LORDS INSTITUTE OF ENGINEERING AND TECHNOLOGY

(An Autonomous Institution)

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

SCHEME OF INSTRUCTIONS & EXAMINATIONS [LR-21]

(w.e.f Academic Year 2022 – 23)

B.E. III-Semester

S. No.	Course Code	Category	Course Title	Scheme of Instructions				Scheme of Examination			Credits
				L	T	P/D	Contact Hours/Week	Maximum Marks		Duration in Hours	
								CIE	SEE		
Theory Course											
1	U21MA301	BSC	M-III Probability and Statistics	3	1	-	4	40	60	3	4
2	U21EN301	HSMC	English for Technical Communication	2	-	-	2	40	60	2	2
3	U21EC301	PCC	Electronic Devices	3	-	-	3	40	60	3	3
4	U21EC302	PCC	Signals and Systems	3	-	-	3	40	60	3	3
5	U21EC303	PCC	Network Theory	3	-	-	3	40	60	3	3
Practical/ Laboratory Course											
6	U21EN3L1	HSMC	Advanced Communication Skills Lab	-	-	3	3	25	50	3	1.5
7	U21EC3L1	PCC	Electronic Devices Lab	-	-	3	3	25	50	3	1.5
8	U21EC3L2	PCC	Basic simulation Lab	-	-	3	3	25	50	3	1.5
Skill Development Course											
9	U21CS3L1	ESC	Programming Language - 1	-	-	2	2	25	50	3	1
Bridge Course*											
10*	U21CS3L2	ESC	C Programming Lab	-	-	2	2	50	-	3	-
11*	U21EN3L2	HSMC	Effective Communication Skills Lab	-	-	2	2	50	-	3	-
Total				**14**	**1**	**11 (*15)**	**26 (*30)**	**300 (*400)**	**500**	**-**	**20.5**

*** Bridge Course for Lateral Entry Admitted Students only**

L: Lecture (Hrs/Wk/Sem) **T**: Tutorial (Hrs/Wk/Sem) **P**: Practical **D**: Drawing (Hrs/Wk/Sem)

CIE: Continuous Internal Evaluation **SEE**: Semester End Examination
PCC: Program Core Courses **EC:** Electronics and Communications **CS**: Computer Science
ESC: Engineering Sciences Courses **EN**: English **MA**: Mathematics
HSMC: Humanities and Social Sciences including Management Courses

Note:

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

Course Code	Course Title						Core / Elective
U21MA301	MATHEMATICS – III (PROBABILITY AND STATISTICS) Branch -CSE(AIML),IT, AIML , ECE & CSE						Core
Prerequisite	Contact Hours Per Week				CIE	SEE	Credits
	L	T	D	P			
Mathematics- II	3	1	-	-	40	60	4

Course Objectives:

The objective of the course is to:

1. Introduce the basic concepts of probability and statistics in engineering
2. Provide an overview of concepts of probability and statistics to engineers
3. Provide the knowledge of probability distributions , Tests of significance
4. Acquire the concepts of curve fitting, correlation and regression.
5. Familiar with the concept of tests of hypothesis for decision making

Course Outcomes:

After completing this course, the student will be able to:

1. Determine Probability, Random variables, distributions and its application
2. Apply the knowledge of some standard discrete probability distributions and moments
3. Calculate parameters of standard continuous probability distributions
4. Find the parameters and concepts of correlation, regression and obtain the knowledge of sampling Theory with context to test of hypothesis.
5. Analyze and check the validity of statement using testing of hypothesis for various parameters and goodness of fit .

UNIT-I

Introduction of Probability : Conditional probability, Baye's Theorem and its applications, Random variables, Types of random variables, Probability mass function and Probability density function, Mathematical expectations.

UNIT-II

Discrete probability distributions: Binomial and Poisson distributions, Mean, Variance, Moment generating function and evaluation of statistical parameters for these distributions.

UNIT-III

Continuous probability distributions, Uniform, Exponential and Normal distributions, Mean, Variance and evaluation of statistical parameters for these distributions.

UNIT-IV

Curve fitting by the method of least squares: Fitting of straight lines, Second degree parabolas and more general curves, Correlation, Regression and rank correlation.

Test of significance: Large sample test for single proportion, Difference of proportions, Single mean, Difference of means.

UNIT-V

Small Sample test for single mean, Difference of means, Test for ratio of variances, Chi-square test for goodness off it and independence of attributes, Low Rank Matrix, Singular Valued Decomposition (SVD).

Textbooks:

1. Advanced Engineering Mathematics, R.K.Jain & Iyengar, Narosa Publications.
2. B.S.Grewal, "Higher Engineering Mathematics", Khanna Publishers, 2000.
3. Engineering Mathematics, P.Sivarama krishna Das & C.Vijaya Kumar, Pearson India
4. Engineering Mathematics, SS Sastry, PHI Learning, Private Limited
5. N.P.Baliand M.Goyal, "A textbook of Engineering Mathematics", Laxmi Publications,

Reference Books:

1. Fundamentals of Mathematical Statistics, S.C.Gupta & V.K. Kapoor, S.Chand Pub.
2. P.G. Hoel, S.C. Portand C.J. Stone, "Introduction to Probability Theory", Universal Book Stall, 2003.
3. W.Feller,"An Introduction to Probability Theory anditsApplications",Vol.1,Wiley, 1968.

Course Code	Course Title						Core / Elective
U21EN301	ENGLISH FOR TECHNICAL COMMUNICATION [CSE(AIML), IT, MECH, AIML & ECE]						Core
Prerequisite	Contact Hours Per Week				CIE	SEE	Credits
	L	T	D	P			
English	2	-	-	-	40	60	2

Course Objectives :

To expose the students to:

1. Understand the significance of Technical Writing
2. Various aspects of professional communication
3. Different types of business correspondence
4. Various styles of technical report writing Designing, creating and developing technical manual
5. Familiarize with the technical features of information transfer

Course Outcomes:

On successful completion of the course, the students would be able to:

1. Apply technical communication skills effectively
2. Adapt different types of official correspondence
3. Construct report writing using various techniques
4. Develop adequate skills of manual writing
5. Interpret the information transfer from verbal to non-verbal data and vice-versa

UNIT-I

Definition and Features of Technical communication: Definition, Types and Process of Communication, Definition and features of technical communication (precision, relevance, format, style, use of visual aids), Difference between general writing and technical writing, Types of technical communication.

UNIT-II

Technical Writing-I (Official correspondence): Emails, Business letters (all types), Business proposals, Preparation of Minutes of Meeting.

UNIT-III

Technical writing-II (Reports): Definition, Importance, Types of Report - Memo, Letter & Manuscript, Feasibility report, Project report, Progress report, Evaluation report.

UNIT-IV

Technical writing-III (Manuals): Types of manuals, User manual, Product manual, Operation manual

UNIT-V

Information Transfer and Presentations: Non-verbal (bar diagram, flow chart, pie chart, tree diagram) to verbal (writing), Verbal (written) to non-verbal, Important aspects of oral and visual presentations.

Text Books:

1. Raman, Meenakshi & Sharma, Sangeeta. (2015). *Technical Communication: Principles and Practice* (3rd Ed.). New Delhi.
2. Rizvi, Ashraf, M. (2017). *Effective Technical Communication* (2nd Ed.). Tata McGraw Hill Education. New Delhi.

Reference Books:

1. Sharma, R. C., & Mohan, Krishna. (2017). Business Correspondence and Report Writing: A Practical Approach to Business &Technical Communication (4th Ed.). Tata McGraw Hill Education. New Delhi.
2. Tyagi, Kavita &Misra, Padma. (2011). Advanced Technical Communication. New Delhi, PHI Learning.
3. English for Technical Communication for Engineering Students, Aysha Vishwamohan, Tata McGraw-Hill 2009
4. Handbook for Technical Communication by David A. McMurrey & Joanne Buckley. 2012.

Course Code	Course Title						Core/Elective
U21EC301	ELECTRONIC DEVICES						Core
Prerequisite	Contact Hours per Week				CIE	SEE	Credits
	L	T	D	P			
Engineering Physics	3	0	0	0	40	60	3

Course Objectives:

Upon completion of this course, students will be able to:

1. Concepts of semiconductor devices like PN junction diode, Transistor, and special diodes.
2. Applications of diodes.
3. Various configurations, characteristics of transistors – BJT, JFET & MOSFET.

Course Outcomes:

Upon completion of this course, students will be able to:

1. Understanding of the characteristic behavior of various electronic devices such as PN Diodes, Zener Diodes, etc.
2. Design rectifier circuits with filters Calculate ripple factor, efficiency and percentage regulation of rectifier circuits.
3. Compare and Contrast the characteristics of BJT in various configurations.
4. Distinguish the working principles of FET & MOSFET
5. To acquire knowledge on special purpose semi conductor devices.

UNIT – I

Semiconductor Diode Characteristics: PN Junction formation, Characteristics, Diode current equation, Breakdown in diodes, Diode as a circuit element, Temperature dependence of PN characteristics Small signal diode models, Diode switching characteristics, Zener Diode, Zener as voltage regulator and its limitation, Schotky diode.

UNIT – II

Rectifiers: Half wave, Full wave and Bridge Rectifiers - their operations, performance characteristics- ripple factor calculations, and analysis, comparison of rectifiers, Filters (L, C, LC and CLC filters).

UNIT – III

Bipolar Junction Transistor: Construction and Operation of NPN and PNP transistor, current components and current flow in BJT, Modes of transistor operation, Early effect, BJT input and output characteristics of CB, CE, CC configuration, determination of h- parameters, Biasing & stabilization circuits.

UNIT – IV

Field Effect Transistor: Junction Field Effect Transistor: Construction of FET, Principle of Operation - the Pinch-off Voltage Vp, V-I Characteristics of JFET. MOSFETs: Enhancement & Depletion mode MOSFETs, V-I characteristics, CMOS inverter.

UNIT – V

Special Purpose Semi-Conductor Devices: Elementary treatment of UJT- Tunnel Diode, Varactor Diode, LED, Photodiode, Solar cell, Photo transistor & applications.

Text Books:

1. Millman and Halkias, “Electronic Devices and Circuits”, 2nd Edition, McGraw Hill Publication, 2007.
2. Robert L. Boylestad, “Electronic Devices and Circuit Theory”, 10th Edition, PHI, 2009.

Suggested Reading:

1. Jacob Millman, Christos Halkias, Chetan Parikh, “Integrated Electronics”,
2. 2nd Edition, McGraw Hill Publication, 2009. 2. David Bell, “Fundamentals of Electronic Devices and Circuits”, 5th Edition, Oxford University Press, 2008.
3. S. Salivahanan , N Suresh Kumar , “Electronic Devices and Circuits “ 4th Edition Mc Graw Hill

Course Code	Course Title						Core/Elective
U21EC302	SIGNALS AND SYSTEMS						Core
Prerequisite	Contact Hours per Week				CIE	SEE	Credits
	L	T	D	P			
Mathematics	3	0	0	0	40	60	3

Course Objectives:

Upon completion of this course, students will be able to:

1. To understand basic concepts related to continuous time signals and systems, mathematical representation of periodic signals.
2. To Understand the various domain characteristics of continuous and discrete time signals using various transform techniques.
3. Define convolution, correlation operations on continuous and discrete time signals.

Course Outcomes:

After completing 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. Obtain Linear Convolution and Correlation of discrete time signals with graphical representation.
5. Apply Z-transforms for discrete time signals to solve difference equations.

UNIT–I:

Classification of Signals and Systems: Classification of signals, Elementary continuous time signals and discrete time signals, Basic operations on continuous-time signals and discrete time signals, Continuous time & Discrete systems, Lumped parameter & distributed parameter systems, Static & Dynamic systems, Causal & Non-causal systems, Time- invariant & Time-variant systems, Stable & Unstable systems.

UNIT–II:

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.

Continuous-time Fourier Transform (FT): The direct and inverse FT, Existence of FT, Properties of FT, FT of standard signals, The Frequency Spectrum.

UNIT–III:

Laplace Transform (LT) Analysis of signals and systems: The direct LT, Region of convergence, Existence of LT, Properties of LT, The inverse LT, Solution of differential equations, System transfer function.

Linear Convolution & Correlation of Continuous time signals: Graphical Representation, Properties of convolution.

Correlation between continuous-time signals: Auto and Cross correlation, Graphical interpretation, Properties of correlation.

UNIT–IV:

Sampling: Sampling theorem, Impulse Sampling, Natural and Flat top Sampling, Reconstruction of signal from its samples, Effect of under sampling, Aliasing, Introduction to band Pass Sampling, Linear Convolution of discrete time signals, Graphical interpretation, Properties of discrete convolution.

UNIT - V:

Z-Transforms: Introduction to Z-Transform, Region of Convergence (ROC) and its properties, S-plane and Z-plane correspondence, Properties of Z-Transform, Inverse Z-Transform, Solution to linear difference equations, Linear constant coefficient systems, System transfer function.

Text Books:

1. Signals and Systems - A.V. Oppenheim, A.S. Willsky and S.H. Nawab, 2nd Ed., PHI.
2. Signals, Systems & Communications - B.P. Lathi, 2013, BSP.
3. Signals & Systems - Simon Haykin and Van Veen,Wiley, 2nd Ed.

Reference Books:

1. Signals and Systems – A. Rama Krishna Rao , 2011, TMH.
2. Signals, Systems and Transforms - C. L. Philips, J.M.Parr and Eve A.Riskin,4th Ed., 2013,PE.
3. Fundamentals of Signals and Systems - Michel J. Robert, 2008, MGH International Edition.
4. P. Ramesh babu, R Ananada Natarajan, 'Signals and Systems',SCITECH, 4th Ed 2011.

Course code	Course title						Core/Elective
U21EC303	NETWORK THEORY						Core
Pre-requisites	Contact Hours Per Week				CIE	SEE	Credits
Basic Electrical Engineering	L	T	D	P			
	3	-	-	-	40	60	3

Course Objectives

Upon completion of this course, students will be able to:

1. Understand the Concepts of Two Port networks, study about the different two port parameter representations.
2. Understand the Concepts about the image impedance on different networks, design of attenuators.
3. Understand the Concepts of equalizers, different filters and network synthesis.

Course Outcomes

At the end of the course students will be able to

1. 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. Understand the properties of symmetrical & asymmetrical networks
3. Learn how to calculate properties of networks and design of attenuators.
4. Design of equalizers. And Design different types of filters using passive elements.
5. Synthesize the RL & RC networks in Foster and Cauer Forms.

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-C Immitance 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.

Text Books:

1. S.P. Ghosh and A.K. Chakraborty, *Network Analysis and Synthesis,* McGraw Hill, 1st edition, 2009
2. Networks, Lines and Fields – JD Ryder, PHI, 2nd Edition, 1999

Suggested Readings:

1. Sudhakar Shyammohan, Circuits Networks: Analysis Synthesis, 4th edition, Tata McGraw-Hill, 2010.
2. Van Valkenburg M.E, Introduction to Modern Network Synthesis, Wiley Eastern 1994.

Course code	Course title						Core/Elective
U21EN3L1	ADVANCED COMMUNICATION SKILLS LAB [CSE(AIML), IT, MECH, AIML & ECE]						Core
Pre-requisites	Contact Hours Per Week				CIE	SEE	Credits
	L	T	D	P			
	-	-	-	3	25	50	1.5

Course Objectives:

To expose the students to:

1. Improve the students' fluency in English, through Interpersonal Communication skills
2. Read the given text at normal speed and analyze and evaluate critically
3. Exhibit their ability and skills relevantly and coherently through resume writing and cover letter writing, Develop oral presentation skills to meet the global competition
4. Boost confidence through the dynamics of Group Discussion
5. Prepare all the students for their placements through Mock Interviews

Course Outcomes:

On successful completion of the course the students would be able to:

1. Organize ideas relevantly and coherently in their communication
2. Analyze and comprehend the text inferentially
3. Write Resume/CV and Cover letter effectively
4. Practice oral presentations confidently
5. Participate in group discussion dynamically and face interviews optimistically

List of Activities:

1. **Activities on Fundamentals of Inter-personal Communication:** Starting a conversation, Responding appropriately and relevantly, Using the right body language and Role Play in different situations.

2. **Activities on Reading Comprehension:** General Vs. Local comprehension, Reading for facts, Guessing meanings from context, Scanning, skimming, Inferring meaning, Critical reading.

3. **Activities on Writing Skills:** Structure and presentation of different types of Resume/CV writing, Cover letter writing, Improving one's writing of Resume and Cover letter.

4. **Activities on Presentation Skills:** Oral presentations through JAM, Extempore, Seminars and Poster Presentations.

5. **Activities on Group Discussion and Interview Skills:**
   a) Dynamics of group discussion, Intervention, summarizing, Modulation of voice, Body language, Relevance, fluency and organization of ideas and rubrics for evaluation.
   b) Concept and Process, Pre-interview planning, Opening strategies, Answering strategies, Interview (Types) and Mock Interviews.

Suggested Readings:

1. KoneruAruna. (2016). Professional Communication. Tata McGraw-Hill Publishing Company. Ltd, New Delhi
2. Raman, Meenakshi & Sharma, Sangeeta. (2015). Technical Communication: Principles and Practice (3rd Ed.). New Delhi.
3. Anderson Paul V. (2007). Technical Communication. Wadsworth Cengage Learning Pvt. Ltd.
4. Sen Leena. (2009). Communication Skills. PHI Learning Pvt Ltd., New Delhi,
5. Downes Colm. (2008). Job Hunting. Cambridge University Press.

Course Code	Course Title						Core/Elective
U21EC3L1	ELECTRONIC DEVICES LAB						Core
Prerequisite	Contact Hours per Week				CIE	SEE	Credits
	L	T	D	P			
Engineering Physics	-	-	-	3	25	50	1.5

Course Objectives:

This course aims to familiarize:

1. The V-I characteristics of diodes and special semiconductor devices.
2. The design and performance evaluation of various diodes as rectifiers.
3. The characteristics of transistor in various configurations.

Course Outcomes:

Upon completion of this course, students will be able to:

1. Demonstrate the characteristic behaviour of PN junction diode, Zener diode and special purpose semiconductor diodes.
2. Design various non-linear wave shaping circuits using diodes for a given specification.
3. Analyse the behaviour of non-linear wave shaping circuits using diodes.
4. Examine the characteristics of BJT and FET in various configurations.
5. Evaluate and compare the significant parameters obtained from the characteristics of BJT and FET.

List of Experiments:

1. V-I Characteristics of PN 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 filters (capacitor filter).
4. Design, realization and performance evaluation of full wave rectifiers without filters and with capacitor filters.
5. Plotting the characteristics of BJT in Common Base configuration.
6. Plotting the characteristics of BJT in Common Emitter configuration.
7. Plotting the characteristics of BJT in Common Collector configuration.
8. Transistor act as a Switch.
9. Plotting the characteristics of JFET in CS configurations.
10. Characteristics of special semi-conductor devices-UJT.

Suggested Reading:

1. Robert Diffenderfer, “Electronic Devices Systems and Applications”, Cengage Learning India Private Limited, 2010.
2. Paul B. Zbar, Albert P. Malvino, Michael A. Miller, “Basic Electronics, A Text - Lab Manual”, 7th Edition, TMH 2001.
3. Mahesh Jain, “Practical semiconductors data manual No.3”, BPB Publications, 1981.
4. Bharath Electronics Ltd., “Semiconductors data manual”, IEC Publication 134, 1969.

Course Code	Course Title						Core/Elective
U21EC3L2	BASIC SIMULATION LAB						Core
Pre-requisite	Contact hours per week				CIE	SEE	Credits
	L	T	D	P			
	-	-	-	3	25	50	1.5

Course Objectives:

1. To impart the knowledge to write MATLAB codes for the generation of signals,
2. To perform different operations and to verify various transforms for converting time domain signal to frequency domain signal.

Course Outcomes:

Upon completion of the course, Students will be able to

1. Write MATLAB codes for the generation of signals.
2. Apply various transforms on signals to find it's Spectrum using MATLAB.
3. Correlate two signals and can remove noise using correlation.
4. Find the response of the system using convolution function in MATLAB.
5. Perform sampling of continuous time signals.

List of Experiments:

1. Basic Operation on Matrices.
2. Generation of Various Signals and Sequences.
3. Operations on Signals and Sequences.
4. Finding the Even and Odd parts of Signals/Sequence.
5. Convolution for Signals and sequences.
6. Auto Correlation and Cross Correlation for Signals and Sequences.
7. Verification of Linearity and Time Invariance Properties of a given Continuous/Discrete System.
8. Finding the Fourier Transform of a given signal and plotting its magnitude and phase spectrum.
9. Locating the Zeros and Poles and plotting the Pole-Zero maps in S-plane and Z-Plane for the given transfer function.
10. Sampling Theorem Verification.

Suggested Readings:

1. Jaydeep Chakravarthy, 'Introduction to MATLAB Programming: Toolbox and Simulink',1/e, University Press,2014.
2. Brian R.Hunt, Ronald L. Lipsman, Jonathan M. Rosenberg ,'A Guide to MATLAB', Cambridge University Press.2008

Course code	Course title						Core/ Elective
U21CS3L1	PROGRAMMING LANGUAGE- I						Core
Pre-requisites	Contact Hours Per Week				CIE	SEE	Credits
	L	T	D	P			
Programming for Problem Solving	-	-	-	3	25	50	1.5

Course Objectives:

1. To write, test, and debug simple Python programs.
2. To implement Python programs with conditionals and loops.
3. Use functions for structuring Python programs.
4. Represent compound data using Python lists, tuples, and dictionaries.
5. Read and write data from/to files in Python.

Course Outcomes

1. Write, test, and debug simple Python programs.
2. Implement Python programs with conditionals and loops.
3. Develop Python programs step-wise by defining functions and calling them.
4. Use Python lists, tuples, dictionaries for representing compound data.
5. Read and write data from/to files in Python.

List of Programming Exercises:

1. a) Write a python program for python variables, Executing python from the command line,editing python files, Python reserved words.
   b) Write a python program to add two numbers.
   c) Write a program to demonstrate different number data types in python.
   d) Write a program to perform different arithmetic operations on numbers in python.

2. a) Write a python program to print a number is positive/negative using if-else.
   b) Write a python program to find largest number among three numbers.
   c) Write a python program to swap two variables
   d) Python program to print all prime numbers in an interval

3. a) Write a python program to check whether the given string is palindrome or not.
   b) Write a program to create, concatenate and print a string and accessing substring from agiven string.
   c) Functions: Passing parameters to a Function, Variable Number of Arguments, Scope, andPassing Functions to a Function.

4. a) Create a list and perform the following methods
   1) insert() 2) remove() 3) append() 4) len() 5) pop() 6)clear()
   b) Create a dictionary and apply the following methods
   1) Print the dictionary items 2) access items 3) useget () 4)change values 5) use len()
   c) Create a tuple and perform the following methods
   1) Add items 2) len() 3) check for item in tuple 4)Access items

5. a) OOP concepts: Classes, File Organization, Special Methods, Inheritance, Polymorphism, Special Characters, Character Classes, Quantifiers, Dot Character, Greedy Matches, Matchingat Beginning or End, Match Objects, Compiling Regular Expressions.
   b) Write a python Program to call data member and function using classes and objects

6. a) Write a program to double a given number and add two numbers using lambda()
   b) Write a program for filter() to filter only even numbers from a given list.
   c) Write a Python Program to Make a Simple Calculator

7. a)Demonstrate a python code to print try, except and finally block statements
   b) Write a python program to open and write "hello world" into a file and check the accesspermissions to that file?
   c)Python program to sort the elements of an array in ascending order and Descending order

8. a) Write a python program to open a file and check what are the access permissions acquired by that file using os module.
   b) write a program to perform basic operations on random module.

9. Write a python program to practice some basic library modules
   a) numpy
   b) scipy

10. Introduction to basic concept of GUI Programming and Develop desktop based applicationwith python basic Tkinter() Module?

Suggested Readings:

1. Gerald J. Kowalski, Mark T. Maybury: Information Storage and Retrieval Systems: Theory and Implementation, Second Edition Kluwer Academic Publishers
2. Frakes, W.B., Ricardo Baeza-Yates: Information Retrieval Data Structures and Algorithms, Prentice Hall,1992.
3. Modern Information Retrival By Yates Pearson Education.
4. Information Storage & Retieval by Robert Korfhage – John Wiley & Sons

Course Code	Course Title						Core / Elective
U21CS3L2	C PROGRAMMING LAB						Core
Prerequisite	Contact Hours Per Week				CIE	SEE	Credits
	L	T	D	P			
Programming for Problem Solving	-	-	-	2	50	-	1

Course Objectives:

1. To understand the fundamentals of programming in C Language.
2. To write, compile and debug programs in C.
3. To formulate solution to problems and implement in C.
4. To effectively choose programming components to solve computing problems

Course Outcomes:

On completion of this course, Students are able to:

1. Choose appropriate data type for implementing programs in C language.
2. Design and implement modular programs involving input output operations, decision making and looping constructs.
3. Implement search and sort operations on arrays.
4. To decompose a problem into functions and to develop modular reusable code
5. Apply the concept of pointers for implementing programs on dynamic memory management and string handling, Design and implement programs to store data in structures and files.

List of experiments:

1. Finding maximum and minimum of given set of numbers, finding roots of quadratic equation.
2. Sinx and Cosx values using series expansion.
3. Conversion of binary to decimal, octal, hexadecimal and vice-versa.
4. Generating Pascal triangle, pyramid of numbers.
5. Recursion: factorial, Fibonacci,GCD.
6. Matrix addition and multiplication using arrays.
7. Programs on pointers: pointer to arrays, pointer to functions.
8. Functions for string manipulations.
9. Programs on structures and unions.
10. File handling programs

Suggested Reading:

1. Byron Gottfried, “Programming with C”, Schaum’s outlines, 2nd Edition, TATA McGraw-Hill.
2. A.K.Sharma, “Computer Fundamentals and Programming in C”, 2nd Edition, University Press.
3. E Balaguruswamy, “Programming in ANSI C”, Tata McGraw-Hill Education, 2008.
4. Brian W. Kernighan and Dennis M. Ritchie, “the C Programming Language”, Prentice Hall of India, 1988.

Course code	Course title						Core/Elective
U21EN1L1	EFFECTIVE COMMUNICATION SKILLS LAB (Common to all Branches)						Core
Pre-requisites	Contact Hours Per Week				CIE	SEE	Credits
	L	T	D	P			
English	-	-	-	3	25	50	1.5

Course Objectives:

To enhance the listening and speaking skills of students by:

1. Giving them sufficient practice in listening with comprehension
2. Providing them ample opportunities to improve their public speaking skills and soft skills
3. Training them in the use of correct pronunciation, stress and intonation
4. Sensitizing them to the use of verbal and non-verbal communication appropriate to the context
5. Encouraging them to learn the art of conversation to suit formal and informal situation
6. Preparing them to make formal presentations and face interviews

Course Outcomes:

After completing this course, the student will be able to:

1. Listen, understand and interpret formal and informal spoken language
2. Speak English with acceptable pronunciation, stress and intonation
3. Present themselves with confidence in formal situations
4. Participate in individual and group activities with relative ease
5. Use verbal and nonverbal communication while using soft skills and make formal presentations and face interviews

LIST OF ACTIVITIES:

1. Listening for comprehension
2. Pronunciation, Intonation, Stress and Rhythm
3. Conversation Skills
4. Introducing Oneself and Others
5. Asking for and Giving information
6. Making Request and Responding to them Appropriately
7. Giving Instructions and Responding to them Appropriately
8. Making Formal Announcement and Emceeing
9. Group Discussion
10. Just A Minute (JAM)
11. Role Play
12. Debate
13. Public Speaking Skills and Body Language
14. Interviews
15. Formal Presentations

Suggested Readings:

1. Board of Editors. Language and Life Skills Approach. Orient Black Swan,2018
2. Bala Subramaniam, T.A. Text book of English Phonetics for Indian Students, Macmillan, 1981.
3. CIEFL, Exercises in Spoken English. PART-III, Oxford University Press.
4. Pillai, Radhakrishna G. Spoken English for You – Level II. Emerald Publisher, 8th Edition.2014.
5. Sethi, J. and PV Dhamija. A Course in Phonetics and Spoken English. Prentice, India Learning Private Limited, 2nd Edition.1999
6. Robert. M. Sherfield& et al. Developing Soft Skills. Pearson Education.4th Edition. 2009.

LORDS INSTITUTE OF ENGINEERING AND TECHNOLOGY

(An Autonomous Institution)

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

SCHEME OF INSTRUCTIONS & EXAMINATIONS [LR-21]

(w.e.f Academic Year 2022 – 23)

B.E. IV-Semester

S. No.	Course Code	Category	Course Title	Scheme of Instructions				Scheme of Examination			Credits
				L	T	P/D	Contact Hours/Week	Maximum Marks		Duration in Hours	
								CIE	SEE		
Theory Course											
1	U21EC401	PCC	Analog Communication	3	-	-	3	40	60	3	3
2	U21EC402	PCC	Pulse and Linear Integrated Circuits	3	-	-	3	40	60	3	3
3	U21EC403	PCC	Electronic Circuit Analysis	3	-	-	3	40	60	3	3
4	U21EC404	PCC	Digital System Design	3	-	-	3	40	60	3	3
5	U21EC405	PCC	Electromagnetic Theory and Transmission Lines	3	-	-	3	40	60	3	3
Practical/ Laboratory Course											
6	U21EC4L1	PCC	Pulse and Integrated Circuits Lab	-	-	3	3	25	50	3	1.5
7	U21EC4L2	PCC	Electronic Circuit Analysis Lab	-	-	3	3	25	50	3	1.5
Skill Development Course											
8	U21CS4L3	ESC	Programming Language - II	-	-	2	2	25	50	2	1
Total				**15**	**-**	**8**	**23**	**275**	**450**	**23**	**19**

L: Lecture(Hrs/Wk/Sem) **T**: Tutorial (Hrs/Wk/Sem) **P**: Practical **D**: Drawing (Hrs/Wk/Sem)

CIE: Continuous Internal Evaluation
PCC: Professional Core Courses
CS: Computer Science
SEE : Semester End Examination
EC: Electronics and Communication
ESC : Engineering Science Courses

Note:

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

Course Code	Course Title				Core/Elective		
U21EC401	ANALOG COMMUNICATION				Core		
Prerequisite	Contact Hours per Week				CIE	SEE	Credits
	L	T	D	P			
Signal and Systems	3	0	0	0	40	60	3

Course Objectives:

Upon completion of this course, students will be able to:

1. To develop ability to analyze system requirements of analog communication systems.
2. To understand the generation, detection of various analog modulation techniques and also perform the mathematical analysis associated with these techniques.
3. To acquire theoretical knowledge of each block in AM and FM receivers.& understand the pulse modulation techniques..

Course Outcomes:

Upon completion of this course, students will be able to:

1. Analyze and design various modulation and demodulation analog systems
2. Compare and analyze analog modulation techniques
3. Understand Various Angel Modulation and Demodulation Techniques
4. Design AM & FM Receivers
5. Study of signal to Noise Ration (SNR) performance, of various Analog Communication systems.& Analyze and design the various Pulse Modulation Systems

UNIT – I

Amplitude Modulation: Introduction to communication system, Need for modulation, Amplitude Modulation, Time and frequency domain description, Single tone modulation, power relations in AM waves, Generation of AM waves, Detection of AM Waves, Double side band suppressed carrier modulators, Time domain and frequency domain description, Generation of DSBSC Waves, Balanced Modulators, Ring Modulator, Coherent detection of DSB-SC Modulated waves.

UNIT – II

SSB Modulation: Frequency domain description, Frequency discrimination method for generation of AM SSB Modulated Wave, Time domain description, Phase discrimination method for generating AM SSB Modulated waves, Demodulation of SSB Waves.

Vestigial Side Band Modulation: Frequency description, Generation of VSB Modulated wave, Time domain description, Comparison of AM Techniques.

UNIT – III

Angle Modulation: Angle Modulation, Frequency Modulation and Phase modulation, Concept of Instantaneous Phase and Frequency.

Types of FM modulation: Narrow Band FM and Wide Band FM, FM Spectrum in Terms of Bessel Functions, Phasor Diagram of NBFM, Direct and Indirect (Armstrong's) methods of FM Generation, Foster–Seeley Discriminator for FM Detection, Introduction to PLL using LM565.

UNIT – IV

Transmitters and Receivers: High level and low level AM Transmitters, Principle and Operation of tuned radio, Frequency receiver and Super heterodyne receivers, Selection of RF Amplifier, Choice of intermediate frequency, Image frequency and its rejection ratio.

Receiver Characteristics: Sensitivity, Selectivity, Fidelity, Double Spotting, Pre-emphasis and De-emphasis.

UNIT – V

Noise: Noise in Analog communication System, Noise in DSB & SSB System Noise in AM System, Noise in Angle modulation system, Threshold effect in Angle modulation system.

Pulse Analog Modulation Schemes: PAM, PWM and PPM. Generation and detection of PAM, PWM and PPM.

Textbooks:

1. Communication Systems by Simon Haykins John Wiley & Sons, 4th Edition.
2. Electronics & Communication System – George Kennedy and Bernard Davis, McGraw Hill Education 2004.

References:

1. Communication theory, Thomas,2 edition, McGraw-Hill Education
2. Communication Systems, 2E, R. P. Singh, S. D. Sapre, McGraw-Hill Education, 2008.
3. Analog and Digital Communication – K. Sam Shanmugam, Willey, 2005
4. Electronics Communication Systems- Wayne Tomasi, 6th Edition, Person 2009
5. Communication Systems B.P Lathi. 3rd Edition BS Publications 2010

Course Code	Course Title						Core/Elective
U21EC402	PULSE AND LINEAR INTEGRATED CIRCUITS						Core
Prerequisite	Contact Hours per Week				CIE	SEE	Credits
	L	T	D	P			
Electronics Devices	3	0	0	0	40	60	3

Course Objectives:

The objectives of this course is to impart knowledge of

1. Behaviour of Wave Shaping Circuits
2. Analysis and Designing of Multivibrators
3. The Functionality & applications of OP-AMPs.

Course Outcomes:

After completing this course, the student will be able to:

1. Construct different linear networks and analyse their response to different input signals
2. Analyse and Design Multivibrators and Sweep Circuits using Transistors
3. To understand the basic concepts of Operational Amplifier and Differential Amplifier.
4. Develop skills to design simple circuits using OP-AMP and simple filter circuits.
5. Learn about various techniques to develop A/D and D/A converters

UNIT-I

Wave Shaping Circuits: High pass, low pass RC circuits, their responses for sinusoidal, Step, Pulse, Square and Ramp inputs. RC network as Differentiator and Integrator

Diode clippers, Transistor clippers, Clipping at two independent levels, Clamping operation, Clamping circuit theorem.

UNIT-II

Multivibrators & Time Base Generators: Analysis and design of Bistable, Monostable, Astable Multivibrators and Schmitt trigger using transistors, General features of a time base signal, Methods of generating voltage time base waveform.

UNIT-III

Operational Amplifiers: Differential Amplifier, Configurations and modes of operations constant current bias, Current mirror, OP-AMP 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

UNIT-IV

OP-AMP Applications: Inverting and Non-Inverting amplifiers, Integrator and Differentiator, Summing amplifier, Precision rectifier, Voltage to Current converter and current to voltage converter. Logarithmic amplifier, Antilogarithmic amplifier

Active filters: Low pass, High pass, Band pass and Band stop

UNIT-V

Data Converters: Digital-to-Analog converters (DAC), Weighted resistor, R-2R ladder and Inverted R-2R ladder, **Analog-to-Digital Converters (ADC):** Flash, Dual Slope, Successive Approximation, DAC/ADC specifications.

Text Books:

1. J. Millman and H. Taub. “Pulse, Digital and Switching Waveforms” McGraw-Hill 1991
2. D. Roy Choudhry, Shail Jain, "Linear Integrated Circuits", New Age International Pvt. Ltd., 2000
3. Op-Amps and Linear Integrated Circuits by Ramakant A. Gayakwad. 3rd Edition.

Reference Books:

1. Anand Kumar, “ Pulse And Digital Circuits” Second Edition, PHI Learning Pvt. Ltd., 12-Feb-2008
2. Mothiki S. Prakash Rao (2006), Pulse and Digital Circuits, Tata McGraw Hill, India.
3. Operational Amplifiers & Linear Integrated Circuits, R.F. Coughlin & Fredrick F. Driscoll, PHI.
4. Operational Amplifiers & Linear Integrated Circuits: Theory & Applications, Denton J. Daibey, TMH

Course Code	Course Title						Core/Elective
U21EC403	ELECTRONIC CIRCUIT ANALYSIS						Core
Pre requisite	Contact Hours per Week				CIE	SEE	Credits
	L	T	D	P			
Electronic Devices	3	0	0	0	40	60	3

Course Objectives:

The objectives of this course is to impart knowledge of

1. Analyse frequency response of Amplifiers in different frequency ranges.
2. Study of various types of feedback Amplifier.
3. To analyse various types of circuits of large signal and tuned amplifiers.

Course Outcomes:

After completing this course, the student will be able to:

1. Design the multistage amplifiers and understand the concepts of High Frequency Analysis of Transistors.
2. Understand the effect of negative feedback on shunt and series feedback amplifiers.
3. Apply the Concepts of negative feedback to improve the stability of amplifiers and positive feedback to generate sustained oscillations.
4. Design and realize different classes of Power Amplifiers and tuned amplifiers useable for audio and Radio applications
5. Understand the operation of Tuned Amplifiers and voltage regulators.

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. Analysis of transformer coupled amplifier in mid frequency, Low frequency and high frequency regions with BJT.

UNIT–II

Transistor at High Frequency: Hybrid π - model of Common Emitter transistor model ,fα, fβ and unity gain bandwidth, Gain-bandwidth product.

Feedback Amplifiers: The feedback concept, General characteristics of negative feedback amplifier, Effect of negative feedback on input and output impedances -Voltage series, Voltage shunt, Current series and Current shunt Feedback configurations.

UNIT–III

Oscillators: Condition for Oscillations, RC type Oscillators-RC phase shift and Wien-bridge Oscillators, LC type Oscillators –Generalized analysis of LC Oscillators, Hartley and Colpitts Oscillators, Frequency and amplitude stability of Oscillators, Crystal Oscillator.

UNIT–IV

Large Signal Amplifiers: Class A Power Amplifier- Series fed and Transformer coupled, Conversion Efficiency, Class B Power Amplifier- Push Pull and Complementary Symmetry configurations, Conversion Efficiency, Principle of operation of Class AB and Class –D Amplifiers.

UNIT–V

Tuned Amplifiers: General consideration, analysis and design of single tuned and double tuned amplifiers wit BJT, selectivity, gain and bandwidth. Comparison of multistage. The problem of stability in RF amplifiers.

Suggested Readings:

1. David A. Bell, Electronic Devices and Circuits, 5th ed., Oxford University Press, 2009.
2. S Salivahanan, N Kumar, and A Vallavaraj, Electronic Devices and Circuits, 2nd ed., McGraw Hill Education, 2007.
3. K. Lal kishore, " Electronic Circuit Analysis " 2nd Edition BS Publications, 2006

Text Books:

1. Jacob Millman, Christos C. Halkias, and SatyabrataJit, Electronic Devices and Circuits, 3rd ed., McGraw Hill Education, 2010.
2. Donald L Schilling & Charles Belove, Electronics Circuits, Discrete & Integrated, 3rd ed., McGraw Hill Education (India) Private Limited, 2002
3. Robert L. Boylestad , Louis Nashelsky , " Electronic Devices and Circuit Theory " 11th Edition. Pearson,

Course Code	Course Title						Core/Elective
U21EC404	DIGITAL SYSTEM DESIGN						Core
Prerequisite	Contact Hours per Week				CIE	SEE	Credits
	L	T	D	P			
Physics	3	0	0	0	40	60	3

Course Objectives

The objectives of this course is to impart knowledge of

1. To learn the principles of digital hardware and support given by it to the software.
2. To explain the operation and design of combinational and Sequential circuits.
3. To design hardware for real world problems.

Course Outcomes

After completing this course, the student will be able to:

1. Understand the number representation, use Boolean algebra to minimize the logical expressions and optimize the implementation of logical functions.
2. Design combinational circuits like adders, MUX etc.
3. Analyses of sequential circuits and Design of registers, counters.
4. Represent a sequential circuit using Finite State machine and apply state minimization techniques to design a FSM
5. Implement the combinational and sequential circuits using VHDL coding

UNIT – I:

Number Systems and Logic Gates: Complements of numbers, Boolean Algebra, Basic theorems and properties, Switching functions, Canonical and standard form, Algebraic simplification, Digital logic gates, Universal gates, Ex-OR, Ex-NOR gates, Multilevel NAND/NOR realizations.

UNIT – II

Minimization Techniques and Combinational Logic Circuits: Implementation of logic functions using K-Map, Quine-McCluskey tabular method combination circuits, Adders, Half adder, Full adder, Subtractors, Comparators, Multiplexers, De-multiplexers, Encoders, Decoders and Code converters, BCD to 7-segment converter, BCD to Excess- 3 converter

UNIT – III

Sequential Logic Circuits: Basic Architectural Distinctions between Combinational and Sequential circuits, SR Latch, Flip Flops: SR, JK , JK Master Slave, D and T Type Flip Flops, Excitation Table of all Flip Flops, Timing and Triggering consideration, Conversion from one type of Flip-Flop to another, Counters, Registers.

UNIT –IV

Minimization and Transformation of Sequential Machine Finite state machine, Capabilities of FSM, State table state graph, State equivalence and machine minimization, Simplification of completely specified machines, State Reduction, Minimal closed cover.

UNIT-V

Introduction to VHDL: Capabilities of HDL, Identifiers, Data types, Operators, Behaviour modeling, Data flow modeling, Structural modeling, VHDL coding for adder, Mux , De-mux,, Encoder-Decoder, Flip Flops , Decade counter.

Suggested Readings:

1. Moris Mano and Michael D CIletti, Digital Design, Pearson, fourth edition,2008
2. Zvi Kohavi, Switching and Finite Automata Theory, 3rd ed., Cambridge University Press-New Delhi, 2011.
3. R. P Jain, Modern Digital Electronics,4th ed., McGraw Hill Education (India) Private Limited, 2003

Text Books:

1. Anand Kumar “Switching Theory and logic Design “ PHI, 2019..
2. VHDL PRIMER,A, 3rd edition, J. Bhasker, Pearson , 1999
3. Charles H. Roth, “Fundamentals of Logic Design”, 5th Edition, Cengage Learning.

Course Code	Course Title						Core/Elective
U21EC405	ELECTROMAGNETIC THEORY AND TRANSMISSION LINES						Core
Prerequisite	Contact Hours per Week				CIE	SEE	Credits
	L	T	D	P			
Engineering Physics	3	0	0	0	40	60	3

Course Objectives:

The objectives of this course is to impart knowledge of

1. Analyze fundamental concepts of vector analysis, electrostatics and magneto statics law and their applications to describe the relationship between Electromagnetic Theory and the Maxwell's equations in differential and integral form.
2. Understand 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.
3. To understand the concepts of RF Lines and their characteristics, Transmission lines and Smith Chart and its applications, acquire knowledge to configure circuit elements, QWTs and HWTs and to apply the same for practical problems

Course Outcomes:

After completing this course, the student will be able to:

1. Differentiate the different coordinate systems, vector calculus, coulombs law and gauss law for finding electric fields due to different charges and to formulate the capacitance for different capacitors.
2. Apply basic magneto-statics concepts and laws such as Biot-Savarts law and Amperes law, their application in finding magnetic field intensity, inductance and magnetic boundary conditions.
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. Apply the Smith Chart profile and stub matching features, and gain ability to practically use the same for solving practical problems

UNIT I

Electrostatics: Review of coordinate systems, Vector calculus, Coulomb's Law, Electric Field Intensity, Fields due to different charge distributions, Electric Flux Density, Gauss law and applications, Electric potential, Poisson's and Laplace's equations, Illustrative problems.

UNIT II

Magneto statics: Biot-Savart Law, Ampere's circuital law and applications, Magnetic Flux Density, Maxwell's equations for magnetostatic fields, Magnetic scalar and vector potentials, Forces due to magnetic fields , Faraday's law.

UNIT III

Electromagnetic Wave : Wave Equations for conducting and perfect Dielectric Media, Uniform plane waves equation, Wave propagation in lossless and conducting media, Conductors & Dielectrics characterization, Wave propagation in good conductors and good dielectrics, Polarization, Reflection and Refraction of plane waves normal and oblique incidences, Poynting vector and poynting theorem,

UNIT IV

Transmission Lines - I: Types, Parameters, Transmission line equations, Primary & Secondary constants, Expressions for characteristic impedance, Propagation, Attenuation and phase constant, Infinite line concepts, Losslessness transmission line, Distortion less, Types of loading.

UNIT V

Transmission Lines-II: Input Impedance of loss less transmission line, SC and OC lines, Reflection coefficient, VSWR. Lines of different length λ/8, λ/4, λ/2, Lines, Impedance matching devices, Significance of Z min and Z max , Smith chart configuration and applications, Single and double stub matching.

Text Books:

1. Elements of Electromagnetic: Matthew N.O. Sadiku, Oxford Univ. Press, 4th ed., 2008.
2. Electromagnetic Waves and Radiating Systems:E.C. Jordan and K.G. Balmain, PHI, 2nd Edition,2000.
3. Electromagnetic field theory and Transmission lines G.S.N .Raju , Pearson Edition 2005.
4. Antenna & wave propagation , K.D. Prasad, Tech india Publications 2nd Edition 1995

References:

1. Engineering Electromagnetics: Nathan Ida, Springer (India) Pvt. Ltd., New Delhi, 2nd ed. 2005.
2. Transmission Lines and Networks-Umesh Sinha, Satya Prakashan,2001(Tech India publications),New Delhi
3. Engineering Electromagnetics: William H. Hayt Jr. and John A. Buck, TMH, 7th ed., 2006.
4. Networks, Lines and Fields:John D. Ryder, PHI, 2nd ed.,1999.

Course Code	Course Title						Core/Elective
U21EC402	PULSE AND LINEAR INTEGRATED CIRCUITS LAB						Core
Prerequisite	Contact Hours per Week				CIE	SEE	Credits
	L	T	D	P			
ED Lab				3	25	50	1.5

Course Objectives

The objectives of this course is to impart knowledge of

1. Implementing high pass and low pass circuit, clipping and clamping circuits and study it's performance
2. Bistable, Monostable and Astable Multivibrators.
3. Applications of Op-Amps and build circuits using Op-Amp and study it's performance

Course Outcomes

After completing this course, the student will be able to:

1. Design and analyse linear and non-linear wave shaping circuits.
2. Design and analyse clipping and clamping circuits
3. Design and analyse multivibrator circuits and Sweep circuits.
4. Design and analyse Schmitt trigger circuit.
5. Design and analyse Inverting and Non-inverting OPAMP

List of Experiments:

1. Low Pass and High Pass RC Circuits
2. Two level Clipping Circuit
3. Clamping Circuit
4. Collector Coupled Bistable Multivibrators
5. Collector Coupled Monstable Multivibrators
6. Collector Coupled Astable Multivibrators
7. Schmitt Trigger Circuit
8. Measurement of OPAMP Parameters
9. Inverting and Non-inverting OPAMP Voltage follower
10. Integrator and Differentiator using OPAMP

Suggested Readings:

1. Robert Boylestad and Louis Nashelsky. Electronic Devices and Cirenit Theon: 5 Edition Prentice-Hall of India Private Limited. New Delhi. 1995
2. David A. Bell. Laboratory Manual for Electronte Devices and Circuits 4 Edition. Prentice-Hall of India Private Limited. New Delhi. 2004

Course Code	Course Title						Core/Elective
U21EC412	ELECTRONIC CIRCUIT ANALYSIS LAB						Core
ECA Lab	Contact Hours per Week				CIE	SEE	Credits
	L	T	D	P			
Electronic Circuit Analysis	-	-	-	3	25	50	1.5

Course Objectives

The objective of this course is to impart knowledge of

1. Design and analyze BJT, FET amplifiers.
2. Design and analyze multivibrators
3. Analyze Oscillator circuits and Understand Op-Amp. Applications

Course Outcomes

After completing this course, the student will be able to:

1. Calculate gain and bandwidth of BJT, FET Amplifier
2. Determine frequency of oscillator circuits
3. Demonstrate filter circuits
4. Demonstrate power amplifier and Op-Amp. Circuits
5. Demonstrate of RF amplifiers

List of Experiments

1. Two Stage RC Coupled CE BJT amplifiers.
2. Voltage Series Feedback Amplifier.
3. Voltage Shunt Feedback Amplifier.
4. Current series feedback Amplifier
5. RC Phase Shift Oscillator.
6. Hartly Oscillator & Colpitts Oscillator
7. Design of ClassA Power amplifier.
8. Design of Class B Power amplifier.
9. Series and Shunt Voltage Regulators
10. RF Tuned Amplifier

Suggested Readings:

1. Paul B. Zbar, Albert P. Malvino, *Micheal A. Miller, Basic Electronics, A text–Lab Manual*, 7th Edition, TMH 2001.

Course code	Course title						Core/Elective
U21CS4L3	PROGRAMMING LANGUAGE- II						Core
Pre-requisites	Contact Hours Per Week				CIE	SEE	Credits
Basic Python	L	T	D	P			
	-	-	-	3	25	50	1.5

Course Objectives:

1. To Learn simple basic library modules operations
2. To implement Python programs using pandas
3. Use of MATPLOTLIB library module
4. To implement python programs using open _cv

Course Outcomes

1. Develop python programs using library modules
2. Able to implement python programs using pandas
3. Develop python programs using Matplotlib Module
4. Write, Test, Debug python library modules.
5. Debug python image programs using various modules

List of Programming Exercises:

1. Write a python program to practice some basic operations on library modules
   a)numpy b) scipy
2. Write a Python program to demonstrate array creation techniques using
   a)list b)tuple c)resized array
3. a) Write a Pandas program to select the specified columns and rows from a given dataframe.
   b) Write a Pandas program to sort the Data Frame first by; name; in descending order, then byin ascending order.
4. a) Write a Pandas program to replace the qualify column contains the values; with True andFalse
   b) Write a Pandas program to change the name James & Suresh in name column of the Data Frame.
5. a) Write a Pandas program to insert a new column in existing Data Frame.
   b) Write a Pandas program to iterate over rows in a Data Frame.
6. a) Write three lines of code, you can generate a basic graph using python matplotlib.
   b) Write a code how to add style to a graph using python matplotlib.
7. a) Write a code to represent the data in bar graph using python matplotlib.
   b) Writea code to represent the data in Histogram using python matplotlib
   c) Write a code to represent the data in scatter plot using python matplotlib.
8. a) Write a code to represent the data in Area plot using python matplotlib.
   b) Writea code to represent the data in pie chart using python matplotlib
   c) Write a code to represent the data working with multiple plots using python matplotlib.
9. a) Write a program to give basic introduction about open cv library?
   b) Write a python program to draw a circle and ellipse using open cv.
   c) Write a python program to see how we can resize the image using cv_resize() .
10. Write a python program Add or Blend Two Images with different weights using open cv.

Suggested Readings:

1. Frakes, W.B., Ricardo Baeza-Yates: Information Retrieval Data Structures andAlgorithms, Prentice Hall, 1992.
2. Gerald J. Kowalski, Mark T. Maybury: Information Storage and Retrieval Systems: Theory and implementation, Second Edition Kluwer Academic Publishers.