

R24

SCHEME OF INSTRUCTION & EXAMINATION
B.E (Group A- IT, CSE(AI), CSE(AI&ML), CSE(DS) ECE,
ETE, ME, CE) SEMESTER-I

S. No.	Course Code	Course Title	Scheme of Instruction				Scheme of Examination			Credits
			L	T	D/P	Contact Hrs/Wk	CIE	SEE	Duration in Hrs	
Theory Courses										
Three Week Induction Program										
1	MC801PO	Indian Constitution	2	-	-	2	30	70	3	-
2	BS201MT	Matrices & Differential Calculus	3	1	-	4	30	70	3	4
3	BS202PH	Engineering Physics	3	1	-	4	30	70	3	4
4	ES302CS	Programming for Problem Solving	3	-	-	3	30	70	3	3
5	ES301EE	Basic Electrical Engineering	3	1	-	4	30	70	3	4
Practical/Laboratory Courses										
6	BS251PH	Engineering Physics Lab	-	-	3	3	25	50	3	1.5
7	ES351CS	Programming for Problem Solving Lab	-	-	3	3	25	50	3	1.5
8	ES353CE	Engineering Graphics	-	-	2x2	4	50	50	3	2
9	ES354EE	Basic Electrical Engineering Lab	-	-	2	2	25	50	3	1
Total			14	3	12	29	275	550	27	21

B.E (Group A- IT, CSE(AI), CSE(AI&ML), CSE(DS) ECE,
ETE, ME, CE) SEMESTER-II

S. No.	Course Code	Course Title	Scheme of Instruction				Scheme of Examination			Credits
			L	T	D/P	Contact Hrs/Wk	CIE	SEE	Duration in Hrs	
Theory Courses										
1	MC802CE	Environmental Sciences	2	-	-	2	30	70	3	-
2	MC803PY	Essence of Indian Traditional Knowledge	2	-	-	2	30	70	3	-
3	HS101EG	English	2	-	-	2	30	70	3	2
4	BS204CH	Engineering Chemistry	3	1	-	4	30	70	3	4
5	BS203MT	Differential Equations & Numerical Methods	3	1	-	4	30	70	3	4
6	ES303CS	Scientific Programming	3	-	-	3	30	70	3	3
Practical/Laboratory Courses										
7	HS151EG	English Lab	-	-	2	2	25	50	3	1
8	BS252CH	Engineering Chemistry Lab	-	-	3	3	25	50	3	1.5
9	ES352ME	Engineering Workshop Practice	-	-	2x3	6	50	50	3	3
10	ES353CS	Scientific Programming Lab	-	-	2	2	25	50	3	1
Total			15	2	13	30	305	620	30	19.5

BS: Basic Science ES: Engineering Science MC: Mandatory Course
L: Lecture T: Tutorial P: Practical D: Drawing
CIE: Continuous Internal Evaluation SEE: Semester End Evaluation


4/9/24
Prof. K. Shyamala
I/c. DEAN
Faculty of Engineering
Osmania University,
Hyderabad-500 007.

Proposed for the academic years 2020-2021
INDIAN CONSTITUTION

MC 801 PO

Instruction: 2 periods per week

CIE: 30 marks

Credits: 0

Duration of SEE: 3 hours

SEE: 70 marks

Objectives:

1. To create awareness among students about the Indian Constitution.
2. To acquaint the working conditions of union, state, local levels, their powers and functions
3. To create consciousness in the students on democratic values and principles articulated in the constitution.
4. To expose the students on the relations between federal and provincial units.
5. To divulge the students about the statutory institutions.

Outcomes: Student will be able to:

1. Know the background of the present constitution of India
2. Understand the working of the union, state and local levels
3. Gain consciousness on the fundamental rights and duties
4. Be able to understand the functioning and distribution of financial resources between the centre and states
5. Be exposed to the reality of hierarchical Indian social structure and the ways the grievances of the deprived sections can be addressed to raise human dignity in a democratic way.

UNIT – I <i>Evolution of the Indian Constitution:</i> 1909 Act, 1919 Act and 1935 Act. Constituent Assembly: Composition and Functions; Fundamental features of the Indian Constitution
UNIT – II <i>Union Government:</i> Executive-President, Prime Minister, Council of Minister <i>State Government:</i> Executive: Governor, Chief Minister, Council of Minister <i>Local Government:</i> Panchayat Raj Institutions, Urban Government
UNIT – III <i>Rights and Duties:</i> Fundamental Rights, Directive principles, Fundamental Duties
UNIT – IV <i>Relation between Federal and Provincial units:</i> Union-State relations, Administrative, legislative and Financial, Inter State council, NITI Ayog, Finance Commission of India.
UNIT – V <i>Statutory Institutions:</i> Elections-Election Commission of India, National Human Rights Commission, National Commission for Women.

Suggested Readings:

1	Durga Das Basu, " <i>Introduction to the Constitution of India</i> ", Lexis Nexis Butterworths Wadhwa Nagpur, 2008
2	Subhash Kashyap, " <i>Our Parliament</i> ", National Book Trust, India, 2004.
3	Peu Ghosh, " <i>Indian Government and Politics</i> ", Prentice Hall of India, New Delhi, 2012.

BE I-Semester syllabus for affiliated engineering colleges of Osmania University
(wef: academic year 2024-2025)

Common to all branches
MATRICES & DIFFERENTIAL CALCULUS

BS201MT	MATRICES & DIFFERENTIAL CALCULUS	3L:1T:0P	4 credits
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Course objectives:

- To study matrix algebra and its use in solving system of linear equations and in solving eigen values problems
- To introduce the concepts of functions of one variable
- To introduce the concepts of functions of several variables
- To introduce and Interpret Multiple Integrals
- To Understand Vector Derivatives, Vector Integration techniques to solve real-world problems.

Outcomes :After completing this course, the students will be

- Solve system of linear equations and eigen value problems
- Understand and Apply Mean value theorems
- Understand partial derivatives, Maxima and minima of function of two and three variables
- Evaluate multiple integrals
- Analyze and Interpret Vector Derivatives & Vector Integration to Real-World Problems

UNIT-I

Matrices: Rank of a matrix, Echelon form, System of linear equations, Linearly dependence and independence of vectors, Linear transformation, Orthogonal transformation, Eigen values, Eigen vectors, Properties of eigen values, Cayley-Hamilton theorem(without proof), Reduction of quadratic form to canonical form by orthogonal transformation, Nature of quadratic forms.

UNIT-II

Calculus of one Variable: Rolle's theorem, Lagrange's Mean-value theorem, Cauchy's mean value theorem, Taylor's series(All theorems without proof), Curvature, Radius of Curvature, Circle of Curvature, Envelope of a family of curves.

UNIT-III

Multivariable Calculus (Differentiation): Functions of two variables, Limits and Continuity, Partial derivatives, Total derivative, Derivatives of composite and implicit functions (Chain rule), Change of variables, Jacobians, Higher order partial derivatives, Taylor's series of functions of two variables, Maximum and minimum of values of functions of two variables, Lagrange's method of undetermined multipliers.

UNIT-IV

Multivariable Calculus(Integration): Double integrals, Change of order of integration, Change of variables from Cartesian to plane polar coordinates, Triple integrals.

UNIT-V

Vector calculus: Scalar and vector fields, Gradient of a scalar field, Directional derivative, Divergence and Curl of a vector field, Line, Surface and Volume integrals, Green's theorem in a plane, Gauss's divergence theorem, Stoke's theorem(without proofs) and their verification.

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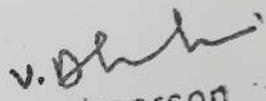
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TEXT BOOKS:

1. R.K.Jain&S.R.K.Iyengar, Advanced Engineering Mathematics, Narosa Publications, 2014.
2. B.S.Grewal, Higher Engineering Mathematics, Khanna Publications, 43rd Edition, 2014.

REFERENCE BOOKS:

1. N.P.Bali&Dr.ManishGoyal, A textbook of Engineering Mathematics (Volume I), 10th Edition, Laxmi Publications, 2022.
2. B.V.Ramana, Higher Engineering Mathematics, 23rd edition, 2015.


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NO 09/CBOSP/2024

DATE 2024/8/2

**Engineering Physics Syllabus for Osmania University Affiliated
Engineering Colleges
B.E (SEM-I & II) AICTE
Academic Year 2024-2025 onwards (Common to All Branches)**

CourseCode: BS202PH	CourseTitle : Physics				Core/Elective: Core		
Prerequisite	ContactHoursper Week				CIE	SEE	Credits
	L	T	D	P			
	3	1	.	.	30	70	04

Course objectives

- Understand the Fundamental Principles and Applications of Lasers, Fiber Optics & Ultrasonics
- Explore Semiconductor Physics and Electromagnetic Theory
- Analyze Magnetic Materials and Superconductors
- Investigate Wave Mechanics and Quantum Computation
- Explore Nano Materials and Thin Film Technologies

Course outcomes

Upon successful completion of the course student will able to:

- Understand and apply the principles of lasers, fiber optics & ultrasonics, including their construction, types, and engineering applications.
- Gain thorough knowledge of semiconductor physics, including key devices and energy harvesting technologies, and understand fundamental electromagnetic theory.
- Analyze magnetic materials and superconductors, including their properties, theories, and technological applications.
- Grasp wave mechanics concepts and quantum computing fundamentals, including quantum gates and their practical applications.
- Explore nano materials and thin film technologies, including preparation methods, characterization techniques, and their engineering uses.

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UNIT I

Lasers, Fiber Optics & Ultrasonics

Characteristics of Lasers, Stimulated Emission, Population Inversion, Einstein's Coefficients, CO₂ Laser, Semiconductor Laser, working of Laser Induced Breakdown Spectroscopy (LIBS) Instrument, Engineering Applications of Lasers.

Construction of Optical Fiber, Types of Optical Fibers (Refractive Index Profiles), Fiber Drawing Process (Double Crucible Method), Basic Principles of Fiber Optics Sensors, Construction and Working of Pressure Sensors, Applications of Optical Fibers in Engineering.

Introduction to Ultrasonic Waves, Production of Ultrasonic Waves - Magnetostriction Method, Ultrasonic Pulse-Echo Testing Method, Engineering Applications of Ultrasonics.

UNIT II

Semiconductor Physics and EM Theory

Types of Semiconductors, Direct and Indirect Bandgap Semiconductors, Hall Effect, Construction and Working of Quantum Light Emitting Diodes (QLEDs) & Solar Cells, Applications of Semiconductor Devices, Concept of Harvesting Energy Devices (Piezoelectric Generators, Thermoelectric Generators), Properties and Advantages of Graphene.

Basic Laws of Electricity and Magnetism, Displacement Current, Maxwell's Equations, Expression for Maxwell's Integral to Differential Equations, Poynting Theorem.

UNIT III

Magnetic Materials & Superconductors

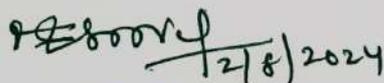
Types of Magnetic Materials, Weiss Molecular Field Theory, Magnetic Domains, Hysteresis Curve, Soft and Hard Magnetic Materials, Magneto-Resistance Materials (CMR & GMR), Applications of Magnetic Materials.

Superconductors, Properties of Superconductors, Meissner Effect, Type I and Type II Superconductors, BCS Theory (Qualitative), High-T_c Superconductors, Applications of Superconductors.

UNIT IV

Wave Mechanics & Quantum Computation

Matter Waves, de-Broglie Wavelength, Physical Significance of Wave Function, Schrödinger Time-Independent Wave Equation, Energy of Particle in 1-D Potential Box, Kronig-Penney Model (Qualitative).

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Introduction to Quantum Computing, Idea of Classical Bits and Qubits, Basics of Quantum Gates (Hadamard, CNOT), Comments on No-Cloning Theorem, Basic Idea of Quantum Teleportation, Applications of Quantum Computing.

UNIT V

Nano Materials & Thin Films

Introduction, Properties of Materials at Reduced Size, Surface-to-Volume Ratio at Nano Scale, Classification of Nano Materials, Preparation Techniques: Bottom-Up Method (Sol-Gel), Top-Down Methods (Ball Milling), Principles of Characterization Techniques (X-ray Diffraction, Scanning Electron Microscope, Transmission Electron Microscope), Applications of Nano Materials.

Distinction between Bulk and Thin Films, Thin Film Preparation Techniques: Thermal Evaporation Method, Electron Beam Evaporation Method, Applications of Thin Films.

PRESCRIBED BOOKS

1. Modern Engineering physics-I &II : S. Chandralingam, K. Vijayakumar, S Chand Co.
2. Engineering Physics: P.K.Palanisamy, Scitech Publishers.
3. Engineering Physics: S.O.Pillai, New age International.
4. Nielsen M. A., I. L Chung, Quantum Computation & Quantum Information, Cambridge Univ. Press
5. Thin Film Fundamentals, A. Goswami , New Age International New Delhi
6. Nano Materilas, A.K. Bandyopadhyay, Newagepublishers

REFERENCE BOOKS

1. Solid State Physics: Charles Kittel, Wiley & Sons (Asia) Pvt. Ltd.
2. Fundamentals of physics:Halliday,Resnick, Walker.
3. Engineering Physics – By V Rajendran, McGraw Hill Edn.
4. Solar Photovoltaics – Fundamentals, Technologies and Applications 3rd Edition, PHI
5. Principles of Quantum computation and Information – By G. Benenti, G. Casati, G. Strini, World scientific.

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ES 302 CS	PROGRAMMING FOR PROBLEM SOLVING				
Pre-requisites		L	T	P	C
		3	-	-	3
Evaluation	SEE	70 Marks	CIE	30 Marks	

Course Objectives :	
1	To introduce the basic concepts of Computing environment, number systems and flowcharts
2	To familiarize the basic constructs of C language – data types , operators and expressions
3	To understand modular and structured programming constructs in C
4	To learn the usage of structured data types and memory management using pointers
5	To learn the concepts of data handling using files

Course Outcomes :	
On completion of this course, the student will be able to :	
CO-1	Explain various functional components in computing environment
CO-2	Develop algorithmic solutions to problems and draw the flow charts
CO-3	Explain and use basic constructs of C in writing simple programs
CO-4	Use standard library functions in C and develop modular programs using user defined functions and structured data types

UNIT – I
<p>Introduction to Computers: Computer Systems, Computing Environments, Computer Languages, Creating and Running Programs, Software Development, Flow charts. Number Systems: Binary, Octal, Decimal, And Hexadecimal.</p> <p>Introduction to C Language - Background, C Programs, Identifiers, Data Types, Variables, Constants, Input / Output Statements</p> <p>Arithmetic Operators and Expressions: Evaluating Expressions, Precedence and Associativity of Operators, Type Conversions.</p>

UNIT – II
<p>Conditional Control Statements: Bitwise Operators, Relational and Logical Operators, If, If-Else, Switch-Statement and Examples. Loop Control Statements: For, While, Do-While and Examples. Continue, Break and Go to statements</p> <p>Functions: Function Basics, User-defined Functions, Inter Function Communication, Standard Functions, Methods of Parameter Passing. Recursion- Recursive Functions.</p> <p>Storage Classes: Auto, Register, Static, Extern, Scope Rules, and Type Qualifiers</p>


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 Prof. K. Shyamala
 I/c. DEAN
 Faculty of Engineering
 Osmania University,
 Hyderabad, 500 007

UNIT- III
Preprocessors: Preprocessor Commands
Arrays - Concepts, Using Arrays in C, Inter-Function Communication, Array Applications, Two- Dimensional Arrays, Multidimensional Arrays, Linear and Binary*Search, Selection and Bubble Sort.

UNIT - IV
Pointers - Introduction, Pointers for Inter-Function Communication, Pointers to Pointers, Compatibility, L -value and R-value, Arrays and Pointers, Pointer Arithmetic and Arrays, Passing an Array to a Function, Memory Allocation Functions, Array of Pointers, Programming Applications, Pointers to void, Pointers to Functions, Command-line Arguments.
Strings - Concepts, C Strings, String Input/Output Functions, Arrays of Strings, String Manipulation Functions

UNIT -V
Structures: Definition and Initialization of Structures, Accessing Structures, Nested Structures, Arrays of Structures, Structures and Functions, Pointers to Structures, Self Referential Structures, Unions, Type Definition (typedef), Enumerated Types.
Input and Output: Introduction to Files, Modes of Files, Streams, Standard Library Input/Output Functions, Character Input/Output Functions.

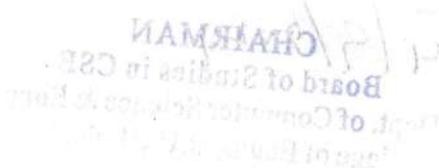
Suggested Reading:

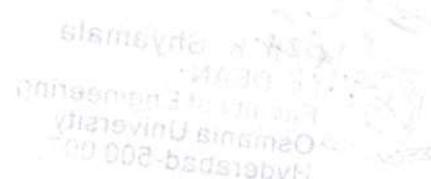
1	B.A. Forouzan and R.F. Gilberg, "A Structured Programming Approach in C" , Cengage Learning, 2007
2	Kernighan BW and Ritchie DM, "The C Programming Language", 2nd Edition, Prentice Hall of India, 2006.
3	Rajaraman V, "The Fundamentals of Computer", 4th Edition, Prentice-Hall of India, 2006.
4	Dromey " How to Solve it By Computer , Pearson education, 2006


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Prof. K. Shyamala
I/c. DEAN
Faculty of Engineering
Osmania University,
Hyderabad-500 007.





BASIC ELECTRICAL ENGINEERING

Common to All Branches

ES 301 EE

Instruction: 3+1 periods per week

CIE: 30 marks

Credits: 4

Duration of SEE: 3 hours

SEE: 70 marks

Objectives:

- | |
|------------------------------------------------------------------|
| 1. To provide an understanding of basics in Electrical circuits. |
| 2. To provide an overview of ordinary differential equations |

Outcomes: Student will be able to:

- | |
|-------------------------------------------------------------------------------------------------------------------------------------|
| 1. To analyse Electrical circuits to compute and measure the parameters of Electrical Energy |
| 2. To comprehend the working principles of Electrical DC Machines |
| 3. To Identify and test various Electrical switchgear, single phase transformers and assess the ratings needed in given application |
| 4. To comprehend the working principles of electrical AC machines |

UNIT – I

DC Circuits: Electrical circuit elements (R, L and C), voltage and current sources, Kirchoff current and voltage laws, analysis of simple circuits with dc excitation. Network Reduction Technique, Mesh and Nodal Analysis, Superposition, Thevenin and Norton Theorems.

UNIT – II

AC Circuits: Representation of sinusoidal waveforms, peak and rms values, phasor representation, real power, reactive power, apparent power, power factor. Analysis of single-phase ac circuits consisting of R, L, C, and RL, RC, RLC combinations (series only). Three phase balanced circuits, voltage and current relations in star and delta connections.

UNIT – III

Transformers and 3-ph Induction Motors: Transformers: Electromagnetic induction, Faradays laws, statically induced emf, Lenz law, BH characteristics, ideal and practical transformer, losses and efficiency (simple Problems only), three-phase transformer connections.
Three Phase Induction motor: Generation of rotating magnetic fields, Construction and working of a three-phase induction motor, squirrel cage IM, slip-ring IM, Applications

UNIT – IV

Single-phase induction motor and DC Machines: Single-phase induction motor: Construction and principle of operation, Capacitor start & capacitor run motor, applications.
DC Generators: Dynamically induced emf, Flemming's Right hand and Left hand rules, Construction and principle of operation of DC generator, EMF equation, Types of DC Generators, OCC characteristics, applications.

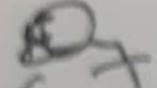
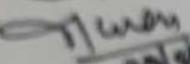
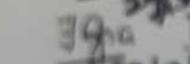
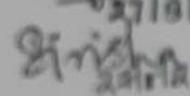
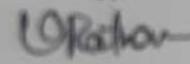
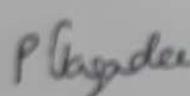
DC Motors: principle of operation of DC Motor, Types of DC motors, applications

UNIT – V

Electrical Installations: Components of LT Switchgear: Switch Fuse Unit (SFU), MCB, ELCB, MCCB, Types of Wires and Cables, Earthing. Elementary calculations for energy consumption, power factor improvement.

Suggested Readings:

1	N. K. De, <i>-Basic Electrical Engineering</i> , Universities Press, 2015.
2	J.B. Gupta, <i>-Fundamentals of Electrical Engineering and Electronics</i> , S.K. Kataria & Sons Publications, 2002
3	J.B. Gupta, <i>-Utilization of Electric Power and Electric Traction</i> , S.K. Kataria & Sons Publications, 2010
4	Abhijit Chakrabarti, Sudipta Nath, Chandan Kumar Chanda, <i>-Basic Electrical Engineering</i> , Tata McGraw Hill, Publications, 2009
5	Hughes, "Electrical Technology", 7 th Edition, Addison Welsey Longman Inc., 1995

- 1)  Prof. E. Vidya Sagar
- 2)  Prof. G. Malluham
- 3)  Dr. Md. Haseeb Iqbal, Head, EED MSCET
- 4)  Dr. FATIMA AZRA, Head EED, DCET
- 5)  P. Srisisha, Incharge EEE, GLLWEC
- 6)  K. Ujjay Ratra Babu Incharge EEE, NG IT
- 7)  Dr. JAGADEESH P Incharge EEE, KMEC



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DATE **2/8/2024**

**Engineering Physics Lab Syllabus for Osmania University Affiliated
Engineering Colleges
B.E (SEM-I&II) AICTE
Academic Year 2024-2025 Onwards (Common to All Branches)**

CourseCode: BS251PH	CourseTitle: Physics Lab				Core/Elective : Core		
Prerequisite	ContactHoursper Week				CIE	SEE	Credits
	L	T	D	P			
	-	-	-	3	25	50	1.5
Course Objective							
<ul style="list-style-type: none"> ➤ Master experimental procedures and programming techniques. ➤ Conduct experiments independently with precision and measurement accuracy ➤ Analyze data graphically and derive conclusions from graphs ➤ Evaluate experiment results critically and draw meaningful conclusions. ➤ Improve communication skills through group work and effective laboratory report writing. 							
Course Outcomes							
<ul style="list-style-type: none"> ➤ Apply the various procedures and programming techniques for the experiments. ➤ Demonstrate the experiment with task and take the measurement independently ➤ Examine the graphical representation data and estimate results from the graph. ➤ Compare and evaluate the results of the experiment and draw relevant conclusions ➤ Develop communication skills through working in groups in performing the laboratory Experiments and by writing laboratory reports. 							

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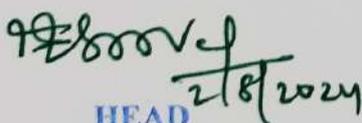
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List of Experiments

1. Determination of Dielectric Constant and Phase Transition Temperature of Dielectric Materials
2. To study the I-V Characteristics of P-N Junction Diode and Resistance Evaluation
3. Find the Electrical Conductivity and Energy Gap of Germanium (Ge) Crystal
4. Study Hall Effect in Semiconductors & find Hall Coefficients, Hall Voltage, and Conductivity
5. Study Characteristics of Thermistor: Determination of Constants A and B
6. Draw Hysteresis Loop for Ferromagnetic Material (B-H Curve)
7. Study V-I Characteristics of Solar Cell: Fill Factor and Series Resistance Calculation
8. Visualization Energy Levels of 1-Dimensional Potential Box Using Schrödinger Wave Equation in Python
9. Visualization of Allowed Energy Levels and Kronig-Penney Model in Python/MATLAB
10. Determine the Density and Elastic Properties of Oxide Glasses/polymers Using Machine learning algorithms
11. Calculate the Numerical Aperture (NA) and Acceptance Angle of Optical Fiber
12. Find the Wavelength of Laser Source using diffraction grating
13. To study the Transition Temperature Measurement of High-Temperature Superconductor
14. Find the Rigidity Modulus of Wire Using Torsional Pendulum
15. To estimate the pressure using optical fiber sensor.

Note: **Minimum Eight experiments should be conducted in the semester**


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ES351CS	Programming for Problem Solving Lab				
Pre-requisites		L	T	P	C
		-	-	2	1
Evaluation	SEE	50 Marks	CIE		25 Marks

Course Objectives :	
1	To use tools available under LINUX for C programming
2	To gain hands-on experience on basic constructs of C programming
3	To formulate problems and implement algorithmic solutions in C
4	To write modular programs in C using structure programming techniques and data files.

Course Outcomes :	
On completion of this course, the student will be able to:	
CO-1	Write, compile and debug C programs in Linux environment
CO-2	Write simple programs using control structures, user defined functions and data manipulation using arrays
CO-3	Use standard C library functions to develop modular programs in C

1. Introducing to programming Environment(Linux commands, editing tools such as vi editor, sample program entry, compilation and execution)
2. Write programs using arithmetic, logical, bitwise and ternary operators.
3. Write programs simple control statements : Roots of a Quadratic Equation, extracting digits of integers, reversing digits ,finding sum of digit ,printing multiplication tables, Armstrong numbers, checking for prime, magic number,
4. Sin x and Cos x values using series expansion
5. Conversion of Binary to Decimal, Octal, Hexa and Vice versa
6. Generating a Pascal triangle and Pyramid of numbers
7. Recursion: Factorial, Fibonacci, GCD
8. Finding the maximum, minimum, average and standard deviation of given set of numbers using arrays
9. Reversing an array ,removal of duplicates from array
10. Matrix addition , multiplication and transpose of a square matrix .using functions
11. Bubble Sort, Selection Sort ,
12. Programs on Linear Search and Binary Search using recursion and iteration


 Prof. K. Shyamala
 I/c. DEAN
 Faculty of Engineering
 Osmania University,
 Hyderabad-500 007.


 4/9/2024
CHAIRMAN
 Board of Studies in CSE
 Dept. of Computer Science & Engg.
 College of Engg., O.U., Hyderabad.

13. Functions of string manipulation: inputting and outputting string , using string functions such as strlen(),strcat(),strcpy().....etc
14. Writing simple programs for strings without using string functions.
15. Finding the No. of characters, words and lines of given text file
16. File handling programs : student memo printing
17. Create linked list, traverse a linked list, insert a node, delete a node, reversing list .

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4/9/2024

CHAIRMAN
Board of Studies in CSE
Dept. of Computer Science & Engg.
College of Engg., O.U.,Hyderabad.

[Handwritten signature in green ink]
4/9/2024



Prof. K. Shyamala
I/c. DEAN
Faculty of Engineering
Osmania University,
Hyderabad-500 007.

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CHAIRMAN
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Dept. of Computer Science & Engg.
College of Engg., O.U.,Hyderabad.

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College of Engg., O.U.,Hyderabad.

ENGINEERING GRAPHICS**ES 353 CE**

Instruction: 6 periods per week

CIE: 50 marks

Credits: 3

Duration of SEE: 3 hours

SEE: 50 marks

Objectives:

1. To prepare you to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
2. To prepare you to use the techniques, skills, modern engineering tools to use for Engineering practice.

Outcomes: Student will be able to:

1. Introduction to engineering design and its place in society
2. Exposure to the visual aspects of engineering design
3. Exposure to engineering graphics standards
4. Exposure to solid modelling
5. Exposure to computer-aided geometric design
6. Exposure to creating working drawings
7. Exposure to engineering communication

S.No	Description	Lectures	Drawing
1	Principles of Engineering Graphics and their significance, usage of drawing instruments	1	
2	Conic Sections – I, Construction of ellipse, parabola and hyperbola given focus and eccentricity.	1	2
3	Conic Sections – II, Construction of ellipse (given major and minor axis), parabola (given base and height), rectangular hyperbola	-	2
4	Cycloids (cycloid & epicycloid)	1	2
5	Involutes (involute of triangle, square & circle)	-	2
6	Scales (plain & diagonal scales)	1	2+2
7	Introduction to AutoCAD –Basic commands and simple drawings	-	2+2
8	Orthographic Projection , Projection of points situated in different quadrants	1	2
9	Projections of straight lines-I Lines parallel to both the reference planes, lines perpendicular or inclined to one reference plane	1	2
10	Projections of straight lines-II Lines parallel to both the reference planes	1	2
11	Projections of planes-I Perpendicular planes	1	2
12	Projections of planes-II Oblique planes	-	2
13	Projections of solids – I Polyhedra and solids revolution, projections of solids in simple position	1	2
14	Projections of solids – II	1	2

	Polyhydra and solids when the axes inclined to one or both the reference planes.		
15	Section of solids – I When the sectional plane is parallel or perpendicular to one reference plane	1	2
16	Section of solids – II When the sectional plane is inclined to one reference plane	-	2
17	Development of surfaces – I Prisms and Cylinders	1	2
18	Development of surfaces – II Pyramids and Cones	-	2
19	Intersection of surfaces – I Intersection of cylinder and cylinder	1	2
20	Intersection of surfaces – I Intersection of cylinder and cones	-	2
21	Isometric projection – I- planes and simple solids	1	2
22	Isometric projection – I – Combination of two or three solids	-	2
23	Conversion of Isometric Views to Orthographic Views	1	2
24	Floor plans of 2 or 3 rooms including windows, doors, and fixtures such as WC, bath, sink, shower, etc.	1	2

Suggested Readings:

1	Bhatt N.D., Panchal V.M. & Ingle P.R., "Engineering Drawing", Charotar Publishing House, 2014
2	Shah, M.B. & Rana B.C., "Engineering Drawing and Computer Graphics", Pearson Education, 2008
3	S.N Lal, "Engineering Drawing with Introduction to Auto CAD", Cengage Learning India Pvt Ltd, New Delhi, 2018
4	Agarwal B. & Agrawal C. M., "Engineering Graphics", TMH Publication, 2012
5	Narayana, K.L. & P Kannaiah, "Text book on Engineering Drawing", Scitech Publishers, 2008
6	(Corresponding set of) CAD Software Theory and User Manuals

NOTE:

1. At least 20 sheets must be covered.
2. Sheet number 1 to 6 (Graph sheets / drawing sheets)
3. Sheet number 7 to 24 (AutoCAD drawings).

BASIC ELECTRICAL ENGINEERING LAB

Common to All Branches

Duration of SEE: 3 hours
SEE: 50 marks

ES 354 EE

Instruction: 2 periods per week

CIE: 25 marks

Credits: 1

Objectives:

1. To impart the practical knowledge on testing of DC and AC Machines.
2. To learn the usage of common electrical measuring instruments

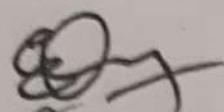
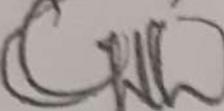
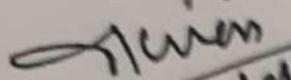
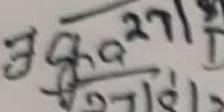
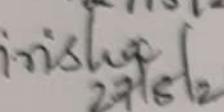
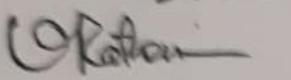
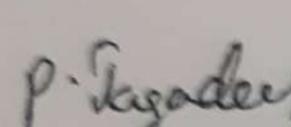
Outcomes: Student will be able to:

1. Get an exposure to common electrical components and their ratings
2. Analyze the performance of DC and AC Machines
3. Comprehend the usage of common electrical measuring instruments
4. Test the basic characteristics of transformers and electrical machines

List of Experiments:

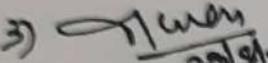
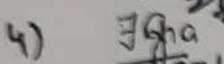
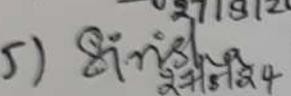
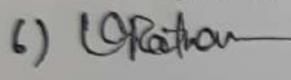
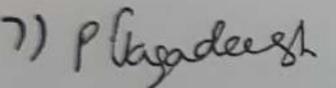
- Dem1. Basic safety precautions. Introduction and use of measuring instruments - voltmeter, ammeter, multi-meter, oscilloscope. Real-life resistors, capacitors and inductors.
- Exp 1. Verification of KVL and KCL, superposition theorem (with DC excitation)
- Exp 2 Verification of Thevenin's and Norton's theorems (with DC excitation)
- Exp 3. Sinusoidal steady state response of R-L, and R-C circuits - impedance calculation and verification. Observation of phase differences between current and voltage. Power factor calculation
- Exp 4. Transformers: Observation of the no-load current waveform on an oscilloscope (non sinusoidal wave-shape due to B-H curve nonlinearity should be shown along with a discussion about harmonics).
- Exp 5. Loading of a transformer: measurement of primary and secondary voltages and currents, and power.
- Exp 6. Three-phase transformers: Star and Delta connections. Voltage and Current relationships (line-line voltage, phase-to-neutral voltage, line and phase currents).
- Exp 7. Measurement of phase voltage/current, line voltage/current and power in a balanced three-phase circuit connected in star and delta.
- Dem2. Demonstration of cut-out sections of machines: dc machine (commutator- brush arrangement), induction machine (squirrel cage rotor), synchronous machine (field winding - slip ring arrangement) and single-phase induction machine.
- Exp 8. OCC characteristics of DC Generator
- Exp 9. Synchronous speed of two and four-pole, three-phase induction motors. Direction reversal by change of phase-sequence of connections.
- Exp 10. Power factor improvement of Induction Motor using static capacitors
- Exp 11. Load Test of DC Motor

Note - : Minimum Eight Experiments should be conducted in the semester

- 1)  Prof. E. Vidyasagar
- 2)  Prof. G. Malleshram
- 3)  Dr. Md. Hasseeb Khan, Head, EED, MJCET
- 4)  DR. FATIMA AZRA, Head EED, DCET
- 5)  P. Sivisha, Incharge EEE, GLLWEC
- 6)  K. Vijay Ratra, Incharge EEE, MRIT
- 7)  Dr. JAGADEESH P Incharge EEE, KMEC

Suggested Readings:

1	N. K. De, <i>-Basic Electrical Engineering</i> , Universities Press, 2015.
2	J.B. Gupta, <i>-Fundamentals of Electrical Engineering and Electronics</i> , S.K. Kataria & Sons Publications, 2002
3	J.B. Gupta, <i>-Utilization of Electric Power and Electric Traction</i> , S.K. Kataria & Sons Publications, 2010
4	Abhijit Chakrabarti, Sudipta Nath, Chandan Kumar Chanda, <i>-Basic Electrical Engineering</i> , Tata McGraw Hill, Publications, 2009
5	Hughes, "Electrical Technology", 7 th Edition, Addison Welsey Longman Inc., 1995

- 1)  Prof. E. Vidya Sagar
- 2)  Prof. G. Malluram
- 3)  Dr. Md. Haseeb Khan, Head, EED MSCET
- 4)  Dr. FATIMA AZRA, Head EED, DCET
- 5)  P. Srisisha, Incharge EEE, GLWEC
- 6)  K. Vijay Raghav Babu Incharge EEE, NGIT
- 7)  Dr. JAGADEESH Incharge EEE, KMEC

Proposed for the academic years 2024-2025
ENVIRONMENTAL SCIENCES

MC 802CE

Instruction: 2 periods per week

CIE: 30 marks

Credits : 0

Duration of SEE: 3 hours

SEE: 70 marks

Objectives:

1. To create awareness and impart basic knowledge about the environment and its allied problems.
2. To know the functions of ecosystems, social and environment related issues and their preventive measures
3. To understand importance of biological diversity, different pollutions and their impact on environment

Outcomes: Student will be able to:

1. Adopt environmental ethics to attain sustainable development
2. Develop an attitude of concern for the environment
3. Conservation of natural resources and biological diversity
4. Creating awareness of Green technologies for nation's security
5. Imparts awareness for environmental laws and regulations

UNIT – I <i>The Multidisciplinary Nature of Environmental Studies:</i> Definition, scope and importance, need for public awareness. <i>Natural Resources:</i> Water Resources – Use and over utilization of surface and ground water, flood, drought, conflicts over water, Dams: Benefits and Problems. Food Resources –World Food Problems, effects of modern agriculture, fertilizer-pesticides problems, water logging, salinity, Forest Resources – Use and over exploitation, deforestation & its effect on tribal people.Land Resources –Land Degradation, environmental effect of mining, man induced landslides, soil erosion and desertification. Energy Resources –Growing energy needs, Renewable and Non-renewable energy resources.
UNIT – II <i>Ecosystems:</i> Concept of an ecosystem, Structure and function of an ecosystem, Producers, consumers and decomposers, Energy flow in ecosystem, food chains, ecological pyramids, ecological succession, types of ecosystems (marine, pond, river, forest, grassland, desert)
UNIT – III <i>Biodiversity:</i> Levels of Biodiversity, Bio-geographical classification of India, Value of biodiversity, Threats to biodiversity, endangered and endemic species of India, Conservation of biodiversity, global and national efforts.
UNIT – IV <i>Environmental Pollution:</i> Definition, Causes, effects and control measures of air pollution, water pollution, soil pollution, noise pollution, thermal pollution, solid waste management. <i>Environment Protection Act:</i> Air, water, forest and wildlife Acts, issues in the enforcement of environmental legislation
UNIT – V

Social Issues and the Environment: Watershed management and environmental ethics. Climate change, global warming, acid rain, ozone layer depletion.

Environmental Disaster Management: Types of disasters, impact of disasters on environment, infrastructure, and development. Basic principles of disaster mitigation, disaster management, and methodology. Disaster management cycle and disaster management in India.

Field Work: Visit to a local area to document environmental issues- agricultural area/ pond/lake/terrestrial ecosystem. Visit to a local polluted area- market/slum area/Industrial area/traffic area.

Suggested Readings:

1	De Anil Kumar, “ <i>Environmental Chemistry</i> ”, New Age Publisher International Pvt Ltd, New Delhi , 2016
2	E.P. Odum, ‘ <i>Fundamentals of Ecology</i> ’, W.B. Sanders Co., USA.,1971
3	M.N. Rao and A.K. Datta, “ <i>Waste Water Treatment</i> ”, Oxford and IBK Publications, New Delhi, 2009.
4	Benny Joseph, “ <i>Environmental Studies</i> ”, Tata McGraw Hill, New Delhi, 2009
5	V.K. Sharma, “ <i>Disaster Management</i> ”, National Centre for Disaster Management, IPE, New Delhi, 1999

ESSENCE OF INDIAN TRADITIONAL KNOWLEDGE

MC 803 PY

Instruction: 2 periods per week

CIE: 30 marks

Credits : 0

Duration of SEE: 3 hours

SEE: 70 marks

Objectives:

1. To get a knowledge in Indian Culture
2. To Know Indian Languages and Literature and the fine arts in India
3. To explore the Science and Scientists of Medieval and Modern India

Outcomes: Student will be able to:

1. Understand philosophy of Indian culture
2. Distinguish the Indian languages and literature.
3. Learn the philosophy of ancient, medieval and modern India.
4. Acquire the information about the fine arts in India
5. Know the contribution of scientists of different eras.

UNIT – I

Introduction to Culture: Culture, civilization, culture and heritage, general characteristics of culture, importance of culture in human literature, Indian Culture, Ancient India, Medieval India, Modern India

UNIT – II

Indian Languages, Culture and Literature: Indian Languages and Literature-I: the role of Sanskrit, significance of scriptures to current society, Indian philosophies, other Sanskrit literature, literature of south India.

Indian Languages and Literature-II: Northern Indian languages & literature

UNIT – III

Religion and Philosophy: Religion and Philosophy in ancient India, Religion and Philosophy in Medieval India, Religious Reform Movements in Modern India (selected movements only)

UNIT – IV

Fine Arts in India (Art, Technology & Engineering): Indian Painting, Indian handicrafts, Music, divisions of Indian classic music, modern Indian music, Dance and Drama, Indian Architecture (ancient, medieval and modern), Science and Technology in India, development of science in ancient, medieval and modern India.

UNIT – V

Education System in India: Education in ancient, medieval and modern India, aims of education, subjects, languages, Science and Scientists of Ancient India, Science and Scientists of Medieval India, Scientists of Modern India

Suggested Readings:

1	Kapil Kapoor, " <i>Text and Interpretation: The India Tradition</i> ", D. K. Print world, 2005
2	Gopala Krishnan, " <i>Science in Samskrit</i> ", Samskrita Bharti Publisher, New Delhi, 2017
3	NCERT, " <i>Position paper on Arts, Music, Dance and Theatre</i> " NCERT, New Delhi, 2010.
4	S. Narain, " <i>Examinations in Ancient India</i> ", Arya Book Depot, New Delhi, 1993
5	Satya Prakash, " <i>Founders of Sciences in Ancient India</i> ", Vijay Kumar Publisher, New Delhi, 1989
6	M. Hiriyanna, " <i>Essentials of Indian Philosophy</i> ", Motilal Banarsidass Publishers, New Delhi, 2005



Department of English
Osmania University
Syllabus with effect from the Academic Year 2024-25

BE 1 year

English (Theory)
(Common to all branches of BE)

HS101EG

Instruction: 2 hours per week
CIE: 30 marks

Credits: 2
SEE: 70 marks
Duration of the SEE: 3 hours

Course Objectives

- To enhance the English language abilities of Engineering students, especially in reading and writing by
- using authentic material for language learning and exposing them to a variety of content-rich texts
 - strengthening their vocabulary and grammar
 - improving their reading and comprehension skills and honing their writing skills
 - encouraging them to think creatively and critically

Course Outcomes

On successful completion of the course, the student will be able to

- read, understand, and interpret a variety of written texts
- use appropriate vocabulary and correct grammar
- undertake writing with confidence

Unit 1

Reading: Rudyard Kipling, "If"
Vocabulary: Word Formation: Root Words, Affixes, Compounding, Standard Abbreviations
Grammar: Basic Sentence, Sentence Structures and Types; Tenses
Writing: Note-taking, Note-making

Unit 2

Reading: Satyajit Ray, "Anukul"
Vocabulary: Synonyms, Antonyms, Homophones, Homographs, Homonyms
Grammar: Linkers and Connectives; Combining Sentences
Writing: Paragraph Writing – Structure and Development

Unit 3

Reading: Adrienne Rich, "Planetarium"
Vocabulary: Phrasal Verbs, Collocation
Grammar: Determiners and Modifiers, Comparison, Concord
Writing: Essay Writing, Paraphrasing, Summarizing

Unit 4

Reading: Martha Nussbaum, "The Silent Crisis" (From *Not for Profit: Why Democracy Needs the Humanities*)
Vocabulary: Formal/Informal Vocabulary, Inclusive Language
Grammar: Voice, Reported Speech, Prepositions
Writing: Formal Letters, Letters of Application, Curriculum Vitae/Resume

Unit 5

Reading: Chimamanda Ngozi Adichie, "The Danger of a Single Story" (TED Talk)
Vocabulary: Words often Confused; One Word Substitutes
Grammar: Punctuation, Common Errors (covering errors in all items of grammar)
Writing: Coherence and Cohesion in Writing; Avoiding Redundancy and Ambiguity

Suggested Reading

Board of Editors. *Language and Life: A Skills Approach*. Orient Black Swan, 2018.
Kumar, Sanjay and Pushp Lata. *English Language and Communication Skills for Engineers*. Oxford University Press, 2018.
Sudarshana, NP and C. Savitha. *English for Engineers*. Cambridge University Press, 2018.
Wood, F.T. *A Remedial English Grammar for Foreign Students*. Trinity Press, 2022.

Parimala
Chairperson
Board of Studies (UG & PG)
Department of English
Osmania University
HYDRABAD - 500 007

Chemistry

BS104CH

Instruction : 3+1 periods per week Duration of

SEE : 3 hours

CIE : 30marks

SEE : 70 marks

Credits : 4

Objectives:

1. Explain the principles of electrochemical processes and study analyze working principles and applications of various batteries.
2. Gain knowledge about the causes of corrosion and its prevention. Attain knowledge about the hard water and treatment of water for drinking purpose
3. Appraise Engineering materials their classifications, structure-property relationship.
4. Expose to qualitative and quantitative parameters of chemical fuels and awareness of eco-friendly materials, fuels and processes.
5. Understand the concepts and applications of spectroscopy

Outcomes: Student will be able to:

1. **Apply** concept of electrode potential in identifying feasibility of electrochemical reaction; **develop** a more in-depth perception on working of various types of batteries and their applications especially in electric vehicles (EVs).
2. **Identify** the mechanism of corrosion of materials on basis of electrochemical approach and devise corrosion control methods. **Estimate** the physical & chemical parameters of quality of water and explain the process of water treatment
3. **Classify** chemical fuels and grade them through qualitative analysis and **acquire** knowledge on environment-friendly bio diesel
4. **Explain** the influence of chemical structure on properties of materials and their choice in engineering applications
5. **Relate** the concept of green chemistry to **modify** engineering processes and

K.R. Reddy

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Sarita

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Chairperson
Board of Studies in Chemistry
Dept of Chemistry
Osmania University, Hyd-07.

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BS104CH

UNIT - I

Electrochemistry: Electrolytic conductance, its types, factors affecting electrolytic conductance. Electrochemical cells: Electrolytic and Galvanic cells. Cell notation, cell reaction and cell potentials. Nernst equation and its derivation. Applications of Nernst equation to electrode potential and emf of cells. Numerical problems. Types of electrodes, Calomel, Quinhydrone and Glass electrodes. Determination of pH of a solution by using Quinhydrone electrode.

Battery Chemistry: Construction and Applications of Primary batteries: Zn-Carbon battery. Secondary batteries : Pb-Acid battery and Li-Ion battery, Flow Batteries (Fuel cells): Methanol-Oxygen fuel cells.

UNIT - II

Corrosion: Causes and its effects. Types of Corrosion-Dry or Chemical Corrosion and Wet or Electrochemical corrosion and their mechanism. Electrochemical corrosion - Galvanic and Waterline Corrosion. Factors influencing rate of corrosion.

Corrosion control methods: Cathodic protection methods - Sacrificial anodic and Impressed current Cathodic protection methods.

Surface coating methods: Hot Dipping-Galvanizing.

Water Chemistry: Hardness of Water-Types and units of hardness of water, estimation of hardness of water by EDTA method - Numerical problems. Alkalinity of water and its sources. Water softening by Ion exchange and Reverse Osmosis methods. Specifications of potable water. Sterilization by Chlorination. Break Point of Chlorination.

UNIT - III

Engineering Materials: Polymers: Monomer and its functionality, Polymers and degree of polymerization. Types of Polymerization - Addition, Condensation and Co-Polymerization with one example each. Classification of polymers-Plastics: (Thermoplastics & Thermosetting resins - PVC and Bakelite), Fibers: (Nylon-6:6)

H. Alkan
O. J. Anthony
K. R. Reddy
Savitri
MM

Chairperson
Board of Studies in Chemistry⁵
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Elastomers: (Buna-S and Buna -N rubber).

Conducting polymers: Introduction, classification, properties and applications of conducting polymers.

Biomaterials: Introduction .Definition of Biomaterials , Preparation, properties and applications of Poly lactic acid (PLA)

UNIT - IV

Chemical Fuels: Introduction, definition and classification of chemical fuels.- primary and secondary – solid ,liquid and gaseous fuels

Requirements of a good fuel. Calorific Value – HCV and LCV. Theoretical calculations of calorific value by Dulong's formula – Numerical problems.

Solid Fuels: Coal and its Ranking. Analysis of coal-Proximate and Ultimate analysis.

Liquid Fuels: Composition and uses of Gasoline, Diesel and Kerosene. Knocking. .Fuel-rating– Octane and Cetane numbers.

Gaseous Fuels: LPG, CNG-Composition and Uses.

Biodiesel: Sources, Concept of Trans esterification, properties and applications of biodiesel. Carbon neutrality and its significance. Ethanol – Biodiesel, sources and uses.

Unit V

Spectroscopy- Description of Electromagnetic spectrum.

Principles of UV-Visible Spectroscopy: Statement of Beer-Lambert Law.

Absorption and intensity shifts: Bathochromic, Hypsochromic, Hyperchromic and Hypochromic shifts with one example each.

Principle and applications of UV – Visible Spectroscopy.

IR Spectroscopy: Principle of IR Spectroscopy. Principle and applications of IR.

NMR Spectroscopy: Principle of ^1H -NMR Spectroscopy. Multiplicity, Chemical Shift. Principle and Applications of MRI

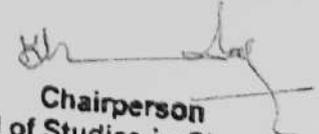
Green Chemistry: Concept, Mention - Principles of Green chemistry – example Diels - Alder reaction

K Reddy M.V.

A Khan
01/07/2024

CB

Savit


Chairperson
Board of Studies in Chemistry
Dept of Chemistry
Osmania University, Hyd-07.

Suggested Readings

1	, <i>Principles of Physical Chemistry</i> ,S.N. Chand &Co. New Delhi,1987
2	PCJain and M Jain ,— <i>Engineering Chemistry</i> ,DhanpatRai&Sons ,15 th Edition, New Delhi, 2004
3	JCKuriacoseandJRajaram,— <i>ChemistryinEngineeringandTechnology</i> —,TataMcGrawHill New Delhi,2010
4	OG Palanna, — <i>Engineering Chemistry</i> ,TataMcGrawHill, New Delhi, 2009
5	S SDaraand SSU mare, — <i>Engineering Chemistry</i> ,S.N. Chand & Co. New Delhi, 2004
6	SashiChawla,— <i>Engineering Chemistry</i> , DhanpatRai&Sons, New Delhi, 2017
7	PrasantaRath,— <i>Engineering Chemistry</i> ,Cengage Learning India Pvt. Ltd, 2015
8	Dr. Kishore Palle, Dr. V. Shanthi , Dr. A. Kishore Kumar and K. Ramesh - <i>Engineering Chemistry</i> .

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Chairperson
Board of Studies in Chemistry
Dept of Chemistry
Osmania University, Hyd-07.

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Sania

K R Reddy

**BE II-Semester syllabus for affiliated engineering colleges of Osmania University
(wef: academic year 2024-2025)**

Common to all branches

DIFFERENTIAL EQUATIONS & NUMERICAL METHODS

BS203MT	DIFFERENTIAL EQUATIONS & NUMERICAL METHODS	3L:1T:0P	4 credits
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Course objectives:

- To Develop strong problem-solving skills by tackling a variety of problems involving first-order differential equations
- To Develop strong problem-solving skills by tackling a variety of problems involving higher order differential equations
- To familiarizes concept of Laplace Transforms
- To Understand the Limitations and Applicability of Numerical Methods
- To Understand the Limitations and Applicability of Numerical Differentiation & Integration

Outcomes: After completing this course, the students will able to

- Students will enhance their problem-solving skills by applying the methods learned involving first-order differential equations.
- Students will enhance their problem-solving skills by applying the methods learned involving higher order differential equations.
- To learn Laplace transform and its properties
- Analyze and Interpret Interpolation
- Analyze and Interpret Numerical differentiation & integration

UNIT-I

Differential Equations of First Order: Exact differential equations, Integrating factors, Linear differential equations, Bernoulli's, Riccati's and Clairaut's differential equations, Orthogonal trajectories of a given family of curves.

UNIT-II

Differential Equations of Higher Orders: Solution of second and higher order linear homogeneous equations with constant coefficients, Method of reduction of order for the linear homogeneous second order differential equations with variable coefficients, Solutions of non-homogeneous linear differential equations, Method of variation of parameters, solution of Euler-Cauchy equation.

UNIT-III

Laplace Transforms: Laplace Transforms, Inverse Laplace Transforms, Properties of Laplace Transforms and inverse Laplace Transforms, Convolution Theorem (without proof), Solution of ordinary differential equations using Laplace Transforms.

UNIT-IV

Numerical Methods-I: Solution of polynomial and transcendental equations- Bisection method, Iteration Method, Newton-Raphson Method and Regula-Falsi method. Finite differences-forward differences-backward differences-central differences-symbolic relations and separation of symbols, Interpolation using Newton's forward and backward formulae: Lagrange's method of interpolation.

UNIT-V

Numerical Methods-II: Numerical Integration: Trapezoidal rule and Simpson's $1/3^{rd}$ and $3/8^{th}$ rules. Ordinary differential equations: Taylor's series; Picard's method; Euler and modified Euler's methods; Runge-Kutta method of fourth order.

V. Shashi
Chairman
BoS in Mathematics
Department of Mathematics
Osmania University
Hyderabad-500007
19/8/24

19/8/24

19/8/24

19/8/24

19/8/2024

19-8-24

19/08/24

19/08/24

TEXT BOOKS:

1. R.K.Jain&S.R.K.Iyengar, Advanced Engineering Mathematics, Narosa Publications, 2014
2. B.S.Grewal, Higher Engineering Mathematics, Khanna Publications, 43rd Edition, 2014.

REFERENCE BOOKS:

1. S.S.Sastry, Introductory Methods of Numerical Analysis, 5th edition, PHI Private Limited, 2012.
2. Dr.B.S.Grewal, Numerical Methods in Engineering and Science, Khanna Publishers, 2014.
3. H.K.Dass, Er.RajnishVarma, Higher Engineering Mathematics, S.Chand Publishers, 3rd Edition.

v. ohh
Chairperson
BoS in Mathematics
Department of Mathematics
Osmania University
Hyderabad-500 007.

ES 303 CS	Scientific Programming				
Pre-requisites		L	T	P	C
		3	-	-	3
Evaluation	SEE	70 Marks	CIE		30 Marks

Course Objectives :	
1	Introduce basic scientific programming concepts using Python and MATLAB
2	Teach effective use of data structures within Python and MATLAB environments.
3	Develop competence in applying numerical methods to solve mathematical problems.
4	Enable data manipulation and visualization using Python and MATLAB tools.
5	Expose students to emerging technologies like machine learning, IoT, and big data

Course Outcomes :	
On completion of this course, the student will be able to :	
CO-1	Proficiency in Scientific Programming using Python and MATLAB for computational tasks.
CO-2	Implementation of Data Structures and Algorithms to solve computational problems.
CO-3	Understanding and Application of Numerical Methods and linear algebra in scientific computing.
CO-4	Ability to Analyze and Visualize Data using Python and MATLAB tools.
CO-5	Introduction to Emerging Technologies and project development in scientific computing.

UNIT – I
Introduction to Scientific Programming and Python Basics: Overview of Scientific Computing, Introduction to Python Programming, Basic Syntax, Variables, and Data Types, Control Structures (if-else, loops), Functions and Modules, Introduction to MATLAB.

UNIT – II
Data Structures and Algorithms: Lists, Tuples, Dictionaries, and Sets in Python, Arrays and Matrices in MATLAB, Basic Algorithms (Searching and Sorting), Complexity Analysis.

(Signature)
4/9/2024

CHAIRMAN
Board of Studies in CSE
Dept. of Computer Science & Engg.
College of Engg., O.U., Hyderabad.

(Signature)
4/9/24



Prof. K. Shyamala
I/c. DEAN
Faculty of Engineering
Osmania University,
Hyderabad-500 007.

With effect from the Academic year 2024-2025

UNIT- III

Numerical Methods and Linear Algebra: Introduction to Numerical Methods, Root Finding Algorithms (Bisection, Newton-Raphson), Numerical Integration and Differentiation, Basics of Linear Algebra, Matrix Operations and Solving Linear Systems.

UNIT - IV

Data Analysis and Visualization: Importance of Data Analysis, Data Manipulation using Pandas (Python) and MATLAB, Data Visualization Techniques, Introduction to Matplotlib, Seaborn (Python), and MATLAB Plotting.

UNIT -V

Emerging Technologies and Project Work: Overview of Emerging Technologies (Machine Learning, IoT, Big Data), Introduction to Machine Learning using Scikit-Learn (Python), Basics of IoT and Big Data Applications in Engineering, Guidelines for Scientific Projects, Report Writing and Presentation Skills

Suggested Reading:

1	Python Programming and Numerical Methods: A Guide for Engineers and Scientists" by Qingkai Kong, Timmy Siau, and Alexandre Bayen
2	Introduction to Scientific Programming with Python" by Joakim Sundnes
3	MATLAB for Engineers" by Holly Moore
4	Learning MATLAB by Tobin A. Driscoll

[Handwritten Signature]
4/9/2024

CHAIRMAN
Board of Studies in CSE
Dept. of Computer Science & Engg.
College of Engg., O.U., Hyderabad.

[Handwritten Signature]
4/9/2024



Prof. K. Shyamala
I/c. DEAN
Faculty of Engineering
Osmania University,
Hyderabad-500 007.

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Department of English
Osmania University
Syllabus with effect from the Academic Year 2024-25

BE 1 year

English (Laboratory)
(Common to all branches of BE)

HS151EG

Instruction: 2 hours per week
CIE: 25 marks

Credits: 1
SEE: 50 marks

Course Objectives

To enhance the listening and speaking skills of students by

- Giving them adequate practice in listening with comprehension
- Providing them ample opportunities to improve their public speaking skills
- Training them in the use of correct pronunciation, stress, and intonation
- Sensitizing them to the use of verbal and non-verbal communication appropriate to the context
- Encouraging them to learn the art of conversation to suit formal and informal situations
- Preparing them to make formal presentations and face interviews

Course Outcomes

On successful completion of the course, students will be able to

- Listen, understand, and interpret formal and informal spoken language
- Speak English with acceptable pronunciation, stress, and intonation
- Present themselves with confidence in formal situations
- Participate in individual and group activities with relative ease

Interactive Sessions in Language Lab:**Experiments and Practice Sessions to Enhance Listening and Speaking Skills**

1. Listening Skills, Barriers to Listening, Listening for Comprehension
2. English Phonology; Varieties of English-Indian, British, American
3. Intelligible Pronunciation, Intonation, Word Stress and Sentence Stress
4. Conversation Skills: Face-to-Face and Telephone
5. Introducing Oneself and Others, Asking for and Giving Information
6. Making Requests and Responding to them Appropriately
7. Giving Instructions and Responding to them Appropriately
8. Agreeing and Disagreeing, Seeking Clarification
9. Making Formal Announcements and Emceeing
10. JAM; Role Play
11. Group Discussions
12. Debate
13. Public Speaking Skills and Body Language
14. Interviews
15. Formal Presentations

Suggested Reading

- Balasubramanian, T. *A Textbook of English Phonetics for Indian Students*. Macmillan, 1981.
Board of Editors. *Language and Life: A Skills Approach*. Orient Black Swan, 2018.
CIEFL. *Exercises in Spoken English. Parts. I-III*. Oxford University Press.
Pillai, Radhakrishna G. *Spoken English For You - Level II*. 8th Edition. Emerald Publishers, 2014.
Sethi, J, PV Dhamija. *A Course in Phonetics and Spoken English*. 2nd Edition, Prentice Hall, 1999.
Shinde, Maithry et al. *Life Skills and Personality Development*. Cambridge University Press, 2022.

Pannelell
Chairperson
Board of Studies (UG & PG)
Department of English
Osmania University
HYDERABAD-500 007.

Course Code	Course Title				Core/Elective		
BS153CH	Chemistry Lab (Common to All Branches)				Core		
Prerequisite	Contact Hours per Week				CIE	SEE	Credits
	L	T	D	P			
-	-	-	-	3	25	50	1.5
Course Objectives <ul style="list-style-type: none"> Conduct experiments, take measurements and analyze the data through hands-on experience in order to demonstrate understanding of the theoretical concepts of quantitative Analysis while working in small group. Interpret the electro analytical principles with experimental results graphically Demonstrate writing skills through clear laboratory reports Course Outcomes On successful completion of this course, students will be able to: <ul style="list-style-type: none"> Apply the principles of Colourimetry and Electrochemistry in quantitative estimations. Estimate the rate constants of reactions from concentration of reactants/products as a function of time. Synthesize small drug molecules. 							

List of Experiments:

- Introduction to Chemical Analysis.
- Techniques of Weighing
- Volumetric Analysis:**
 - Preparation of Standard Mohr's salt solution, Standardization of KMnO_4 and estimation of ferrous ion by Permanganometry,
 - Estimation Iron(II) by Dichromatometry
- Water Analysis:**
 - Preparation of Standard Magnesium sulphate solution, Standardization of EDTA and Estimation of Total Hardness.
 - Preparation of Standard Sodium Carbonate Solution, Standardization of HCl and Estimation of Carbonate and Bicarbonate Alkalinity.
- Conductometry:**
 - Estimation of HCl
 - Estimation of CH_3COOH
 - Estimation of mixture of acids
- Potentiometry**
 - Estimation of HCl
 - Estimation of Iron
- pH Metry:**
 - Estimation of HCl
- Colorimetry:**
 - Verification of Beer-Lambert's law and estimation of Manganese
- Drug Synthesis** Preparation of Aspirin and paracetamol.

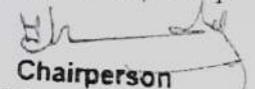
Note: Minimum ten experiments should be conducted in the semester **Suggested**

Readings:

- Senior Practical Physical Chemistry, B.D. Khosla, A. Gulati and V. Garg (R. Chand & Co., Delhi)
- An Introduction to Practical Chemistry, K.K. Sharma and D.S. Sharma (Vikas publishing, N. Delhi)

H. Chandra
01/07/2024

CPJ
MAY
Savitri
K. Reddy


Chairperson
Board of Studies in Chemistry,
Dept of Chemistry
Osmania University, Hyd-07.

Proposed for the academic years 2020-2021
ENGINEERING WORKSHOP PRACTICE

ES 352 ME

Instruction: 6 periods per week

CIE: 50 marks

Credits: 3

Duration of SEE: 3 hours

SEE: 50 marks

Objectives:

1. Identify and use marking out tools, hand tools, measuring equipment and to work to prescribed tolerances.
2. To provide hands on experience about use of different engineering materials, tools, equipments and processes those are common in the engineering field.
3. To gain a good basic working knowledge required for the production of various engineering products.
4. To Study different hand operated power tools, uses and their demonstration.
5. Adopt safety practices while working with various tools

Outcomes: Student will be able to:

1. Demonstrate an understanding of and comply with workshop safety regulations.
2. Identify and apply suitable tools for different trades of Engineering processes including drilling, material removing, measuring, chiseling.
3. Study and practice on machine tools and their operations
4. Undertake jobs connected with Engineering Workshop trades including fitting, carpentry, sheet metal, house wiring, welding, smithy and foundry.
5. Apply basic electrical engineering knowledge for house wiring practice

List of Experiments:
<p>A. TRADE FOR EXERCISES:</p> <ol style="list-style-type: none">1. Carpentry2. Fitting3. House wiring4. Sheet metal working5. Smithy6. Welding7. Plumbing <p>B. TRADES FOR DEMONSTRATION AND EXPOSURE:</p> <ol style="list-style-type: none">1. Machining (Lathe & Drilling)2. Injection moulding3. Mould making and casting4. Basic Electronics lab instruments <p>C. PRESENTATIONS AND VIDEO LECTURES</p> <ol style="list-style-type: none">1. Manufacturing Methods2. Rapid Prototyping3. Glass Cutting4. 3D printing5. CNC LATHE <p>D. IT WORKSHOP: Computer hardware, identification of parts, Disassembly, Assembly of computer to working condition, operating system installation.</p> <p>Note: At least two exercises from each trade.</p>



Suggested Readings:

1	Venugopal, K, " <i>Workshop Manual</i> ", Anuradha Publications, Kumbakonam, TN, 2012
2	K.C. John, " <i>Mechanical Workshop</i> " 2 nd Edn., PHI, 2010.
3	Hajra Choudary, " <i>Elements of Workshop Technology</i> " Vol. 1, Asian Publishers, Edn., 1993.
4	G.S. Sawhney, " <i>Mechanical Experiments and Workshop Practice</i> ", I.K. International Publishing House, New Delhi, 2009.

ES353CS		Scientific Programming Lab			
Pre-requisites		L	T	P	C
		-	-	2	1
Evaluation	SEE	50 Marks		CIE	25 Marks

Course Objectives :	
1	Enable students to install and use Python and MATLAB for writing and debugging programs.
2	To implement control structures, data structures, and algorithms and analyze their complexities.
3	Train students to perform data manipulation and create customized visualizations using Python and MATLAB tools.

Course Outcomes :	
On completion of this course, the student will be able to:	
CO-1	Set up and use Python and MATLAB for scientific programming.
CO-2	Implement and analyze data structures, control structures, and algorithms.
CO-3	Gain skills in data manipulation, visualization, and analysis using Python and MATLAB.

1. Python and MATLAB Installation and IDE Setup
2. Writing Simple Python and MATLAB Programs
3. Implementing Control Structures and Functions
4. Implementing Data Structures in Python and MATLAB
5. Writing and Testing Search and Sort Algorithms
6. Analyzing Algorithm Complexity in Practical Problems
7. Implementing Numerical Methods in Python and MATLAB
8. Performing Matrix Operations and Solving Linear Systems
9. Case Studies and Applications in Engineering
10. Data Manipulation and Analysis using Pandas and MATLAB
11. Creating Various Plots (Line, Scatter, Bar, Histogram)
12. Customizing and Interpreting Plots for Engineering Data
13. Implementing Basic Machine Learning Algorithms in Python
14. Exploring IoT and Big Data Tools
15. Working on Individual/Group Projects
16. Preparing Project Reports and Presentations
17. Final Project Presentation

FACULTY OF ENGINEERING

Scheme of Instruction & Examination

(With effect from Academic Year 2025-26)

and

Syllabi

B.E. III and IV Semester

of

Four Year Degree Programme

in

Electronics and Communication Engineering

(With effect from the academic year 2025-2026)

(As approved in the faculty meeting held on 6th June 2025)



Issued by

Dean, Faculty of Engineering

Osmania University, Hyderabad – 500 007

P. Venkatesh
CHAIRMAN
BOARD OF STUDIES
Dept. of Electronics & Commn. Engg.
Osmania University
Hyderabad-500 007

G. J. G. G.
Dept. of Electronics & Comm'n Engg.
Muffakham Jah College of Engg. & Tech.,
Hyderabad-500 007

G. J. G. G.
2025
Head of Department
Electronics & Communication Engineering
Muffakham Jah College of Engg. & Tech.
Road No: 3, Banjara Hills, Hyderabad-34

R24

SCHEME OF INSTRUCTION & EXAMINATION
B.E. III- Semester
(ELECTRONICS AND COMMUNICATION ENGINEERING)

S. No	Course Code	Course Title	Scheme of Instruction				Scheme of Examination			Credits
			L	T	P/D	Contact Hrs/Wk	CIE	SEE	Duration in Hrs	
Theory Course										
1	HS 201EG	Effective Technical Communication in English	3	-	-	3	30	70	3	3
2	ES 401 EC	Signals & Systems	3	1	-	4	30	70	3	4
3	PC 302 EC	Digital Electronics	3	-	-	3	30	70	3	3
4	PC 303 EC	Probability Theory and Stochastic Processes	3	1	-	4	30	70	3	4
5	PC 304 EC	Electronic Devices	3	-	-	3	30	70	3	3
6	PC 305 EC	Network Theory	3	-	-	3	30	70	3	3
Practical / Laboratory Course										
7	PC 351EC	Electronic Devices Lab	-	-	2	2	25	50	3	1
8	PC 352EC	Electronic Workshop Lab	-	-	2	2	25	50	3	1
9	PC353EC	Logic DesignLab	-	-	2	2	25	50	3	1
Total			18	2	6	26	255	570	27	23

PC: Professional Course**MC:** Mandatory Course**L:**Lecture**T:**Tutorial**P:** Practical**D:**Drawing**G:** Grade(E/VG/G/S/U)**CIE:** Continuous Internal Evaluation **SEE:** Semester End Examination (Univ. Exam)**Note:**

1. Each contact hour is a Clock Hour
2. The duration of the practical class is two clock hours, however it can be extended wherever necessary, to enable the student to complete the experiment

P. Venkatesh
 CHAIRMAN
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 Hyderabad-500 007

G. S. S. S.
 Dept. of Electronics & Comm'n Engg.
 Muffakham Jah College of Engg. & Tech.
 Hyderabad-500 007

A. S. S.
 Head of Department
 Electronics & Communication Engineering
 Muffakham Jah College of Engg. & Tech.
 Road No: 3, Banjara Hills Hyderabad-34

Course Code	Course Title				Core/PE/OE		
HS201EG	EFFECTIVE TECHNICAL COMMUNICATION IN ENGLISH				Core		
	Contact Hours per Week				CIE	SEE	Credits
Prerequisite	L	T	D	P			
-	3	-	-	-	30	70	3


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 Road No: 3, Banjara Hills Hyderabad-34

Course Code	Course Title					Core/PE/OE	
ES 401 EC	SIGNALS AND SYSTEMS					Core	
	Contact Hours per Week				CIE	SEE	Credits
Prerequisite	L	T	D	P			
BS201MT	3	1	0	0	30	70	4
Course Objectives: The course is taught with the objectives of enabling the student to:							
1. Analyze basic concepts related to signals and systems.							
2. Familiarize with basic operations on signals and mathematical representation of periodic and aperiodic signals.							
3. Define convolution, correlation operations on continuous signals.							
4. Define the characterization of system using constant coefficient difference equations.							
5. Analyze the response of systems upon application of step and ramp inputs using Fourier and Z transforms							
Course Outcomes: On completion of this course, the student will be able to :							
1. Define and differentiate types of signals and systems in continuous and discretetime							
2. Apply the properties of Fourier transform for continuous timesignals							
3. Relate Laplace transforms to solve differential equations and to determine the response of the Continuous Time Linear Time Invariant Systems to knowninputs							
4. Apply Z-transforms for discrete time signals to solve Differenceequations							
5. Obtain Linear Convolution and Correlation of discrete time signals with graphical representation							

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	-	-	1	-	-	-	-	1	-	2
CO2	3	3	2	-	2	-	-	-	-	1	-	2
CO3	3	3	2	2	2	-	-	-	-	1	-	2
CO4	3	3	2	2	2	-	-	-	-	1	-	2
CO5	3	2	-	2	2	-	-	-	-	1	-	2

Correlation rating: Low / Medium / High: 1 / 2 / 3 respectively.

UNIT I

Definitions and classifications: Classification of continuous time signals. Basic operations on continuous-time signals and classification of continuous-time systems.

Discrete-time signals and systems: Sampling, Classification of discrete-time signals, Basic operations on discrete time signals, Basic operations on discrete time signals, Classification of discrete time systems, properties of systems.

UNIT II

Representation of Continuous-time signals: Analogy between vectors and signals, signal representation by a discrete- set of orthogonal functions, orthogonality and completeness. Fourier series – Trigonometric and Exponential Fourier series, computational formulae, symmetry conditions, the complex Fourier spectrum.

Fourier Transform (FT): The direct and inverse FT, existence of FT, Properties of FT, The Frequency Spectrum.
UNIT III
Laplace Transform (LT): The direct LT, Region of convergence, existence of LT, properties of LT. The inverse LT, Solution of differential equations, system transfer function. Linear convolution of continuous time signals: Graphical interpretation, properties of convolution, Correlation between continuous-time signals: Auto and Cross correlation, graphical interpretation, properties of correlation.
UNIT IV
Z-Transform: The direct Z transform, Region of convergence, Z-plane and S-plane correspondence. Inverse Z transform, Properties of Z-transforms, Solution to linear difference equations, Linear constant coefficient systems, System transfer function
UNIT V
Discrete Fourier series, Frequency domain Representation of discrete-time systems and signals. Sampling the z-transform. Linear Convolution of discrete time signals: Graphical interpretation, properties of discrete convolution. Correlation between discrete time signals: Auto and Cross-correlation, graphical interpretation, properties of correlation.

Suggested Text Books:

1. B.P.Lathi, Linear Systems and Signals, Oxford University Press, 2nd Edition, 2009
2. Alan V O P Penneim, A. S. Wlisky, Signals and Systems, 2nd Edition, Prentice Hall
3. Rodger E. Ziemer, William H Trenter, D. Ronald Fannin, Signals and Systems, 4th Edition, Pearson 1998.

Reference Text Books:

1. Douglas K. Linder, Introduction to Signals and Systems, McGraw Hill, 1999
2. P. Ramakrishna Rao, Signals and Systems, TMH
3. P. Ramesh Babu, R Ananda Natrajan, Signals and systems SCITECH


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 Osmania University
 Hyderabad-500 007

 Dept. of Electronics & Comm'n Soft.
 Deccan College of Engg. & Tech.
 Secy. - 2, Secy. - 2, Hyderabad-500 041.


 Head of Department
 Electronics & Communication Engineering
 Muffakham Jah College of Engg. & Tech.
 Road No: 3, Banjara Hills Hyderabad-34

Course Code	Course Title					Core/PE/OE	
PC302EC	DIGITAL ELECTRONICS					Core	
	Contact Hours per Week				CIE	SEE	Credits
Prerequisite	L	T	D	P			
BS202PH	3	-	-	-	30	70	3
Course Objectives : The course is taught with the objectives of enabling the student to:							
1. Understand the fundamental principles of digital hardware design and number systems.							
2. Apply Boolean algebra and logic minimization techniques to implement combinational circuits efficiently.							
3. Analyze the functionality and timing characteristics of sequential circuits using various flip-flops and latches.							
4. Design finite state machines (FSMs) for real-time digital applications using synchronous sequential logic.							
5. Explore the architecture and design methodologies using programmable logic devices like PALs, PLAs, CPLDs, and FPGAs.							
Course Outcomes : On completion of this course, the student will be able to :							
1. Explain the fundamentals of digital hardware design, logic gates, Boolean algebra, and logic synthesis.							
2. Design and optimize combinational circuits using K-Map and Quine-Mc Cluskey methods.							
3. Construct and analyze various sequential circuits including flip-flops, registers, and counters.							
4. Develop FSM-based digital systems for sequence detection and generation using Mealy/Moore models.							
5. Implement combinational logic using PLDs such as PALs, PLAs, CPLDs, and FPGAs.							

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	1	1	-	-	-	-	-	-	-	1
CO2	3	2	3	2	-	-	-	-	-	-	-	2
CO3	3	2	3	2	1	-	-	-	-	-	-	2
CO4	3	2	3	3	1	-	-	-	-	-	-	2
CO5	3	2	3	2	-	-	-	-	-	-	-	2

Correlation rating: Low / Medium / High: 1 / 2 / 3 respectively.

UNIT I

Design Concepts: Digital Hardware, Design process, Design of digital hardware. Number systems and codes. Introduction to logic circuits – Variables and functions, Logic gates and networks. Boolean algebra, Synthesis using gates, Design examples.

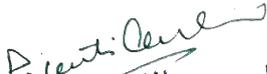
UNIT II

Logic Optimization: Optimized implementation of logic functions using K-Map and Quine-Mc Cluskey Tabular method.

Combinational Circuit Design: Adders and Subtractors, Multiplexers, Demultiplexers, Parity Checkers and Generators, Decoders, Encoders, Code converters, BCD to 7-segment

converter and Arithmetic comparator circuits.
UNIT III
Sequential Circuits: Basic Latch, Gated SR Latch, gated D Latch, Master-Slave edge triggered flip-flops, T Flip-flop, JK Flip-flop, Excitation tables, Timing diagrams and analysis, Flip flop conversions, Set-up and hold time, Registers and Counters.
UNIT IV
Synchronous Sequential Circuits: Basic Design Steps, Finite State machine (FSM) representation using Moore and Mealy state models, State minimization, Design of FSM for Sequence Generation and Detection, Algorithmic State Machine charts.
UNIT V
Design of combinational circuits using Programmable Logic Devices (PLDs): General structure of a Programmable Array Logic (PAL), Programmable Logic Arrays (PLAs), Structure of CPLDs and FPGAs, 2-input and 3-input lookup tables (LUTs).

<i>Suggested Text Books:</i>
1. Morris Mano and Michael D. Ciletti, "Digital Design", Pearson, 6/e, 2021.
2. Zvi Kohavi, "Switching and Finite Automata Theory", 3/e, Cambridge University Press New Delhi, 2011.
3. R. P Jain, "Modern Digital Electronics", 4/e, McGraw Hill Education (India) Private Limited, 2010.
<i>Reference Text Books:</i>
1. John F. Wakerly, <i>Digital Design: Principles and Practices</i> , 5th Edition, Pearson Education, 2018.
2. Ronald J. Tocci, Neal S. Widmer, and Gregory L. Moss, <i>Digital Systems: Principles and Applications</i> , 12th Edition, Pearson Education, 2016.
3. A. Anand Kumar, <i>Fundamentals of Digital Circuits</i> , 4th Edition, PHI Learning, 2016.
4. Charles H. Roth Jr. and Larry L. Kinney, <i>Fundamentals of Logic Design</i> , 7th Edition, Cengage Learning, 2013.


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 Road No: 3, Banjara Hills Hyderabad-34

Course Code	Course Title					Core/PE/OE	
PC 303 EC	PROBABILITY THEORY AND STOCHASTIC PROCESSES					Core	
	Contact Hours per Week				CIE	SEE	Credits
Prerequisite	L	T	D	P			
BS201MT	3	1	-	-	30	70	4
Course Objectives : The course is taught with the objectives of enabling the student to:							
1. Understand fundamentals of probability, repeated trials and Baye's theorem.							
2. Learn Random variable and distribution and density functions of different variables along with their mean and variance.							
3. Learn two Random variables along with joint moments and its properties.							
4. Understand elementary concepts of the Stochastic Processes and their temporal characteristics							
5. Understand elementary concepts of the Stochastic Processes and their Spectral characteristics							
Course Outcomes : On completion of this course, the student will be able to :							
1. Understand axioms of probability and prove some basic theorems of probability.							
2. To understand different types of Random variables, their density and distribution functions							
3. To learn bi-variate distributions and the operations on them.							
4. To understand elementary concepts of the Stochastic Processes in the Temporal domain.							
5. To analyze the frequency domain information of Stochastic Processes.							

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	-	-	-	-	-	-	-	1	-	1
CO2	3	2	-	-	-	-	-	-	-	1	-	1
CO3	3	2	-	-	-	-	-	-	-	1	-	1
CO4	3	2	-	-	-	-	-	-	-	1	-	1
CO5	3	2	-	-	-	-	-	-	-	1	-	1

Correlation rating: Low / Medium / High: 1 / 2 / 3 respectively.

UNIT I: Concept of Probability
Probability introduced through Set Theory and Operations – Definitions and Axioms, Probability Space – Discrete and Continuous, Events - Mutually Exclusive and independent events, Joint Probability, Conditional Probability, Total Probability & Baye's Theorem, Repeated Trials, Combined Experiments, Bernoulli Trials, Bernoulli's Theorem.
UNIT II: Random Variable, Distribution & Density Functions
Random Variable: Definition of a Random Variable, Conditions for a Function to be a Random Variable, Discrete, Continuous and Mixed Random Variables.
Distribution & Density Functions and Operations on One Random Variable
Distribution and Density functions and their Properties - Binomial, Poisson, Uniform, Gaussian, Gamma, Rayleigh Distribution functions, Conditional Density and its Properties. Expected Value of a Random Variable, Function of a Random Variable $g(x)$ and its distribution, Moments about the Origin, Central Moments and Variance, Characteristic Function, Moment Generating Function.
UNIT-III: Two Random Variables and operations
Bi-Variate Distributions: Joint Distribution and Density Function and their properties, Joint

Moments, Co-Variance, Correlation and Degree of Correlation, Joint Characteristic Functions, Conditional Distributions, Conditional Expected Values. Central Limit Theorem (no proof). One Function of Two Random Variables, Two functions of two random variables.

UNIT-IV Stochastic Processes – Temporal Characteristics

Stochastic Processes – Temporal Characteristics

Definitions and types of Stochastic Processes, Introduction to stationarity (First, Second and n^{th} order), Wide Sense and Strict Sense Stationary Processes, Statistical independence, Time averages and ergodicity, Mean-Ergodic Processes, Correlation-Ergodic Processes, Autocorrelation Function and its Properties, Cross-Correlation Function and its Properties, Covariance and its Properties.

UNIT-V Stochastic Processes – Spectral Characteristics

Stochastic Processes – Spectral Characteristics

Power Spectral Density and its properties; Relationship between Power Spectrum and Autocorrelation Function; Relationship between Cross-Power Spectrum and Cross-Correlation Function; White and colored noise, Linear Systems, Response to linear systems for stochastic inputs, Introduction to Gaussian, Poisson and Markov Processes.

Suggested Text Books:

1. Henry Stark and John W. Woods, *Probability and Random Processes with Application to Signal Processing*, 3rd edition, Pearson Education, 2014.
2. Athanasius Papoulis and S. Unnikrishna Pillai, *Probability, Random Variables and Stochastic Processes*, 4th edition, McGraw Hill, 2006.
3. Peyton Z. Peebles, *Probability, Random Variables & Random Signal Principles*, 4th edition, Tata McGraw Hill, 2001.

Reference Text Books:

1. T Veerarajan, *Probability, Statistics and Random Processes*, McGraw Hill, 3rd edition
2. P Sri Hari, *Probability and Random Variables*, The Hi-Tech Publishers


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 Head of Department
 Electronics & Communication Engineering
 Muffakham Jah College of Engg. & Tech.
 Road No: 3, Banjara Hills Hyderabad-34

Course Code	Course Title					Core/PE/OE	
PC 304 EC	ELECTRONIC DEVICES					Core	
	Contact Hours per Week				CIE	SEE	Credits
Prerequisite	L	T	D	P/D			
BS301EE	3	-	-	-	30	70	3
Course Objectives : The course is taught with the objectives of enabling the student to:							
1. Study semiconductor physics and Analyze the behavior of Semiconductor diodes in Forward and Reverse bias.							
2. Develop Half wave and Full wave rectifiers with L, C Filters.							
3. Explain V-I characteristics of Bipolar Junction Transistor in CB, CE & CC configurations and Design of DC Biasing techniques							
4. Design and analysis of small signal transistor amplifiers using exact and simplified hybrid models. Design and application of special devices like UJT, SCR, DIAC, TRIAC, and CCD							
5. Explore V-I Characteristics , Biasing techniques, small signal model of FET's and MOSETS.							
Course Outcomes : On completion of this course, the student will be able to :							
1. Analyze the behavior of semiconductor diodes in forward and reverse bias							
2. Develop Half wave and Full wave rectifiers with L,C,LC & CLC Filters							
3. Explain V-I characteristics of Bipolar Junction Transistor in CB,CE& CC configurations and Design DC Biasing techniques							
4. Design Biasing techniques for BJT in Amplifier Applications							
5. Explore V-I characteristics, analyze Amplifier configurations and Biasing circuits of FET and MOSFETS.							

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	1	2	-	-	-	-	-	-	-	-
CO2	3	1	2	2	-	-	-	-	-	-	-	-
CO3	3	3	2	1	-	-	-	-	-	-	-	-
CO4	3	2	2	2	-	-	-	-	-	-	-	-
CO5	3	3	1	2	-	-	-	-	-	-	-	-

Correlation rating: Low / Medium / High: 1 / 2 / 3 respectively.

UNIT I
Junction Diode : Different types of PN Junction formation techniques, PN Junction Characteristics, biasing- band diagrams and current flow, Diode current equations under forward bias and reverse bias conditions, Junction breakdown in diodes and breakdown voltages, effect of temperature on diode characteristics, Diode as a circuit element, small signal diode models, Junction capacitance under forward bias and reverse bias, Diode switching characteristics, Zener Diodes, Zener voltage regulator and its limitation
UNIT II
PN Diode Applications: Half wave, Full wave and Bridge rectifiers - their operation, performance characteristics, and analysis; Filters (L, C, LC and CLC filters) used in power supplies and their ripple factor calculations, design of Rectifiers with and without Filters.
UNIT III
Bipolar Junction Transistor : Transistor Junction formation (collector-base, base-emitter Junctions) Transistor biasing-band diagram for NPN and PNP transistors, current

components and current flow in BJT, Modes of transistor operation, Early effect, BJT input and output characteristics in CB, CE CC configurations, BJT as an amplifier, BJT biasing techniques, Thermal runaway, heat sinks and thermal stabilization, operating point stabilization against temperature and device variations, stability factors, Bias stabilization and compensation techniques, Biasing circuit design.

UNIT IV

Small Signal Transistors equivalent circuits: Small signal low frequency h-parameter model of BJT, Determination of h parameters, analysis of BJT amplifiers using h-parameter, comparison of CB, CE and CC amplifier configurations, Analysis of BJT amplifier with approximate model. Introduction to low frequency Π and T models
Special Devices: Working of photo diode, solar cells, LED.

UNIT V

Junction Field Effect Transistors (JFET): JFET formation, operation & current flow, pinch-off voltage, V-I characteristics of JFET. JFET biasing-zero current drift biasing, biasing against device variations. Low frequency small signal model of FETs. Analysis of CS, CD and CG amplifiers and their comparison. FET as an amplifier and as a switch.
MOSFETs: MOSFETs, Enhancement & Depletion mode MOSFETs, V-I characteristics.

Suggested Text Books:

1. Jacob Millman, Christos C. Halkias, and Satyabrata Jit, *Electronic Devices and Circuits*, 3rd ed., McGraw Hill Education, 2010
2. Robert Boylestad and Louis Nashelsky, *Electronic Devices and Circuit Theory*, 11th ed., Pearson India Publications, 2015
3. S Salivahanan, N Kumar, and A Vallavaraj, *Electronic Devices and Circuits*, 2nd ed., McGraw Hill Education, 2007.

Reference Text Books:

1. David A. Bell, *Electronic Devices and Circuits*, 5th ed., Oxford University Press, 2009.
2. JB Gupta, *Electronic Devices and Circuits*, S.K Kataria & sons, 5th Edition, 2012
3. *The Art of Electronics*, Horowitz, 3rd Edition Cambridge University Press
4. *Electronic Devices and Circuits*, A.P Godse, U.A Bakshi, Technical Publications

A. Venkatesh
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 Head of Department
 Electronics & Communication Engineering
 Muffakham Jah College of Engg. & Tech.
 Road No: 3, Banjara Hills Hyderabad-34

Course Code	Course Title					Core/Elective	
PC 305 EC	NETWORK THEORY					Core	
Prerequisite	Contact Hours per Week				CIE	SEE	Credits
	L	T	D	P			
ES154EE BS102MT	3	-	-	-	30	70	3
Course Objectives : The course is taught with the objectives of enabling the student to:							
1. Concepts of Two Port networks, study about the different two port parameter representations.							
2. Concepts about the image impedance on different networks, design of attenuators.							
3. Design concepts of equalizers.							
4. Design concepts of different filters.							
5. Design concepts of network synthesis							
Course Outcomes : On completion of this course, the student will be able to :							
1. Able to Express given Electrical Circuit in terms of A,B,C,D and Z,Y Parameter Model and Solve the circuits and how they are used in real time applications.							
2. Able to learn how to calculate properties of networks and design of attenuators.							
3. Able to design of equalizers							
4. Able to design different types of filters using passive elements.							
5. Able to synthesize the RL & RC networks in Foster and Cauer Forms.							

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	2	-	-	-	-	-	-	-	-
CO2	3	3	2	2	-	2	-	-	-	-	-	2
CO3	3	3		2	-	-	-	-	-	-	-	
CO4	2	2	-	-	-	2	2	-	-	-	-	2
CO5	2	-	-	-	-	2	2	-	-	-	-	

Correlation rating: Low / Medium / High: 1 / 2 / 3 respectively.

UNIT I
Two Port networks: Z, Y, h, g and ABCD parameters, equivalence of two ports networks, T- π transforms, Reciprocity theorem, Interconnection of two port networks and Brune's test for inter connections.
UNIT II
Symmetrical and Asymmetrical Networks: Characteristic impedance and propagation constant of symmetrical T and π networks, Image and iterative impedances, Image transfer constant and iterative transfer constant of asymmetrical L, T and π networks,
UNIT III
Constant k- Filters- Low pass, high pass, band pass and band elimination filter design, m-derived low pass and high pass filter design, Composite filter design and notch filter.
UNIT IV
Attenuators and Equalizers- Design of symmetrical T, π , Bridge-T and Lattice attenuators, impedance matching networks, Inverse networks, Equalizers, Constant resistance equalizer,

full series and full shunt equalizer.

UNIT V

Network Synthesis: Hurwitz polynomials, positive real functions, Basic Philosophy of Synthesis, L-Clmittance functions, RC impedance functions and RL admittance functions. RL impedance functions and RC admittance functions. Cauer and Foster's forms of RL impedance and RC admittance. Properties of RC, RL Networks.

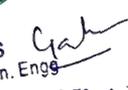
<i>Suggested Text Books:</i>

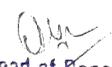
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| 1. William H. Hayt, Jack E. Kemmerly and Steven M. Durbin, "Engineering Circuit Analysis", 6th edition, Tata McGraw-Hill, 2007. |
| 2. A Sudhakar and Shyammoan S Palli, "Circuits & Networks: Analysis and Synthesis", 3 rd ed., Tata McGraw-Hill, 2007. |
| 3. A. Sudhakar Shyammoan, <i>Circuits Networks: Analysis Synthesis</i> , 4th edition, Tata McGraw-Hill, 2010. |

<i>Reference Text Books:</i>

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|-----------------------------------------------------------------------------------------------------------------------------|
| 1. Ryder J.D, <i>Network Lines Fields</i> , 2nd edition, Prentice Hall of India, 1991. |
| 2. P.K. Jain and Gurbir Kau, <i>Networks, Filters and Transmission Lines</i> , Tata McGraw-Hill Publishing Company Limited. |
| 3. Van Valkenburg M.E, <i>Introduction to Modern Network Synthesis</i> , Wiley Eastern 1994. |
| 4. S.P. Ghosh and A.K. Chakraborty, <i>Network Analysis and Synthesis</i> , McGraw Hill, 1 st edition, 2009. |


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 Road No: 3, Banjara Hills Hyderabad-34

Course Code	Course Title					Core/PE/OE	
PC 351 EC	ELECTRONIC DEVICES AND CIRCUITS LAB					Core	
	Contact Hours per Week				CIE	SEE	Credits
Prerequisite	L	T	D	P			
PC304EC				2	25	50	1
Course Objectives : The course is taught with the objectives of enabling the student to:							
1. To learn the characteristics of Semiconductor diodes							
2. To design the filters and rectifiers with and without capacitors.							
3. Demonstrate the characteristics of different transistor Configurations							
4. Design of Biasing Circuits for BJT and FET Amplifiers							
5. To develop simulation skills using tools to model and analyze diode and rectifier circuits.							
Course Outcomes : On completion of this course, the student will be able to :							
1. Demonstrate the characteristics of Semiconductor diodes							
2. Realize the filters and rectifiers with and without capacitors.							
3. Demonstrate the characteristics of different transistor Configurations							
4. Design of Biasing Circuits for BJT and FET Amplifiers							
5. Design and simulate diode-based circuits and rectifier systems using electronic circuit simulation tools.							

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	3	2	2	-	-	-	-	-	-	-
CO2	3	2	3	2	1	-	-	-	-	-	-	-
CO3	3	2	3	2	2	-	-	-	-	-	-	-
CO4	3	3	3	2	2	-	-	-	-	-	-	-
CO5	2	3	2	3	3	-	-	-	-	-	-	-

Correlation rating: Low / Medium / High: 1 / 2 / 3 respectively.

List of Experiments
1. V-I Characteristics of Silicon and Germanium diodes and measurement of static and dynamic resistances
2. Zener diode characteristics and its application as voltage regulator
3. Design, realization and performance evaluation of half wave rectifiers without filters and with LC & pi section filters
4. Design, realization and performance evaluation of full wave rectifiers without filters and with LC & pi section filters
5. Plotting the characteristics of BJT in Common Base configuration and measurement of h-parameters
6. Plotting the characteristics of BJT in Common Emitter configuration and measurement of h-parameters
7. Plotting the characteristics of JFET in CS configuration and measurement of Trans-conductance and Drain resistance
8. BJT biasing circuits , Fixed Biasing, Collector to base bias and Self bias
9. Design and Simulation of the V-I characteristics of a PN junction diode and Zener diode.
10. Design and Simulation of Half-wave and Full-wave rectifier circuits with and without filters

Suggested Text Books:

1. Paul B. Zbar, Albert P. Malvino, Michael A. Miller, *Basic Electronics, A Text - Lab Manual*, 7thed., McGraw Hill Education, 2001.
2. David Bell, *Fundamentals of electronic devices and circuits Lab Manual*, 5th ed., Oxford university press, 2009.
3. R.C. Jaeger & T. N. Blalock, *Micro Electronic circuit design*, 4th ed., Mc Graw Hill Higher Education, 2011.


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 Head of Department
 Electronics & Communication Engineering
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 Road No: 3, Banjara Hills Hyderabad-34

Course Code	Course Title					Core/PE/OE	
PC 352EC	ELECTRONIC WORKSHOP LAB					Core	
	Contact Hours per Week				CIE	SEE	Credits
Prerequisite	L	T	D	P			
BS202PH				2	25	50	1
Course Objectives : The course is taught with the objectives of enabling the student to:							
1. To identify and understand the function of basic electronic components and measurement tools.							
2. To develop hands-on skills in soldering and PCB design.							
3. To verify fundamental theorems of electrical networks using hardware.							
4. To verify key network theorems both through hardware implementation and SPICE simulation.							
5. To analyze and simulate electrical circuits to measure and interpret network parameters and resonance characteristics.							
Course Outcomes : On completion of this course, the student will be able to :							
1. Identify and classify active, passive components, and use basic electrical measurement tools.							
2. Demonstrate basic soldering, de-soldering skills, and design simple PCB layouts.							
3. Apply and verify fundamental electrical theorems.							
4. Measure and analyze two-port parameters, image impedance, and characteristic impedance using appropriate test setups..							
5. Simulate and verify resonance conditions in electrical circuits using SPICE and analyze their frequency response.							

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	2	1	1	-	-	-	-	-	-	1
CO2	2	3	2	-	2	-	-	-	-	-	-	2
CO3	3	2	3	2	1	-	-	-	-	-	-	1
CO4	3	2	3	2	2	-	-	-	-	-	-	2
CO5	2	2	2	1	2	-	-	-	-	-	-	1

Correlation rating: Low / Medium / High: 1 / 2 / 3 respectively.

List of Experiments
1. Study of all types of discrete Active & passive devices, display devices, integrated components, electro mechanical components (switches, sockets, connectors etc.) electromagnetic components (relays). Study and use of different meters (volt/ammeter, AVO/Multi meter) for the measurement of electrical parameters. Measurement of RLC components using LCR Meter.
2. Soldering and Desoldering.
3. PCB design and circuit assembling
4. Study of CRO and its applications.
5. Design and Verification of Superposition and Tellegan's theorem
6. Design and Verification of Thevenin's and Maximum Power Transfer Theorem.
7. Measurement of two-port network parameters.
8. Measurement of Image impedance and Characteristics impedance.
9. Design and Verification of SPICE simulation of Superposition and Tellegan's theorem.
10. Design and Verification of SPICE simulation of Thevenin's and Maximum Power Transfer.

11.Design and Verification of SPICE simulation of Series Resonance.

12.Design, Verification of SPICE simulation of Parallel Resonance.

<i>Suggested Text Books:</i>

1. David A. Bell, <i>Electronic Devices and Circuits Lab Manual</i> , 5th Edition, Oxford University Press, 2014.

2. Zbar, Malvino, and Miller, <i>Basic Electronics: A Text-Lab Manual</i> , McGraw Hill Education, 1993.

3. A. Sudhakar and Shyammohan S. Palli, <i>Circuits and Networks: Analysis and Synthesis</i> , 5th Edition, McGraw Hill Education, 2015.


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 Head of Department
 Electronics & Communication Engineering
 Muffakham Jah College of Engg. & Tech.
 Road No: 3, Banjara Hills Hyderabad-34

Course Code	Course Title					Core/PE/OE	
PC 353EC	LOGIC DESIGN LAB					Core	
	Contact Hours per Week				CIE	SEE	Credits
Prerequisite	L	T	D	P			
ES301EE				2	25	50	1
Course Objectives: The course is taught with the objectives of enabling the student to:							
1. To understand and verify the functionality of basic logic gates and standard combinational logic circuits.							
2. To design and realize combinational circuits using universal gates, multiplexers, and decoders.							
3. To verify and analyze the operation of various flip-flops and their conversions.							
4. To design and simulate sequential circuits including counters and shift registers using simulation tools.							
5. To introduce students to the basics of PCB design using CAD tools for digital/analog circuits.							
Course Outcomes : On completion of this course, the student will be able to :							
1. Verify the truth tables of basic logic gates and implement simple code converters using logic gates.							
2. Design and implement half and full adders/subtractors using universal gates, MUX, and decoders.							
3. Analyze the working of different flip-flops and perform flip-flop conversions to implement required memory elements.							
4. Simulate combinational and sequential logic circuits using digital design tools to validate logical functionality							
5. Create and simulate PCB layouts for simple analog/digital circuits using PCB design tools.							

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	2	2	3	-	-	-	-	-	-	1
CO2	3	3	3	2	3	-	-	-	-	-	-	2
CO3	3	3	2	3	3	-	-	-	-	-	-	2
CO4	2	3	2	3	3	-	-	-	-	-	-	1
CO5	3	2	3	2	3	-	-	-	-	-	-	1

Correlation rating: Low / Medium / High: 1 / 2 / 3 respectively.

List of Experiments:
1. Verification of truth tables of Logic gates and realization of Binary to Gray and Gray to Binary code converters.
2. Realization of Half adder/subtractor using universal logic gates.
3. Realization of Full adder/subtractor using universal logic gates.
4. Realization of Full adder/Sub using MUX and Decoder
5. Verification of truth tables of Flip Flops and Flip flop conversions form one form to the other.
6. Design and simulation of basic logic gates and verification of their truth tables.
7. Design and simulation of Combinational circuits such as adders, subtractors, multiplexers, and demultiplexers

R24

SCHEME OF INSTRUCTION & EXAMINATION
B.E. IV- Semester
(ELECTRONICS AND COMMUNICATION ENGINEERING)

S. No	Course Code	Course Title	Scheme of Instruction				Scheme of Examination			Credits
			L	T	P/D	Contact Hrs/Wk	CIE	SEE	Duration in Hrs	
Theory Course										
1	PC 401 EC	Analog Electronic Circuits	3	1	-	4	30	70	3	4
2	PC 402 EC	Computer Organization and Architecture	3	-	-	3	30	70	3	3
3	PC 403 EC	Electromagnetic Theory and Transmission Lines	3	-	-	3	30	70	3	3
4	PC 404 EC	Pulse and Linear Integrated Circuits	3	1	-	4	30	70	3	4
5	PC 405 EC	Digital Signal Processing	3	-	-	3	30	70	3	3
6	PC 406EC	Electronic Measurements and Instrumentation	3	-	-	3	30	70	3	3
Practical / Laboratory Course										
7	PC 451EC	Analog Electronic Circuits Lab	-	-	2	2	25	50	3	1
8	PC 452EC	Pulse and Linear Integrated Circuits Lab	-	-	2	2	25	50	3	1
9	PC 453EC	Digital Signal Processing Lab	-	-	2	2	25	50	3	1
Total			18	2	6	26	255	570	27	23

PC: Professional Course **MC:** Mandatory Course **L:**Lecture **T:**Tutorial
P: Practical **D:**Drawing **G:** Grade(E/VG/G/S/U)
CIE: Continuous Internal Evaluation **SEE:** Semester End Examination (Univ. Exam)

Note:

1. Each contact hour is a Clock Hour
2. The duration of the practical class is two clock hours, however it can be extended wherever necessary, to enable the student to complete the experiment


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Course Code	Course Title					Core/PE/OE	
PC401EC	Analog Electronic Circuits					Core	
	Contact Hours per Week				CIE	SEE	Credits
Prerequisite	L	T	D	P			
PC304EC	3	-	-	-	30	70	4
Course Objectives : The course is taught with the objectives of enabling the student to:							
1. Analyze frequency response of Amplifiers in different frequency ranges.							
2. Familiarize with concept and effect of negative feedback							
3. Study positive feedback and Design different types of oscillators							
4. Design Power Amplifiers and calculate their efficiencies							
5. Familiarize with concept of tuned amplifiers							
Course Outcomes : On completion of this course, the student will be able to :							
1. Design and analyze frequency response of different amplifiers using BJT and FET.							
2. Identify the type of negative feedback, analyze and design of negative feedback amplifiers							
3. Design Audio Frequency and Radio Frequency oscillators.							
4. Distinguish between the classes of Power Amplifiers and their design considerations.							
5. Compare the performance of single and double tuned amplifiers							

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	1	1	-	-	-	-	-	-	-	1
CO2	3	2	3	2	-	-	-	-	-	-	-	2
CO3	3	2	3	2	1	-	-	-	-	-	-	2
CO4	3	2	3	3	1	-	-	-	-	-	-	2
CO5	3	2	3	2	-	-	-	-	-	-	-	2

Correlation rating: Low / Medium / High: 1 / 2 / 3 respectively.

UNIT I
Small signal amplifiers: Classification of amplifiers. Mid-frequency, Low-frequency and high frequency analysis of single and Multistage RC coupled amplifier with BJT & FET. Analysis of Transformer coupled amplifier at mid-frequency, low-frequency and high frequency.
UNIT II
Feedback Amplifiers: The feedback concept, General characteristics of negative feedback amplifier, Effect of negative feedback on input and output impedances, voltage and current, series and shunt feedbacks, Stability considerations, Local Versus global feedback.
UNIT III
Oscillators: Positive feedback and conditions for sinusoidal oscillations, RC oscillators, LC oscillators, Crystal oscillator, Amplitude and frequency stability of oscillator. Regulators: Transistorized series and shunt regulators.
UNIT IV
Large Signal Amplifiers: BJT as large signal audio amplifiers, Classes of operation, Harmonic distortion, power dissipation, efficiency calculations. Design considerations of transformer coupled and transform less push- pull audio power amplifiers under Class-A, Class-B, Class-D and Class-AB operations.
UNIT V

R.F. Voltage Amplifiers: General considerations, Analysis and design of single tuned and double tuned amplifiers with BJT, selectivity, gain and bandwidth. Comparison of multistage, single tuned amplifiers and double tuned amplifiers. The problem of stability in RF amplifiers, neutralization and uni-lateralisation, introduction to staggered tuned amplifier.

Suggested Text Books:

1. Jacob Millman, Christos Halkias, Chetan Parikh, *Integrated Electronics*, 2nded., McGraw Hill Education (India) Private Limited, 2011.
2. S Salivahanan, N Kumar, and A Vallavaraj, *Electronic Devices and Circuits*, McGraw Hill, 3rd edition, 2010.
3. Donald A. Neamen, *Electronic Circuits: Analysis and Design*, 3rd edition, McGraw Hill, 2006.

Reference Text Books:

1. Robert Boylestad and Louis Nashelsky, *Electronic Devices and Circuit Theory*, 11th ed., Pearson India Publications, 2015.
2. J.B. Gupta. *Electronic Devices and Circuits*. Publisher, S.K. Kataria & Sons. Edition, 6th 2016.
3. Allen Mottershead, *Electronic Devices and Circuits: An introduction*, PHI Learning Private Limited, 2011.
4. Sedra smith, *Microelectronics circuits*, oxford university press, 6th edition, 2009


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Course Code	Course Title					Core/PE/OE	
PC 402 EC	COMPUTER ORGANIZATION AND ARCHITECTURE					Core	
	Contact Hours per Week				CIE	SEE	Credits
Prerequisite	L	T	D	P			
PC302EC	3			3	30	70	3
Course Objectives : The course is taught with the objectives of enabling the student to:							
1. Understand various number representations and perform binary, fixed-point, and floating-point arithmetic operations.							
2. Learn the internal hardware organization of computers including control unit design using hardwired and microprogrammed techniques.							
3. Analyze CPU design concepts including instruction formats, pipelining, and performance metrics such as CPI and Amdahl's Law.							
4. Examine memory hierarchy, virtual memory, cache design, and modern memory technologies relevant to system performance.							
5. Explore input-output interfacing techniques, communication protocols, and embedded system integration including SoC and modern ISAs like RISC-V and ARM.							
Course Outcomes : On completion of this course, the student will be able to :							
1. Perform binary, fixed-point, and floating-point arithmetic relevant to computer systems and AI applications.							
2. Design and describe the datapath and control units of a CPU using register-transfer level (RTL) principles.							
3. Explain the instruction cycle and analyze the effect of control sequencing, pipelining, and interrupt mechanisms.							
4. Analyze and evaluate memory systems, cache performance, and virtual memory operations in computing systems.							
5. Design and assess I/O subsystems including DMA, bus communication, and interface protocols for peripheral devices.							

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	-	-	-	-	-	-	-	-	-	-
CO2	-	3	2	-	-	-	-	-	-	-	-	-
CO3	3	-	-	2	-	1	-	-	-	-	-	-
CO4	2	-	-	-	3	-	-	2	-	-	-	-
CO5	-	-	3	-	-	-	2	-	1	-	-	-

Correlation rating: Low / Medium / High: 1 / 2 / 3 respectively.

UNIT I

Data Representation and Arithmetic Operations- Number systems and binary codes, Fixed and floating-point representation (IEEE-754). Binary arithmetic: addition, subtraction, Booth's multiplication, restoring and non-restoring division. Low-precision formats (INT8, bfloat16) and relevance to AI applications.

UNIT II

Computer Organization and Control Unit- Instruction codes, stored program concept, computer registers, common bus system. Instruction cycle: fetch, decode, execute, and interrupt. Control unit design: hardwired and microprogrammed control, RTL basics. Microinstruction sequencing and control word format.

UNIT III
CPU Architecture, Pipelining, and Modern ISAs- Register and stack-based organization, instruction formats, addressing modes. Datapath and control path design. RISC vs CISC architecture, Instruction pipelining, hazards. Performance metrics: CPI, IPC, Amdahl's Law, Introduction to RISC-V and ARM architectures.
UNIT IV
Input-Output and Communication - I/O interfacing: memory-mapped vs I/O-mapped I/O. Asynchronous data transfer: strobe and handshaking. Data transfer modes: programmed I/O, interrupt-driven I/O, and DMA, I/O protocols and buses: AMBA/AXI overview, Peripheral communication and CPU-IOP interactions.
UNIT V
Memory Systems and Emerging Technologies - Memory hierarchy: primary, secondary, cache, associative memory, Cache organization: mapping techniques, replacement policies. Virtual memory: paging, address translation, TLB. Modern memory technologies: DDR5, HBM, NVRAM, Memory design for embedded and AI systems.

<i>Suggested Text Books:</i>
1. David A. Patterson & John L. Hennessy, Computer Organization and Design: RISC-V Edition, Morgan Kaufmann. – 2nd Edition, 2017.
2. William Stallings, Computer Organization and Architecture: Designing for Performance, Pearson Education. 8th Edition, 2009.
3. Andrew S. Tanenbaum & Todd Austin, Structured Computer Organization, Pearson. Pearson, 6 th Edition, 2021.
<i>Reference Text Books:</i>
1. John P. Hayes, Computer Architecture and Organization, McGraw Hill, 3rd Edition, 1998.
2. Carl Hamacher, Zvonko Vranesic, Safwat Zaky, Computer Organization, McGraw Hill. 6th Edition, 2011.
3. Steve Furber, ARM System-on-Chip Architecture, Pearson Education, 2nd Edition, 2000.

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 Gachibowli, Hyderabad-500 031.

G. J. S.
 Head of Department
 Electronics & Communication Engineering
 Muffakham Jah College of Engg. & Tech.
 Road No: 3, Banjara Hills Hyderabad-34

Course Code	Course Title				Core/PE/OE		
PC 403 EC	ELECTROMAGNETIC THEORY AND TRANSMISSION LINES				CORE		
	Contact Hours per Week				CIE	SEE	Credits
Prerequisite	L	T	D	P			
BS201MT	3	-	-	-	30	70	3

Course Objectives : The course is taught with the objectives of enabling the student to:

1. Analyze fundamental concepts of vector analysis, electrostatics and magneto statics law and their applications to describe
- 2.
3. e the relationship between Electromagnetic Theory and circuittheory
4. Formulate the basic laws of static electricity and magnetism and extend them to time varying fields to define the Maxwell's equations in differential and integral form.
5. Derive the wave equations for conducting and di-electric mediums to analyze the wave propagation characteristics of Uniform Plane Waves (UPW) in normal and oblique incidences
6. Analyze fundamental concepts of Transmission lines and to formulate the basic relationship between distortion less transmission lines & applications.
7. Understand the concepts of RF Lines, their characteristics and analyze the applications of Smith Chart.

Course Outcomes : On completion of this course, the student will be able to :

1. Understand the different coordinate systems, vector calculus, coulombs law and gauss law for finding electric fields due to different charge distributions.
2. Learn basic magneto-statics concepts and laws such as Biot-Savart law and Amperes law, their application in finding magnetic field intensity.
3. Distinguish between the static and time-varying fields, establish the corresponding sets of Maxwell's Equations and Boundary Conditions, and use them for solving engineering problems.
4. Determine the Transmission Line parameters to characterize the distortions and estimate the characteristics for different lines.
5. Study the Smith Chart profile and stub matching features, and gain ability to practically use the same for solving practical problems

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	-	2	-	-	-	-	-	1	-	1
CO2	3	2	2	2	-	-	-	-	-	1	-	1
CO3	3	2	-	2	-	-	-	-	-	1	-	1
CO4	3	2	-	3	-	-	-	-	-	1	-	1
CO5	3	2	-	-	-	-	-	-	-	1	-	1

Correlation rating: Low / Medium / High: 1 / 2 / 3 respectively.

UNIT I : Electrostatics:

Review of coordinate systems. Coulomb's Law, Electric Field Intensity, Electric field due to Line Charge , Sheet Charge and Volume Charge Distribution, Electric flux, Flux density. Gauss's Law and its applications. Energy and Potential, Potential of a point

charge, System of Charges, Potential gradient.
UNIT II : Magneto-statics and Maxwell's Equations
Steady magnetic field -Biot-Savart's law, Ampere's law. Stoke's theorem, Magnetic flux and magnetic flux density. Scalar and vector magnetic potentials. Electric and Magnetic fields boundary conditions. Maxwell's equations for static and time varying fields.
UNIT III : Wave Equations and Reflection
Uniform plane waves in free space and in conducting medium, Wave Polarization-Linear, Circular and Elliptical Polarization, Poynting theorem. Reflection of Uniform Plane Wave at Normal incidence and oblique incidence on dielectrics medium, Reflection Coefficient, Transmission Coefficient.
UNIT IV: Transmission Lines at Low Frequency
Types of Transmission Lines-Two wire lines and its circuit representation, Primary and secondary constants. Transmission Line equations, Infinite line, characteristic impedance of Open and short circuit lines and their significance. Distortion less transmission line, Concept of loading of a transmission line, Campbell's formula.
UNIT V: Transmission Lines at High Frequency
Impedance at any point on the transmission line- Input impedance. RF and UHF lines, transmission lines as circuit elements. Properties of $\lambda/2$, $\lambda/4$ and $\lambda/8$ Lines. Reflection and VSWR. Matching: Stub matching. Smith chart and its applications.

<i>Suggested Text Books:</i>
1. Matthew N.O. Sadiku, <i>Principles of Electro-magnetic</i> , 6th edition, Oxford University Press,2016
2. William H. Hayt Jr. and John A. Buck, <i>Engineering Electromagnetics</i> , 7th edition, Tata McGraw Hill,2006.
3. John D. Ryder, <i>Networks Lines and Fields</i> , 2nd edition, Pearson,2015.
<i>Reference Text Books:</i>
1. John D. Ryder, <i>Networks Lines and Fields</i> , 2nd edition, Pearson,2015.
2. E.C. Jordan and K.G. Balmain, <i>Electromagnetic Waves and Radiating Systems</i> , 2nd edition, Pearson,2015
3. K.D. Prasad, <i>Antennas and Wave Propagation</i> , Khanna Publications.


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 Head of Department
 Electronics & Communication Engineering
 Muffakham Jah College of Engg. & Tech.
 Road No: 3, Banjara Hills Hyderabad-34

Course Code	Course Title					Core/PE/OE	
PC 404 EC	PULSE AND LINEAR INTEGRATED CIRCUITS					Core	
	Contact Hours per Week				CIE	SEE	Credits
Prerequisite	L	T	D	P			
PC 304 EC	3	1	-	-	30	70	4
Course Objectives : The course is taught with the objectives of enabling the student to:							
1. Discuss the behavior and applications of linear and non-linear wave shaping circuits.							
2. Describe the design and operation of multivibrators and time base generator circuits							
3. Analyze the characteristics of differential amplifiers and operational amplifiers							
4. Implement OP-AMP-based circuits for amplification, filtering, and waveform generation.							
5. Explain the functionality of 555 timer, PLL, and their applications in data converters and voltage regulation.							
Course Outcomes : On completion of this course, the student will be able to :							
1. Analyze the response of linear wave shaping circuits to various input signals							
2. Design multivibrator and sweep circuits using transistors							
3. Analyze DC and AC characteristics of differential amplifier configurations using BJTs and operational amplifiers.							
4. Implement various linear and non-linear applications of operational amplifiers							
5. Demonstrate the various applications of 555 Timer and analyze the operation of the D/A and A/D converters.							

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	1	2	1	1	1	-	-	-	-	1
CO2	3	3	3	1	1	1	1	-	-	-	-	1
CO3	3	3	1	3	1	1	1	-	-	-	-	1
CO4	3	3	3	1	3	1	1	-	-	-	-	1
CO5	3	3	2	3	3	1	1	-	-	-	-	1

Correlation rating: Low / Medium / High: 1 / 2 / 3 respectively.

UNIT I

Linear Wave Shaping: High pass, low pass RC circuits, their response for sinusoidal, step, pulse, square and ramp inputs. RC network as differentiator and integrator, attenuators, its applications in CRO probe.

Non-Linear Wave Shaping: Diode clippers, Transistor clippers, clipping at two independent levels, Comparators, applications of voltage comparators. Clamping operation, clamping circuit taking Source and Diode resistances into account, Clamping circuit theorem.

UNIT II

Multivibrators: Analysis and Design of Bistable, Monostable, Astable Multivibrators and Schmitt trigger using transistors.

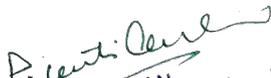
Time Base Generators: General features of a time base signal, methods of generating voltage time base waveform.

UNIT III

Differential amplifiers: Classification, DC and AC Analysis of Single/Dual input Balanced and Unbalanced output configurations using BJTs. Level Translator.

Operational Amplifier: OPAMP Block diagram, ideal Op-amp characteristics, Op-amp and its features, Op-amp parameters and Measurements, Input and Output Offset voltages and currents, Slew rate, CMRR, PSRR. Frequency response and Compensation Techniques
UNIT IV
OP-AMP Applications: Inverting and Non-Inverting Amplifiers, Integrator and differentiator, summing amplifier, precision rectifier, Schmitt trigger and its applications. Active filters: Lowpass, high pass, band pass and band stop. Log and Anti Log Amplifiers
UNIT V
555 Timer: Functional Diagram, Monostable, Astable and Schmitt Trigger Applications. Fixed and variable voltage regulators, PLL and its Applications. Data Converters: Digital-to-analog converters (DAC): Weighted resistor, inverted R-2R ladder, Analog-to-digital converters (ADC): dual slope, successive approximation, flash, Specifications

<i>Suggested Text Books:</i>
1. Anand Kumar A, "Pulse and Digital Circuits", Prentice-Hall of India private Limited, New Delhi, 2007.
2. D.Roy Chowdhury, Shail B. Jain, "Linear Integrated Circuits", 4/e, New Age International (P) Ltd., 2008.
3. David A. Bell, "Pulse Circuits and Systems", Oxford University Press, New Delhi, 2008.
4. Venkatramani K. and Bhaskaran M., "Pulse and Digital Circuits", McGraw-Hill Education (India), New Delhi, 2010
5. Salivahanan S. and Arivazhagan S., "Linear Integrated Circuits", McGraw-Hill Education (India), New Delhi, 2018.
<i>Reference Text Books:</i>
1. J. Millman and H. Taub, "Pulse, Digital and Switching Waveforms" - McGraw-Hill, 1991.
2. David A. Bell, "Solid State Pulse Circuits" - PHI, 4/e, 2002
3. Ramakanth A. Gayakwad, "Op-Amps and Linear Integrated Circuits", Pearson, 4/e, 2018.
4. K. Lal Kishore, "Operational Amplifiers and Linear Integrated Circuits", Pearson Education, New Delhi, 2012.
5. Schilling Donald L. and Belove Charles, "Electronic Circuits: Discrete and Integrated", McGraw-Hill Education, New York, 2002.


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 Electronics & Communication Engineering
 Muffakham Jah College of Engg. & Tech.
 Road No: 3, Banjara Hills Hyderabad-34

Course Code	Course Title					Core/PE/OE	
PC 405 EC	DIGITAL SIGNAL PROCESSING					Core	
	Contact Hours per Week				CIE	SEE	Credits
Prerequisite	L	T	D	P			
PC 301 EC	3	-	-	-	30	70	3
Course Objectives : The course is taught with the objectives of enabling the student to:							
1. To describe the necessity and efficiency of digital signal processing.							
2. To analyze signals in the frequency domain using the principles and applications of Fast Fourier Transform (FFT) for improved computational efficiency.							
3. To discuss various design methods of FIR & IIR filters.							
4. To describe the concepts of Multirate signal processing							
5. Identify important features of TMS320C67XX DSP processors.							
Course Outcomes : On completion of this course, the student will be able to :							
1. Apply the knowledge of FFT Algorithms for computation of DFT.							
2. Design of FIR filters using various methods.							
3. Design of IIR filters using various methods.							
4. Apply decimation and interpolation concepts for the design of sampling rate converters.							
5. Understand TMS320C67XX DSP processors for the design of digital filters.							

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	2	-	-	-	-	-	-	-	-	3
CO2	2	2	2	3	-	-	-	-	-	-	-	3
CO3	2	3	1	-	-	-	-	-	-	-	-	3
CO4	2	2	1	-	-	-	-	-	-	-	-	3
CO5	3	3	1	-	-	-	-	-	-	-	-	3

UNIT I
Discrete Fourier Transform and Fast Fourier Transform: Discrete Fourier Transform (DFT), Computation of DFT- Linear and Circular Convolution, FFT algorithms: Radix-2 Decimation in Time and Decimation in Frequency algorithms, In place computation, Bit reversal.
UNIT II
Finite Impulse-Response Filters (FIR): Linear phase filters, Windowing techniques for design of Linear phase FIR Filters-Rectangular, triangular, Bartlett, Hamming, Hanning, Kaiser windows, Realization of filters, Finite word length effects.
UNIT III
Infinite Impulse-Response Filters (IIR): Introduction to filters, comparison between practical and theoretical filters, Butterworth and Chebyshev approximation, IIR digital filter design Techniques, Impulse Invariant technique, Bilinear transformation technique, Digital Butterworth & Chebyshev filters, Implementation, Digital filters structures, Comparison between FIR and IIR.
UNIT IV
Multirate Digital Signal Processing: Introduction, Decimation by factor D and interpolation by a factor I, Sampling Rate conversion by a Rational factor I/D. Implementation of Sampling Rate Conversion: Multistage implementation of sampling rate conversion, Application of

Multirate Signal Processing.
UNIT V
Introduction to DSP Processors: Difference between DSP and other microprocessors architectures Importance of DSP Processors- General purpose DSP processors TMS320C67XX processor, architecture, registers, pipelining, addressing modes and Introduction to instruction set.

<i>Suggested Text Books:</i>
1. Digital Signal Processing: Principles, Algorithms, and Applications by John G. Proakis and Dimitris G. Manolakis, Pearson Education / PHI, 2007.
2. Discrete-Time Signal Processing by Alan V. Oppenheim and Ronald W. Schaffer, PHI.
3. Digital Signal Processing by S. Salivahanan, A. Vallavaraj, and C. Gnanapriya, TMH, 2009.
<i>Reference Text Books:</i>
1. Ashok Ambardar, "Digital Signal Processing : A Modern Introduction," Cengage Learning, 2009.
2. Alan V. Oppenheim & Ronald W. Schaffer, "Digital Signal Processing," PHI, 2nd edition, 2014.
3. Li Tan, "Digital Signal Processing: Fundamentals and Applications," Elsevier, 2012.
4. B.Venkataramani & M. Bhaskar, "Digital Signal Processor Architecture, Programming and Application," TMH, 2e 2013.


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 Muffakham Jah College of Engg. & Tech.
 Road No: 3, Banjara Hills Hyderabad-34

Course Code	Course Title				Core/Elective		
PC 406 EC	ELECTRONIC MEASUREMENTS AND INSTRUMENTATION				Core		
Prerequisite	Contact Hours per Week				CIE	SEE	Credits
	L	T	D	P			
BS202PH	3	-	-	-	30	70	3
Course Objectives : The course is taught with the objectives of enabling the student to:							
1. Understand the different standards of measurements.							
2. Study different types of transducers.							
3. List various types of physical quantities measurements.							
4. Learn the design of measuring Instruments.							
5. Study various types of bio-medical instruments							
Course Outcomes : On completion of this course, the student will be able to :							
1. Describe characteristics of electronic measurements and state different Standards of measurements.							
2. Identify and explain different types of Transducers.							
3. Interpret types of transducers for Sound, Temperature.							
4. Design and analyze the digital voltmeters, spectrum analyzers and Prioritize the instruments.							
5. Identify and classify types of Biomedical instruments.							

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	1	-	-	-	-	-	-	-	-	-	-
CO2	2	-	1	-	-	-	-	-	-	-	-	-
CO3	1	1	1	-	-	-	-	-	-	-	-	-
CO4	1	1	2	-	-	-	-	-	-	-	-	-
CO5	1	-	1	-	-	1	-	-	-	-	-	-

Correlation rating: Low / Medium / High: 1 / 2 / 3 respectively.

UNIT I
Electronic Measurement fundamentals: Accuracy, Precision, Resolution and Sensitivity. Errors and their types. Standards of measurement, classification of standards, IEEE standards.
UNIT II
Transducers: Classification, factors for selection of a transducer, transducers for measurement of velocity, Pressure and Humidity. Passive electrical transducers- Strain gauges and strain measurement, LVDT and displacement measurement, capacitive transducer and thickness measurement. Active electrical transducers: Piezo electric, photo conductive, photo voltaic and photo emissive transducers.
UNIT III
Electronic Sensors: Characteristics of sound, pressure, power and loudness measurement. Microphones and their types. Temperature measurement, resistance wire thermometers, semiconductor thermometers and thermo-couples. Optical and Magnetic sensors, pH sensor.

UNIT IV

Measuring instruments: Block diagram, specification and design considerations of different types of DVMs. Spectrum analyzers. The IEEE488 or GPIB Interface and protocol. Delayed time base oscilloscope and Digital storage oscilloscope. Introduction to virtual instrumentation, SCADA. Data acquisition system block diagram

UNIT V

Biomedical Instrumentation: Human physiological systems and related concepts. Bio-potential electrodes Bio-potential recorders – ECG, EEG, EMG, X- ray machines and CT scanners, magnetic resonance and imaging systems, Ultrasonic Imaging systems.

Suggested Text Books:

1. Albert D. Helfric, and William D. Cooper, “Modern Electronic Instrumentation and Measurement Techniques”, PHI, 2010.
2. H S Kalsi, “Electronic Instrumentation”, 3/e, TMH, 2011

Reference Text Books:

1. Robert A Witte, “Electronic Test Instruments: Analog and Digital Measurements”, 2/e, 2002
2. Nakra B.C, and Chaudhry K.K., “Instrumentation, Measurement and Analysis”, TMH, 2004
3. Khandpur. R.S., “Handbook of Bio-Medical Instrumentation”, TMH, 2003

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 Head of Department
 Electronics & Communication Engineering
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 Road No: 3, Banjara Hills Hyderabad-34

Course Code	Course Title					Core/PE/OE	
PC 451 EC	ANALOG ELECTRONIC CIRCUIT LAB					Core	
	Contact Hours per Week				CIE	SEE	Credits
Prerequisite	L	T	D	P			
PC 401 EC	-	-	-	2	25	50	1
Course Objectives : The course is taught with the objectives of enabling the student to:							
1. Analyze and Verify frequency response of BJT and FET amplifiers							
2. Design different negative feedback amplifiers circuits							
2. Design AF and RF oscillator circuits							
4. Design power amplifiers							
5. Demonstrate various circuits using PSPICE and verifying functionality							
Course Outcomes : On completion of this course, the student will be able to :							
1. Design, construct, and evaluate RC-coupled amplifiers using BJTs.							
2. Understand and implement different types of feedback topologies in amplifier circuits							
3. Design and construct sinusoidal oscillator circuits							
4. Analyze and design various amplifier circuits tuned, and power amplifiers using BJT and FET,							
5. Apply circuit simulation tools (like SPICE) to verify and analyze the behavior of amplifier							

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	3	2	2	-	-	-	-	-	-	-
CO2	3	2	3	2	1	-	-	-	-	-	-	-
CO3	3	2	3	2	2	-	-	-	-	-	-	-
CO4	3	3	3	2	2	-	-	-	-	-	-	-
CO5	2	3	2	3	3	-	-	-	-	-	-	-

Correlation rating: Low / Medium / High: 1 / 2 / 3 respectively.

PART A	
1.	Design and plot the frequency response of a single-stage RC coupled amplifier using a BJT. Analyze the gain and bandwidth of the amplifier.
2.	Design and plot the frequency response of a single-stage RC coupled amplifier using a FET. Compare performance with BJT-based amplifiers.
3.	Design and analyze a voltage series negative feedback amplifier. Measure the gain and observe the effect of feedback on bandwidth and distortion.
4.	Design and analyze a current shunt negative feedback amplifier. Determine the changes in input/output impedance due to feedback.
5.	Design and analyze a voltage shunt negative feedback amplifier. Observe and explain the changes in amplifier gain due to feedback.
6.	Design, construct, and study a current series negative feedback amplifier. Measure the impact of feedback on the amplifier's stability and frequency response.
7.	Simulate and analyze BJT amplifier circuits using SPICE. Plot frequency responses and compare simulation results with theoretical calculations

PART B	
1.	Design and analyze Hartley and Colpitts oscillators using BJTs. Calculate and compare the theoretical and practical oscillation frequencies.
2.	Design RC phase shift oscillator using a BJT. Verify the frequency of oscillation and waveform .
3.	Design and construct a Class-A power amplifier. Plot the input-output characteristics and evaluate power efficiency and distortion levels
4.	Design and plot the frequency response of single-tuned amplifiers. Study selectivity and bandwidth characteristics.
5.	Design and implement a transistor-based voltage regulator. Test its line and load regulation capabilities under different load conditions.
6.	Simulate and analyze FET amplifier circuits using SPICE. Plot frequency responses and compare simulation results with theoretical calculations
7.	Design and plot the frequency response of single-tuned amplifiers. Study selectivity and bandwidth characteristics

Note :Students are required to perform minimum 10 experiments, 5 experiments from Part A and 5 experiments Part B.

<i>Suggested Text Books:</i>	
1.	Paul B. Zbar, Albert P. Malvino, Michael Miller, <i>Basic Electronics, A Text- Lab Manual</i> , 7 th ed., McGraw Hill Education (India) Private Limited, 2001
2.	David Bell A, <i>Laboratory Manual for Electrical Circuits</i> , PHI-New Delhi, 2009
3.	Hayt W H Kemmerly J.E and Durbin SM, <i>Engineering Circuit Analysis</i> , 8 th ed., McGraw Hill Education (India) Private Limited, 2013.


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 Road No: 3, Banjara Hills Hyderabad-34

Course Code	Course Title				Core/PE/OE		
PC 452 EC	PULSE AND LINEAR INTEGRATED CIRCUITS LAB				Core		
	Contact Hours per Week				CIE	SEE	Credits
Prerequisite	L	T	D	P			
PC 404 EC	-	-	-	2	25	50	1
Course Objectives : The course is taught with the objectives of enabling the student to:							
1. Analyze low-pass and high-pass RC circuits, clipping, and clamping circuits for waveform shaping and filtering.							
2. Design and construct transistor-based bistable, monostable, and astable multivibrators.							
3. Demonstrate the working of OPAMP circuits like amplifiers, followers, integrators, differentiators, and filters.							
4. Develop and test NE555 timer and OPAMP-based multivibrator circuits for timing applications.							
5. Apply waveform generation principles to build and analyze Schmitt triggers, Miller sweep, and UJT relaxation oscillators.							
Course Outcomes : On completion of this course, the student will be able to :							
1. Analyze RC circuits, clippers, and clampers for their waveform shaping characteristics.							
2. Design and evaluate transistor-based multivibrator circuits.							
3. Implement OPAMP-based circuits for signal conditioning and processing.							
4. Develop timer-based multivibrators using NE555 IC and OPAMPs.							
5. Construct waveform generators like Schmitt triggers, sweep circuits, and UJT oscillators.							

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	2	2	1	-	-	1	3	1	-
CO2	3	3	3	2	2	1	-	-	1	3	1	-
CO3	3	2	3	2	3	1	-	-	1	3	1	-
CO4	3	3	3	2	3	1	-	-	1	3	1	-
CO5	3	3	3	2	2	1	-	-	1	3	1	-

Correlation rating: Low / Medium / High: 1 / 2 / 3 respectively.

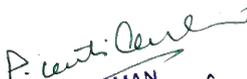
PART A
1. Analyze the response of low-pass and high-pass RC circuits for various time constants
2. Verify the characteristics clipping circuits
3. Verify the characteristics Clamping Circuits
4. Study the characteristics of a transistor used as a switch
5. Design and analyze the characteristics of a collector-coupled bistable multivibrator using transistors
6. Design and analyze the characteristics of a collector-coupled Monostable Multivibrator using transistors
7. Design and analyze the characteristics of a collector-coupled Collector Coupled

Astable Multivibrator using transistors
PART B
1. Design and verify the characteristics of inverting, non-inverting and voltage follower using Op-Amp.
2. Design and verify the characteristics of Op-Amp based integrator and differentiator circuits
3. Design and verify the characteristics of active low-pass, high-pass, and band-pass filters using Op-Amp.
4. Construct and analyze a Schmitt trigger using Op-Amp to understand hysteresis and waveform shaping.
5. Design and verify the characteristics of astable and monostable multivibrator circuits using the NE555 timer IC.
6. Verify the characteristics of a Miller sweep circuit for linear ramp voltage generation
7. Verify the characteristics of a UJT relaxation oscillator for waveform generation.

Note : A minimum of 10 experiments should be performed with atleast 5 from each section

Suggested Text Books:

1. Anand Kumar A, "Pulse and Digital Circuits", Prentice-Hall of India private Limited, NewDelhi, 2007
2. D.Roy Chowdhury, ShailB.Jain, "Linear Integrated Circuits", 4/e, New Age International (P) Ltd., 2008.
3. Ramakanth A. Gayakwad, "Op-Amps and Linear Integrated Circuits", Pearson, 4/e, 2018.


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 Muffakham Jah College of Engg. & Tech.
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Course Code	Course Title					Core/PE/OE	
PC 453EC	DIGITAL SIGNAL PROCESSING LAB					Core	
	Contact Hours per Week				CIE	SEE	Credits
Prerequisite	L	T	D	P			
PC405EC	-	-	-	2	30	70	1
Course Objectives : The course is taught with the objectives of enabling the student to:							
1. To develop MATLAB programs for operation of sequences.							
2. To implement the program of DFT, IDFT, FFT and IFFT on discrete time signals.							
3. To design and obtain the frequency response of various digital filters.							
4. To familiarize students with the architecture and functionality of the TMS320C67XX DSP processor and to utilize the DSP kit for real-time processing and manipulation of audio signals.							
5. To interface input/output devices with the DSP kit and implement real-time FIR and IIR filters for data acquisition and output signal processing.							
Course Outcomes : On completion of this course, the student will be able to :							
1. Develop MATLAB files for the verification of system response.							
2. Design and analyze the digital filters using MATLAB.							
3. Verify the functionality of FFT algorithms.							
4. Experiment with multirate techniques using MATLAB & CCS.							
5. Design and implement the digital filters on DSP processor.							

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	2	3	3	-	-	-	-	-	-	-
CO2	3	3	3	2	3	-	-	-	-	-	-	-
CO3	3	3	2	3	2	-	-	-	-	-	-	-
CO4	2	3	2	3	3	-	-	-	-	-	-	-
CO5	3	3	3	3	3	-	-	-	-	-	-	-

Correlation rating: Low / Medium / High: 1 / 2 / 3 respectively.

PART A: Perform the following programs using MATLAB Simulator
1. Introduction to MATLAB and signal generation.
2. Perform Linear Convolution.
3. Perform Circular Convolutions.
4. Perform DFT and FFT algorithm
5. Perform FIR filters design using different window functions.
6. Perform IIR filters design: Butterworth and Chebyshev, LPF, HPF, BPF & BSF filter.
7. Perform Interpolation and Decimation.
8. Implementation of multi-rate systems.
PART B :Implement the following experiments using DSK(TMS320C67XX)
1. Introduction to DSP processors and Study of procedure to work in real-time.
2. Implement Solution of difference equations.
3. Implement Impulse Response.
4. Implement Linear Convolution.
5. Implement Circular Convolution.
6. Implement Fast Fourier Transform Algorithms.

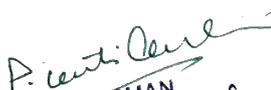
7. Design of FIR (LP/HP) USING windows :(a) Rectangular (b) Triangular(c)Hamming windows.
8. Design of IIR (HP/LP) filters.

Note:

1. Atleast ten experiments to be conducted in the semester.
2. Minimum of 5 from Part A and Part B is compulsory.
3. For Section-A 'MATLAB with different toolboxes like signal processing. block set and SIMULINK/MATHEMATICA/ any popular software can be used.

Suggested Text Books:

1. Digital Signal Processing: Principles, Algorithms, and Applications by John G. Proakis and Dimitris G. Manolakis, Pearson Education / PHI, 2007.
2. Discrete-Time Signal Processing by Alan V. Oppenheim and Ronald W. Schaffer, PHI.
3. Digital Signal Processing by S. Salivahanan, A. Vallavaraj, and C. Gnanapriya, TMH, 2009


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R24

SCHEME OF INSTRUCTION & EXAMINATION
B.E. III- Semester
(CSE/ CSE allied courses, IT)

S. No	Course Code	Course Title	Scheme of Instruction				Scheme of Examination			Credits
			L	T	P/D	Contact Hrs/Wk	CIE	SEE	Duration in Hrs	
Theory Course										
1	ES301EC	Basic Electronics	3	-	-	3	30	70	3	3
Practical / Laboratory Course										
2	ES351EC	Basic Electronics Lab	-	-	2	2	25	50	3	1
Total			3		2	5	55	120	6	4

R24

SCHEME OF INSTRUCTION & EXAMINATION
B.E. IV- Semester
(CSE/ CSE allied courses, IT)

S. No	Course Code	Course Title	Scheme of Instruction				Scheme of Examination			Credits
			L	T	P/D	Contact Hrs/Wk	CIE	SEE	Duration in Hrs	
Theory Course										
1	ES401EC	Digital Electronics	3	-	-	3	30	70	3	3
2	ES401EC	Signals and Systems	3	-	-	3	30	70	3	3
Total			6			6	60	140	6	6

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Q. M. S. Reddy
Head of Department
Electronics & Communication Engineering
Muffakham Jah College of Engg. & Tech.
 Road No: 3, Banjara Hills Hyderabad-34

Course Code	Course Title					Core/PE/OE	
ES301EC	BASIC ELECTRONICS					Core	
	Contact Hours per Week				CIE	SEE	Credits
Prerequisite	L	T	D	P/D			
BS202PH	3	-	-	-	30	70	3
Course Objectives : The course is taught with the objectives of enabling the student to:							
1. Understand the characteristics of diodes and its applications.							
2. Understand the design concepts of biasing of BJT and FET							
3. Understand the design concepts of feedback amplifiers and oscillators							
4. Study the design concepts of OP Amp.							
5. Understand the concepts of Data Acquisition Systems and data converters							
Course Outcomes : On completion of this course, the student will be able to :							
1. Study and analyze the rectifiers and regulator circuits.							
2. Study and analyze the performance of BJTs, FETs on the basis of their operation and working.							
3. Study& design oscillator circuits.							
4. Studyand analyze different Op amps and its applications.							
5. Study and analyze different data acquisition systems							

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	1	1	-	-	-	-	-	-	-	1
CO2	3	2	3	2	-	-	-	-	-	-	-	1
CO3	3	2	3	2	-	-	-	-	-	-	-	1
CO4	3	2	3	3	-	-	-	-	-	-	-	1
CO5	3	2	3	2	-	-	-	-	-	-	-	1

Correlation rating: Low / Medium / High: 1 / 2 / 3 respectively.

UNIT I
PN Junction Diode: Characteristics, Half wave rectifier, Full wave rectifier, filters, ripple, regulation, TIF and efficiency, Zener diode and Zener diode regulators. CRT construction and CRO applications.
UNIT II
Transistors: BJT construction and working, modes of operation, configurations of BJT (CB, CE, CC), small signal h-parameter model of CE, CE amplifier analysis. Construction and working of JFET, V-I characteristics of JFET.
UNIT III
Feedback concepts: Types of negative feedback – modification of gain, bandwidth, input and output impedances, applications. Oscillators: RC Phase shift, Wein bridge, LC and crystal Oscillators (Qualitative treatment only).
UNIT IV
Operational Amplifier: OP-AMP Block diagram, Ideal OP-AMP, DC and AC Characteristics, Inverting and Non-Inverting Amplifiers, Adder/Subtractor, Integrator, Differentiator, Precision rectifier , Schmit trigger and its applications.
UNIT V
Data Acquisition Systems: Construction and Operation of transducers- Strain

guageLVDT, Thermo couple, Instrumentation systems.

Data Converters: R-2R Ladder DAC, Successive approximation and Flash ADC.

Suggested Text Books:

1. Robert Boylestad L. and Louis Nashelsky, Electronic Devices and Circuit Theory, PHI,2007. 2 st Edition, Prentice Hall of India, 2006.
2. Helfrick Dand David Cooper, Modern Electronic Instrumentation and Measurements Techniques, 1st edition
3. Salivahanan, Suresh Kumar and Vallavaraj, Electronic Devices and Circuits, 2nd Edition, Tata McGraw-Hill,2010.

Reference Text Books:

1. David A. Bell, *Electronic Devices and Circuits*, 5th ed., Oxford University Press, 2009
2. JB Gupta, *Electronic Devices and Circuits*, S.K Kataria & sons, 5th Edition, 2012
3. The Art of Electronics, Horowitz, 3rd Edition Cambridge University Press
4. *Electronic Devices and Circuits*,A.P Godse, U.A Bakshi , Technical Publications

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Course Code	Course Title						Core/PE/OE
ES 351 EC	BSIC ELECTRONICS LAB						Core
	Contact Hours per Week				CIE	SEE	Credits
Prerequisite	L	T	D	P			
ES301EC				2	25	50	1
Course Objectives : The course is taught with the objectives of enabling the student to:							
1. To understand the characteristics of diodes and transistor configurations.							
2. To understand the design concepts of biasing of BJT and FET							
3. To understand the design concepts of feedback amplifiers and oscillators							
4. To study the design concepts of OP Amp and data converters							
Course Outcomes : On completion of this course, the student will be able to :							
1. Ability to design diode circuits & understand the application of Zener diode.							
2. Ability to analyze characteristics of BJTs & FETS.							
3. Ability to understand the different oscillator circuits.							
4. Ability to understand operation of HWR & FWR circuits with & without filters.							
5. Ability to design Analog-to-Digital converters & Digital-to-Analog converters.							

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	3	2	2	-	-	-	-	-	-	-
CO2	3	2	3	2	1	-	-	-	-	-	-	-
CO3	3	2	3	2	2	-	-	-	-	-	-	-
CO4	3	3	3	2	2	-	-	-	-	-	-	-
CO5	2	3	2	3	3	-	-	-	-	-	-	-

Correlation rating: Low / Medium / High: 1 / 2 / 3 respectively.

LIST OF EXPERIMENTS
1. CRO-Applications, Measurements of R, L and C using LCR meter, Colour code method and soldering practice.
2. Characteristics of Semiconductors diode Ge, Si and Zener.
3. Static Characteristics of BJT-Common Emitter.
4. Static Characteristics of BIT-Common Base.
5. Static Characteristics of FET.
6. RC-Phase Shift Oscillator.
7. Hartley and Colpitts Oscillators.
8. Common Emitter Amplifier.
9. Astable Multivibrator.
10. Full-wave rectifier with and without filters using BJT.
11. Operational Amplifier Applications.
12. Strain Gauge Measurement.
13. Analog-to-Digital and Digital to Analog Converters.
Suggested Text Books:
1. Paul B. Zbar, Albert P. Malvino, Michael A. Miller, <i>Basic Electronics, A Text - Lab Manual</i> , 7 th ed., McGraw Hill Education, 2001.
2. David Bell, <i>Fundamentals of electronic devices and circuits Lab Manual</i> , 5 th ed., Oxford university press, 2009.
3. R.C. Jaeger & T. N. Blalock, <i>Micro Electronic circuit design</i> , 4 th ed., Mc Graw Hill Higher Education, 2011.

Course Code	Course Title					Core/PE/OE	
ES401EC	DIGITAL ELECTRONICS					Core	
	Contact Hours per Week				CIE	SEE	Credits
Prerequisite	L	T	D	P/D			
BS202PH	3	-	-	-	30	70	3
Course Objectives : The course is taught with the objectives of enabling the student to:							
1. Understand the fundamental principles of digital hardware design and number systems.							
2. Apply Boolean algebra and logic minimization techniques to implement combinational circuits efficiently, modelling of circuits using Verilog HDL.							
3. Analyze the functionality and timing characteristics of sequential circuits using various flip-flops and latches.							
4. Design finite state machines (FSMs) for real-time digital applications using synchronous sequential logic.							
5. Explore the architecture and design methodologies using programmable logic devices like PALs, PLAs, CPLDs, and FPGAs.							
Course Outcomes : On completion of this course, the student will be able to :							
1. Explain the fundamentals of digital hardware design, logic gates, Boolean algebra, and logic synthesis.							
2. Design and optimize combinational circuits using K-Map and Quine-Mc Cluskey methods and modelled using Verilog HDL.							
3. Construct and analyze various sequential circuits including flip-flops, registers, and counters.							
4. Develop FSM-based digital systems for sequence detection and generation using Mealy/Moore models.							
5. Implement combinational logic using PLDs such as PALs, PLAs, CPLDs, and FPGAs.							

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	1	1	-	-	-	-	-	-	-	1
CO2	3	2	3	2	-	-	-	-	-	-	-	2
CO3	3	2	3	2	1	-	-	-	-	-	-	2
CO4	3	2	3	3	1	-	-	-	-	-	-	2
CO5	3	2	3	2	-	-	-	-	-	-	-	2

UNIT – I
Design Concepts: Digital Hardware, Design process, Design of digital hardware. Number systems and codes. Introduction to logic circuits – Variables and functions, Logic gates and networks. Boolean algebra, Synthesis using gates, Design examples.
UNIT – II
Number representation: Addition and Subtraction of signed and unsigned numbers. Combinational circuit building blocks: Adders and Subtractors, Multiplexers. Demultiplexers, Parity Checkers and Generators, Decoders. Encoders. Code converters, BCD to 7-segment converter, Arithmetic comparator circuits. Verilog modeling of simple combination circuits.
Logic Optimization: Optimized implementation of logic functions using K-Map and Quine-Mc Cluskey Tabular method.
Combinational Circuit Design: Adders and Subtractors, Multiplexers, Demultiplexers, Parity Checkers and Generators, Decoders, Encoders, Code converters, BCD to 7-segment converter and Arithmetic comparator circuits. Verilog modeling (Gate level and Dataflow) of simple

combination circuits.
UNIT – III
Sequential Circuits: Basic Latch, Gated SR Latch, gated D Latch, Master-Slave edge triggered flip-flops, T Flip-flop, JK Flip-flop, Excitation tables, Timing diagrams and analysis, Flip flop conversions, Set-up and hold time, Registers and Counters.
UNIT – IV
Synchronous Sequential Circuits: Basic Design Steps, Finite State machine (FSM) representation using Moore and Mealy state models, State minimization, Design of FSM for Sequence Generation and Detection, Algorithmic State Machine charts.
UNIT – V
Design of combinational circuits using Programmable Logic Devices (PLDs): General structure of a Programmable Array Logic (PAL), Programmable Logic Arrays (PLAs), Structure of CPLDs and FPGAs, 2-input and 3-input lookup tables (LUTs).

<i>Suggested Text Books:</i>
1. Morris Mano and Michael D. Ciletti, “Digital Design”, Pearson, 6/e, 2021.
2. Zvi Kohavi, “Switching and Finite Automata Theory”, 3/e, Cambridge University Press New Delhi, 2011.
3. R. P Jain, “Modern Digital Electronics”,4/e, McGraw Hill Education (India) Private Limited, 2010.
4. Samir Palnitkar, “Verilog HDL A Guide to Digital Design and Synthesis”, 2/e, Pearson
<i>Reference Text Books:</i>
1. John F. Wakerly, <i>Digital Design: Principles and Practices</i> , 5th Edition, Pearson Education, 2018.
2. Ronald J. Tocci, Neal S. Widmer, and Gregory L. Moss, <i>Digital Systems: Principles and Applications</i> , 12th Edition, Pearson Education, 2016.
3. A. Anand Kumar, <i>Fundamentals of Digital Circuits</i> , 4th Edition, PHI Learning, 2016.
4. Charles H. Roth Jr. and Larry L. Kinney, <i>Fundamentals of Logic Design</i> , 7th Edition, Cengage Learning, 2013.


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Course Code	Course Title					Core/Elective	
ES401EC	SIGNALS AND SYSTEMS					Core	
Prerequisite	Contact Hours per Week				CIE	SEE	Credits
	L	T	D	P			
BS201MT	3	-	-	-	30	70	3
Course Objectives : The course is taught with the objectives of enabling the student to:							
1. Analyze basic concepts related to continuous time signals and systems, mathematical representation of periodic signals.							
2. Familiarize with basic operations on signals and mathematical representation of aperiodic signals using Fourier and Laplace transform.							
3. Analyze basic concepts related to discrete time signals and systems, mathematical representation discrete time signals.							
4. Describe the concept of Z- Transform and its properties and illustrate their applications to analyze systems.							
Define convolution, correlation operations on continuous and discrete time signals.							
Course Outcomes : On completion of this course, the student will be able to :							
1. Define and differentiate types of signals and systems in continuous and discrete time.							
2. Apply the properties of Fourier transform for continuous time signals.							
3. Relate Laplace transforms to solve differential equations and to determine the response of the Continuous Time Linear Time Invariant Systems to known inputs.							
4. Apply Z-transforms for discrete time signals to solve Difference equations.							
5. Obtain Linear Convolution and Correlation of discrete time signals with graphical representation.							

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	1	1	-	-	-	-	-	-	-	1
CO2	3	2	3	2	-	-	-	-	-	-	-	2
CO3	3	2	3	2	-	-	-	-	-	-	-	2
CO4	3	2	3	3	-	-	-	-	-	-	-	1
CO5	3	2	3	2	-	-	-	-	-	-	-	1

Correlation rating: Low / Medium / High: 1 / 2 / 3 respectively.

UNIT I
Definitions and classifications: Classification of signals. Elementary continuous time signals, Basic operations on continuous-time signals. Classification of continuous-time systems: continuous time & discrete time systems, lumped-parameter & distributed –parameter systems, static & dynamic systems, causal & non-causal systems, Time-invariant & time-variant systems, stable & unstable systems.
UNIT II
Representation of Continuous-time signals: Analogy between vectors and signals, orthogonality and completeness. Fourier series Analysis of Continuous-time signals: Fourier series – Existence of Fourier series, Trigonometric and Exponential Fourier series, computational formulae, symmetry conditions, complex Fourier spectrum.
UNIT III

<p>Continuous-time Fourier Transform (FT): The direct and inverse FT, existence of FT, Properties of FT, FT of standard signals, properties of FT, The Frequency Spectrum.</p> <p>Linear Convolution of continuous time signals: Graphical interpretation, properties of convolution, Correlation between continuous-time signals: Auto and Cross correlation, graphical interpretation, properties of correlation.</p>
UNIT IV
<p>Discrete-time signals and systems: Sampling, Classification of discrete-time signals, Basic operations on discrete time signals, Classification of discrete time systems, properties of systems.</p> <p>Linear Convolution of discrete time signals: Graphical interpretation, properties of discrete convolution</p> <p>Fourier analysis of discrete-time signals: Discrete-time Fourier transform (DTFT), properties of DTFT, Transfer function, Discrete Fourier transform properties of DFT.</p>
UNIT V
<p>Z-Transform analysis of signals & systems: The direct Z transform, Region of convergence, Z-plane and S-plane correspondence. Inverse Z transform, Properties of Z-transforms. Solution to linear difference equations, Linear constant coefficient systems, System transfer function.</p>

Suggested Text Books:

1. Alan V O P Penheim, A. S. Wlisky, *Signals and Systems*, 2nd Edition, Prentice Hall.
2. Rodger E. Ziemer, William H Trenter, D. Ronald Fannin, *Signals and Systems*, 4th Edition, Pearson 1998.
3. Douglas K. Linder, *Introduction to Signals and Systems*, McGraw Hill, 1999.

Reference Text Books:

1. P. Ramesh babu, R Ananada Natarajan, *Signals and Systems*, SCITECH, 3rd edition 2009.


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SCHEME OF INSTRUCTION & EXAMINATION
B.E. III- Semester
(EEE / EIE)

S. No	Course Code	Course Title	Scheme of Instruction				Scheme of Examination			Credits
			L	T	P/D	Contact Hrs/Wk	CIE	SEE	Duration in Hrs	
Theory Course										
1	ES302EC	Analog Electronics	3	-	-	3	30	70	3	3
Practical / Laboratory Course										
2	ES352EC	Analog Electronics Lab	-	-	2	2	25	50	3	1
Total			3		2	5	55	120	6	4

SCHEME OF INSTRUCTION & EXAMINATION
B.E. III- Semester
(Mechanical / Production)

S. No	Course Code	Course Title	Scheme of Instruction				Scheme of Examination		
			L	T	P/D	Contact Hrs/Wk	CIE	SEE	Duration in Hrs
Theory Course									
1	ES303EC	Microcontroller and Interfacing	3	-	-	3	30	70	3
Total			3			3	30	70	3

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Course Code	Course Title					Core/PE/OE	
ES302EC	Analog Electronic Circuits					Core	
	Contact Hours per Week				CIE	SEE	Credits
Prerequisite	L	T	D	P			
ES301EE	3	-	-	-	30	70	4
Course Objectives : The course is taught with the objectives of enabling the student to:							
1. Study the characteristics of diode in forward and reverse bias and applications of diodes.							
2. Describe the construction and working of Bipolar Junction Transistor in various modes and JFET.							
3. Familiarize with feedback concepts and identify various types of feedback amplifiers.							
4. Study the importance of power amplifiers and Oscillators.							
5. Understand the operation and applications of op-amps.							
Course Outcomes : On completion of this course, the student will be able to :							
1. Interpret the characteristics and apply diode models to analyze various applications of diodes							
2. Discriminate the BJT configurations to recognize appropriate transistor configuration for any given application and design the biasing circuits with good stability							
3. Analyze and compare feedback amplifiers.							
4. Distinguish various classes of Power Amplifiers.							
5. Analyze the operation of OPAMP and its applications.							

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	1	1	-	-	-	-	-	-	-	1
CO2	3	2	3	2	-	-	-	-	-	-	-	2
CO3	3	2	3	2	1	-	-	-	-	-	-	2
CO4	3	2	3	3	1	-	-	-	-	-	-	2
CO5	3	2	3	2	-	-	-	-	-	-	-	2

Correlation rating: Low / Medium / High: 1 / 2 / 3 respectively.

UNIT I
P-N junction characteristics, V-I characteristics, Avalanche breakdown, Zener diode, Applications of Diodes as rectifiers. Filters (L, C), LED, photodiode. Basic Clipping and clamping circuits using diodes. (One level only).
UNIT II
Bipolar Junction Transistor - V-I characteristics, JFET - I-V characteristics, and various configurations (such as CE/CS, CB/CG, CC/CD) and their features. Small signal models of BJT and JFET. Analysis of BJT as an amplifier, estimation of voltage gain, current gain, input resistance, output resistance. Transistor Biasing: Fixed bias, collector to base bias, self-bias, thermal stability, heat sinks.
UNIT III
Concept of Feedback - positive and negative, Feedback topologies: Voltage series, current series, voltage shunt, current shunt, effect of feedback on gain, bandwidth etc., and concept of stability. (Qualitative treatment only).

UNIT IV
Oscillators: Barkhausen criterion, RC oscillators (phase shift, Wien bridge), LC oscillators (Hartley, Colpitts), CRYSTAL Oscillator. (Qualitative treatment only) Power Amplifiers: Various classes of operation (Class A, B, and AB), their power efficiency and distortion (Qualitative treatment only).
UNIT V
OP-AMP Block diagram, Ideal OP-AMP,DC and AC Characteristics, Inverting and Non-Inverting Amplifiers, Adder/Subtractor, Integrator, Differentiator, Comparator, Zero crossing detector, Square and Triangular wave generators, Peak detector, Sample and Hold circuit and Precision Rectifiers.

<i>Suggested Text Books:</i>
4. Jacob Millman, Christos Halkias, Chetan Parikh, <i>Integrated Electronics</i> , 2 nd ed.,McGraw Hill Education (India) Private Limited, 2011.
5. S Salivahanan, N Kumar,and A Vallavaraj, <i>Electronic Devices and Circuits</i> ,McGraw Hill,3 rd edition,2010.
6. Donald A.Neamen, <i>Electronic Circuits: Analysis and Design</i> , 3 rd edition, McGraw Hill,2006.
<i>Reference Text Books:</i>
5. Robert Boylestad and Louis Nashelsky, <i>Electronic Devices and Circuit Theory</i> , 11 th ed., Pearson India Publications, 2015.
6. J.B. Gupta. <i>Electronic Devices and Circuits</i> . Publisher, S.K. Kataria & Sons. Edition, 6th 2016.
7. Allen Mottershead, <i>Electronic Devices and Circuits: An introduction</i> , PHI Learning Private Limited,2011.
8. Sedra smith, <i>Microelectronics circuits</i> , oxford university press, 6 th edition, 2009


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Course Code	Course Title					Core/PE/OE	
PC 352 EC	ANALOG ELECTRONIC CIRCUIT LAB					Core	
	Contact Hours per Week				CIE	SEE	Credits
Prerequisite	L	T	D	P			
ES301EE	-	-	-	2	25	50	1
Course Objectives : The course is taught with the objectives of enabling the student to:							
Designing basic circuits of rectification with and without filters using diodes							
Designing wave shaping circuit using diodes.							
Designing of single and multistage amplifier circuits.							
Demonstrate negative feedback in amplifier circuits and positive feedback in Oscillators							
Design of P, PI and PID controllers.							
Course Outcomes : On completion of this course, the student will be able to :							
Calculate ripple factor, efficiency and % regulation of rectifier circuits							
Analyse feedback amplifiers and op-amp oscillator circuits							
Design single, and multi-stage amplifier, wave shaping and controller circuits							
Understand the characteristics of electronics devices							
Design of P, PI and PID controllers using op-amps.							

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	3	2	2	-	-	-	-	-	-	-
CO2	3	2	3	2	1	-	-	-	-	-	-	-
CO3	3	2	3	2	2	-	-	-	-	-	-	-
CO4	3	3	3	2	2	-	-	-	-	-	-	-
CO5	2	3	2	3	3	-	-	-	-	-	-	-

Correlation rating: Low / Medium / High: 1 / 2 / 3 respectively.

List of Experiments
1. Characteristics of Silicon, Germanium and Zener Diode in forward bias and reverse bias
2. Application of diode as a full wave rectifier with and without filters. Calculation of Ripple factor, voltage regulation and efficiency with various loads
3. Static characteristics of BJT in CE configuration
4. Static characteristics of MOSFET in CS configuration
5. Frequency response of Single and two stage BJT amplifier in CE configuration
6. Frequency response of Single and two stage MOSFET amplifier in CS configuration
7. Inverting amplifier using op-amp.
8. Non inverting amplifier using op-amp.
9. Instrumentation amplifier.
10. Design of integrator and differentiator using op-amp.
11. RC Phase Oscillator and Wein Bridge Oscillator using op-amp.
12. A/D converters.
13. Clipping circuits
14. Clamping Circuits.
15. Monostable Multivibrator using op-amp.
16. Generation of triangular and square wave using op-amp.
17. Design of P, PI and PID controller using op-amp.
18. Design of Lead/lag compensator using op-amp

Suggested Text Books:

- | |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 4. Paul B. Zbar, Albert P. Malvino, Michael Miller, <i>Basic Electronics, A Text- Lab Manual</i> , 7 th ed., McGraw Hill Education (India) Private Limited, 2001 |
| 5. David Bell A, <i>Laboratory Manual for Electrical Circuits</i> , PHI-New Delhi, 2009 |
| 6. Hayt W H Kemmerly J.E and Durbin SM, <i>Engineering Circuit Analysis</i> , 8 th ed., McGraw Hill Education (India) Private Limited, 2013. |


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 Road No: 3, Banjara Hills Hyderabad-34

Course Code	Course Title					Core/PE/OE	
ES303EC	MICROCONTROLLER AND INTERFACING					Core	
	Contact Hours per Week				CIE	SEE	Credits
Prerequisite	L	T	D	P/D			
-	3	-	-	-	30	70	3
Course Objectives : The course is taught with the objectives of enabling the student to:							
1. Understand the architecture and programming of 8051 Microcontroller.							
2. Learn the memory organization & instruction set of 8051 microcontroller.							
3. Getfamiliarityofassemblylanguage programmingof I/O ports, Timers/Counters& UART using 8051 Microcontroller.							
4. Todevelopinterfacing of real time programmable devices like ADC, DAC, LCD and stepper motor with 8051.							
Course Outcomes: On successful completion of the course, the students will be able to:							
1. Explaintheinternal architectureof an8-bit8051 Microcontroller							
2. Explain the Memory Organization, 8051 Pin Configuration & Instruction Set of 8051Microcontroller.							
3. Learn the 8051 Addressing modes, 8051 Instruction Set & write simple ALPs.							
4. Program Timers/Counters, Serial Communication & Interrupts							
5. Interface different programmable peripheral devices to 8051 microcontroller.							

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	1	1	-	-	-	-	-	-	-	2
CO2	3	2	3	2	-	-	-	-	-	-	-	2
CO3	3	2	3	2	-	-	-	-	-	-	-	2
CO4	3	2	3	3	1	-	-	-	-	-	-	2
CO5	3	2	3	2	1	-	-	-	-	-	-	2

Correlation rating: Low / Medium / High: 1 / 2 / 3 respectively.

UNIT I
Introduction to Microcontrollers& its Architecture: Overview of Microprocessors andMicrocontrollers, Differences between Microprocessors andMicrocontrollers, Hexadecimal numbering system,Salient features of 8051 Microcontroller, 8051 Microcontroller family, Internal Architecture of 8051 Microcontroller, PSW.
UNIT II
8051 Memory, Pin Configuration & Instruction Set: 8051 Memory Organization (Internal & External Memories), 8051 Pin Configuration, Crystal Oscillator frequency, Machine cycles, Stack of 8051, 8051 Instruction Set.
UNIT III
8051 Addressing Modes& Assembly Language Programming: Addressing modes, bit addressable features, I/O port structures, Assembly Language Programming using data transfer, arithmetic, logical and branch instructions with simple programs.
UNIT IV
8051 Timers,Serial PortandInterrupts: 8051 Timers/Counters and its programming, Serial data communication, Serial port and its programming, 8051 interrupts, Interrupt vector table, Interrupts programming.

UNIT V

8051 Interfacing: Interfacing of 8051 with Digital-Analog Converter, Stepper motor & LCD interfacing.

Converter, Analog-Digital

Suggested Text Books:

1. Mazidi M.A, Mazidi J.G and Rolin D. McKinlay,—The 8051 Microcontroller & Embedded Systems Using Assembly and C++, 2/e, Pearson Education, 2008.
2. Ayala K.J,—The 8051 Microcontroller Architecture, programming & Applications I, Penram International, 2007.
3. Scott Mackenzie and Raphael C. W. Phan. —The 8051 Microcontroller, 4th Edition, Pearson education, 2008.

A. Senthil Kumar
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 Osmania University
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G. J. S.
 Dept. of Electronics & Comm'n Engg.
 Jeevan College of Engg. & Tech.
 Hyderabad-500 081

G. J. S.
 Head of Department
 Electronics & Communication Engineering
 Muffakham Jah College of Engg. & Tech.
 Road No: 3, Banjara Hills Hyderabad-34