Level, Displacement, Flow.
<b>Unit V</b>	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**


T.1	A.D. Helfrick and W.D. Cooper: "Modern Electronic Instrumentation and Measurement Techniques", PHI Publications.
T.2	A.K. Sawhney : "Electrical and Electronic Measurement and Instrumentation", Dhanpat Rai & Sons Publications.
T.3	S.S. Kalsi : "Electronics Measurements", Mc Graw Hill Publications.

**Reference Books**


R.1	Joseph J. Carr : "Elements of Electronic Instrumentation and Measurement", Pearson Education Publications.
R.2	R.K. Rajput : "Electrical And Electronic Measurement", PHI Publications.
R.3	DVS Murthy : "Transducers and Instrumentation", PHI Publications.

**Useful Links**

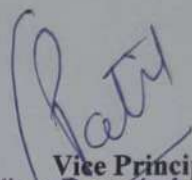
1	<a href="https://nptel.ac.in/courses/108/108/108108147/">https://nptel.ac.in/courses/108/108/108108147/</a>
2	<a href="https://nptel.ac.in/courses/108/105/108105153/">https://nptel.ac.in/courses/108/105/108105153/</a>
	<b>Course Outcomes</b>
<b>EC2302.1</b>	<b>Examine</b> measuring methods and instruments of electrical quantities.
<b>EC2302.2</b>	<b>Determine</b> design aspects and performance criterion of measuring instruments.
<b>EC2302.3</b>	<b>Design</b> the different types of bridges.
<b>EC2302.4</b>	<b>Test</b> the working principle of various transducers.
<b>EC2302.5</b>	<b>Analyze</b> CRO, signal generator, wave analyzer and data acquisition system.

  
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Semester	Course Code	Name of Course	L	T	P	Credits
III	EC2303	Object Oriented programming Structure	3	-	-	3

**Course Contents**

<b>Unit I</b>	Basic concepts of object oriented programming-Benefits of OOPs-Application OOP Structure of Java Programming.
<b>Unit II</b>	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.
<b>Unit III</b>	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.
<b>Unit IV</b>	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
<b>Unit V</b>	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**

T.1	Java: The Complete Reference” by Herbert Schildt
T.2	Programming with Java” by Balagurusamy
T.3	Core Java for the Impatient” by Horstmann
T.4	Head First Object-Oriented Analysis and Design

**Reference Books**

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

**Useful Links**

1	<a href="https://nptel.ac.in/courses/106/102/106102064/">https://nptel.ac.in/courses/106/102/106102064/</a>
2	<a href="https://nptel.ac.in/courses/106/106/106106145/">https://nptel.ac.in/courses/106/106/106106145/</a>
3	<a href="https://nptel.ac.in/courses/106/105/106105085/">https://nptel.ac.in/courses/106/105/106105085/</a>

**Course Outcomes**

<b>EC2303.1</b>	<b>Analyze</b> the concept of OPPS and its importance
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EC2303.2	Apply the knowledge of programming and controlling statements in Java.
EC2303.3	Analyze the Concept of programming.
EC2303.4	Apply the knowledge of Inheritance in program development.
EC2303.5	Illustrate the knowledge to handle various exceptions using concepts of exception handling

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Semester	Course Code	Name of Course	L	T	P	Credits
III	EC2304	Network Analysis & Synthesis	3	1	-	4

**Course Contents**

<b>Unit I</b>	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
<b>Unit II</b>	Superposition Theorem, Thevenin's Theorem, Norton's Theorem, Maximum Power Transfer Theorem
<b>Unit III</b>	Ac circuit analysis with dependent current and voltage sources, Series and parallel resonant circuits, Significance of Quality factor, Bandwidth, Selectivity, Effect of $R_g$ on BW & Selectivity, Magnification factor.
<b>Unit IV</b>	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.
<b>Unit V</b>	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**

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

**Reference Books**

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

**Useful Links**

1	<a href="https://nptel.ac.in/courses/108/105/108105159/">https://nptel.ac.in/courses/108/105/108105159/</a>
2	<a href="https://nptel.ac.in/courses/108/102/108102042/">https://nptel.ac.in/courses/108/102/108102042/</a>
3	<a href="https://onlinecourses.nptel.ac.in/noc20_ec46/preview">https://onlinecourses.nptel.ac.in/noc20_ec46/preview</a>

**Course Outcomes**

<b>EC2304.1</b>	<b>Apply</b> the knowledge of electrical circuits with nodal and mesh analysis.
<b>EC2304.2</b>	<b>Apply</b> various network theorems for the analysis of electrical circuits.
<b>EC2304.3</b>	<b>Examine</b> Ac circuit and Significance of Quality factor, Bandwidth, Selectivity.

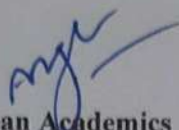


EC2304.4	Evaluate steady state and transient analysis with Laplace Transform.
EC2304.5	Analyze different Filters and Attenuators



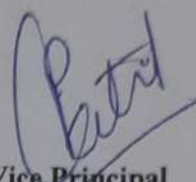
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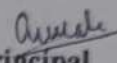
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**Program: B. Tech Electronics & Communication Engineering**

Semester	Course Code	Name of Course	L	T	P	Credits
III	EC2305	Digital Electronics & Memories	3	-	-	3

**Course Contents**

<b>Unit I</b>	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,
<b>Unit II</b>	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 subtractor, ALU, Digital Comparator, Multiplexers and their use in combinational logic designs, multiplexer trees, Demultiplexers, Encoders & Decoders
<b>Unit III</b>	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, ripple Counters, up/down counters, synchronous counters. Asynchronous counters.
<b>Unit IV</b>	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)
<b>Unit V</b>	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**

T.1	Morris Mano : " An approach to digital Design", Pearson Publications.
T.2	Herbert Taub, Donald L Schilling "Digital Integrated Electronics", McGraw Hill, 1977
T.3	W. Fletcher : "Engg. Approach to Digital Design", PHI Publications.

**Reference Books**

R.1	Wakerly Pearson : "Digital Design: Principles and Practices", Pearson Education Publications.
R.2	Mark Bach : "Complete Digital Design", Tata McGraw Hill Publications
R.3	R.P. Jain : "Modern digital electronics", TMH Publications.

**Useful Links**

1	<a href="https://nptel.ac.in/courses/117/106/117106114/">https://nptel.ac.in/courses/117/106/117106114/</a>
2	<a href="https://nptel.ac.in/courses/117/106/117106086/">https://nptel.ac.in/courses/117/106/117106086/</a>

	Course Outcomes
EC2305.1	Apply the knowledge of digital Electronics and Component working.
EC2305.2	Solve the problems of expression by using K map technique.
EC2305.3	Design flip-flops with the help of Logic Gates.
EC2305.4	Structure the design of memories by using digital electronics.
EC2305.5	Analyze and Design state diagrams with the help of digital techniques.

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Semester	Course Code	Name of Course	L	T	P	Credits
III	EC2306	Electronic Devices and Circuit	4	-	-	4

**Course Contents**

<b>Unit I</b>	Semiconductor Diodes: PN junction diode and its application, Physics and structure of diodes, Diode small signal model, Zener diode, Rectifier circuits, Clipping and clamping circuits.
<b>Unit II</b>	Bipolar Junction Transistors : Bipolar junction transistor (BJT), V-I characteristics, Biasing, Small signal low frequency amplifier. Physical structure and operation modes, Ebers-Moll model, Current voltage characteristics of CE, CB, CC configuration,
<b>Unit III</b>	Junction Field-effect Transistor: JFET parameters, C-V 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.
<b>Unit IV</b>	Power Amplifier : Class A, Class B, Class AB and Class C, Power Efficiency, Power Dissipation, Cross-Over Distortion in Class AB Circuits, , Oscillators : RC, LC, Crystal Oscillators
<b>Unit V</b>	MOSFET: Device Structure and Physical Operation of MOSFET, Finite Output Resistance in Saturation, I-V Characteristics of the MOSFET, Overview of D-MOSFET, E-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	<a href="https://nptel.ac.in/courses/108/104/108104139/">https://nptel.ac.in/courses/108/104/108104139/</a>
2	<a href="http://nptel.ac.in/courses/117107095">http://nptel.ac.in/courses/117107095</a>
3	<a href="http://nptel.ac.in/courses/117103064">http://nptel.ac.in/courses/117103064</a>

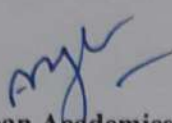
**Course Outcomes**

<b>EC2306.1</b>	<b>Apply</b> the concept of various semiconductor devices.
<b>EC2306.2</b>	<b>Analyze</b> Transistor Characteristics and its operating mode for design different circuits.

EC2306.3	Evaluate the response of transistors at low and high frequency.
EC2306.4	Construct Power amplifiers and oscillators.
EC2306.5	Analyze the operation of MOSFET in various regions.



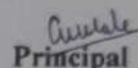
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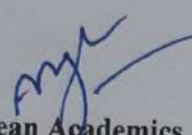
Semester	Course Code	Name of Course	L	T	P	Credits
III	EC2307	Object Oriented programming Structure Lab	-	-	2	1
Sr. No.	List of Experiment					CO
1	Setup a Java programming development environment and test using small program.					CO1
2	Develop programs to demonstrate use of if statement and its different forms.					CO1
3	Develop programs to demonstrate use of looping statement 'for'					CO1
4	Develop a program for implementation of Wrapper Class to convert primitive into object and object into primitive.					CO2
5	Develop a program for the concept of class constructor and its type in Java					CO3
6	Develop a program to implement the Overloading					CO3
7	Develop a program for implementation of Single and Multilevel inheritance					CO4
8	Develop a program for implementation of multiple inheritances.					CO4
9	Develop a program for implementation of I/O stream and file stream classes.					CO5
10	Develop a program for exception handling					CO5
Text Books						
T.1	Java: The Complete Reference" by Herbert Schildt					
T.2	Programming with Java" by Balagurusamy					
T.3	Core Java for the Impatient" by Horstmann					
T.4	Head First Object-Oriented Analysis and Design					
Reference Books						
R.1	Thinking in Java by Bruce Eckel					
R.2	Java 9 for Programmers by Paul Deitel, Harvey Deite					
R.3	Beginning Java Programming: The Object-Oriented Approach by Bart Baesens, Aimee Backiel, and Seppe vanden Broucke					
Useful Links						
1	<a href="https://nptel.ac.in/courses/106/102/106102064/">https://nptel.ac.in/courses/106/102/106102064/</a>					
2	<a href="https://nptel.ac.in/courses/106/106/106106145/">https://nptel.ac.in/courses/106/106/106106145/</a>					
3	<a href="https://nptel.ac.in/courses/106/105/106105085/">https://nptel.ac.in/courses/106/105/106105085/</a>					
Course Outcomes						
EC2307.1	Analyze the concept of OPPS and its importance					




EC2307.2	Apply the knowledge of programming and controlling statements in Java.
EC2307.3	Analyze the Concept of programming.
EC2307.4	Apply the knowledge of Inheritance in program development.
EC2307.5	Illustrate the knowledge to handle various exceptions using concepts of exception handling

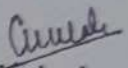
  
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Semester	Course Code	Name of Course	L	T	P	Credits
III	EC2308	Electronic Devices and Circuit Lab	-	-	2	1

Sr. No.	List of Experiment	CO
1	Examine the V- I characteristics of PN junction diode (Silicon) and Zener diode.	CO1
2	To evaluate Voltage regulation of a Zener diode	CO 1
3	To Design Full Wave Rectifier with filter	CO1
4	To analyze I/P & O/P Characteristics of BJT Common Base Transistor Configuration	CO2
5	To analyze I/P & O/P Characteristics of BJT Common Emitter Transistor Configuration	CO2
6	To analyze Junction Field Effect Transistor Characteristics	CO3
7	To Design Class B Amplifier with Cross Over Distortion.	CO4
8	To Design Class C Amplifier with crossover Distortion.	CO4
9	To evaluate the concept of LC Oscillators.	CO5
10	To structure Drain and Transfer characteristics of Metal Oxide Semiconductor Field Effect Transistor (MOSFET).	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	<a href="https://nptel.ac.in/courses/108/104/108104139/">https://nptel.ac.in/courses/108/104/108104139/</a>
2	<a href="http://nptel.ac.in/courses/117107095">http://nptel.ac.in/courses/117107095</a>

**Course Outcomes**

EC2308.1	Apply the concept of various semiconductor devices.
EC2308.2	Analyze Transistor Characteristics and its operating mode for design different circuits.
EC2308.3	Evaluate the response of transistors at low and high frequency.

EC2308.4	Construct Power amplifiers and oscillators.
EC2308.5	Analyze the operation of MOSFET in various regions.

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Semester	Course Code	Name of Course	L	T	P	Credits
III	EC2309	Digital Electronics & Memories Lab	-	-	2	1
Sr. No.	List of Experiment					CO
1	Construct & verify the truth table of different Logic Gates					CO1
2	Design & implement universal gates.					CO1
3	Verify proof of demorgan's theorem					CO1
4	Design & verify truth table of Multiplexer and Demultiplexer					CO2
5	Design & Execute Adder and subtractor Circuits.					CO2
6	Design Circuit for Code converter.					CO2
7	Design Circuit for Conversion of Flip Flop					CO3
8	Construct and design Flip Flop Circuit.					CO3
9	Experiment Based on transient state diagram.					CO4
10	Verify the application of state diagram.					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**

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

**Useful Links**

1	<a href="https://nptel.ac.in/courses/117/106/117106114/">https://nptel.ac.in/courses/117/106/117106114/</a>
2	<a href="https://nptel.ac.in/courses/117/106/117106086/">https://nptel.ac.in/courses/117/106/117106086/</a>

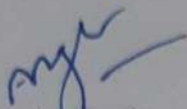
Course Outcomes	
EC2309.1	Apply the knowledge of digital Electronics and Component working.
EC2309.2	Solve the problems of expression by using K map technique.
EC2309.3	Design flip-flops with the help of Logic Gates.

EC2309.4	Structure the design of memories by using digital electronics.
EC2309.5	Analyze and Design state diagrams with the help of digital techniques.



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Semester	Course Code	Name of Course	L	T	P	Credits
III	EC2310	Instrument and Measurement Lab	-	-	2	1

Sr. No.	List of Experiment	CO
1	To Examin 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	<a href="https://nptel.ac.in/courses/108/108/108108147/">https://nptel.ac.in/courses/108/108/108108147/</a>
2	<a href="https://nptel.ac.in/courses/108/105/108105153/">https://nptel.ac.in/courses/108/105/108105153/</a>

**Course Outcomes**

EC2310.1	<b>Examine</b> measuring methods and instruments of electrical quantities.
EC2310.2	<b>Determine</b> design aspects and performance criterion of measuring instruments.



EC2310.3	Design the different types of bridges.
EC2310.4	Test the working principle of various transducers.
EC2310.5	Analyze CRO, signal generator, wave analyzer and data acquisition system.

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