



RISE KRISHNA SAI GANDHI GROUP OF INSTITUTION

(AUTONOMOUS)

(Approved by AICTE, New Delhi and affiliated to JNTUK, Kakinada)

Accredited by NAAC & Recognized under UGC 2(f)

NH-16, Valluru - 523272, ONGOLE, Prakasam Dt., A.P.

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www.risekrishnasaigandhi.edu.in

Dr. K.V. Subrahmanyam

M.Tech, Ph.D, MISTE, FIE, FIETE.

Principal

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Minutes of meeting of Board of Studies

Date: 26. 06.2025

The 3rd External Board of Studies Meeting of the Department Electronics and Communication Engineering was held online on 26.06.2025 at 12:30 PM via Google meet to finalizing the syllabus for II B. Tech I semester (third semester) all the courses.

The following members were present:

S. No	Name of the Member	Designation	Position	Signature
1	Mr. S V Ravi Kumar	HoD of ECE	Chairman	
2	Dr. B.T. Krishna	Professor in ECE JNTUK, Kakinada	University Nominee and External BoS Member	
3	Dr. G. Srinivasulu	Professor in ECE, SVU, Tirupati	Member Nominated by Academic Council	Approved Via Email
4	Dr. P. Ramesh Babu	Professor in EIE, PTU, Puducherry	Member Nominated by Academic Council	Approved Via Email
5	Mr. Pallapothu Ravi Teja	Lead Engineer, HCL Pvt. Ltd. Karnataka	Industry member	Approved Via Email
6	Dr. S. Chandrasekhar	Professor in ECE, RGAN	Faculty Member	
7	Dr. S.V.V.N. Chanakya P	Associate Professor in ECE	Faculty Member	
8	Mr. R. V. Kiran Kumar	Associate Professor in ECE	Faculty Member	
9	Mr. Sk. John	Asst. Professor in ECE	Faculty Member	
10	Mrs. M Sireesha	Asst. Professor in EEE	Faculty Member	
11	Mr. P Maruthi Rajesh	Consultant, Wipro Pvt.Ltd, Gachibowli, Hyderabad.	Alumni Member	Approved Via Email

Promoted by

Rural Institute of Social & Economic Empowerment (RISE)



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NH-16, Valluru-523272, Ongole, Prakasam (District), A.P.

Dept. of Electronics and Communication Engineering

At the onset of the meeting, the Chairman of BoS, Professor S. V. Ravi Kumar, welcomed all the members. The meeting began with the presentation of the course structure and syllabus of II B. Tech ECE I semester subjects under RG24 regulations prepared by the internal BOS members.

Resolutions in Meeting:

Agenda 1: To discuss and finalize course structure and syllabus of II B. Tech ECE I semester subjects under RG24 regulations.

Resolution: After Consultations with CSE, S&H, departments and as per the suggestions of BoS experts course contents of II Year B.Tech I semester of RG24 regulations are approved. The board of studies unanimously approved the proposal to interchange UHV (sem-I) and MEFA (sem-II) in the curriculum prescribed by JNTUK for departmental convenience without altering the prescribed syllabus content and credits.

Encl: Annexure –I: Course structure and Syllabus copies

General Comments:

Dr. B.T. Krishna (University Nominee): The proposed course structure and syllabus for II B.Tech ECE I Semester are in alignment with the JNTUK, Kakinada curriculum. It is appreciated that the department has adhered to the university guidelines without any deviations, ensuring uniformity across affiliated institutions.

Subject expert comments

Dr. G Srinivasulu: The syllabus content is well-structured and covers all essential fundamentals required at the second-year level. Following the JNTUK curriculum ensures students are on par with the university standards and can smoothly progress into advanced topics in subsequent semesters.

Dr. P. Ramesh Babu: The inclusion of laboratory and theory components as per JNTUK norms is satisfactory. The department is advised to supplement the syllabus with additional practice sessions or value-added content, where necessary, to enhance student learning outcomes without altering the prescribed syllabus.



ECE Dept <ecehod@risekrishnasaigandhi.edu.in>

Minutes of Meeting -BoS_26.06.2025

2 messages

ECE Dept <ecehod@risekrishnasaigandhi.edu.in>
To: T Krishna Battula <tkbattula@jntucek.ac.in>

Tue, Aug 19, 2025 at 12:17 PM

Dear Professor,

I hope you are doing well.

Please find attached the minutes from the Board of Studies (BoS) meeting held on 26.06.2024. I kindly request your approval of these minutes via email. If there are any corrections or suggestions, please share them.

Your prompt response will be appreciated. If you approve the minutes as they are, a simple reply stating your approval will suffice.

Thank you for your cooperation.

Thank you for your time and attention.

with kind regards,
S V Ravi Kumar M.Tech., (Ph.D),
Professor & HOD, Dept. of ECE,
RISE Krishna Sai Gandhi Group of Institutions,
Ongole, Andhra Pradesh.
Pin:523272
Cell:7093383852

2 attachments

 RGAN_MoM_BOS-III.pdf
360K

 A-I_II-I Syllabus.pdf
657K

T Krishna Battula <tkbattula@jntucek.ac.in>
To: ECE Dept <ecehod@risekrishnasaigandhi.edu.in>

Wed, Aug 20, 2025 at 4:33 AM

Ok sir
I approve the minutes of the meeting

Dr T.K.Battula
Department of ECE
UCEK, JNTUK
Kakinada 533003
[Quoted text hidden]



ECE Dept <ecehod@risekrishnasaigandhi.edu.in>

Minutes of Meeting_BoS_26.06.2025

2 messages

ECE Dept <ecehod@risekrishnasaigandhi.edu.in>
To: "Dr. Ramesh babu Pojala" <prameshbabu@ptuniv.edu.in>

Tue, Aug 19, 2025 at 12:16 PM

Dear Professor,

I hope you are doing well.

Please find attached the minutes from the recent Board of Studies (BoS) meeting held on 26.06.2025. I kindly request your approval of these minutes via email. If there are any corrections or suggestions, please share them.

Your prompt response will be appreciated. If you approve the minutes as they are, a simple reply stating your approval will suffice.

Thank you for your cooperation.

Thank you for your time and attention.

warm regards
S V Ravi Kumar M.Tech., (Ph.D),
Professor & HOD, Dept. of ECE,
RISE Krishna Sai Gandhi Group of Institutions,
Ongole, Andhra Pradesh.
Pin:523272
Cell:7093383852

2 attachments

 **RGAN_MoM_BOS-III.pdf**
360K

 **A-I_II-I Syllabus.pdf**
657K

Dr. Ramesh babu Pojala <prameshbabu@ptuniv.edu.in>
To: ECE Dept <ecehod@risekrishnasaigandhi.edu.in>

Tue, Aug 19, 2025 at 2:27 PM

Dear sir
I here by approve the syllabus
Dr.P.Ramesh babu
[Quoted text hidden]



ECE Dept <ecehod@risekrishnasaigandhi.edu.in>

Minutes of Meeting -BoS_26.06.2025

2 messages

ECE Dept <ecehod@risekrishnasaigandhi.edu.in>
To: sreenivasulu gunapati <gunapatieeee@rediffmail.com>

Tue, Aug 19, 2025 at 12:18 PM

Dear Professor,

I hope you are doing well.

Please find attached the minutes from the recent Board of Studies (BoS) meeting held on 26.06.2025. I kindly request your approval of these minutes via email. If there are any corrections or suggestions, please share them.

Your prompt response will be appreciated. If you approve the minutes as they are, a simple reply stating your approval will suffice.

Thank you for your cooperation.

Thank you for your time and attention.

with kind regards,
S V Ravi Kumar M.Tech., (Ph.D),
Professor & HOD, Dept. of ECE,
RISE Krishna Sai Gandhi Group of Institutions,
Ongole, Andhra Pradesh.
Pin:523272
Cell:7093383852

2 attachments **A-I_II-I Syllabus.pdf**
657K **RGAN_MoM_BOS-III.pdf**
360K

sreenivasulu gunapati <gunapatieeee@rediffmail.com>
To: ECE Dept <ecehod@risekrishnasaigandhi.edu.in>

Tue, Aug 19, 2025 at 1:29 PM

Dr. G. Sreenivasulu Professor Department of ECE SVU College of Engineering SV University, Tirupati Mobile:
9490182693

From: ecehod@risekrishnasaigandhi.edu.in
Sent: Tue, 19 Aug 2025 12:19:02
To: sreenivasulu gunapati <gunapatieeee@rediffmail.com>
Subject: Minutes of Meeting -BoS_26.06.2025

Minutes of the meeting are approved.

Dear Professor,

[Quoted text hidden]

[Quoted text hidden]



ECE Dept <ecehod@risekrishnasaigandhi.edu.in>

Minutes of Meeting_BoS_26.06.2025

2 messages

ECE Dept <ecehod@risekrishnasaigandhi.edu.in>
To: raviteja138438@gmail.com

Tue, Aug 19, 2025 at 12:15 PM

Dear sir,

I hope you are doing well.

Please find attached the minutes from the Board of Studies (BoS) meeting held on 26.06.2025, I kindly request your approval of these minutes via email. If there are any corrections or suggestions, please share them.

Your prompt response will be appreciated. If you approve the minutes as they are, a simple reply stating your approval will suffice.

Thank you for your cooperation.

Thank you for your time and attention.
S V Ravi Kumar M.Tech., (Ph.D),
Professor & HOD, Dept. of ECE,
RISE Krishna Sai Gandhi Group of Institutions,
Ongole, Andhra Pradesh.
Pin:523272
Cell:7093383852

2 attachments**A-I_II-I Syllabus.pdf**
657K**RGAN_MoM_BOS-III.pdf**
360K

ravi teja <raviteja138438@gmail.com>
To: ECE Dept <ecehod@risekrishnasaigandhi.edu.in>

Tue, Aug 19, 2025 at 2:28 PM

Approved.

Regards,
P. Ravi Teja,
Sr Executive - Field Application Engineer
CoreEL Technologies.

[Quoted text hidden]



ECE Dept <ecehod@risekrishnasaigandhi.edu.in>

(no subject)

2 messages

ECE Dept <ecehod@risekrishnasaigandhi.edu.in>
To: MARUTHI RAJESH <rajeshpothakamuri1@gmail.com>

Tue, Aug 19, 2025 at 12:13 PM

Dear Maruthi Rajesh P,

I hope you are doing well.

Please find attached the minutes from the Board of Studies (BoS) meeting held on 26.06.2025. I kindly request your approval of these minutes via email. If there are any corrections or suggestions, please share them.

Your prompt response will be appreciated. If you approve the minutes as they are, a simple reply stating your approval will suffice.

Thank you for your cooperation.

Thank you for your time and attention.

with kind regards,
S V Ravi Kumar M.Tech., (Ph.D),
Professor & HOD, Dept. of ECE,
RISE Krishna Sai Gandhi Group of Institutions,
Ongole, Andhra Pradesh.
Pin:523272
Cell:7093383852

2 attachments

A-I_II-I Syllabus.pdf
657K



RGAN_MoM_BOS-III.pdf
360K

MARUTHI RAJESH <rajeshpothakamuri1@gmail.com>
To: ECE Dept <ecehod@risekrishnasaigandhi.edu.in>

Tue, Aug 19, 2025 at 3:50 PM

Hi Sir,

Yes this is approved.

I don't have any concerns on the below points.

Thanks & Regards,
Maruthi Rajesh Pothakamuri.

[Quoted text hidden]



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Dept. of ELECTRONICS AND COMMUNICATION ENGINEERING

(RG24-IInd YEAR , SEM-I COURSE STRUCTURE & SYLLABUS)

B.Tech.- II Year I Semester

S.No.	Category	Title	L	T	P	Credits
1	BS	Probability theory and stochastic process	3	0	0	3
2	Management Course- I	Managerial Economics and Financial Analysis	2	0	0	2
3	Engineering Science	Signals and Systems	3	0	0	3
4	Professional Core	Electronic Devices and Circuits	3	0	0	3
5	Professional Core	Switching Theory and Logic Design	3	0	0	3
6	Professional Core	Electronic Devices and Circuits Lab	0	0	3	1.5
7	Professional Core	Switching Theory and Logic Design Lab	0	0	3	1.5
8	Skill Enhancement Course	Data Structures using Python	0	1	2	2
9	Audit Course	Environmental Science	2	0	0	-
Total			14	01	08	19

AS



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Dept. of ELECTRONICS AND COMMUNICATION ENGINEERING

II Year-I Semester

L	T	P	C
3	0	0	3

PROBABILITY THEORY AND STOCHASTIC PROCESS

Course Objectives:

- This gives basic understanding of random variables and operations that can be performed on them.
- To know the Spectral and temporal characteristics of Random Process.
- To Learn the Basic concepts of Information theory Noise sources and its representation for understanding its characteristics

UNIT - I Probability & Random Variable:

Probability introduced through Sets and Relative Frequency: Experiments and Sample Spaces, Discrete and Continuous Sample Spaces, Events, Probability Definitions and Axioms, Joint Probability, Conditional Probability, Total Probability, Bay's Theorem, Independent Events, Random Variable-Definition, Conditions for a Function to be a Random Variable, Discrete, Continuous and Mixed Random Variable, Distribution and Density functions, Properties, Binomial, Poisson, Uniform, Gaussian, Exponential, Rayleigh, Methods of defining Conditioning Event, Conditional Distribution, Conditional Density and their Properties.

BS

UNIT - II Operations on Single & Multiple Random Variables – Expectations:

Expected Value of a Random Variable, Function of a Random Variable, Moments about the Origin, Central Moments, Variance and Skew, Chebychev's Inequality, Characteristic Function, Moment Generating Function, Transformations of a Random Variable: Monotonic and Non-monotonic Transformations of Continuous Random Variable, Transformation of a Discrete Random Variable. Vector Random Variables, Joint Distribution Function and its Properties, Marginal Distribution Functions, Conditional Distribution and Density – Point Conditioning, Conditional Distribution and Density – Interval conditioning, Statistical Independence. Sum of Two Random Variables, Sum of Several Random Variables, Central Limit Theorem, (Proof not expected). Unequal Distribution, Equal Distributions. Expected Value of a Function of Random Variables: Joint Moments about the Origin, Joint Central Moments, Joint Characteristic Functions, Jointly Gaussian Random Variables: Two Random Variables case, N Random Variable case, Properties, Transformations of Multiple Random Variables, Linear Transformations of Gaussian Random Variables

UNIT - III Random Processes – Temporal Characteristics:

The Random Process Concept, Classification of Processes, Deterministic and Nondeterministic Processes, Distribution and Density Functions, concept of Stationarity and Statistical Independence. First-Order Stationary Processes, Second Order and Wide-



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Dept. of ELECTRONICS AND COMMUNICATION ENGINEERING

Sense Stationarity, (N-Order) and Strict-Sense Stationarity, Time Averages and Ergodicity, Mean-Ergodic Processes, Correlation-Ergodic Processes, Autocorrelation Function and Its Properties, Cross-Correlation Function and Its Properties, Covariance Functions, Gaussian Random Processes, Poisson Random Process. Random Signal Response of Linear Systems: System Response – Convolution, Mean and Mean-squared Value of System Response, autocorrelation Function of Response, Cross-Correlation Functions of Input and Output.

UNIT - IV Random Processes – Spectral Characteristics:

The Power Spectrum: Properties, Relationship between Power Spectrum and Autocorrelation Function, The Cross-Power Density Spectrum, Properties, Relationship between Cross-Power Spectrum and Cross-Correlation Function. Spectral Characteristics of System Response: Power Density Spectrum of Response, Cross-Power Density Spectrums of Input and Output.

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UNIT - V Noise Sources & Information Theory:

Resistive/Thermal Noise Source, Arbitrary Noise Sources, Effective Noise Temperature, Noise equivalent bandwidth, Average Noise Figures, Average Noise Figure of cascaded networks, Narrow Band noise, Quadrature representation of narrow band noise & its properties. Entropy, Information rate, Source coding: Huffman coding, Shannon Fano coding, Mutual information, Channel capacity of discrete channel, Shannon-Hartley law; Trade-off between bandwidth and SNR.

TEXT BOOKS:

1. Peyton Z. Peebles - Probability, Random Variables & Random Signal Principles, 4 th Ed, TMH, 2001.
2. Taub and Schilling - Principles of Communication systems, TMH, 2008.

REFERENCE BOOKS:

1. Bruce Hajek - Random Processes for Engineers, Cambridge unipress, 2015
2. Athanasios Papoulis and S. Unnikrishna Pillai - Probability, Random Variables and Stochastic Processes, 4th Ed., PHI, 2002.
3. B.P. Lathi - Signals, Systems & Communications, B.S. Publications, 2003.
4. S.P Eugene Xavier -Statistical Theory of Communication, New Age Publications, 2003.

Course Outcomes:

- Perform operations on single and multiple Random variables.
- Determine the Spectral and temporal characteristics of Random Signals.



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Dept. of ELECTRONICS AND COMMUNICATION ENGINEERING

- Characterize LTI systems driven by stationary random process by using ACFs and PSDs.
- Understand the concepts of Noise and Information theory in Communication systems

BS



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Dept. of ELECTRONICS AND COMMUNICATION ENGINEERING

II Year-I Semester

L	T	P	C
2	0	0	2

MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS

Course Objectives:

- To inculcate the basic knowledge of microeconomics and financial accounting
- To make the students learn how demand is estimated for different products, input-output relationship for optimizing production and cost
- To Know the Various types of market structure and pricing methods and strategy
- To give an overview on investment appraisal methods to promote the students to learn how to plan long-term investment decisions.
- To provide fundamental skills on accounting and to explain the process of preparing financial statements.

Course Outcomes:

- Define the concepts related to Managerial Economics, financial accounting and management(L2)
- Understand the fundamentals of Economics viz., Demand, Production, cost, revenue and markets (L2)
- Apply the Concept of Production cost and revenues for effective Business decision (L3)
- Analyze how to invest their capital and maximize returns (L4)
- Evaluate the capital budgeting techniques. (L5)
- Develop the accounting statements and evaluate the financial performance of business entity (L5)

UNIT - I Managerial Economics

Introduction – Nature, meaning, significance, functions, and advantages. Demand-Concept, Function, Law of Demand - Demand Elasticity- Types – Measurement. Demand Forecasting- Factors governing Forecasting, Methods. Managerial Economics and Financial Accounting and Management.

UNIT - II Production and Cost Analysis

Introduction – Nature, meaning, significance, functions and advantages. Production Function– Least- cost combination– Short run and long run Production Function- Isoquants and Is costs, Cost & Break-Even Analysis - Cost concepts and Cost behaviour- Break-Even Analysis (BEA) - Determination of Break-Even Point (Simple Problems).

UNIT - III Business Organizations and Markets

Introduction – Forms of Business Organizations- Sole Proprietary - Partnership - Joint Stock Companies - Public Sector Enterprises. Types of Markets - Perfect and Imperfect Competition - Features of Perfect Competition Monopoly- Monopolistic Competition– Oligopoly-Price-Output Determination - Pricing Methods and Strategies

UNIT - IV Capital Budgeting

Introduction – Nature, meaning, significance. Types of Working Capital, Components, Sources of Short-term and Long-term Capital, Estimating Working capital requirements. Capital Budgeting– Features, Proposals, Methods and Evaluation. Projects – Pay Back



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Dept. of ELECTRONICS AND COMMUNICATION ENGINEERING

Method, Accounting Rate of Return (ARR) Net Present Value (NPV) Internal Rate Return (IRR) Method (sample problems)

UNIT - V Financial Accounting and Analysis

Introduction – Concepts and Conventions- Double-Entry Bookkeeping, Journal, Ledger, Trial Balance- Final Accounts (Trading Account, Profit and Loss Account and Balance Sheet with simple adjustments). Introduction to Financial Analysis - Analysis and Interpretation of Liquidity Ratios, Activity Ratios, and Capital structure Ratios and Profitability.

Textbooks:

1. Varshney & Maheswari: Managerial Economics, Sultan Chand.
2. Aryasri: Business Economics and Financial Analysis, 4/e, MGH.

Reference Books:

1. Ahuja Hl Managerial economics Schand.
2. S.A. Siddiqui and A.S. Siddiqui: Managerial Economics and Financial Analysis, New Age International.
3. Joseph G. Nellis and David Parker: Principles of Business Economics, Pearson, 2/e, New Delhi.
4. Domnick Salvatore: Managerial Economics in a Global Economy, Cengage.

Online Learning Resources:

<https://www.slideshare.net/123ps/managerial-economics-ppt>
<https://www.slideshare.net/rossanz/production-and-cost-45827016>
<https://www.slideshare.net/darkyla/business-organizations-19917607>
<https://www.slideshare.net/balarajbl/market-and-classification-of-market>
<https://www.slideshare.net/ruchi101/capital-budgeting-ppt-59565396>
<https://www.slideshare.net/ashu1983/financial-accounting>



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Dept. of ELECTRONICS AND COMMUNICATION ENGINEERING

II Year-I Semester

SIGNALS AND SYSTEMS

L	T	P	C
3	0	0	3

Course Objectives:

- To study about signals and systems.
- To analyze the spectral characteristics of signal using Fourier series and Fourier transforms.
- To understand the characteristics of systems.
- To introduce the concept of sampling process
- To know various transform techniques to analyze the signals and systems.

UNIT- I: INTRODUCTION: Definition of Signals and Systems, Classification of Signals, Classification of Systems, Operations on signals: time-shifting, time-scaling, amplitude-shifting, amplitude-scaling. Problems on classification and characteristics of Signals and Systems. Complex exponential and sinusoidal signals, Singularity functions and related functions: impulse function, step function signum function and ramp function. Analogy between vectors and signals, orthogonal signal space, Signal approximation using orthogonal functions, Mean square error, closed or complete set of orthogonal functions, Orthogonality in complex functions. Related problems.

UNIT-II: FOURIER SERIES AND FOURIER TRANSFORM:

Fourier series representation of continuous time periodic signals, properties of Fourier series, Dirichlet's conditions, Trigonometric Fourier series and Exponential Fourier series, Relation between Trigonometric and Exponential Fourier series, Complex Fourier spectrum. Deriving Fourier transform from Fourier series, Fourier transform of arbitrary signal, Fourier transform of standard signals, Fourier transform of periodic signals, properties of Fourier transforms, Fourier transforms involving impulse function and Signum function. Introduction to Hilbert Transform, Related problems.

UNIT-III: ANALYSIS OF LINEAR SYSTEMS: Introduction, Linear system, impulse response, Response of a linear system, Linear time invariant (LTI) system, Linear time variant(LTV)system, Concept of convolution in time domain and frequency domain, Graphical representation of convolution, Transfer function of a LTI system, Related problems. Filter characteristics of linear systems. Distortion less transmission through a system, Signal band width, system band width, Ideal LPF, HPF and BPF characteristics, Causality and Poly-Wiener criterion for physical realization, relationship between bandwidth and rise time.



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UNIT-IV:

CORRELATION: Auto-correlation and cross-correlation of functions, properties of correlation function, Energy density spectrum, Parseval's theorem, Power density spectrum, Relation between Convolution and correlation, Detection of periodic signals in the presence of noise by correlation, Extraction of signal from noise by filtering.

SAMPLING THEOREM: Graphical and analytical proof for Band Limited Signals, impulse sampling, Natural and Flat top Sampling, Reconstruction of signal from its samples, effect of under sampling –Aliasing, Introduction to B and Pass sampling, Related problems.

UNIT-V:

LAPLACE TRANSFORMS: Introduction, Concept of region of convergence (ROC) for Laplace transforms, constraints on ROC for various classes of signals, Properties of L.T's, Inverse Laplace transform, Relation between L.T's, and F.T. of a signal. Laplace transform of certain signals using waveform synthesis.

Z-TRANSFORMS: Concept of Z-Transform of a discrete sequence. Region of convergence in Z- Transform, constraints on ROC for various classes of signals, Inverse Z- transform, properties of Z-transforms. Distinction between Laplace, Fourier and Z transforms.

BJ

TEXTBOOKS:

1. Signals, Systems & Communications-B.P.Lathi, BSPublications,2003.
2. Signals and Systems-A.V. Oppenheim,A.S. Willsky and S.H. Nawab, PHI, 2nd Edn,1997
3. Signals & Systems-Simon Haykin and VanVeen,Wiley,2nd Edition,2007

REFERENCEBOOKS:

1. Principles of Linear Systems and Signals–BP Lathi, Oxford University Press,2015
2. Signals and Systems–TK Rawat, Oxford University press,2011

Course Outcomes:

At the end of this course the student will able to:

- Differentiate the various classifications of signals and systems
- Analyze the frequency domain representation of signals using Fourier concepts
- Classify the systems based on their properties and determine the response of LTI Systems.
- Know the sampling process and various types of sampling techniques.
- Apply Lap lace and z-transforms to analyze signals and Systems (continuous&discrete).



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Dept. of ELECTRONICS AND COMMUNICATION ENGINEERING

II Year - I Semester

L	T	P	C
3	0	0	3

ELECTRONIC DEVICES AND CIRCUITS

Course Objectives:

- To learn and understand the basic concepts of semiconductor physics.
- Study the physical phenomena such as conduction, transport mechanism and electrical characteristics of different diodes.
- To learn and understand the application of diodes as rectifiers with their operation and characteristics with and without filters are discussed.
- Acquire knowledge about the principle of working and operation of Bipolar Junction Transistor and Field Effect Transistor and their characteristics.
- To learn and understand the purpose of transistor biasing and its significance.
- Small signal equivalent circuit analysis of BJT and FET transistor amplifiers and compare different configurations.

AS

UNIT-I: Review of Semiconductor Physics: Mobility and Conductivity, Intrinsic and extrinsic semiconductors, Hall effect, continuity equation, law of junction, Fermi Dirac function, Fermi level in intrinsic and extrinsic Semiconductors. (Text book: 1)

Junction Diode Characteristics : energy band diagram of PN junction Diode, Open circuited p-n junction, Biased p-n junction, p-n junction diode, current components in p-n junction Diode, Diode equation, V-I Characteristics, temperature dependence on V-I characteristics, Diode resistance, Diode capacitance. (Text book: 1)

UNIT-II:

Special Semiconductor Devices: Zener Diode, Breakdown mechanisms, Zener diode applications, Varactor Diode, LED, Photodiode, Tunnel Diode, UJT, PNP Diode, SCR, Construction, operation and V-I characteristics. (Text book: 1)

Diode Circuits: The Diode as a circuit element, The Load-Line concept, The Piecewise Linear Diode model, Clipping (limiting) circuits, Clipping at Two Independent Levels, Peak Detector, Clamping circuits, Comparators, Sampling Gate, Basic Rectifier setup, half wave rectifier, full wave rectifier, bridge rectifier, derivations of characteristics of rectifiers, Filters, Inductor filter, Capacitor filter, π -section Filter, comparison of various filter circuits in terms of ripple factors. (Text book: 1, 2)

UNIT- III:

Transistor Characteristics: Junction transistor, transistor current components, transistor equation in CB configuration, transistor as an amplifier, characteristics of transistor in Common Base, Common Emitter and Common Collector configurations, Ebers-Moll model of a transistor, punch through/ reach through, Photo transistor, typical transistor junction voltage values. (Text book: 1)

Transistor Biasing and Thermal Stabilization : Need for biasing, operating point, load line analysis, BJT biasing- methods, basic stability, fixed bias, collector to base bias, self bias,



RISE KRISHNA SAI GANDHI GROUP OF INSTITUTIONS

(AUTONOMOUS)

(Approved by AICTE New Delhi, Affiliated to JNTU Kakinada)

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Dept. of ELECTRONICS AND COMMUNICATION ENGINEERING

Stabilization against variations in V_{BE} , I_c , and β , Stability factors, (S, S', S'') , Bias compensation, Thermal runaway, Thermal stability. (Text book: 1)

UNIT- IV: Small Signal Low Frequency Transistor Amplifier Models

BJT: Two port network, Transistor hybrid model, determination of h-parameters, conversion of h-parameters, generalized analysis of transistor amplifier model using h-parameters, Analysis of CB, CE and CC amplifiers using exact and approximate analysis, Comparison of transistor amplifiers. (Text book: 1, 2)

UNIT- V: FET: FET types, JFET operation, characteristics, small signal model of JFET. (Text book: 1) **MOSFET:** MOSFET Structure, Operation of MOSFET: operation in triode region, operation in saturation region, MOSFET as a variable resistor, derivation of V-I characteristics of MOSFET, Channel length modulation, MOS transconductance, MOS device models: MOS small signal model, PMOS Transistor, CMOS Technology, Comparison of Bipolar and MOS devices. (Text book: 3) **CMOS amplifiers:** General Considerations, Common Source Stage, Common Gate Stage, Source Follower, comparison of FET amplifiers. (Text book: 3)

Text Books:

1. Millman's Electronic Devices and Circuits- J. Millman, C. C. Halkias and Satyabrata Jit, Mc-Graw Hill Education, 4th edition, 2015.
2. Millman's Integrated Electronics-J. Millman, C. Halkias, and Ch. D. Parikh, Mc-Graw Hill Education, 2nd Edition, 2009.
3. Fundamentals of Microelectronics-Behzad Razavi, Wiley, 3rd edition, 2021.

References:

1. Basic Electronics-Principles and Applications, Chinmoy Saha, Arindam Halder, Debarati Ganguly, Cambridge University Press.
2. Electronics devices & circuit theory- Robert L. Boylestad and Louis Nashelsky, Pearson, 11th edition, 2015.
3. Electronic Devices and Circuits - David A. Bell, Oxford University Press, 5th edition, 2008.
4. Electronic Devices and Circuits- S. Salivahanan, N. Suresh Kumar, Mc-Graw Hill, 5th edition, 2022.

Course Outcomes:

- Apply the basic concepts of semiconductor physics.
- Understand the formation of p-n junction and how it can be used as a p-n junction as diode in different modes of operation.
- Analyze the construction, working principle of Semiconductor Devices and Diode Circuits
- Know the need of transistor biasing, various biasing techniques for BJT and FET and stabilization concepts with necessary expressions
- Apply small signal low frequency transistor amplifier circuits using BJT and FET in different configurations



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Dept. of ELECTRONICS AND COMMUNICATION ENGINEERING

II Year - I Semester

L	T	P	C
3	0	0	3

SWITCHING THEORY and LOGIC DESIGN

Course Objectives:

- To solve a typical number base conversion and analyze new error coding techniques.
- Theorems and functions of Boolean algebra and behavior of logic gates
- To optimize logic gates for digital circuits using various techniques.
- Boolean function simplification using Karnaugh maps and Quine-McCluskey methods
- To understand concepts of combinational circuits.
- To develop advanced sequential circuits.

UNIT – I

REVIEW OF NUMBER SYSTEMS & CODES:

Representation of numbers of different radix, conversion from one radix to another radix, $r-1$'s complements and r 's complements of signed members. Gray code, 4 bit codes; BCD, Excess-3, 2421, 84-2-1 code etc. Error detection & correction codes: parity checking, even parity, odd parity, Hamming code.

BOOLEAN THEOREMS AND LOGIC OPERATIONS:

Boolean theorems, principle of complementation & duality, De-morgan theorems. Logic operations ; Basic logic operations -NOT, OR, AND, Universal Logic operations, EX-OR, EX- NOR operations. Standard SOP and POS Forms, NAND-NAND and NOR-NOR realizations, Realization of three level logic circuits.

UNIT – II

MINIMIZATION TECHNIQUES:

Minimization and realization of switching functions using Boolean theorems, K-Map (up to 6 variables) and tabular method (Quine-mccluskey method) with only four variables and single function.

COMBINATIONAL LOGIC CIRCUITS DESIGN:

Design of Half adder, full adder, half subtractor, full subtractor, applications of full adders; 4-bit adder-subtractor circuit, BCD adder circuit, Excess 3 adder circuit and carry look-a- head adder circuit, Design code converts using Karnaugh method and draw the complete circuit diagrams.

UNIT – III

COMBINATIONAL LOGIC CIRCUITS DESIGN USING MSI & LSI :

Design of encoder, decoder, multiplexer and de-multiplexers, Implementation of higher order circuits using lower order circuits . Realization of Boolean functions using decoders and multiplexers. Design of Priority encoder, 4-bit digital comparator and seven segment decoder.

PJ



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INTRODUCTION OF PLD's :

PLDs: PROM, PAL, PLA -Basics structures, realization of Boolean functions, Programming table.

UNIT – IV

SEQUENTIAL CIRCUITS I:

Classification of sequential circuits (synchronous and asynchronous) , operation of NAND & NOR Latches and flip-flops; truth tables and excitation tables of RS flip-flop, JK flip- flop, T flip-flop, D flip-flop with reset and clear terminals. Conversion from one flip-flop to another flip- flop. Design of 5ripple counters, design of synchronous counters, Johnson counter, ring counter. Design of registers - Buffer register, control buffer register, shift register, bi-directional shift register, universal shift, register

Study the following relevant ICs and their relevant functions
7474,7475,7476,7490,7493,74121.

UNIT – V

SEQUENTIAL CIRCUITS II :

Finite state machine; state diagrams, state tables, reduction of state tables. Analysis of clocked sequential circuits Mealy to Moore conversion and vice-versa. Realization of sequence generator, Design of Clocked Sequential Circuit to detect the given sequence (with overlapping or without overlapping)

TEXT BOOKS:

1. Switching and finite automata theory Zvi.KOHAVI,Niraj.K.Jha 3rdEdition,Cambridge UniversityPress,2009
2. Digital Design by M.MorrisMano, Michael D Ciletti,4th editionPHIpublication,2008
3. Switching theory and logic design by Hill and Peterson,Mc-Graw Hill TMH edition, 2012.

REFERENCES:

1. Fundamentals of Logic Design by Charles H. Roth Jr,JaicoPublishers,2006
2. Digital electronics by R S Sedha.S.Chand &companylimited,2010
3. Switching Theory and Logic Design by A. AnandKumar,PHI Learningpvtltd,2016.
4. Digital logic applications and design by John M Yarbough, Cengagelearning,2006.
5. TTL 74-Seriesdatabook.

Course Outcomes:

- Classify different number systems and apply to generate various codes.
- Use the concept of Boolean algebra in minimization of switching functions
- Design different types of combinational logic circuits.
- Apply knowledge of flip-flops in designing of Registers and counters
- The operation and design methodology for synchronous sequential circuits and algorithmic state machines.
- Produce innovative designs by modifying the traditional design techniques.



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II Year-I Semester

L	T	P	C
0	0	3	1.5

ELECTRONIC DEVICES AND CIRCUITS LAB

Note: The students are required to perform the experiment to obtain the V-I characteristics and to determine the relevant parameters from the obtained graphs.

List of Experiments : (Minimum of Ten Experiments has to be performed)

1. Clipper circuit using diode
2. Clamping circuit using diode
3. Rectifiers (without and with c-filter) Part A:
Half-wave Rectifier
Part B: Full-wave Rectifier
4. BJT Characteristics (CE Configuration) Part A:
Input Characteristics
Part B: Output Characteristics
5. FET Characteristics (CS Configuration) Part A:
Drain Characteristics
Part B: Transfer Characteristics
6. SCR Characteristics
7. UJT Characteristics
8. Transistor Biasing
9. CRO Operation and its Measurements
10. BJT-CE Amplifier
11. Emitter Follower-CC Amplifier
12. FET-CS Amplifier

Equipment required:

1. Regulated Power supplies
2. Analog/ Digital Storage Oscilloscopes
3. Analog/ Digital Function Generators
4. Digital Multi-meters
5. Decade Resistance Boxes/Rheostats
6. Decade Capacitance Boxes
7. Ammeters (Analog or Digital)
8. Voltmeters (Analog or Digital)
9. Active & Passive Electronic Components.



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L	T	P	C
0	0	3	1.5

II Year-I Semester

SWITCHING THEORY and LOGIC DESIGN LAB

List of Experiments:

1. Verification of truth tables of the following Logic gates
Two input (i) OR (ii) AND (iii) NOR (iv) NAND (v) Exclusive-OR (vi) Exclusive-NOR
2. Design a simple combinational circuit with four variables and obtain minimal SOP expression and verify the truth table using Digital Trainer Kit.
3. Verification of functional table of 3 to 8-line Decoder /De-multiplexer
4. 4 variable logic function verification using 8 to 1 multiplexer.
5. Design full adder circuit and verify its functional table.
6. Verification of functional tables of (i) JK Edge triggered Flip-Flop (ii) JK Master Slave Flip-Flop (iii) D Flip-Flop
7. Design a four-bit ring counter using D Flip-Flops/JK Flip Flop and verify output.
8. Design a four-bit Johnson's counter using D Flip-Flops/JK Flip Flops and verify output
9. Verify the operation of 4-bit Universal Shift Register for different Modes of operation.
10. Draw the circuit diagram of MOD-8 ripple counter and construct a circuit using T-Flip-Flops and Test It with a low frequency clock and sketch the output waveforms.
11. Design MOD-8 synchronous counter using T Flip-Flop and verify the result and sketch the output waveforms.
12. (a) Draw the circuit diagram of a single bit comparator and test the output
(b) Construct 7 Segment Display Circuit Using Decoder and 7 Segment LED and test it.

Additional Experiments:

1. Design BCD Adder Circuit and Test the Same using Relevant IC
2. Design Excess-3 to 9- Complement convertor using only four Full Adders and test the Circuit.
3. Design an Experimental model to demonstrate the operation of 74154 De-Multiplexer using LEDs for outputs.
4. Design of any combinational circuit using Hardware Description Language
5. Design of any sequential circuit using Hardware Description Language



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II Year-I Semester

L	T	P	C
0	1	2	2

DATA STRUCTURES USING PYTHON

List of Experiments:

1. Write a Python program for class, Flower, that has three instance variables of type str, int, and float that respectively represent the name of the flower, its number of petals, and its price. Your class must include a constructor method that initializes each variable to an appropriate value, and your class should include methods for setting the value of each type, and retrieving the value of each type.
2. Develop an inheritance hierarchy based upon a Polygon class that has abstract methods area() and perimeter(). Implement classes Triangle, Quadrilateral, Pentagon, that extend this base class, with the obvious meanings for the area() and perimeter() methods. Write a simple program that allows users to create polygons of the various types and input their geometric dimensions, and the program then outputs their area and perimeter
3. Write a python program to implement Method Overloading and Method Overriding.
4. Write a Python program to illustrate the following comprehensions: a) List Comprehensions b) Dictionary Comprehensions c) Set Comprehensions d) Generator Comprehensions
5. Write a Python program to generate the combinations of n distinct objects taken from the elements of a given list. Example: Original list: [1, 2, 3, 4, 5, 6, 7, 8, 9]
Combinations of 2 distinct objects: [1, 2] [1, 3] [1, 4] [1, 5] [7, 8] [7, 9] [8, 9].
6. Write a program for Linear Search and Binary search.
7. Write a program to implement Bubble Sort and Selection Sort.
8. Write a program to implement Merge sort and Quick sort.
9. Write a program to implement Stacks and Queues.
10. Write a program to implement Singly Linked List.
11. Write a program to implement Doubly Linked list.
12. Write a program to implement Binary Search Tree.

12



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II Year-I Semester

L	T	P	C
2	0	0	-

ENVIRONMENTAL SCIENCE

Course Objectives:

- To make the students to get awareness on environment
- To understand the importance of protecting natural resources, ecosystems for future generations and pollution causes due to the day-to-day activities of human life
- To save earth from the inventions by the engineers.

UNIT – I

Multidisciplinary Nature of Environmental Studies: – Definition, Scope and Importance – Need for Public Awareness.

Natural Resources : Renewable and non-renewable resources – Natural resources and associated problems – Forest resources – Use and over – exploitation, deforestation, case studies – Timber extraction – Mining, dams and other effects on forest and tribal people – Water resources – Use and over utilization of surface and ground water – Floods, drought, conflicts over water, dams – benefits and problems – Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies – Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies. – Energy resources:

UNIT – II

Ecosystems: Concept of an ecosystem. – Structure and function of an ecosystem – Producers, consumers and decomposers – Energy flow in the ecosystem – Ecological succession – Food chains, food webs and ecological pyramids – Introduction, types, characteristic features, structure and function of the following ecosystem:

- a. Forest ecosystem.
- b. Grassland ecosystem
- c. Desert ecosystem
- d. Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

Biodiversity and Its Conservation : Introduction and Definition: genetic, species and ecosystem diversity – Bio-geographical classification of India – Value of biodiversity: consumptive use, Productive use, social, ethical, aesthetic and option values – Biodiversity at global, National and local levels – India as a mega-diversity nation – Hot-spots of biodiversity – Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts – Endangered and endemic species of India – Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.



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UNIT – III

Environmental Pollution: Definition, Cause, effects and control measures of:

- a. Air Pollution.
- b. Water pollution
- c. Soil pollution
- d. Marine pollution
- e. Noise pollution
- f. Thermal pollution
- g. Nuclear hazards

Solid Waste Management: Causes, effects and control measures of urban and industrial wastes – Role of an individual in prevention of pollution – Pollution case studies – Disaster management: floods, earthquake, cyclone and landslides.

UNIT – IV

Social Issues and the Environment: From Unsustainable to Sustainable development – Urban problems related to energy – Water conservation, rain water harvesting, watershed management – Resettlement and rehabilitation of people; its problems and concerns. Case studies – Environmental ethics: Issues and possible solutions – Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case Studies – Wasteland reclamation. – Consumerism and waste products. – Environment Protection Act. – Air (Prevention and Control of Pollution) Act. – Water (Prevention and control of Pollution) Act – Wildlife Protection Act – Forest Conservation Act – Issues involved in enforcement of environmental legislation – Public awareness.

UNIT – V

Human Population And The Environment: Population growth, variation among nations. Population explosion – Family Welfare Programmes. – Environment and human health – Human Rights – Value Education – HIV/AIDS – Women and Child Welfare – Role of information Technology in Environment and human health – Case studies.

Field Work: Visit to a local area to document environmental assets River/forest grassland/hill/mountain – Visit to a local polluted site-Urban/Rural/Industrial/Agricultural Study of common plants, insects, and birds – river, hill slopes, etc.

Textbooks:

1. Erach Bharucha, Text book of Environmental Studies for Undergraduate Courses, Universities Press (India) Private Limited, 2019.
2. Palaniswamy, Environmental Studies, 2/e, Pearson education, 2014.
3. S.Azeem Unnisa, Environmental Studies, Academic Publishing Company, 2021.
4. K.Raghavan Nambiar, "Text book of Environmental Studies for Undergraduate Courses as per UGC model syllabus", SciTech Publications (India), Pvt. Ltd. 2010.



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Reference Books:

1. Deeksha Dave and E.Sai Baba Reddy, Textbook of Environmental Science, 2/e, Cengage Publications, 2012.
2. M.Anji Reddy, "Textbook of Environmental Sciences and Technology", BS Publication, 2014.
3. J.P. Sharma, Comprehensive Environmental studies, Laxmi publications, 2006.
4. J. Glynn Henry and Gary W. Heinke, Environmental Sciences and Engineering, Prentice Hall of India Private limited, 1988.
5. G.R. Chatwal, A Text Book of Environmental Studies, Himalaya Publishing House, 2018.
6. Gilbert M. Masters and Wendell P. Ela, Introduction to Environmental Engineering and Science, 1/e, Prentice Hall of India Private limited, 1991.

Online Learning Resources:

- https://onlinecourses.nptel.ac.in/noc23_hs155/preview
- https://www.edx.org/learn/environmental-science/rice-university-ap-r-environmental-science-part-3-pollution-and-resources?index=product&objectID=course-3a6da9f2-d84c-4773-8388-1b2f8f6a75f2&webview=false&campaign=AP%C2%AE+Environmental+Science+Part+3%3A+Pollution+and+Resources&source=edX&product_category=course&placement_url=https%3A%2F%2Fwww.edx.org%2Flearn%2Fenvironmental-science
- <http://ecoursesonline.iasri.res.in/Courses/Environmental%20Science-I/Data%20Files/pdf/lec07.pdf>
- <https://www.youtube.com/watch?v=5QxxaVfgQ3k>

Course Outcomes:

COs	Statements	Blooms Level
CO1	Grasp multi disciplinary nature of environmental studies and various renewable and non-renewable resources.	L2
CO2	Understand flow and bio-geo- chemical cycles and ecological pyramids.	L2
CO3	Understand various causes of pollution and solid waste management and related preventive measures.	L2
CO4	Understand the rainwater harvesting, watershed management, ozone layer depletion and waste land reclamation.	L2
CO5	Illustrate the causes of population explosion, value education and welfare programmes.	L3