VidyaJyothi Institute of Technology

(An Autonomous Institution)

(Accredited by NAAC & NBA, Approved by AICTE New Delhi & Permanently Affiliated to JNTUH)

Aziz Nagar Gate, C.B. Post, Hyderabad-500 075

Department of Electronics and Communication Engineering

Minutes of the Board of studies in ECE meeting held on 15th July 2021 at 02.00 PM in the online mode.

The following members were present in the online meeting.

S.No	Name of the Member	Designation	Signature
1.	Dr. K.Vasanth, Professor & Head ECE, VJIT	Chairman	
2.	Dr. P. Chandra Sekhar Reddy, Professor, JNTUH CEH	JNTUH Nominee	
3.	Dr. K S Rao, Director, Anurag Group of Institutions.	Member	
4.	Dr. P. Chandra Sekhar, Professor, Osmania University	Member	
5.	Dr. Y. Pandurangaiah, Professor, Vardhaman College of Engineering, Shamshabad.	Member	
6.	Mr. A. Hariharan, Associate Director, PACTRA EDGE, Hyderabad.	Member	
7.	Mr. N. Venkatesh, Sr. Director, Sillicon Labs, Hyderabad.	Member	
8.	Dr. S. Tulasi Prasad, Professor,ECE,VJIT	Member	
9.	Dr.P.Ganesan, Professor, ECE,VJIT	Member	
10.	Mr. M Rajendra Prasad, Assoc. Professor, ECE, VJIT.	Member	
11.	Mrs. A. Jaya Lakshmi, Assoc. Professor, ECE, VJIT.	Member	

Resolutions

Item No. 1: Approval of B.Tech. (ECE) II, III and IV Year Course Structure of R-20 regulations

The chairman of BoS presented a detailed course structure of B.Tech.(ECE) II, III and IV Years of R-20 regulations.

Resolution (1): The members after adetailed discussion approved the course structure of B.Tech. (ECE) II, III and IV Years of R-20 regulations. The details of the course structure are given in Annexure - 1

Noted and Approved.

Item No. 2: Approval of B.Tech. (ECE) II, III and IV Year Syllabi of R-20 regulations

The Chairman presented a detailed syllabi of all the three years of B.Tech.(ECE) II, III and IV Years of R-20 regulations.

Resolution (2): The members after thorough discussion approved the syllabi of B.Tech. (ECE) II, III and IV Years. The details of the syllabi approved are given in Annexure -2

Noted and Approved.

Item No. 3: Approval of syllabi of B.Tech. (ECE) III and IV Year Professional and Open Electives Courses under R-20 regulations

The chairman of BoS presented the details of professional electives offered to B.Tech.(ECE) students of III and IV Years of R-20 regulations. The chairman also presented the detailed syllabi of open elective courses offered to other than ECE students.

Resolution (3): The members after detailed discussion approved the syllabi of Professional elective courses of B.Tech. (ECE) III and IV Yearsand Open elective courses to other than ECE students . The details of the syllabi are given in Annexure -3

Noted and Approved.

Item No. 4: Approval of B.Tech. (ECE) Fast track Curriculum scheme offered to B.Tech III and IV Year students of R-20 regulations .

The chairman of BoS also presented the salient features of B.Tech.(ECE) Fast track Curriculum scheme offered toB.Tech. (ECE)III and IV Years students.

Resolution (4): The members after thorough discussion approved the Fast track Curriculum scheme offered toB.Tech. (ECE) III and IV Years students and the details are given in Annexure – 4.

Noted and Approved

Item No. 5: Approval of the courses along with their syllabi offered to other department students under R-20 regulations

The Chairman presented a detailed syllabi of courses which are offered to other Engg. Departments under R-20 regulations.

Resolution (5): The members after thorough discussion approved the courses offered toother engg. depts and the details are given in Annexure – 5.

Noted and Approved

Item No. 6: Approval of Courses / Equivalent Subjects (Detained Students of Old Regulation) along with their syllabi offered to students under R18 / R19 / R15 Regulations

Resolution (6): Kindly grant powers to the Chairman of BoS to take decision regarding Approval of Courses / Equivalent Subjects (Detained students of old regulation) along with their syllabi offered to students under R18 / R19 / R15 Regulations

Noted and Approved

Item No. 7: Approval of Panel of examiners

The Chairperson emphasized the necessity of Panel of Examiners. Their services will be utilized in the preparation of End-Semester Question paper(s) and Evaluation of End-Semester Examination Answer Scripts. They will be paid remuneration as per the recommendations of College Finance Committee.

Resolution (7): The committee on BoS in ECE to prepare the Panel of examiners in consultation with the senior teachers for all the B.Tech (ECE) courses under R-20 regulations. The same may be submitted to the Examination branch (Autonomous) for further processing.

Noted and Approved.

BoS Members' Signatures:

1. Dr. K. Vasanth, Professor, Head & Chairman of BoS ECE Dept., VJIT.	2.Dr.P. Chandrasekhar Reddy, Professor of ECE,JNTUH CEH, University Nominee.	3.Dr. K.S. Rao, Director, Anurag Group ofInstitutions, External Member.	4. Dr. P. Chandra Sekhar, HoD, Dept., of ECE, OsmainaUniversity, External Member.
5. Dr. Y. Pandurangaiah, Professor, Vardhaman College of Engineering, Shamshabad, External Member.	6. Mr. A. Hariharan, Associate Director, PACTRA EDGE, Hyderabad, External Member.	7. Mr. N. Venkatesh, Sr. Director, Sillicon Labs, Hyderabad, External Member.	8. Dr. S. Thulasi Prasad, Professor,ECE,VJIT, Internal Member.
9. Dr. P. Ganesan, Professor, ECE,VJIT, Internal Member.	10. Mr. M. Rajendra Prasad, Associate Professor, ECE,VJIT, Internal Member.	11. Mrs. A. Jaya Lakshmi, Associate Professor, ECE,VJIT, Internal Member.	**Date of Bos Meeting On** **15/07/2021**

Vidya Jyothi Institute of Technology R20

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Aziz Nagar Gate, C.B. Post, Hyderabad-500 075

Department of Electronics and Communication Engineering

Place before every Semester in Course Structure for reference

R20 REGULATIONS

Syllabus

R20 REGULATIONS

Department of ECE

Course Structure

The Syllabus is for the Students admitted in AY: 2020 - 2021

Department of Electronics and Communication Engineering

ANNEXURE - I
COURSE STRUCTURE FOR B.TECH I YEAR

I B.Tech I Sem ECE:

S.No.	Course Category	Course Title	L	T	P	Credits
1.	BS-1	Mathematics-I	3	1	0	4.0
2.	BS -2	Applied Physics	3	1	0	4.0
3.	BS -3	Physics Lab	0	0	3	1.5
4.	H&S -1	English	2	0	0	2.0
5.	H&S Lab -1	English Language Skills Lab (ELSL)	0	0	2	1.0
6.	ES -1	Programming for Problem Solving-I	2	0	0	2.0
7.	ES lab - 1	Programming for Problem Solving Lab-I	0	0	2	1.0
8.	ES -2	Engineering Graphics & Modeling	1	0	3	2.5
Total number			11	2	10	18

I B.Tech II Sem ECE:

S.No.	Course Category	Course Title	L	T	P	Credits
1.	BS-4	Mathematics-II	3	1	0	4.0
2.	BS-5	Chemistry	3	1	0	4.0
3.	BS -6	Chemistry Lab	0	0	3	1.5
4.	ES -3	Basic Electrical Engineering	3	0	0	3.0
5.	ES lab -2	Basic Electrical Engineering Lab	0	0	2	1.0
6.	ES - 5	Engineering Workshop	0	1	3	2.5
7.	H&S Lab-2	English Communication Skills Lab (ECSL)	0	0	2	1.0
8.	ES -6	Programming for Problem Solving-II	2	0	0	2.0
9.	ES lab - 4	Programming for Problem Solving Lab-II	0	0	2	1.0
Total number			11	3	12	20

Department of Electronics and Communication Engineering

COURSE STRUCTURE FOR B.TECH II YEAR

II B.Tech I Sem ECE:

S.No.	Course Category	Course Title	L	T	P	Credits
1.	BS-7	Complex Analysis and Fourier Transforms	3	0	0	3.0
2.	ES-7	OOP Through JAVA	3	0	0	3.0
3.	PC-1	Electronic Devices and Circuits	3	0	0	3.0
4.	BS-8	Probability Theory and Stochastic Processes	3	0	0	3.0
5.	PC-2	Signals and Systems	3	1	0	4.0
6.	H&S-3	Professional Communications	2	0	0	2.0
7.	PC Lab-1	Electronic Devices and Circuits Laboratory	0	0	2	1.0
8.	PC Lab-2	Basic Simulation Laboratory	0	0	2	1.0
9.	MC-1	Gender Sensitization	2	0	0	0
Total number			19	1	4	20

II B.Tech II Sem ECE:

S.No.	Course Category	Course Title	L	T	P	Credits
1.	PC-3	Switching Theory and Logic Design	2	1	0	3.0
2.	ES-8	Electrical Technology	3	0	0	3.0
3.	PC – 4	Network Analysis and Transmission Lines	3	0	0	3.0
4.	PC-5	Analog and Digital Communications	2	1	0	3.0
5.	PC-6	Analog and Pulse Circuits	3	0	0	3.0
6.	PC-7	Electromagnetic Waves	3	0	0	3.0
7.	PC Lab-3	Analog & Digital Comm. Laboratory	0	0	2	1.0
8.	PC Lab-4	Analog and Pulse Circuits Laboratory	0	0	2	1.0
9.	MC-2	Environment Science	2	0	0	0
Total number			18	2	4	20

Department of Electronics and Communication Engineering

COURSE STRUCTURE FOR B.TECH II YEAR

II B.Tech I Sem ECE:

S.No.	Course Category	Course Title	L	T	P	Credits
1.	BS-7	Complex Analysis and Fourier Transforms	3	0	0	3.0
2.	ES-7	OOP Through JAVA	3	0	0	3.0
3.	PC-1	Electronic Devices and Circuits	3	0	0	3.0
4.	BS-8	Probability Theory and Stochastic Processes	3	0	0	3.0
5.	PC-2	Signals and Systems	3	1	0	4.0
6.	H&S-3	Professional Communications	2	0	0	2.0
7.	PC Lab-1	Electronic Devices and Circuits Laboratory	0	0	2	1.0
8.	PC Lab-2	Basic Simulation Laboratory	0	0	2	1.0
9.	MC-1	Gender Sensitization	2	0	0	0
Total number			19	1	4	20

II B.Tech II Sem ECE:

S.No.	Course Category	Course Title	L	T	P	Credits
1.	PC-3	Switching Theory and Logic Design	2	1	0	3.0
2.	ES-8	Electrical Technology	3	0	0	3.0
3.	PC – 4	Network Analysis and Transmission Lines	3	0	0	3.0
4.	PC-5	Analog and Digital Communications	2	1	0	3.0
5.	PC-6	Analog and Pulse Circuits	3	0	0	3.0
6.	PC-7	Electromagnetic Waves	3	0	0	3.0
7.	PC Lab-3	Analog & Digital Comm. Laboratory	0	0	2	1.0
8.	PC Lab-4	Analog and Pulse Circuits Laboratory	0	0	2	1.0
9.	MC-2	Environment Science	2	0	0	0
Total number			18	2	4	20

Department of Electronics and Communication Engineering

COURSE STRUCTURE FOR B.TECH III YEAR

III B.Tech I Sem ECE:

S.No	Course Category	Course Title	L	T	P	Credits
1	ES – 9	Control Systems Engineering	3	0	0	3.0
2	PC – 8	Microprocessors & Microcontrollers	2	1	0	3.0
3	PC – 9	Linear & Digital IC Applications	3	0	0	3.0
4	PC – 10	Antenna And Propagation	3	0	0	3.0
5	PE-1	**Professional Elective-1**	3	0	0	3.0
		1. Computer Architecture				
		2. Information Theory and Coding				
		3. Introduction to Mems				
6	OE-1	**Open Elective-1**	3	0	0	3.0
		1. Introduction to Microcontrollers				
		2. Basic Electronics				
7	PC Lab-5	Microprocessor and Microcontrollers Laboratory	0	0	2	1.0
8	PC Lab-6	Linear & Digital IC App. Laboratory	0	0	2	1.0
9	VAC 1	Personality Development &Behavioral Skills	2	0	0	1.0
Total Number			**19**	**1**	**4**	**21**

III B.Tech II Sem ECE:

S.No	Course Category	Course Title	L	T	P	Credits
1	H&S- 4	Managerial Economics & Financial Analysis	3	0	0	3.0
2	PC-11	Digital Signal Processing	2	1	0	3.0
3	PC-12	Microwave Engineering	2	1	0	3.0
4	PC-13	Data Communication and Networking	2	1	0	3.0
5	PE-2	**Professional Elective-2**	3	0	0	3.0
		1. Digital Signal Processors and Architectures				
		2. Modelling and Simulation using MATLAB				
		3. Optical Communications				
6	OE – 2	**Open Elective-2**	3	0	0	3.0
		1. Basic Electronic Instrumentation				
		2. Consumer Electronics				
7	PC Lab-7	Digital Signal Processing Laboratory	0	0	2	1.0
8	H&S lab-3	Adv. Communication Skills Laboratory	0	0	2	1.0
9	VAC 2	Quantitative Methods & Logical Reasoning	2	0	0	1.0
Total Number			**17**	**3**	**4**	**21**

Department of Electronics and Communication Engineering

COURSE STRUCTURE FOR B.TECH III YEAR (FAST TRACK)

III B.Tech II Sem ECE:

S.No	Course Category	Course Title	L	T	P	Credits
1	H&S -4	Managerial Economics & Financial Analysis	3	0	0	3.0
2	PC-11	Digital Signal Processing	2	1	0	3.0
3	PC-12	Microwave Engineering	2	1	0	3.0
4	PC-13	Data Communication and Networking	2	1	0	3.0
5	PE-2	**Professional Elective-2**	3	0	0	3.0
		1. Digital Signal Processors and Architectures				
		2. Modelling and Simulation using MATLAB				
		3. Optical Communications				
	PC-16	**Fast Track**	3	0	0	3.0
6	OE – 2	**Open Elective-2**	3	0	0	3.0
		1. Basic Electronic Instrumentation				
		2. Consumer Electronics				
7	PC Lab-7	Digital Signal Processing Laboratory	0	0	2	1.0
8	H&S lab-3	Adv. Communication Skills Laboratory	0	0	2	1.0
9	VAC 2	Quantitative Methods & Logical Reasoning	2	0	0	1.0
Total Number			**20**	**3**	**4**	**24**

Department of Electronics and Communication Engineering

COURSE STRUCTURE FOR B.TECH IV YEAR

IV B.Tech I Sem ECE:

S.No.	Course Category	Course Title	L	T	P	Credits
1	PC – 14	Embedded System Design	2	1	0	3.0
2	PC – 15	VLSI Design	2	1	0	3.0
3	PE-3	**Professional Elective-3** 1. Digital Image Processing 2. Cellular and Mobile Communications 3. Radar Engineering	3	0	0	3.0
4	PE-4	**Professional Elective-4** 1. Biomedical Instrumentation 2. Satellite Communications 3. Telecommunication Switching Systems and Networks	3	0	0	3.0
5	OE-3	**Open Elective-3** 1. Automotive Electronics 2. Introduction to Communication Engineering	3	0	0	3.0
6	PC Lab-8	Embedded & VLSI Laboratory	0	0	2	1.0
7	PC Lab-9	Antenna and Microwave Engineering Laboratory	0	0	2	1.0
8	Mini P	Industry OrientedMini Project	0	0	0	3.0
Total Number			**13**	**2**	**4**	**20**

IV B.Tech II Sem ECE:

S.No.	Course Category	Course Title	L	T	P	Credits
1	PC-16	Electronic Measurements & Instrumentation	3	0	0	3.0
2	PC-17	Wireless Communications and Networks	3	0	0	3.0
3	TS	Technical Seminar	0	0	0	2.0
4	CVV	Comprehensive Viva Voce	0	0	0	2.0
5	MP	Major Project	0	0	20	10.0
Total number			**6**	**0**	**20**	**20**

Department of Electronics and Communication Engineering

COURSE STRUCTURE FOR B.TECH IV YEAR (FAST TRACK)

IV B.Tech I Sem ECE:

S.No.	Course Category	Course Title	L	T	P	Credits
1	PC – 14	Embedded System Design	2	1	0	3.0
2	PC – 15	VLSI Design	2	1	0	3.0
3	PE-3	**Professional Elective-3** 1. Digital Image Processing 2. Cellular and Mobile Communications 3. Radar Engineering	3	0	0	3.0
4	PE-4	**Professional Elective-4** 1. Biomedical Instrumentation 2. Satellite Communications 3. Telecommunication Switching Systems and Networks	3	0	0	3.0
	PC-17	**Fast Track**	3	0	0	3.0
5	OE-3	**Open Elective-3** 1. Automotive Electronics 2. Introduction to Communication Engineering	3	0	0	3.0
6	PC Lab-8	Embedded & VLSI Laboratory	0	0	2	1.0
7	PC Lab-9	Antenna and Microwave Engineering Laboratory	0	0	2	1.0
8	Mini P	Industry OrientedMini Project	0	0	0	3.0
		Total Number	**16**	**2**	**4**	**23**

IV B.Tech II Sem ECE:

S.No.	Course Category	Course Title	L	T	P	Credits
1	TS	Technical Seminar	0	0	0	2.0
2	CVV	Comprehensive Viva Voce	0	0	0	2.0
3	MP	Major Project	0	0	20	10.0
		Total number	0	0	20	14

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9. Dr. P. Ganesan, Professor, ECE,VJIT, Internal Member.	10. Mr. M. Rajendra Prasad, Associate Professor, ECE,VJIT, Internal Member.	11. Mrs. A. Jaya Lakshmi, Associate Professor, ECE,VJIT, Internal Member.	**Date of Bos Meeting On** **15/07/2021**

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OBJECT ORIENTED PROGRAMMING Through JAVA

II B.Tech I Semester

L	T	P	C
3	0	0	3

COURSE OUTCOMES:

After going through this course the student will be able to:

1. Able to solve real world problems using OOPtechniques.
2. Able to understand the use of abstract classes.
3. Able to solve problems using inheritance, polymorphism.
4. Able to develop multithreaded applications with synchronization.
5. Able to handle run time errors while applying exception handling

Unit-I:

Fundamentals of Object Oriented Programming:

Object-Oriented Paradigm, Basic Concepts of Object Oriented Programming- Objects and Classes, Data abstraction and encapsulation, inheritance , Polymorphism, Data binding, Message Communication, Benefits of OOP, Applications of OOP.

Java Basics:

History of Java, Java buzzwords, data types, variables, scope and life time of variables, arrays, operators, expressions, control statements, type conversion and type casting, simple java program.

Unit-II:

Concepts of classes and objects:

classes, objects, constructors, methods, access control, this keyword, garbage collection, overloading methods and constructors, parameter passing, recursion, nested and inner classes, Strings.

Unit-III:

Inheritance:

Base class object, subclass, subtype, substitutability, forms of inheritance- specialization, specification, construction, extension, limitation, combination, Member access rules, super uses, using final with inheritance, polymorphism- method overriding, abstract classes, Objectclass.

Unit-IV:

Packages:

Defining a Package, CLASSPATH, Access protection, importing packages.

Interfaces:

Defining an interface, implementing interfaces, variables in interfaces and extending interfaces.

Stream based I/O (java.io):

The Stream classes-Byte streams and Character streams, Reading console Input and Writing Console Output, The Console class, Serialization, Enumerations, auto boxing, generics.

Unit V:

Exception handling:

Concepts of exception handling, exception hierarchy, usage of try, catch, throw, throws and finally, built in exceptions, creating own exception sub classes.

Multithreading:

Difference between multitasking and multithreading, Thread Lifecycle, Thread class, Runnable interface, Thread priorities, Daemon threads

TEXTBOOKS:

1. Herbert Schildt , The Complete Reference Java, Tata Mc Graw Hill, 2002
2. Budd T , Understanding Object Orient Programming with Java, Pearson.2002

REFERENCE BOOKS:

1. Jaime Nino, Frederick A. Hosch, An Introduction to programming and object oriented design using java, Wiley, 2009
2. Budd T, An Introduction to Object Orient Programming, Pearson, 2008

ELECTRONIC DEVICES AND CIRCUITS

II B.Tech I Semester

L	T	P	C
3	0	0	3

COURSE OUTCOMES:

After going through this course the student will be able to:

1. Demonstrate the concepts of semiconductor theory.
2. Interpret the characteristics of different semiconductor devices with its applications.
3. Apply different biasing techniques of transistors for amplification.
4. Analyze transistor amplifiers using small signal model.
5. Ability to describe the behavior of special purpose diodes.

UNIT I:

Diode:

PN junction Diode – Characteristics, Current equation, Temperature dependence, Static and Dynamic resistances, Equivalent circuit, Diffusion and Transition Capacitances,

Diode Applications:

Rectifier - Half Wave Rectifier, Full Wave Rectifier, Bridge Rectifier, Rectifiers with Capacitive Filter, Clippers, Clampers.

UNIT II:

Bipolar Junction Transistor (BJT):

Principle of Operation and characteristics - Common Emitter, Common Base, Common Collector Configurations, Operating point, DC & AC load lines, Transistor Hybrid parameter model, Determination of h-parameters from transistor characteristics, Conversion of h-parameters.

UNIT III:

Transistor Biasing and Stabilization:

Bias Stability, Fixed Bias, Collector to Base bias, Self Bias, Bias compensation using Diodes and Transistors.

Analysis and Design of Small Signal Low Frequency BJT Amplifiers:

Analysis of CE, CC, CB Amplifiers and CE Amplifier with emitter resistance, low frequency response of BJT Amplifiers, effect of coupling and bypass capacitors on CE Amplifier.

UNIT IV:

Junction Field Effect Transistor:

Construction, Principle of Operation, Pinch-Off voltage, Volt-Ampere characteristic, comparison of BJT and FET, Biasing of FET, FET as voltage variable resistor, MOSFET construction and its characteristics in enhancement and depletion modes.

UNIT V:

FET Amplifiers:

Small Signal Model, Analysis of CS, CD, CG JFET Amplifiers. Basic Concepts of MOSFET Amplifiers.

Special Purpose Devices:

Zener Diode - Characteristics, Voltage Regulator; Principle of Operation - SCR, Tunnel diode, UJT, Varactor Diode.

TEXTBOOKS:

1. Millman & Halkias, Electronic devices and circuits, McGraw Hill , 2007
2. S. Salivahanan, N. Suresh Kumar, A. Vallavaraj , Electronic Devices and Circuits, Tata Mc Graw Hill , 2008.

REFERENCE BOOKS:

1. Boylestad R L & Louis Nashelsky Electronic Devices and Circuits, Prentice Hall India, 2006.
2. Gupta J B, Electronic Devices and Circuits, S. K. Kataria, 2009

ANNEXURE - II

COMPLEX ANALYSIS AND FOURIER TRANSFORM

II B.Tech I Semester

L	T	P	C
3	0	0	3

Course Outcomes:

After learning the contents of this course the students must be able to:

1. Work with the functions of complex variables and evaluation of complex differentiation.
2. Acquire the knowledge of complex power series and integration.
3. Apply the knowledge of contour integration to evaluate real integrals in engineering problems and acquire the knowledge of evaluating of conformal mapping and bilinear transformations.
4. Studying of Fourier series and defining it for various types of functions.
5. Apply Fourier sine and cosine integral theorems for a given function f(x) evaluate Fourier transforms, sine and cosine transforms.

UNIT-I:

Functions of Complex Variables:

Introduction, Complex functions - limits and Continuity-Differentiability, Analytic functions and Properties, Cauchy-Riemann Equations (Cartesian and Polar), Harmonic functions, Construction of analytic functions.

UNIT-II:

Complex Integration:

Introduction, Complex integration-Line integral, Cauchy's integral theorem, Cauchy's integral formula, Generalized Cauchy's integral formula, Power series: Taylor's series, Laurent series, Singular points, Types of Singularities, Residue, Cauchy's Residue theorem.

UNIT-III:

Evaluation of Integrals & Conformal Mapping:

Introduction,-Evaluation of improper real integrals of the type (a) $\int_{\infty}^{\infty} f(x)dx$

(b) $\int_{c}^{c+2\pi} f(\cos\theta, \sin\theta)d\theta$ -Conformal Mapping,-Critical Points-Bilinear transformation – fixed point – cross ratio - properties - invariance of circles.

UNIT-IV:

Fourier series:

Introduction- Periodic functions- Fourier series of periodic function- Dirichlet's conditions- Even and odd functions- Change of interval- Half-range sine and cosine series.

UNIT-V:

Fourier Transforms:

Introduction- Fourier integral theorem (without proof)- Fourier integrals in complex form- Standard results- Fourier sine and cosine integrals- Fourier Transforms- Infinite and finite Fourier Transforms- Properties- Fourier sine and cosine transforms- inverse transforms, Finite Fourier transforms.

TEXTBOOKS:

1. Grewal B S, Higher Engineering Mathematics, Khanna Publishers, 2014.
2. Bali N P, Manesh Goyal , A text book of Engineering Mathematics, Laxmi Publications. 2011

REFERENCE BOOKS:

1. Erwin Kreyszig, Herbert Kreyszig, Edward J. Norminton , Advanced Engineering Mathematics, Wiley, 2011
2. Saff E B, Arthur David Snider , Fundamentals of Complex Analysis, Pearson, 1993.

PROBABILITY THEORY AND STOCHASTIC PROCESSES

II B.Tech I Semester

L	T	P	C
3	0	0	3

COURSE OUTCOMES:

After going through this course the student will be able to

1. Demonstrate knowledge in Probability theory, Single and multiple random variables and Random processes and their characteristics
2. Analyzeoperationsonsingleandmultiplerandomvariablesandprocesses.
3. Compute Simple probabilities using an appropriate sample space, Expectations from probability density functions, Least-square & maximum likelihood estimators for engineering problems Mean and Covariance functions for simple random processes.
4. Designsolutionsforcomplexengineeringproblemsinvolvingrandomprocesses.
5. Understand how random variables and stochastic processes can be described and analyzed

UNIT-I:

Probability & Random variables:

Probability:

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.

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, 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 and more Random Variables, Central Limit Theorem, Equal and UnequalDistribution. Expected Value of a Function of Random Variables- Joint Moments about the Origin, Joint Central Moments, Joint Characteristic Functions

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- 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 unction and Its Properties,RandomSignalResponseofLinearSystems:SystemResponse–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, RelationshipbetweenCross – PowerSpectrumandCross-CorrelationFunction.SpectralCharacteristicsof System Response: Power Density Spectrum of Response, Cross-Power Density Spectrums of Inputand Output.

UNIT-V:

Noise sources:

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.

TEXT BOOKS:

1. Peyton Z. Peebles , Probability, Random Variables & Random Signal Principles, Tata McGraw Hill, 2001.
2. Taub and Schilling , Principles of Communication systems , Tata McGraw Hill,2008

REFERENCE BOOKS:

1. Athanasios Papoulis and S. Unnikrishna Pillai, Probability, Random Variables and Stochastic Processes, Prentice Hall India, 2002.
2. Murugesan K, Guruswamy P, Probability, Statistics & Random Processes, Anuradha Publications,2003.

SIGNALS AND SYSTEMS

II B.Tech I Semester

L	T	P	C
3	1	0	4

COURSE OUTCOMES:

After going through this course the student will be able to:

1. Understand the Mathematics, operations and classification of signals and systems
2. Apply the transform on standard and arbitrary signals
3. Infer the signal transmission through linear systems
4. Interpret the concepts of Laplace Transform and Z-Transform in analysis of systems.
5. Understand the process of sampling and the effects of under sampling.

UNIT I:

Signal Analysis:

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, Classification of Signals and systems, Exponential and Sinusoidal signals, Concepts of Impulse function, Unit Step function, Signum function.

UNIT II:

Fourier series&Fourier Transforms:

Representation of Fourier series, Continuous time periodic signals - Dirichlet's conditions, Trigonometric Fourier Series and Exponential Fourier Series, Complex Fourier spectrum. Deriving Fourier Transform from Fourier series, Fourier Transform of arbitrary signal - standard signals - Periodic Signals – Properties - Introduction to Hilbert Transform.

UNIT III:

Signal Transmission through Linear Systems:

Linear System, Impulse response, Response of a Linear System, Linear Time Invariant(LTI) System, Linear Time Variant (LTV) System, Transfer function of a LTI System, Filter characteristic of Linear System, Distortion less transmission through a system, Signal bandwidth, System Bandwidth, Ideal LPF, HPF, and BPF characteristics, Causality and Paley-Wiener criterion for physical realization, Relationship between Bandwidth and rise time.

UNIT IV:

Laplace Transforms:

Laplace Transforms (L.T), Inverse Laplace Transform, Concepts of Region of Convergence (ROC) for Laplace Transforms, Properties of L.T, Relation between L.T and F.T of a signal, Laplace Transform of certain signals using waveform synthesis.

UNIT V:

Sampling Theorem and Z–Transforms:

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 Band PassSampling.

Concept of Z-Transform of a Discrete Sequence, Distinction between Laplace, Fourier and Z Transforms, Region of Convergence in Z-Transform, Constraints on ROC for various classes of signals, Inverse Z-transform, Properties ofZ-transforms.

TEXT BOOKS:

1. Lathi B P, Signals, Systems & Communications, B.S. Publications, 2003.
2. Alan V. Oppenheim, Alan S. Willsky, Syed Hamid Nawab , Signals and Systems, Prentice Hall India,1997

REFERENCE BOOKS:

1. Simon S. Haykin, Barry Van Veen , Signals and Systems, Wiley, 2003
2. Rama Krishna Rao A, Signals and Systems, 2008, Tata McGraw Hill , 2008.

PROFESSIONAL COMMUNICATIONS

(Common to all branches)

II B.Tech I Semester

L	T	P	C
2	0	0	2

COURSE OUTCOMES:

After going through this course the student will be able to:

1. Acquire enhanced personality
2. Exhibit appropriate professional etiquette
3. Practice team building with strong communication skills
4. Develop problem solving skills and decision-making
5. Demonstrate effective presentation skills

UNIT-I:

Self Appraisal:

Self Introspection/ Self Retrospection
Introducing self & others
Goal setting
SWOT Analysis,

UNIT- II:

Professional Etiquette:

Etiquette-Telephone Etiquette- Netiquette
Email, Social Network
Behavioural Traits
Case study

UNIT-III:

Team Building:

Leadership skills-Case Studies
Team Essentials
Negotiation Skills
Group Discussion-Functional Aspects

UNIT-IV:

Logical Thinking and Analytical Reasoning:

Decision Making
Problem Solving
Conflict management
Case Study

UNIT-V:

Presentation Skills:

Poster Presentation
Oral Presentation-Individual Presentation, Team Presentation, Thematic Presentation

TEXT BOOK:

1. Ashrif Rizvi, Effective Technical Communication, Tata Mc Graw Hill, 2011

REFERENCE BOOKS:

1. Soundarajan, Speaking and Writing for Effective Business, Memillan, 2010.
2. Hector Sanchez , English for Professional Success, Thomson , 2010.

Department of Electronics and Communication Engineering

ELECTRONIC DEVICES AND CIRCUITS LABORATORY

II B.Tech I Semester

L	T	P	C
0	0	2	1

COURSE OUTCOMES:

After going through this course the student will be able to:

1. Identify and use the basic components and instruments in electronics laboratory
2. Outline the characteristics of different semiconductor devices.
3. Interpret the ripple factor, regulations of rectifiers.
4. Sketch the frequency response of small signal amplifiers.
5. Understand the concepts of SCR & UJT and observe its characteristics.

PART A:
(Only for Viva-voce Examination):
Electronic Workshop Practice (In 3 Lab Sessions):

1. Identification, Specifications, Testing of R, L, C Components (Color Codes), Potentiometers, Switches (SPDT, DPDT, and DIP), Coils, Gang Condensers, Relays, Bread Boards and PCBs
2. Identification, Specifications and Testing of Active Devices, Diodes, BJTs, Low power JFETs, MOSFETs, Power Transistors, LEDs, LCDs, SCR and UJT.
3. Study and operation of
   a. Multimeters (Analog and Digital)
   b. Function Generator
   c. Regulated Power Supplies
   d. CRO.

PART B:
(For Laboratory Examination – Minimum of 12 experiments):

1. Forward & Reverse Bias Characteristics of PN Junction Diode.
2. Zener diode characteristics and Zener as voltage Regulator.
3. Half Wave Rectifier with & without filters.
4. Full Wave Rectifier with & without filters.
5. Input & Output Characteristics of Transistor in CB Configuration and h-parameter calculations.
6. Input & Output Characteristics of Transistor in CE Configuration and h-parameter calculations.
7. FET characteristics.
8. Lissajous patterns using CRO
9. Frequency Response of CC Amplifier.
10. Frequency Response of CE Amplifier.
11. Frequency Response of Common Source FET amplifier.
12. SCR characteristics.
13. UJT Characteristics
14. Clippers
15. Clampers

Department of Electronics and Communication Engineering

BASIC SIMULATION LABORATORY

II B.Tech I Semester

L	T	P	C
0	0	2	1

COURSE OUTCOMES:

After going through this course the student will be able to:

1. Evaluate the operation on signals and systems using arithmetic operations and transforms
2. Application of correlation and transforms on noise removal and signal extraction
3. Compute various statistical properties of a random noise and verify whether it is stationary
4. Determine the correlation & Convolution between Signals and sequences.
5. Validate the properties and waveform synthesis of various transforms

Minimum 12 experiments to be Simulated Using MATLAB:

1. Generation of various signals and sequences (Periodic and A periodic), such as Unit Impulse, Unit step, square, saw tooth, Triangular, Sinusoidal, Ramp, Sinc.
2. Operations on Signals and Sequences such as Addition, multiplication, scaling, Shifting, Folding, computation of Energy and average power.
3. Finding the Even and Odd parts of Signal/sequence and Real and imaginary parts of signal.
4. Convolution between signals and sequences.
5. Auto correlation and cross correlation between signals and sequences.
6. Verification of Linearity and Time Invariance Properties of a given continuous/Discrete system.
7. Gibbs Phenomenon.
8. Finding the Fourier Transform of a given signal and plotting its magnitude and phase spectrum.
9. Waveform synthesis using Laplace Transform.
10. Locating the Zeros and Poles and plotting the Pole-Zero maps in S plane and Z-plane for the given transfer function.
11. Generation of Guassian noise (Real and complex), Computation of its mean, M.S. value and its Skew, Kurtosis, and PSD, probability distribution function.
12. Sampling Theorem Verification.
13. Removal of noise by Autocorrelation / Cross correlation.
14. Extraction of Periodic signal masked by noise using correlation.

GENDER SENSITIZATION

II B.Tech I Semester

L	T	P	C
2	0	0	0

COURSE OUTCOMES:

After going through this course the student will be able to:

1. Students will have developed a better understanding of important issues related to gender in contemporary India.
2. Students will be sensitized to basic dimensions of the biological, sociological, psychological and legal aspects of gender. This will be achieved through discussion of materials derived from research, facts, everyday life, literature and film.
3. Students will attain a finer grasp of how gender discrimination works in our society and how to counter it.
4. Students will acquire insight into the gendered division of labour and its relation to politics and economics.
5. Men and women students and professionals will be better equipped to work and live together as equals.
6. Students will develop a sense of appreciation of women in all walks of life.
7. Through providing accounts of studies and movements as well as the new laws that provide protection and relief to women, the textbook will empower students to understand and respond to gender violence.

UNIT-I:
UNDERSTANDING GENDER:
Gender: Why Should We Study It? (Towards a World of Equals: Unit -1) Socialization: Making Women, Making Men (Towards a World of Equals: Unit -2) Introduction. Preparing for Womanhood. Growing up Male. First lessons in Caste. Different Masculinities.

UNIT-II:
GENDER AND BIOLOGY:
Missing Women: Sex Selection and Its Consequences (Towards a World of Equals: Unit -4) Declining Sex Ratio. Demographic Consequences.
Gender Spectrum: Beyond the Binary (Towards a World of Equals: Unit -10) Two or Many? Struggles with Discrimination.

UNIT-III:
GENDER AND LABOUR:
Housework: the Invisible Labour (Towards a World of Equals: Unit -3)
"My Mother doesn't Work." "Share the Load."
Women's Work: Its Politics and Economics (Towards a World of Equals: Unit -7)
Fact and Fiction. Unrecognized and Unaccounted work. Additional Reading: Wages and Conditions of Work.

UNIT-IV:

ISSUES OF VIOLENCE:

Sexual Harassment: Say No! (Towards a World of Equals: Unit -6)
Sexual Harassment, not Eve-teasing- Coping with Everyday Harassment- Further Reading: *"Chupulu".*

Domestic Violence: Speaking Out (Towards a World of Equals: Unit -8)
Is Home a Safe Place? -When Women Unite [Film]. Rebuilding Lives. Additional Reading: New Forums for Justice.
Thinking about Sexual Violence (Towards a World of Equals: Unit -11)
Blaming the Victim-"I Fought for my Life…." - Additional Reading: The Caste Face of Violence.

UNIT-V:

GENDER: CO – EXISTENCE:

Just Relationships: Being Together as Equals (Towards a World of Equals: Unit -12) Mary Kom and Onler. Love and Acid just do not Mix. Love Letters. Mothers and Fathers. Additional Reading: Rosa Parks-The Brave Heart.

TEXTBOOK:

All the five Units in the Textbook, "Towards a World of Equals: A Bilingual Textbook on Gender" written by

1. Suneetha, Uma Bhrugubanda, Duggirala Vasanta, Rama Melkote, Vasudha Nagaraj, Asma Rasheed, Gogu Shyamala, Deepa Sreenivas and Susie Tharu and published by Telugu Akademi, Hyderabad, Telangana State in the year 2015.

Note: Since it is an Interdisciplinary Course, Resource Persons can be drawn from the fields of English Literature or Sociology or Political Science or any other qualified faculty who has expertise in this field from engineering departments.

REFERENCE BOOKS:

1. Menon, Nivedita. Seeing like a Feminist. New Delhi: Zubaan-Penguin Books, 2012
2. Abdulali Sohaila. "I Fought For My Life…and Won."Available online at: http://www.thealternative.in/lifestyle/i-fought-for-my-lifeand-won-sohaila-abdulal/

Department of Electronics and Communication Engineering

BoS Members' Signatures:

1. Dr. K. Vasanth, Professor, Head & Chairman of BoS ECE Dept., VJIT.	2.Dr.P. Chandrasekhar Reddy, Professor of ECE,JNTUH CEH, University Nominee.	3.Dr. K.S. Rao, Director, Anurag Group ofInstitutions, External Member.	4. Dr. P. Chandra Sekhar, HoD, Dept., of ECE, OsmainaUniversity, External Member.
5. Dr. Y. Pandurangaiah, Professor, Vardhaman College of Engineering, Shamshabad, External Member.	6. Mr. A. Hariharan, Associate Director, PACTRA EDGE, Hyderabad, External Member.	7. Mr. N. Venkatesh, Sr. Director, Sillicon Labs, Hyderabad, External Member.	8. Dr. S. Thulasi Prasad, Professor,ECE,VJIT, Internal Member.
9. Dr. P. Ganesan, Professor, ECE,VJIT, Internal Member.	10. Mr. M. Rajendra Prasad, Associate Professor, ECE,VJIT, Internal Member.	11. Mrs. A. Jaya Lakshmi, Associate Professor, ECE,VJIT, Internal Member.	**Date of Bos Meeting On** **15/07/2021**

Vidya Jyothi Institute of Technology R20
(An Autonomous Institution)
(Accredited by NAAC & NBA, Approved by AICTE New Delhi & Permanently Affiliated to JNTUH)
Aziz Nagar Gate, C.B. Post, Hyderabad-500 075

Department of Electronics and Communication Engineering

SWITCHING THEORY AND LOGIC DESIGN

II B.Tech II Semester

L	T	P	C
2	1	0	3

COURSE OUTCOMES:

At the end of the course the student should be able to

1. Demonstrate the basic theorems of Boolean algebra, logic gates, combinational and sequential circuits and memories.
2. Analyze the combinational and sequential circuits and memories.
3. Design of logic circuits
4. Realization of gates using different logic families.
5. Explain the design and operation of different semiconductor memories

UNIT-I:
Number System and minimization techniques:
Number System:
Review of number system and base conversion, complements, signed binary numbers, Floating point number representation, Error detection (parity detection only).
Minimization techniques
Boolean Algebra, postulates ,basic logic gates, Canonical and Standard Form, NAND and NOR implementation, Minimization of switching function using theorem, The Karnaugh Map Method-Up to Five Variable Maps, Tabular Method.

UNIT-II:
Combinational Circuits:
Adders&Subtractor, Binary Adder-Subtractor, Decimal Adder, Binary Multiplier, Magnitude Comparators, Multiplexers, De-multiplexers, Decoders, Encoders and Code converters, Hazards and Hazard Free Relations.

UNIT-III:
Sequential circuits-I:
Basic Architectural Distinctions between Combinational and Sequential circuits, Latches, Flip Flops: SR, JK, Race Around Condition in JK, JK Master Slave, D and T Type Flip Flops, Excitation Table of all Flip Flops, Design of a Clocked Flip-Flop, Timing and Triggering Consideration, Clock Skew, Conversion from one type of Flip-Flop to another.

Unit-IV:
Sequential Circuits-II:
Synchronous – Asynchronous – Comparison, Design of Single mode Counter, Ripple Counter, Ring Counter, Shift Register, Shift Register Sequences, Ring Counter Using Shift Register, MOD Counters. Finite state machine-capabilities and limitations, Mealy and Moore models.

UNIT-V:

Logic Families and Semiconductor Memories:

Logic Families:

DCTL, RTL, DTL, TTL and CML Logic –gate realization - Comparison.

Semiconductor Memories:

Introduction to ROM, PAL, PLA, CPLD, FPGA.

TEXT BOOKS:

1. Morris Mano , Digital Design, Prentice Hall India, 2006
2. A Anand Kumar, Switching Theory and Logic Design, Prentice Hall India, 2013

REFERENCE BOOKS:

1. Jain N P, Modern Digital Electronics, Tata McGraw Hill, 2007.
2. Fredriac J. Hill, Gerald R. Peterson , Introduction to Switching Theory and Logic Design Wiley, 1981.

Department of Electronics and Communication Engineering

ELECTRICAL TECHNOLOGY

(B. Tech. Electronics and Communication Engineering)

II Year B. Tech II semester

L	T	P	C
3	0	0	3

COURSE OUTCOMES:

At the end of the course the student should be able to

1. Understand the concept of network topology
2. Apply the concepts of the filters, attenuators to real-world problems.
3. Able to synthesize the electrical networks using different techniques.
4. Analyse the basic concepts of DC machines & AC Machines.
5. Understand the basic concepts of some special machines.

UNIT I:

Network topology:

Definitions, Graph, Tree, Basic cutest and Basic Tie set Matrices for Planar Networks, Loop and Nodal methods for analysis of Networks with Dependent & Independent Voltage and Current Sources, Duality & Dual Networks.

UNIT II:

Filters and attenuators:

Filters:

Classification of Filters, Filter Network, Classification of Pass band and Stop Band, Characteristic Impedance in the Pass and Stop bands, Constant-k Low Pass Filter, High Pass Filter, m-derived T-Section, Band Pass Filter and Band Elimination filter, Illustrative problems.

Attenuators:

T-Type Attenuator, p-Type Attenuator, Bridged T-Type Attenuator, Lattice Attenuator.

UNIT III:

Network synthesis:

Reliability Concept, HurwitzProperty, Positive Realness, Properties of positive real functions, Synthesis of R-L, R-C and L-C driving point functions, Foster and Cauer forms.

UNIT IV:

Dc generators and dc motors:

DC Generators:

Principle of Operation, EMF equation, Introduction to armature reaction and commutation, Types of Generators, Magnetization (OCC) characteristics - critical field resistance and critical speed, Applications.

DC Motors:

Principle of operation - Back E.M.F. - Torque equation, Types of DC Motors, Losses and Efficiency, Brake Test, Speed control of DC Motor - Flux and Armature Voltage control methods, Applications.

UNIT V:

Special machines:

Synchros, Principles of operation of Reluctance Motors, Stepper Motors, Universal Motors, Permanent magnet Brushless DC Motors

TEXT BOOKS:

1. ChakrabartiA , Circuit Theory: Analysis & Synthesis, Dhanpat Rai & Sons, 2008.
2. Gupta J B, Theory and performance of Electrical machines, S K Kataria, 2009.

REFERENCE BOOKS:

1. William Hayt, Jack Kemmerly, Jamie Phillips and Steven Durbin, Engineering Circuits Analysis, McGraw Hill Company, 2019.
2. Bimbra P S, Electric Machinery-, Khanna Publishers, 2010

NETWORK ANALYSIS AND TRANSMISSION LINES

II B.Tech II Semester

L	T	P	C
3	0	0	3

COURSE OUTCOMES:

After going through this course the student can

1. Recite basic concepts of network parameters, theorems and transmission line theory.
2. Differentiate the changes of transient networks using Laplace transform
3. Compare and contrast the parameters, functions and synthesis of the network
4. Apply the concepts of theorems on networks and transmission line theory to solve impedancematching issues.
5. Solve the transmission lines and matching circuits problems using Smith chart

UNIT-I:
Network Theorems:
Source transformation - Superposition Theorem - Thevenin's theorem - Norton's theorem - Reciprocity theorem - Maximum power transfer theorem

UNIT-II:
Transient Analysis:
Transient response of RL, RC, RLCCircuits(Series and Parallel combinations) for DC excitations, Initial Conditions, Solution using Differential Equations approach and Laplace Transform Method. Transient response for different inputs such as step, ramp, pulse and impulse by using Laplace transforms method.

UNIT – III:
Two Port Networks:
Impedance Parameters, Admittance Parameters, Hybrid Parameters, Transmission (ABCD) Parameters, *g* parameters, Conversion of one of Parameter to another, Conditions for Reciprocity and Symmetry, Inter Connection of Two Port networks in series, Parallel and Cascaded configurations, Illustration problems.

UNIT – IV:
Transmission Lines - I:
Types, Parameters, Transmission Line Equations, Primary & Secondary Constants, Equivalent Circuit, Characteristic Impedance, Propagation Constant, Phase and Group Velocities, Infinite Line Concepts, Lossless / Low Loss Characterization, Types of Distortion, Condition for Distortion less line, Minimum Attenuation, Loading - Types of Loading.

UNIT- V:

Transmission Lines – II:

Input Impedance Relations, SC and OC Lines, Reflection Coefficient, VSWR, $\lambda/4$, $\lambda/2$, $\lambda/8$ Lines – Impedance Transformations, Smith Chart – Configuration and Applications, Single Stub Matching.

TEXT BOOKS:

1. Abhijith Chakrabarthi , Circuit Analysis and Synthesis, Dhanpat Rai and Company, 2018.
2. Umesh Sinha, Transmission Lines and Networks, Satya prakash Publications, 2010

REFERENCE BOOKS:

1. Van Valken Burg , Network Analysis , Pearson, 2016
2. Ryder J D, Networks, Lines and Fields, Prentice Hall India, 1999.

ANALOG AND DIGITAL COMMUNICATIONS

II B.Tech II Semester

L	T	P	C
2	1	0	3

COURSE OUTCOMES:

After going through this course the student can

1. Demonstrate fundamental knowledge in Elements of Analog and Digital Communication systems.
2. Analyze different types of analog and digital modulation systems and calculate total power & bandwidth.
3. Design an efficient Transmitter and Receiver based on SNR, bandwidth and equipment complexities.
4. Formulate and solve engineering problems in the core area of analog and digital communications in developing information transmitting systems and telemetry system.
5. Illustrate the impact of noise in analog communication systems and computation of Probability of error in digital modulation techniques

UNIT-I:

Amplitude Modulation:

Review of signals and systems, Amplitude Modulation: Time and Frequency domain representations – Power and Bandwidth, AM Generators: Square law modulator - Switching modulator, AM Detectors: Square law detector - Envelope detector, DSBS Modulation: Time domain and frequency domain representations, DSB-SC Generators: Balanced Modulators - Ring Modulator, DSB-SC Detectors: Coherent detector - COSTAS Loop, SSB Modulation: Time and Frequency domain representations - SSB Generators and Detectors, VSB Modulation: Time and Frequency domain representation - Envelope detection of a VSB wave, Comparison and Applications of different AM Systems, Frequency Division Multiplexing.

UNIT-II:

Frequency Modulation:

Angle Modulation: Time domain representation - Single tone FM wave - NBFM and WBFM - Spectral analysis of single tone FM Wave - Power and Bandwidth, FM Generators: Indirect FM and Direct FM Generators, FM Detectors: Balanced Frequency discriminator - Ratio detector, Pre-emphasis & De-emphasis, Threshold effect, Comparison of FM between AM.

UNIT-III:

Pulse and Base Band Digital Modulations:

Pulse Analog Modulation:

Sampling process, Pulse Amplitude Modulation and Demodulation, Pulse Width Modulation and demodulation, Pulse Position Modulation and Demodulation, Time Division Multiplexing.

Pulse Digital Modulation:

Quantization process, Pulse Code Modulation (PCM), Differential PCM (DPCM), Delta Modulation (DM), Inter Symbol Interference (ISI) - Nyquist criterion, Optimal detection of digital signals

UNIT-IV:

Passband Digital Modulations:

Pass-band Digital Modulation Schemes:

ASK – PSK – DPSK - FSK – QAM, Probability of error, Optimal Coherent detection of PSK and FSK

UNIT-V:

Noise in Communication Systems:

Output SNR& Noise Figure in Analog modulation systems: AM – DSBSC - SSB - FM, Output SNR in PCM and DM systems, Comparison of PCM and DM systems.

TEXT BOOKS:

1. Haykin S, Communications Systems, Wiley, 2001.
2. Sam Shanmugam, Digital and Analog Communication Systems, Wiley, 2006.

REFERENCE BOOKS:

1. Proakis J G , Digital Communications, McGraw Hill, 2000.
2. Kenndy – Davis, Electronics and Communication Systems, McGraw Hill 4th Edition, 2006.

Department of Electronics and Communication Engineering

ANALOG AND PULSE CIRCUITS

II B.Tech II Semester

L	T	P	C
3	0	0	3

COURSE OUTCOMES:

After going through this course the student will be able to:

1. Understand the concepts of amplifiers, feedback, large signal model and time base generators.
2. Utilize the Concepts of feedback to improve the stability in amplifiers and oscillators.
3. Analyze different multistage amplifiers, multivibrators and time base generators.
4. List different classes of Power Amplifiers and tuned amplifiers useable for audio and Radio applications
5. Design RC and LC Oscillators for different frequencies and analyze them for frequency and amplitude stability.

UNIT I:

Multistage Amplifiers:

Classification of Amplifiers, Distortion in amplifiers, Different coupling schemes used in amplifiers, Frequency response and Analysis of multistage cascade amplifiers, Cascode amplifier, Darlington pair.

Transistor at High Frequency:

Hybrid - model of Common Emitter transistor model, $f\alpha$, β and unity gain bandwidth, Gain bandwidth product.

UNIT II:

Feedback Amplifiers:

Concepts of feedback – Classification of feedback amplifiers – General characteristics of Negative feedback amplifiers – Effect of Feedback on Amplifier characteristics – 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 Complimentary Symmetry configurations, Conversion Efficiency, Principle of operation of Class AB and Class C Amplifiers.

Tuned Amplifiers:

Single Tuned Amplifiers – Q-factor, frequency response of tuned amplifiers, Concept of stagger tuning and synchronous tuning.

UNIT V:

Multivibrators:

Analysis and Design of Astable Multivibrators,Types of Triggering, MonostableMultivibrators, BistableMultivibrators and Schmitt trigger using Transistors.

Time Base Generators

General features of a Time base Signal, Methods of Generating Time Base Waveform, concepts of Transistor Miller and Bootstrap Time Base Generator, Methods of Linearity improvement

TEXT BOOKS:

1. Jacob Millman, Christos C Halkias , Integrated Electronics, , McGraw Hill, 2010
2. S Salivahanan, Electronics Device and Circuits, Tata McGraw-Hill Education, 1998.

REFERENCE BOOKS:

1. David A. Bell , Electronic Devices and Circuits, Oxford, 1986.
2. Robert L. Boylestead, Louis Nashelsky, Electronic Devices and Circuits theory, Pearson, 2009.

Department of Electronics and Communication Engineering

ELECTROMAGNETIC WAVES

II B.Tech II Semester

L	T	P	C
3	0	0	3

COURSE OUTCOMES:

At the end of the course the student should be able to

3. Understand the electric field due to different charge distributions.
4. Demonstrate the EM Field Characteristics divergence and curl of fields.
5. Interpret the Maxwell's equations for static Electric and Magnetic fields and dynamic Electromagnetic fields.
6. Analyze the behavior of EM waves in different media.
7. Solving Engineering problems on EM Wave Propagation.

UNIT I: Electrostatics-I:
Introduction to Vectors and Coordinate system- Coulomb 's Law- Electric Field Intensity – Fields due to Different Charge Distributions, Electric Flux Density, Gauss Law and Applications, Electric Potential, Relation between E and V, Maxwell's Two Equations for Electrostatic Fields, Energy Density in Electrostatics.

Unit-II: Electrostatics-II:
Convection and Conduction Currents, Dielectric Constant, Dielectric polarization, Linear, Isotropic and Homogeneous Dielectrics, Continuity Equation, Relaxation Time, Poisson 's and Laplace 's Equations, Capacitors – Parallel Plate, Coaxial, Spherical, boundary conditions in static electric field,Uniqueness theorem.

UNIT III: Magneto statics:
Biot-Savart's Law-Magnetic Field Intensity due to finite length current carrying conductor, Ampere's Circuit Law and Applications, Magnetic Flux Density, Maxwell's two Equations for Magneto static Fields, Magnetic Scalar and Vector Potentials, Forces due to Magnetic Fields, Ampere's Force Law,Magnetostatic boundary conditions.

UNIT IV: EM Wave Characteristics -I (Time-Varying Maxwell's Equations):
Faraday's Law and Transformer EMF, Inconsistency of Ampere's Law and Displacement Current Density, Maxwell's Equations in Different Forms, Time-varying Boundary Conditions at a Surface - Dielectric-Dielectric and Dielectric-Conductor Interfaces, Lorentz condition for Time-varying potentials.

UNIT V:EM Wave Characteristics –II:
Wave Equations for Conducting and Perfect Dielectric Media, Uniform Plane Waves –Definitions, Relation between E & H, Sinusoidal Variations, Wave Propagation in Conductor & Dielectric media, Polarization. Reflection and Refraction of Plane Waves – Normal and Oblique Incidences for both Perfect Conductor and Perfect Dielectrics, Brewster Angle, Critical Angle and Total Internal Reflection, Surface Impedance, Poynting Vector and Poynting Theorem.

TEXT BOOKS:

1. Matthew N.O. Sadiku and S.V. Kulkarni, Elements of Electromagnetic, Tata McGraw Hill, 2020.
2. E.C. Jordan and K.G. Balman, Electromagnetic Waves and Radiating Systems, PHI, 2000.

REFERENCE BOOKS:

1. Engineering Electromagnetics – William H. Hayt Jr. and John A. Buck, McGrawHill,2014.
2. Engineering Electromagnetics – Nathan Ida, Springer (India) Pvt. Ltd., New Delhi,2005.

Department of Electronics and Communication Engineering

ANALOG AND DIGITAL COMMUNICATIONS LABORATORY

II B.Tech II Semester

L	T	P	C
0	0	2	1

COURSE OUTCOMES:

At the end of the course the student should be able to

1. Demonstrate knowledge in different Analog and Digital Communication Systems.
2. Compare the characteristics of various Analog and Digital modulation schemes and analyze theirperformances.
3. Develop various analog and digital modulation and demodulation systems
4. Explain how Pulse code modulation is applied to transform an analog signal into a digital one and transmitted through the digital communication network.
5. Design the shift keying based digital modulation techniques for the transmission of digital information

Note: Any 10 experiments to be conducted

1. Amplitude modulation and demodulation
2. DSBSC modulation and demodulation
3. SSB modulation and demodulation
4. Frequency modulation and demodulation
5. Pulse Amplitude Modulation and demodulation
6. Pre-emphasis and De-emphasis
7. Verification of Sampling Theorem
8. Pulse code modulation and demodulation
9. Delta modulation and demodulation
10. PSK Modulation and demodulation
11. FSK Modulation and demodulation
12. DPSK and QPSK Modulation and demodulation

Department of Electronics and Communication Engineering

ANALOG AND PULSE CIRCUITS LABORATORY

II B.Tech II Semester

L	T	P	C
0	0	2	1

COURSE OUTCOMES:

At the end of the Course, the student will be able to:

1. Compare the frequency response of tuned, MOS, Darlington amplifier.
2. Sketch the sustained waveforms of oscillators, multivibrators and sweep circuits.
3. Interpret the efficiency of power amplifiers.
4. Explain the characteristics of Boot strap sweep circuit, Miller sweep circuit and UJT relaxation oscillator
5. Design LC Oscillators for different frequencies and analyze them for frequency and amplitude stability.

Note: Any 12 experiments to be conducted

1. Class A Power Amplifier (With Transformer Load)
2. Class C Power Amplifier
3. Single Tuned Voltage Amplifier
4. Hartley Oscillators
5. Colpitts Oscillators
6. Darlington Pair
7. MOS Amplifier
8. Design a Bistable Multi vibrator and draw its waveforms
9. Design aMonostable Multi vibrator and draw its waveforms
10. Design an Astable Multi vibrator and draw its waveforms
11. Response of Schmitt Trigger circuit for loop gain less than and greater one
12. The output – voltage waveform of Boot strap sweep circuit
13. The output – voltage waveform of Miller sweep circuit
14. UJT relaxation oscillator

Department of Electronics and Communication Engineering

ENVIRONMENTAL SCIENCE
(Common to all Branches)

II B.Tech II Semester

L	T	P	C
2	0	0	0

COURSE OUTCOMES:

At the end of the Course, the student will be able to:

1. Define and explain the structure and functions of ecosystem, value of biodiversity, threats and conservation of biodiversity.
2. Explain the limitations of the resources and impacts of over utilization of all natural resources.
3. Explain the sources and effects of environmental pollutions and list the available techniques to control the pollution.
4. Explain the global environmental issues like climate change, ozone hole and can explain the scope of EIA, Environmental Management Plan, environmental audit and list the EIA methods.
5. Mention the salient features of environmental acts and rules, define the sustainable goals along with measures required for the sustainability.

UNIT- I:

Ecosystem:
Definition, Scope and Importance of ecosystem, Structure and Functions of ecosystem: Food chains, Food Web and Ecological Pyramids, Flow of energy; Bio-magnification.

Biodiversity and Biotic Resources:
Introduction, Definition, levels of Biodiversity, Value of biodiversity, Hot spots of biodiversity, Threats to biodiversity, conservation of biodiversity: In-Situ and Ex-situ conservation.

UNIT- II:

Natural Resources:
Classification of Resources,

Water resources:
use and over utilization of surface and ground water, Dams: benefits and problems, Rain water harvesting;

Energy resources:
growing energy needs, Renewable and Non Renewable Energy resources.

Land resources:
land degradation – Landslide and Soil Erosion;

Forest Resources:
Uses and Exploitation.

UNIT- III:

Environmental Pollution And Control:
Types of Pollution, Sources, Effects and Control measures of Air Pollution ,Water Pollution ,Soil Pollution and Noise Pollution.

UNIT- IV:

Global Environmental Problems and Global Efforts:
Green house effect, Global Warming, climate change and their impacts on human environment; Ozone depletion and Ozone depleting substances (ODS); Acid Rains.

Environmental Impact Assessment (EIA):
Scope of EIA and EIA methods, scope of Environmental audit and Environmental Management Plan.

UNIT- V:

Environmental Policy, Legislation, Rules And Regulations:
Salient features of Environmental Protection act, Air (Prevention and Control of pollution) Act-1981, Water (Prevention and Control of pollution) Act-1974, Forest Conservation Act, Municipal solid waste, Hazardous waste, E-waste, Bio-medical waste, Radioactive waste Rules.

Towards Sustainable Future:
Concept of Sustainable Development, Sustainable goals defined by UN, Threats to Sustainability, Environmental Education, Role of IT in Environment, Smart Cities, Concept of Green Building, Low Carbon Lifestyle, Life cycle assessment and Ecological Foot Print.

TEXT BOOKS:

1. Anubha Kaushik, Text Book of Environmental Studies, New age International, 2006.
2. ErachBharucha, Environmental studies, University Press, 2005.

REFERENCEBOOKS:

1. Anji Reddy M, Environmental Science and Technology, B S Publications, 2007
2. Richard T. Wright , Environmental Science: Towards a Sustainable Future, Prentice Hall India, 2008

Department of Electronics and Communication Engineering

BoS Members' Signatures:

1. Dr. K. Vasanth, Professor, Head & Chairman of BoS ECE Dept., VJIT.	2.Dr.P. Chandrasekhar Reddy, Professor of ECE,JNTUH CEH, University Nominee.	3.Dr. K.S. Rao, Director, Anurag Group ofInstitutions, External Member.	4. Dr. P. Chandra Sekhar, HoD. Dept., of ECE, OsmainaUniversity, External Member.
5. Dr. Y. Pandurangaiah, Professor, Vardhaman College of Engineering, Shamshabad, External Member.	6. Mr. A. Hariharan, Associate Director, PACTRA EDGE, Hyderabad, External Member.	7. Mr. N. Venkatesh, Sr. Director, Sillicon Labs, Hyderabad, External Member.	8. Dr. S. Thulasi Prasad, Professor,ECE,VJIT, Internal Member.
9. Dr. P. Ganesan, Professor, ECE,VJIT, Internal Member.	10. Mr. M. Rajendra Prasad, Associate Professor, ECE,VJIT, Internal Member.	11. Mrs. A. Jaya Lakshmi, Associate Professor, ECE,VJIT, Internal Member.	**Date of Bos Meeting On** **15/07/2021**

CONTROL SYSTEMS ENGINEERING

(B.Tech. Electronics and Communication Engineering)

III B.Tech I semester

L	T	P	C
3	0	0	3

COURSE OUTCOMES:

At the end of the Course, the student will be able to:

1. Understand and analyzing different linear-time-invariant systems using transfer function.
2. Analyze system response in time domain for first and second order systems and evaluate static error.
3. Understand the concept of stability and its assessment for linear-time invariant systems.
4. Analyze system response in frequency domain and understanding compensation networks.
5. Realize the concept of state variable, state space and analyze the stability of linear Time discrete systems.

UNIT I:

Introduction to control Systems:

Concepts of control systems, open & closed loop control systems-examples, Industrial Control systems examples, Mathematical models of physical systems.

Transfer Function Representation: Block diagram representation of systems considering electrical systems as examples- Block diagram algebra – Representation by signal flow graph- Reduction using Manson's gain formula

UNIT II:

Time Response Analysis: Standard test signals – Time response of first order systems- Characteristic Equation of feedback controls systems, Transient response of second order systems – Time domain specifications - Steady state response – Steady state errors & error constants – Effects of proportional derivative, proportional integral systems and PID controllers, Application of Proportional, Integral and Derivative Controllers.

UNIT III:

Stability analysis in S- Domain:

The concept of stability – Routh's stability criterion – qualitative stability & conditional stability – limitations of Routh's stability.

Root Locus technique: The root locus concept – construction of root loci-effects of adding poles and zeros to G(s)H(s) on the root loci.

UNIT IV:

Frequency-response analysis:

Relationship between time and frequency response, Polar plots, Bode plots. Nyquist stability criterion. Relative stability using Nyquist criterion – gain and phase margin. Closed-loop frequency response.Introduction to compensation techniques.

UNIT V:

State space analysis:

Concepts of state, state variables and state model, derivation of state models from block diagrams, Diagonalization-Solving the Time invariant state Equation- State Transition Matrix and it's Properties-Concepts of Controllability and Observability.

TEXT BOOKS:

1. Nagoorkani A, Control Systems Engineering, CBS PUB & DIST,2020
2. Nagrath I J & Gopal M, Control Systems Engineering, New Age International, 2009.

REFERENCE BOOKS:

1. A.Anand Kumar, Control Systems, PHI Publications, Second Edition,2014.
2. Jagan N.C, Control Systems, BS Publications, 2014.

Department of Electronics and Communication Engineering

MICRO PROCESSORS& MICRO CONTROLLERS

III B.Tech I Semester

L	T	P	C
2	1	0	3

COURSE OUTCOMES:

At the end of the course the student should be able to

1. Acquire knowledge about Microprocessors, Microcontroller and its need.
2. Ability to identify basic architecture of different Microprocessors & Microcontroller
3. Develop systems for interfacing of different peripheral devices microprocessor & Microcontrollers
4. Compose a program to interface microprocessor and microcontroller for different applications.
5. Develop microcontroller application for different domain

UNIT-I:
8086 Architecture:
8086 Architecture-Functional diagram, Register Organization, Memory Banks, Memory Segmentation, Programming Model, Memory adresses, Physical Memory Organization, Architecture of 8086, Signal descriptions of 8086, Minimum Modes – Maximum Modes, Timing diagrams.

UNIT-II:
Instruction Set and Assembly Language Programming of 8086:
Instruction formats, Addressing modes, Instruction Set, Assembler Directives, Macros, Simple Programs involving Logical, Branch and Call Instructions, sorting, Evaluating Arithmetic Expressions, String Manipulations.

UNIT-III:
Interfacing RAM with 8086:
8255PPI – Modes – Interfacing with 8086 – 8251 – Modes, Interfacing with 8086 – Interfacing Structure of 8086 – Interfacing with 8259 – 8257 DMA – Modes, Interfacing 8086 with – Stepper Motor Interfacing – 0800

UNIT-IV:
Introduction to Microcontrollers:
Overview of 8051 Microcontroller, Architecture, I/0 Ports, Memory Organization, Addressing Modes and instruction set of 8051

UNIT-V:
8051 Real Time Control:
Interrupts, Timers/Counters, and Serial Communication, Programming Timer Interrupts, Programming external Hardware Interrupts, Programming the Serial Communication interrupts, Programming 8051 Timers and Counters

TEXT BOOKS:

1. Ray A K and Bhurchandani K M , Advanced Microprocessors and Peripherals , Tata McGraw-Hill, 2006.
2. Kenneth. J. Ayala, The 8051 Microcontroller ,Cengage Learning, 2005

REFERENCE BOOKS:

1. D. V. Hall, Microprocessors and Interfacing,Tata McGraw-Hill, 2006
2. Uma Rao K., AndhePallavi , The 8051 Microcontrollers, Architecture and Programming and Applications, Pearson, 2009

Department of Electronics and Communication Engineering

LINEAR & DIGITAL IC APPLICATIONS

III B.Tech I Semester

L	T	P	C
3	0	0	3

COURSE OUTCOMES:

At the end of the course the student should be able to

1. Demonstrate the functioning of OP-AMP, Special function and Digital ICs
2. Analyze the operation, characteristics of OP-AMP, Special Function and Digital ICs
3. Design a logic circuits using digital ICs
4. Devising filters, multivibrators, waveform generators & arithmetic circuits using OP-AMP and Special Function ICs.
5. Analyze and design applications like Counters FlipFlops Shift register using Digital integrated circuit.

UNIT-I:

Operational Amplifier:

Introduction, Advantages & Classification of IC's, IC chip size and circuit complexity, Ideal and Practical Op-Amp, Op-Amp Characteristics-DC and AC Characteristics and their compensations, Features of 741 Op-Amp

Applications of Op-Amp:

Inverting, Non-Inverting, Adder, Subtractor , Instrumentation, Sample and Hold Circuit, Differentiator and Integrator, Comparator & its applications, Schmitt Trigger, waveform Generators – Astable multivibrator, Monostable multivibrator,Triangular.

UNIT-II:

Active filters:

Introduction, Butterworth filters-1st order, 2nd order, LPF,HPF filters(VCVS), Characteristics of Band pass, Band rejects and All Pass Filters.

D to A and A to D Converters:

Introduction, Basic DAC techniques, Different types of DACs-Weighted resistor DAC, R-2R ladder DAC, Inverted R-2R DAC, Different Types of ADCs - Parallel Comparator Type ADC, Counter Type ADC, Successive Approximation ADC and Dual Slope ADC, DAC and ADC Specifications

UNIT-III:

Timer and Phase Locked Loops:

IC555 Timer - Functional Diagram, Monostable and Astable Operations, Applications.IC565 PLL - Block Schematic, Description of Individual Blocks and Applications.

Voltage regulator: Introduction to Voltage Regulators, Features & Internal Operation of 723 Regulator, Design of low voltage and high voltage regulators using IC723 VR.

UNIT-IV:

Digital Integrated Circuits:

Parameters of logic families, Comparison of Various Logic Families, TTL Logic ,CMOS Logic TTL Driving CMOS & CMOS Driving TTL, Combinational Logic ICs - Specifications and Applications of TTL-74XX Series ICs - Code Converters, Decoders, Demultiplexers, LED & LCD decoders with drivers , Encoder, Multiplexer, Demultiplexer, Parallel Binary Adder/ Subtractor, Magnitude Comparators.

UNIT-V:

Sequential Logic IC's:

74XX Series ICs - All Types of Flip-flops, Conversion between Flip-flops, Synchronous and Asynchronous Counters, Mod-N Counters, Shift Registers, Applications of Shift Registers

TEXT BOOKS:

1. Roy Choudhury D, Shail B. Jain, Linear Integrated Circuit, New Age International, 2012
2. John F. Wakerly, Digital Design Principles and Practices, Prentice Hall / Pearson Education, 2007.

REFERENCE BOOKS:

1. Ramakant A. Gayakwad, OP-AMP and Linear Integrated Circuits, Prentice HallIndia , 2012.
2. Thomas L Floyd, Digital Fundamentals, Pearson Education, 2015

Department of Electronics and Communication Engineering

ANTENNA AND PROPAGATION

III B.Tech I semester

L	T	P	C
3	0	0	3

COURSE OUTCOMES:

At the end of the course the student should be able to

1. Understand different antennas, field analysis and their applications to antenna elements.
2. Distinguish the mechanism of radiation, different antenna characteristics, mathematical relations their estimates in practical cases.
3. Analyze and design the working of different antenna's and to interpret the radiation pattern of planar arrays from the knowledge of linear arrays.
4. Obtain the capability to differentiate and report the electromagnetic radiation levels in the Atmosphere and any radio transmissions.
5. Design Microwave antenna Systems from specification

UNIT I:

Antenna Basics:

Basic Antenna Parameters – Patterns, Beam Area, Radiation Intensity, Beam Efficiency, Directivity-Gain-Resolution, Antenna Apertures, Effective Height.Fields from Oscillating Dipole, Field Zones, Front - to-back Ratio, Antenna Theorems, Radiation, Retarded Potentials – Helmholtz Theorem.

Thin Linear Wire Antennas:

Radiation from Small Electric Dipole, Quarter Wave Monopole and Half Wave Dipole – Current Distributions, Field Components, Radiated Power, Radiation Resistance, Beam Width, Directivity, Effective Area and Effective Height, Natural Current Distributions, Far Fields and Patterns of Thin Linear Centre-fed Antennas of Different Lengths. Loop Antennas - Small Loop, Comparison of Far Fields of Small Loop and Short Dipole, Radiation Resistances and Directivities of Small Loops (Qualitative Treatment).

UNIT II:

Antenna Arrays:

Point Sources – Definition, Patterns, arrays of 2 Isotropic Sources - Different Cases, Principle of Pattern Multiplication, Uniform Linear Arrays – Broadside Arrays, End fire Arrays.

Antenna Measurements:

Introduction, Concepts - Reciprocity, Near and Far Fields, Coordinate System, Sources of Errors.Patterns to be Measured, Directivity Measurement, Gain Measurements (by Comparison, Absolute and 3-Antenna Methods).

UNIT III:

VHF, UHF and Microwave Antennas - I:

Arrays with Parasitic Elements, Yagi-Uda Array, Folded Dipoles and their Characteristics, Helical Antennas – Helical Geometry, Helix Modes, Horn Antennas – Types, Fermat's Principle, Optimum Horns.

VHF, UHF and Microwave Antennas – II:

Microstrip Antennas – Introduction, Features, Advantages and Limitations, Rectangular Patch Antennas – Geometry and Parameters, Characteristics of Microstrip Antennas. Reflector Antennas – Introduction, Flat Sheet and Corner Reflectors, Paraboloidal Reflectors – Geometry, Pattern Characteristics, Feed Methods, Reflector Types – Related Features.

UNIT IV:

Wave Propagation:

Definitions, Categorizations and General Classifications, Different Modes of Wave Propagation, Ray/Mode Concepts.

Ground Wave Propagation:

Plane Earth Reflections, Space and Surface Waves, Wave Tilt, Curved Earth Reflections.

Space Wave Propagation:

Field Strength Variation with Distance and Height, Effect of Earth's Curvature, Absorption, Super Refraction, M-Curves and Duct Propagation, Scattering Phenomena, Troposphere Propagation.

UNIT V:

Sky Wave Propagation:

Structure of Ionosphere, Refraction and Reflection of Sky Waves by Ionosphere, Ray Path, Critical Frequency, MUF, LUF, OF, Virtual Height and Skip Distance, Relation between MUF and Skip Distance, Multi-hop Propagation.

TEXT BOOKS:

1. Kraus J D, Marhefka R J and Ahmad S. Khan , Antennas and Wave Propagation, Tata McGraw-Hill, 2010.
2. Jordan E C and Balmain K G, Electromagnetic Waves and Radiating Systems,Prentice Hall India, 2000.

REFERENCE BOOKS:

1. Balanis C A, Antenna Theory, John Wiley, 2005.
2. K.D. Prasad & Satya Prakashan, Antennas and Wave Propagation, Tech India Publications, 2001.

Department of Electronics and Communication Engineering

COMPUTER ARCHITECTURE
(Professional Elective-I)

III B.Tech I Semester

L	T	P	C
3	0	0	3

COURSE OUTCOMES:

At the end of the course the student should be able to

1. Recall the structure and organization involved in computer design.
2. Identify the different memory and input- output system involved in system design.
3. Analyze computer parallelism and its design on program control and computer arithmetic operations.
4. Comprehend the various details of multiprocessor and multi-core processors in computer design
5. Illustrate a better way the I/O and memory organization.

UNIT-I:

Structure of Computers:
Computer types, functional units, basic operational concepts, VonNeumann architecture, bus structures, software, performance, multiprocessors and multicomputer, data representation, fixed and floating point and error detecting codes.

Register Transfer and Micro Operations:
Register transfer language, register transfer, bus and memory transfers, arithmetic micro operations, shift micro operations, arithmetic logic shift unit

UNIT-II:

Basic Computer Organization and Design:
Instruction codes, computer registers, computer instructions, instruction cycle, timing and control, memory reference instructions, input, output and interrupt.

Central Processing Unit:
stack organization, instruction formats, addressing modes, data transfer and manipulation, progra m control, reduced instruction set computer (RISC).

UNIT-III:

Computer Arithmetic:
Addition and subtraction, multiplication and division algorithms, floating point arithmetic operation, decimal arithmetic unit, and decimal arithmetic operations.

UNIT-IV:

The Memory System:
Basic concepts, semiconductor RAM types of read only memory (ROM), cache memory, performance considerations, virtual memory, secondary storage raid, direct memory access (DMA).

Pipelining and Hazards:
Pipelining – Pipelined data path and control – Handling Data hazards & Control hazards – Exceptions, Data path and Control Considerations, Superscalar Operation, Performance Considerations.

UNIT-V:

Parallelism:

Instruction-level-parallelism – Parallel processing challenges – Flynn's classification – Hardware multithreading, Multicore processors, Array Processors: Attached Array Processor- SIMO Array Processor .

Multiprocessors:

Characteristics of multiprocessors, interconnection structures, inter Processor arbitration, inter pr ocessor communication and synchronization, cache Coherence, shared memory multiprocessors.

TEXT BOOKS:

1. Moris Mano M , Computer System Architecture, Pearson, 2006
2. Carl Hamacher, ZvonkoVranesic, Computer Organization, McGraw Hill, 2002.

REFERENCE BOOKS:

1. William Stallings, Computer Organization and Architecture- Designing for performance, Prentice Hall,2010.
2. Andrew S. Tanenbaum, Structured Computer Organization, Pearson, 2006.

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Aziz Nagar Gate, C.B. Post, Hyderabad-500 075

Department of Electronics and Communication Engineering

INFORMATION THEORY AND CODING
(Professional Elective-1)

III B.Tech I Semester

L	T	P	C
3	0	0	3

COURSE OUTCOMES:
At the end of the course, students will be able to:

1. Understand the concept of information theory, coding techniques and errors related to it.
2. Compare the different coding techniques.
3. Formulate codes using different coding techniques
4. Apply different coding techniques to develop an error free communication system.
5. Inspect error detection and correction in various coding technique.

UNIT-I:
Basics of Information Theory:
Entropy, Entropy for discrete ensembles, Information rate, source coding: Shannon's noiseless coding theorem, Shannon's noisy coding theorem, Mutual Information, Shannon- Hartley law

UNIT-II:
Source Coding:
Encoding of the Source Output, Shannon's Encoding Algorithm, Shannon Fano Encoding Algorithm, Huffman codes, Extended Huffman coding, Arithmetic Coding, Lempel – Ziv Algorithm, Calculations of Channel capacity and bounds for Discrete Channel, Applications to continuous channels

UNIT-III:
Information Channels:
Communication Channels, Channel Models, Channel Matrix, Joint probability Matrix, Binary Symmetric Channel, System Entropies, Mutual Information, Channel Capacity, Channel Capacity of : Binary Symmetric Channel, Binary Erasure Channel, Morgan's Theorem, Continuous Channels

UNIT-IV:
Error Control Coding:
Examples of Error control coding, methods of Controlling Errors, Types of Errors, Linear Block Codes: matrix description of Linear Block Codes, Error Detection and Error Correction Capabilities of Linear Block Codes, Single Error Correcting hamming Codes, Binary Cyclic Codes: Algebraic Structure of Cyclic Codes, Encoding using an (n-k) Bit Shift register, Syndrome Calculation, Error Detection and Correction

UNIT-V:
Convolution Arithmetic Codes:
Convolution Encoder, Time domain approach, Transform domain approach, Code Tree, Trellis and State Diagram, The Viterbi Algorithm.

TEXT BOOKS:

1. Abramson N. Information and Coding. McGraw Hill, 1963.
2. Mansurpur M. Introduction to Information Theory. McGraw Hill, 1987.

REFERENCE BOOKS:

1. Ash R B. Information Theory. Prentice Hall, 1970.
2. Chitode J S. Information Theory and coding. Technical publication. 2009.

Department of Electronics and Communication Engineering

INTRODUCTION TO MEMS
(Professional Elective-1)

III B.Tech I Semester

L	T	P	C
3	0	0	3

COURSE OUTCOMES:

After this course students will be able to

1. Understand the basic concepts involved in the design of MEMS devices.
2. Interpret the different properties of MEMS materials
3. Enumerate role of MEMS devices on sensing and Actuation through different mediums.
4. Contrast the types of MEMS devices on different materials through different mediums.
5. Apply the MEMS for different applications.

UNIT-I:
Introduction to MEMS and Micro-fabrication:
History of MEMS Development, Characteristics of MEMS-miniaturization - micro electronics integration - Mass fabrication with precision. Micro fabrication - microelectronics fabrication process- silicon based MEMS processes- new material and fabrication processing- points of consideration for processing.

UNIT-II:
Electrical and mechanical properties of MEMS materials:
Conductivity of semiconductors, crystal plane and orientation, stress and stain – definition – relationship between tensile stress and stain- mechanical properties of silicon and thin films, Flexural beam bending analysis under single loading condition- Types of beam- deflection of beam-longitudinal stain under pure bending spring constant, torsional deflection, intrinsic stress, resonance and quality factor.

UNIT-III:
Sensing and Actuation:
Electrostatic sensing and actuation-parallel plate capacitor – Application-Inertial, pressure and tactile sensor parallel plate actuator- comb drive. Thermal sensing and Actuations-thermal sensors-Actuators- Applications- Inertial, Flow and Infrared sensors. Piezo resistive sensors-piezo resistive sensor material- stress in flexural cantilever and membrane Application-Inertial, pressure, flow and tactile sensor. Piezoelectric sensing and actuation- piezoelectric material properties-quartz-PZT-PVDF –ZnO Application-Inertial, Acoustic, tactile, flow-surface elastic waves Magnetic actuation- Micro magnetic actuation principle- deposition of magnetic materials-Design and fabrication of magnetic coil.

UNIT-IV:
Bulk and Surface Micromachining;
Anisotropic wet etching, Dry etching of silicon, Deep reactive ion etching (DRIE), Isotropic wet etching, Basic surface micromachining process- structural and sacrificial material, stiction and antistiction methods, Foundry process.

UNIT-V:

Polymer and Optical MEMS:

Polymers in MEMS- polymide-SU-8 liquid crystal polymer(LCP) - PDMS-PMMA – Parylene – Flurocorbon, Application-Acceleration, pressure, flow and tactile sensors. Optical MEMS - passive MEMS optical components – lenses – mirrors - Actuation for active optical MEMS.

TEXT BOOKS:

1. Chang Liu,Foundations of MEMS, Pearson, 2006.
2. Gaberiel M Rebiz, RF MEMS Theory, Design and Technology, John Wiley & Sons,2003

REFERENCE BOOKS:

1. Charles P.Poole, Frank J.Owens, Introduction to nanotechnology, John Wiley, 2003.
2. Julian W.Gardner, Vijay K Varadhan, Microsensors, MEMS and Smart devices, John Wiley, 2001.

Department of Electronics and Communication Engineering

INTRODUCTION TO MICROCONTROLLERS
(Open Elective – 1)

III B.Tech I Semester

L	T	P	C
3	0	0	3

COURSE OUTCOMES:

At the end of the course the student should be able to

1. Interpret the internal organization of 8051 with its unique features.
2. Infer and give examples about the various addressing modes, instruction formats and instructions of 8051.
3. Construct the hardware and software interaction with each other using programming.
4. Summarize the features of the advanced architecture using ARM controller.
5. Train their practical knowledge through laboratory experiments.

UNIT-I:
Overview Microcontroller:
Microprocessors & microcontrollers- Comparison -Types – Selection criteria –Architecture – resources – Memory (RAM, ROM, DMA)- Watch dog timer, PWM– Buses- power down modes – EPROM – Interrupts- Serial communication

UNIT-II:
8051 Family Microcontrollers:
Architecture- 8051 microcontroller – Pins- Ports- Registers- Special function registers (SFR's) - Memory Organization- Counters and Timers.

UNIT-III:
Programming the Microcontrollers :
Addressing modes- Instruction Formats- Instruction set- Data transfer -Bit-manipulation – Arithmetic – Logical – Program flow control – Interrupt control flow – Simple Programs illustrating instruction set.

UNIT-IV:
Systems Design and Interfacing Methods:

Switch- Matrix Keypad – LED -7 Segment – LCD – Serial Interface – RS232- Parallel interface – IEEE1284 - IEEE 488 – ADC (0808) - DAC(0800) – Optical motor shaft encoders – Industrial control – Industrial process control system.

UNIT-V:
ARM 32 Bit MCUs:

Introduction to 16/32 Bit processors – ARM architecture and organization – ARM / Thumb programming model – ARM / Thumb instruction set – Development tools.

TEXT BOOKS:

1. Raj Kamal , Microcontrollers Architecture, Programming, Interfacing and System Design, Pearson, 2005.
2. Mazidi and Mazidi, The 8051 Microcontroller and Embedded Systems, Prentice Hall India, 2000.

REFERENCE BOOKS:

1. Ajay V Deshmukh,Microcontrollers: Theory & Applications, , Tata McGraw Hill, 2005.
2. Jenneth J Ayala , 8051 Microcontrollers , Thomson Delmar Learning, 2005.

Department of Electronics and Communication Engineering

BASIC ELECTRONICS
(Open Elective – 1)

III B.Tech I Semester

L	T	P	C
3	0	0	3

COURSE OUTCOMES:

After going through this course the student will be able to:

1. Understand and analyze the different types of diodes, operation and its characteristics Design and analyze the DC bias circuitry of BJT and FET Design.
2. To analyze and design diode application circuits, amplifier circuits and oscillators employing BJT, FET devices.
3. Understand the different applications based on operational amplifier
4. Analyze different types of oscillators and multivibrators.
5. Design and analyze any digital logic gate circuits

UNIT-I:
Semiconductor junction diodes and its applications:
Diode:

Introduction to Semiconductor - PN junction Diode – Construction and operation – VI Characteristics of PN Junction diode-Diffusion and Transition Capacitances - Zener diode - Tunnel Diode

Applications:
Rectifier - Half Wave Rectifier, Full Wave Rectifier, Bridge Rectifier, Clippers and Clampers-Zener diode as voltage regulator.

UNIT-II:
Semiconductor junction transistor:
Bipolar Junction Transistor (BJT):
Construction and Operation of NPN and PNP transistors – CE, CB and CC configurations - Input and output characteristics of CE, CB and CC - Transistor biasing – Transistor as an Amplifier - Qualitative explanation of voltage gain, current gain, power gain, input impedance, output impedance, frequency response and bandwidth - Tuned amplifier – Introduction to power amplifier

UNIT-III:
Field effect transistor and operational amplifiers:
Field Effect Transistor (FET):
Classification of FETs-JFET, MOSFET, operating principle of JFET. Drain and transfer characteristics of JFET (n-channel and p-channel), CS, CG, CD configurations.
Operational Amplifiers (OP-Amp):
Ideal OPAMP, Inverting and Non Inverting OPAMP circuits, OPAMP applications: voltage follower, addition, subtraction, integration, differentiation; Numerical examples as applicable.

UNIT-IV:

Electronic circuits:

RC differentiator and integrators - Oscillators, RC Phase Shift Oscillator, Wien Bridge Oscillator, Hartley Oscillator and Colpitts Oscillator, Applications - Multivibrators, Types, Operation, Waveforms, Applications.

UNIT-V:

Logic gates and its applications:

Logic Gates:

Basic gates AND, OR, NOT, NAND, NOR, EX-OR, EX-NOR - Building of AND, OR and NOT Gate with diodes.

Applications:

Half adder, Full adder, Half Subtractor, Full Subtractor and Binary parallel adder.

TEXT BOOKS:

1. Satyabrata Jit, Millman's Electronic Devices and Circuits, Tata McGraw Hill ,1998.
2. Millman , Digital and Switching Waveforms, Tata McGraw Hill, 2008.

REFERENCE BOOKS:

1. Boylestad R L and Louis Nashelsky , Electronic Devices and Circuits, Prentice Hall India , 2006.
2. Morris Mano M, Charles R. Kime, Logic and Computer Design Fundamentals, Pearson, 2003.

Department of Electronics and Communication Engineering

MICRO PROCESSORS AND MICRO CONTROLLERS LABORATORY

III B.Tech I Semester

L	T	P	C
0	0	2	1

COURSE OUTCOMES:

After going through this course the student will be able to:

1. Apply the fundamentals of assembly level programming of microprocessors and microcontrollers.
2. Build a program on a microprocessor using instruction set of 8086 and 8051.
3. Evaluate Assembly language program for 8086 and 8051 microcontroller to interface peripheral devices for simple applications
4. Develop assembly language programs for various applications using 8051 microcontroller
5. Understand the development of prototype using combination of hardware and software

Note: Minimum 12 Experiments have to be conducted

1. Introduction to MASM.
2. Programs for 16 bit Arithmetic Operations for 8086.
3. Program for sorting an array for 8086.
4. Program for searching a number or character in a string for 8086.
5. Programs for String Manipulations for 8086.
6. Interfacing to 8086 and programming to control Stepper Motor.
7. Interfacing ADC to 8086.
8. Interfacing DAC to 8086.
9. Serial Communication between Two Microprocessors using 8255.
10. Programming using Arithmetic, Logical and Bit Manipulation Instructions of 8051.
11. Program and verify timer/counter in 8051
12. Program and verify interrupt handling in 8051
13. UART operation in 8051
14. Interfacing LCD to 8051.
15. Data transfer from peripheral to memory through DMA Controller 8237/8257

LINEAR & DIGITAL IC APPLICATIONS LABORATORY

III B.Tech I Semester

L	T	P	C
0	0	2	1

COURSE OUTCOMES:

At the end of the course the student should be able to

1. Study the applications of IC's such as 741,555 and 723
2. Design and construct thecombinational and sequential circuits using digital IC's
3. Understand and design the adder and subtractor digital circuits.
4. Design and verify the Multiplexer
5. Understand the basics of Op-Amp and to Design, Analyze Adder subtractor and comparator

Note: Minimum 12 Experiments have to be conducted (six from each part)

Part – A: Linear IC Applications:

1. OP AMP Applications-Adder, Subtractor, Comparator Circuits.
2. Integrator and Differentiator Circuits using IC741
3. Active Filter Applications- LPF, HPF [Second Order]
4. IC741 Waveform Generators-Square wave and Triangular waves.
5. Weighted/R-2R Ladder type DAC(Digital to analog converter)
6. IC 555 Timer AstableMultivibrator Circuit.
7. Calculation of Capture Range & Lock Range Using IC 565 PLL
8. Voltage Regulator using IC 723.

Part – B: Digital IC Applications:

1. Design of all logic gates using NAND/NOR gates and verify the truth tables.
2. Design full adder & full subtractor using NAND/NOR gates and verify the truth table.
3. Design T & D flip flops using JK flip flop and verify the truth table.
4. Design any 4 variable functions using 8:1 Multiplexer and verify.
5. Verification of 4-bit Magnitude comparator
6. Design full adder using 3*8 Decoder and verify.
7. Verification of 4-bit Decade counter
8. Verification of Universal Shift Register

Department of Electronics and Communication Engineering

PERSONALITY DEVELOPMENT AND BEHAVIOURALSKILLS

(Common to all branches)

III B.Tech I semester

L	T	P	C
2	0	0	1

COURSE OUTCOMES:

At the end of the course the student should be able to

1. Practice optimistic attitude for an efficient, socially viable and multi-faceted personality.
2. Demonstrate functions of non-verbal communication in formal context.
3. Build effective individual & team dynamics for professional accomplishments.
4. Analyze appropriate strategic Interpersonal Skills for productive workplace relationships.
5. Correspond in multiple contexts, for varied audiences, across genres and modalities.

UNIT – I:
Personality Development:
Definition - Various Aspects of Personality Development - BehaviouralTraits.Importance of Soft Skills for personal and professional development - Success stories.

UNIT – II:
Non Verbal Communication:
Kinesics, Haptics ,Proxemics, Vocalics, OculesicsBody Language informal contexts such as Group Discussions, Presentations and Interviews.

UNIT – III:
Team Dynamics:
Different Types of Teams– Role of an individual – Communicating as a group or team leader Individual Presentations/Team Presentation-Project Presentations- Case Studies

UNIT-IV:
Interpersonal Skills:
Time Management- Stress Management- Emotional Intelligence- Conflict Management-Relationship Management

UNIT-V:
Digital Correspondence:
Role of Multimedia in Communication - Communication in a Digital Edge (Video Conference Etc.) Social Networking: Importance and Effects.

TEXT BOOK:

1. Shikha Kapoor, Personality Development and Soft Skills, Preparing for Tomorrow, Wiley, 2020.

REFERENCE BOOKS:

1. Barun K Mitra, Personality Development and Soft Skills, Oxford University Press, 2016.
2. Subramanian R, Professional Ethics, Oxford University Press,2015.

Department of Electronics and Communication Engineering

BoS Members' Signatures:

1. Dr. K. Vasanth, Professor, Head & Chairman of BoS E C E D e p t . , VJIT.	2.Dr.P. Chandrasekhar Reddy, Professor of ECE,JNTUH CEH, University Nominee.	3.Dr. K.S. Rao, Director, Anurag Group ofInstitutions, External Member.	4. Dr. P. Chandra Sekhar, HoD, Dept., of ECE, OsmainaUniversity, External Member.
5. Dr. Y. Pandurangaiah, Professor, Vardhaman College of Engineering, Shamshabad, External Member.	6. Mr. A. Hariharan, Associate Director, PACTRA EDGE, Hyderabad, External Member.	7. Mr. N. Venkatesh, Sr. Director, Sillicon Labs, Hyderabad, External Member.	8. Dr. S. Thulasi Prasad, Professor,ECE,VJIT, Internal Member.
9. Dr. P. Ganesan, Professor, ECE,VJIT, nternal Member.	10. Mr. M. Rajendra Prasad, Associate Professor, ECE,VJIT, Internal Member.	11. Mrs. A. Jaya Lakshmi, Associate Professor, ECE,VJIT, Internal Member.	**Date of Bos Meeting On** **15/07/2021**

Vidya Jyothi Institute of Technology
(An Autonomous Institution)
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Aziz Nagar Gate, C.B. Post, Hyderabad-500 075
Department of Electronics and Communication Engineering

MANAGERIAL ECONOMICS & AND FINANCIAL ANALYSIS

III B.Tech II semester

L	T	P	C
3	0	0	3

COURSE OUTCOMES:

At the end of the course the student should be able to

1. Understand the nature and scope of business economics.
2. Differentiate the various forms of Business organizations.
3. Identify the impact of economic variables on the Business firms
4. Analyze the Demand, Supply, Production, Cost, Market Structure, Pricing aspects
5. Analyze, compare and interpret the Financial Statements of a Company using ratios.

UNIT – I:

Introduction to Business and Economics: Business:

Structure of Business Firm, Theory of Firm, Types of Business Entities, Limited Liability Companies, Sources of Capital for a Company, Non-Conventional Sources of Finance.

Economics:

Significance of Economics, Micro and Macro Economic Concepts, Concepts and Importance of National Income, Inflation, Money Supply in Inflation, Business Cycle, Features and Phases of Business Cycle. Nature and Scope of Business Economics, Role of Business Economist, Multidisciplinary nature of Business Economics.

UNIT – II:

Demand and Supply Analysis:

Elasticity of Demand:

Elasticity, Types of Elasticity, Law of Demand, Measurement and Significance of Elasticity of Demand, Factors affecting Elasticity of Demand, Elasticity of Demand in decision making, Demand Forecasting: Characteristics of Good Demand Forecasting, Steps in Demand Forecasting, Methods of Demand Forecasting.

Supply Analysis:

Determinants of Supply, Supply Function & Law of Supply.

UNIT- III:

Production, Cost, Market Structures & Pricing:

Production Analysis:

Factors of Production, Production Function, Production Function with one variable input, two variable inputs, Returns to Scale.

Cost analysis: Types of Costs. Market Structures: Nature of Competition, Features of Perfect competition, Monopoly, Oligopoly, and Monopolistic Competition. Pricing: Types of Pricing, Product Life Cycle based Pricing, Break Even Analysis, and Cost Volume Profit Analysis

UNIT - IV:

Financial Accounting:

Accounting concepts and Conventions, Accounting Equation, Double-Entry system of Accounting, Rules for maintaining Books of Accounts, Journal, Posting to Ledger, Preparation of Trial Balance, and Preparation of Final Accounts.

UNIT – V:

Financial Analysis through Ratios:

Concept of Ratio Analysis, Liquidity Ratios, Turnover Ratios, Profitability Ratios, Proprietary Ratios, Solvency, Leverage Ratios (simple problems)

TEXT BOOK:

1. Chaturvedi D D, Gupta S L, Business Economics - Theory and Applications, International Book House, 2013.
2. Dhanesh K Khatri, Financial Accounting, Tata McGraw Hill, 2011.

REFERENCES BOOKS:

1. Paresh Shah, Financial Accounting for Management, Oxford Press, 2015.
2. Maheshwari S N , Sharad C A, Maheshwari K & Suneel K Maheshwari, Financial Accounting,Vikas Publications, 2013.

Department of Electronics and Communication Engineering

DIGITAL SIGNAL PROCESSING

III B.Tech II Semester

L	T	P	C
2	1	0	3

COURSE OUTCOMES:

At the end of the course the student should be able to

1. Define the concepts of Fourier transforms, digital filters with their effect of errors.
2. Illustrate speed and memory requirements of Fourier transforms on signals.
3. Relate the effects of finite word length on systems.
4. Formulate frequency filtering, impulse response filters with its structure.
5. Ability to understand various applications of DSP such as multi rate signal processing, telecommunication

UNIT-I:

Introduction to DSP- applications-advantages

Discrete Fourier Transform:

DTFT, DFT-Complexity calculation- Properties of DFT- linear convolution- Circular convolution- Sectioned convolution- Relation between DTFT, DFS, DFT and Z-Transform.

UNIT-II:

Fast Fourier Transform:

Fast Fourier Transform (FFT), Radix-2 decimation-in-time and decimation-in-frequency FFT Algorithms, Inverse FFT- Convolution of sequences using FFT.

UNIT-III:

IIR Digital Filters:

Analog filter approximations –Butterworth and Chebyshev- Design of IIR digital filters from analog filters- Impulse invariant technique – warping effect- bilinear transformation method - Spectral transformations, realization of IIR filters- direct, canonic, cascade and parallel forms.

UNIT-IV:

FIR Digital Filters:

Characteristics of FIR Digital filters - frequency response – Gibbs Phenomenon- Design of FIR filters - window techniques – Frequency Sampling - Comparison of IIR and FIR filters, realization of FIR filters- direct& cascade forms

UNIT-V:

Finite Word Length Effects:

Quantization- Quantization error- Types- Limit cycles- Overflow oscillations –Scaling

Multirate Signal Processing: Introduction - down sampling- Decimation – up sampling – Interpolation -Sampling Rate Conversion

TEXT BOOK:

1. John G. Proakis, Digital Signal Processing, Principles, Algorithms, and Applications, Pearson, 2007.
2. Tarun Kumar Rawat , Digital Signal Processing, Oxford Publications, 2015

REFERENCES BOOKS:

1. Andreas Antoniou, Digital Signal Processing, TATA McGraw Hill , 2006
2. Ashok Ambardar , Digital Signal Processing, Cenage Learning, 2007.

Department of Electronics and Communication Engineering

MICROWAVE ENGINEERING

III B.Tech II Semester

L	T	P	C
2	1	0	3

COURSE OUTCOMES:

At the end of the course the student should be able to

1. Understands the application of 3-D coordinate geometry, calculus and vector geometry to analyze the EM wave transmission at microwave frequencies.
2. Analyze the problem within the Microwave Transmission line by considering the parameters at transmitter and receiver.
3. Classify Microwave Tubes and Microwave solid state devices
4. Evaluate VSWR, Attenuation, Microwave Frequency of Microwaves in Waveguides.
5. Design the microwave components and different transmission lines with the given characteristics at microwave frequencies

UNIT I:Microwave Transmission Lines:

Microwave Spectrum and Band designation, Rectangular Waveguides – Solution of Wave Equations in Rectangular Coordinates, TE/TM mode analysis, Expressions for Fields, Characteristic Equation and Cut-off Frequencies, Dominant and Degenerate Modes, Sketches of TE and TM mode fields in the cross-section, Phase and Group Velocities, Wavelengths, Impedance Relations, Equation of Power Transmission, Impossibility of TEM Mode. Microstrip Lines – Zo Relations, Effective Dielectric Constant.

UNIT II:Microwave Tubes:

Limitations and Losses of conventional Tubes at Microwave Frequencies, Microwave Tubes – O Type and M Type Classifications, O-type Tubes : 2 Cavity Klystrons – Structure, Reentrant Cavities, Velocity Modulation Process and Applegate Diagram, Bunching Process and Small Signal Theory – Expressions for O/P Power and Efficiency. Reflex Klystrons – Structure, Velocity Modulation and Applegate Diagram, Mathematical Theory of Bunching, Power Output, Efficiency, Oscillating Modes and O/P Characteristics.

UNIT III: Helix TWTs and M-Type Tubes:

Helix TWTs:

Types and Characteristics of Slow Wave Structures; Structure of TWT and Amplification Process (qualitative treatment), Suppression of Oscillations, Gain Considerations.

M-Type Tubes:

Introduction, Cross-field Effects, Magnetrons – Different Types, Cylindrical Traveling Wave Magnetron – Hull Cut-off and Hartree Conditions, Modes of Resonance and PI-Mode Operation, Separation of PI-Mode, o/p characteristics.

UNIT IV: Waveguide Components and Scattering Parameters:
Coupling Mechanisms, Waveguide Discontinuities – Waveguide Windows, Tuning Screws and Posts, Matched Loads. Waveguide Attenuators – Different Types, Resistive Card and Rotary Vane Attenuators; Waveguide Phase Shifters – Types, Dielectric and Rotary Vane Phase Shifters, Scattering Parameters-Scattering matrix, Properties, S-parameters of Waveguide Multiport Junctions - E plane and H plane Tees, Magic Tee, Directional Couplers – 2 Hole, Bethe Hole, Ferrites– Composition and Characteristics, Faraday Rotation Law, Ferrite Components – Gyrator, Isolator, circulator.

UNIT V: Microwave Solid State Devices and Measurements:
Microwave Solid State Devices:
Introduction, Classification, Applications. TEDs – Introduction, Gunn Diodes – Principle, RWH Theory, Characteristics, Modes of Operation - Gunn Oscillation Modes, Principle of operation of IMPATT and TRAPATT Devices.
Microwave Measurements:
Description of Microwave Bench – Different Blocks and their Features, Errors and Precautions, Measurement of Attenuation, Frequency.Standing Wave Measurements-measurement of Low and High VSWR, Impedance Measurements.

TEXT BOOK:
1. Samuel Y. Liao, Microwave Devices and Circuits, Pearson, 2003.
2. Kulkarni M , Microwave and Radar Engineering , UMESH Publications, 2003

REFERENCES BOOKS:
1. David M. Pozar, Microwave Engineering, John Wiley, 2011.
2. Raghuvanshi G S, Microwave Engineering, Cengage Learning, 2012.

DATA COMMUNICATION AND NETWORKS

III B.Tech II Semester

L	T	P	C
2	1	0	3

COURSE OUTCOMES:

At the end of the course the student should be able to

1. Demonstrate concepts of various types of computer networks, TCP/IP and OSI models.
2. Analyze different LLC multiplexing mechanisms, node-to-node flow and error control
3. Analyze different MAC mechanisms (Aloha, Slotted Aloha, TDMA, FDMA) and understand their pros and cons.
4. Identify and design the different types of network devices and shortest path in a given network & Enable to interconnect various heterogeneous networks.
5. Implement a peer to peer file sharing application utilizing application layer protocols and transportation layer protocol.

UNIT – I:

Introduction to Networks:

Internet, Protocols and Standards, The OSI Model, Layers in OSI Model, TCP/IP Suite, Addressing.

Physical Layer:

Multiplexing, Transmission Media, Circuit Switched Networks, Datagram Networks, and Virtual Circuit Networks.

UNIT – II:

Data Link Layer:

Design issues, framing, and checksum, Elementary data link protocols: simplest protocol, A simplex stop and wait protocol for an error-free channel,

Sliding Window protocols: A one-bit sliding window protocol, A protocol using Go-Back-N, A protocol using Selective Repeat.

Multiple Access: ALOHA, CSMA, CSMA/CD, CSMA/CA, Ethernet, Wireless LANs

UNIT – III:

Network Layer:

Logical Addressing, Internetworking, IPv4, IPv6, Tunneling, Address Mapping, ICMP, IGMP, Forwarding, Routing-Flooding,

Network Layer: Delivery, Forwarding, Unicast routing protocols-Distance vector routing –RIP-Multicast Routing Protocols-OSPF, DVMRP.

UNIT – IV:

Transport Layer:

Process to Process Delivery, UDP, TCP and SCTP Protocols, Congestion, Congestion Control, Quality of Service

UNIT – V:

Application Layer:

Domain Name Space, DNS in Internet, Electronic Mail, File Transfer Protocol, HTTP.

TEXT BOOKS:

1. Behrouz A. Forouzan , Data Communications and Networking, Mc Graw Hill, 2006.
2. William Stallings, Data communications and Networks, Pearson, 2007.

REFERENCE BOOKS:

1. James F. Kurose, K. W. Ross , Computer Networking: A Top-Down Approach Featuring the Internet, Pearson, 2013.
2. Bhusan Trivedi , Data communication and Networks, Oxford university press, 2016.

Department of Electronics and Communication Engineering

DIGITAL SIGNAL PROCESSORS AND ARCHITECTURES
(Professional Elective-2)

III B.Tech II Semester

L	T	P	C
3	0	0	3

COURSE OUTCOMES:

At the end of the course the student should be able to

1. Understand signal processing principles, interfacing strategies and the different architectural features of DSP processors.
2. Differentiate the architectural features of various DSP processors.
3. Illustrate the methodology of writing programs for TMS32OC54xx.
4. Explain the system development using DSP Processors for various applications.
5. Able to introduce architectural features of analog devices family of DSP devices i.e. ADSP 2100, ADSP 2181 and blackfin processor

UNIT –I:

Introduction to Digital Signal Processing:
Digital signal processing system, the sampling process, discrete time sequences. Discrete Fourier Transform (DFT) and Fast Fourier Transform (FFT), LTI systems, Digital filters, Decimation and interpolation.

Computational Accuracy in DSP Implementations:
Number formats for signals and coefficients in DSP systems, Dynamic Range and Precision, Sources of error in DSP implementations, A/D Conversion errors, DSP Computational errors, D/A Conversion Errors, Compensating filter.

UNIT —II:

Architecture for Programmable DSP Devices:
Basic Architectural features, DSP Computational Building Blocks, Bus Architecture and Memory, Data Addressing Capabilities, Address Generation Unit, Programmability and Program Execution, Speed Issues, Features for External interfacing.

UNIT –III:

Programmable Digital Signal Processors:
Commercial Digital signal- processing Devices, Data Addressing modes of TMS32OC54XX DSPs, TMS32OC54XX Processors- Data Addressing modes, Memory space, Program Control, instructions and Programming, On-Chip Peripherals, Interrupts, Pipeline Operation.

UNIT –IV:

Analog Devices Family of DSP Devices:

Analog Devices Family of DSP Devices —ALU and MAC block diagram, Shifter Instruction, Base Architecture of ADSP 2100, ADSP-2181 high performance Processor.

Introduction to Blackfin Processor:

The Blackfin Processor, Introduction to Micro Signal Architecture, Overview of Hardware Processing Units and Register files, Address Arithmetic Unit, Control Unit, Bus Architecture and Memory, Basic Peripherals.

UNIT –V:

Interfacing Memory and I/O Peripherals to Programmable DSP Devices:

Memory space organization, External bus interfacing signals, Memory interface, Parallel I/O interface, Programmed I/O, Interrupts and I/O, Direct memory access (DMA).

TEXT BOOKS:

1. Avatar Singh & S. Srinivasan , Digital Signal Processing, Thomson Publications, 2004.
2. Padmanabhan K, Vijayarajeswaran R, Ananthi S , A Practical Approach To Digital Signal Processing, New Age International, 2009

REFERENCE BOOKS:

1. Venkataramani B and Bhaskar M, Digital Signal Processors, Architecture, Programming and Applications, Tata, Mc Graw Hill, 2002.
2. Jonatham Stein ,Digital Signal Processing, John Wiley ,2005,.

Department of Electronics and Communication Engineering

MODELING AND SIMULATION USING MATLAB
(Professional Elective-2)

III B.Tech II Semester

L	T	P	C
3	0	0	3

COURSE OUTCOMES:

At the end of the course the student should be able to

1. Develop codes on various domains of Electronics and Communication Engineering
2. Handle the advanced commands in appropriate fields of engineering
3. Visualize the impact of parameters during simulation
4. Cater the industrial needs pertaining to the semiconductor technologies.
5. Students will be able to implement simulation models using the tool Simulink

UNIT-I:
Introduction to MATLAB:
Components of MATLAB desktop-Types of files- Variables and Arrays–Handling Arrays–Operators and Special Characters- Input / Output commands-File handling-Data types-Functions –Built-in and user defined functions - passing arguments - Cell arrays &Structures - Strings - 2D strings-String comparing - Concatenation.

UNIT- II:
Programming :
Introduction - Control Flow Conditional Control — if, else, switch -Loop Control — for, while, continue, break , Program Termination — return- TRY & CATCH - Error trapping - Writing programs with logic and flow control - Differentiation & Integration using MATLAB-, Debugging methods -

UNIT-III:
Plotting in MATLAB & GUI:
Introduction-The plot command-Formatting Plot-Multiple Plots-Adding legend to the plot-Subplot-Plotting complex data-Basic 2D plots, Labels, Line style, Markers,Grid axis- Log, Log-Log, Semilog-Polar, fplot, ezplot, ezpolar, Hold, Stem, Bar, Hist, Interactive plotting - 3D plots – Mesh - Contour - Example programs- Fundamentals of GUI Creation

UNIT-IV:
Application Programs:
Diode Characteristics-BJT characteristics-Half wave and Full wave Rectifier-Open Loop gain of OPAMP-Signal generation-Frequency response of FIR & IIR filters

UNIT-V:

Simulink & applications:

Introduction-Getting Simulink-Creating and Simulating a Simulink model-Creating a subsystem in Simulink- Data import and export-Simulink solution of Differential equations-Using Simulink generating an AM, PCM, DPCM-Designing of FWR & HWR using Simulink.

TEXT BOOKS:

1. R.K.Bansal- A.K.Goe- M.K.Sharma- "MATLAB and Its Applications in Engineering"- Pearson Education India- 2009.
2. John Okyere Attia, John O. Attia, Electronics and circuit analysis using MATLAB, CRC press, 1999.

REFERENCE BOOKS:

1. Sanjeevan Kapshe, ShailendraJain,Modeling and Simulation Using Matlab – Simulink, Wiley, 2016.
2. Rudra Pratap, Getting Started with MATLAB 6.0,Oxford University Press, 2004.

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Department of Electronics and Communication Engineering

OPTICAL COMMUNICATIONS
(Professional Elective-2)

III B.Tech II Semester

L	T	P	C
3	0	0	3

COURSE OUTCOMES:

At the end of the course the student should be able to

1. Gain Knowledge in optical communication, components, Mode theory, sources & detectors and Losses in optical fibers.
2. Analyze single & multimode fibers and analog & digital links.
3. Design and develop Optical sources, Detectors and links
4. Develop Multi-Channel Optical Systems
5. Discuss the elements of WDM networks and its potential applications.

UNIT-I:

Introduction to optical fiber waveguides:

Introduction, vector nature of light: linear polarization-elliptical polarization and circular polarization - the quantum nature of the light, optical fiber modes and configurations: fiber types-rays and modes- step index fiber structure-ray optic representation – wave representation

UNIT-II:

Optical fibers and fiber losses:

Optical Fibers:

Types of optical fibers: Step-Index Fibers - Graded-Index Fibers, Fiber Modes: Single-Mode Fiber, Dispersion in Single-Mode Fibers - Group-Velocity Dispersion - Material Dispersion - Waveguide Dispersion - Higher-Order Dispersion - Polarization-Mode Dispersion.

Fiber Losses:

Attenuation, absorption, scattering losses, bending losses, core and cladding losses.

UNIT III:

Optical sources and detectors:

Optical Sources:

Light Emitting Diodes: Structures - Light Source Materials - Quantum Efficiency and LED Power - Modulation of LED, Laser Diodes: Laser Diode Modes and Threshold Conditions - Laser Diode Rate Equations - External Quantum Efficiencies - Resonant Frequencies.

Optical Detectors:

Physical Principles of Photo Diodes, Photo Detector Noise, Detector Response Time, Avalanche Multiplication Noise, Structures for InGaAs & APDs, Temperature Effect on Avalanche Gain, Comparisons of Photo Detectors.

UNIT-IV:

Optical links:

Fundamental receiver operation: Digital signal transmission – Error Sources – Receiver Configuration, Digital Links: Point-to-Point Links: System consideration – Link power budget –Rise time budget – Line coding: NRZ Codes – RZ Codes – Block Codes, Noise effect on system Performance: Modal Noise – Mode-Partition Noise – Chirping – Refection Noise, Analog Links: Overview, Carrier to Noise Ratio: Carrier Noise – Photo detector nose & Preamplifier noise –Relative Intensity Noise (RIN) – Reflection Effects on RIN, Multi-channel Transmission Techniques: Multichannel Amplitude Modulation - Multichannel Frequency Modulation – Subcarrier Multiplexing.

UNIT-V:

Optical amplifiers and multichannel systems:

Optical Amplifiers:

Basic Concepts: Gain Spectrum and-Gain Saturation-Amplifier Noise Amplifier Applications, Raman Amplifiers: Raman Gain and Bandwidth - Amplifier Characteristics - Amplifier Performance, Erbium-Doped Fiber Amplifiers: Pumping Requirements - Gain Spectrum - Simple Theory - Amplifier Noise - Multichannel Amplification - Distributed-Gain Amplifiers.

Multichannel Systems:

WDM Light wave Systems: High-Capacity Point-to-Point Links - Wide-Area and Metro-Area Networks - Multiple-Access WDM Networks, WDM Components: Tunable Optical Filters - Multiplexers and Demultiplexers - Add–Drop Multiplexers - Star Couplers - Wavelength - Optical Cross - Wavelength Converters - WDM Transmitters and Receivers

TEXT BOOKS:

1. Keiser J, Fibre Optic communication, McGraw-Hill, 2013.
2. Tamir T, Integrated optics, (Topics in Applied Physics Vol.7), Springer-Verlag, 1975.

REFERENCE BOOKS:

1. Max Ming-Kang Liu, Principles and Applications of Optical Communications, Tata McGraw Hill , 2010.
2. Gupta S C, Optical Fiber Communication and its Applications, Prentice Hall India , 2005.

Department of Electronics and Communication Engineering

BASIC ELECTRONIC INSTRUMENTATION
(Open Elective – 2)

III B.Tech II Semester

L	T	P	C
3	0	0	3

COURSE OUTCOMES:

After successful completion of this course, the students should be able to

1. Comprehend the basics of instrumentation system and its static and dynamic characteristics.
2. Classify and describe resistive, inductive, capacitive and other transducers which are used for measuring various parameters.
3. Understand the working principles of oscilloscopes, signal generators and analysers.
4. Explain about different types of signal analyzers
5. Apply the complete knowledge of various electronics instruments/transducers to measure the physical quantities in the field of science, engineering and technology

UNIT I:

Basics of Instrumentation and Its Characteristics:

Functional Elements of Measurement Systems - Classification of errors, Limiting error and probable error –Error analysis –Static characteristics– accuracy, precision, sensitivity, linearity, resolution, hysteresis, threshold, input impedance, loading effect etc– generalized mathematical model of measurement systems – dynamic characteristics.

UNIT II:

Electronic Instruments and Bridges:

Electronic Instruments for Measuring Basic Parameters: DC Volt meter, AC Voltmeter, DC Ammeter, Ohm meter, Electronic multi-meter, Digital voltmeter.
Bridge Measurement: DC bridges- Wheatstone, Kelvin Bridge, AC bridges –Hay, Maxwell, Schering and Wien bridges.

UNIT III:

Oscilloscopes:

Oscilloscopes:

Block diagram of CRO, Cathode Ray Tube, Vertical and Horizontal Deflection Systems, Delay lines, Probes, Specification of an Oscilloscope. Oscilloscope measurement Techniques, Special Oscilloscopes – Storage Oscilloscope, Sampling Oscilloscope.

UNIT IV:

Signal Generators and Analyzers:

Signal Generators: Sine wave generator, Frequency – Synthesized Signal Generator, Sweep frequency Generator. Pulse and square wave generators. Function Generators.
Signal Analysis: Wave Analyzer, Spectrum Analyzer. Frequency Counters: Simple Frequency Counter; Distortion Analyzer.

UNIT V:

Transducers:

Transducers: Definition-classification-characteristics-Selection Principle of operation, construction, characteristics and application of semiconductor strain gauge, LVDT, Capacitive transducer- Digital transducers- Introduction to Smart sensors and MEMS.

TEXT BOOKS:

1. *Albert D Helstrick and William D Cooper , Modern Electronics Instrumentation & Measurement Techniques, Pearson, 2011.*
2. *Carr , Elements of Electronics Instrumentation and Measurement, Pearson,1996 .*

REFERENCE BOOKS:

1. *Doebelin E A, Measurement Systems – Applications and Design, Tata Mc Graw Hill, 2012*
2. *John P. Bentley, Principles of Measurement Systems, Pearson Education, 2005.*

Department of Electronics and Communication Engineering

CONSUMER ELECTRONICS
(Open Elective – 2)

III B.Tech II Semester

L	T	P	C
3	0	0	3

COURSE OUTCOMES:

At the end of the course the student should be able to

1. Understand electronics engineering concepts used in consumer electronics systems.
2. Identify the need of preventive maintenance in various electronic appliances.
3. Evaluate and analyze different electronic products and systems based on specifications.
4. Use different product safety, compliance standards and techniques associated with electronic products.
5. Identify the need of preventive maintenance in various electronic appliances.

UNIT –I:

Audio systems:

Audio System: Microphones, characteristics of microphone, types of microphone loudspeakers: ideal loud speaker, basic loud speaker, electrostatic loudspeaker, types of loud speaker, baffle, infinite baffle systems , Acoustics: reflection of sound,reverberation,absorption of sound, stereo systems,

UNIT -II:

Video Systems:monochrome tv standards and systems: elements of a television system,the scanning process,scanning methods and aspect ratio,persistence of vision and flicker,vertical resolution,interlacing of scanning lines,control pulses,composite video signal,monochrome TV camera,vidicon camera tube,television as a system,American 525-line TV system,the 625-line system,vestigial sideband transmission,color picture tube,difference between a monochrome and a color picture tube,colorTV systems,the ntsc system

UNIT – III:

Domestic & Consumer Appliances I:

Washing machines, Microwave Oven,Air-conditioners and Refrigerators, Computers office System, telecommunication systems,line system characteristics,radio system characteristics,telephone receivers and handsets,modes of operation

UNIT-IV:

Domestic & Consumer Appliances II:

Power Supplies SMPS/UPS and Preventive Maintenance and others systems such as Remote controls, Bar codes,

UNIT – V:

Switching Systems: switching system principles,uniselectors,two-motion selectors,four digit step-by-step automatic exchange,reed relay and crossbar exchanges,traffic handling capacity,PBX switching,functions of a switching office,hands free phones vs. speakerphones

TEXT BOOKS:

1. Bali S P, Consumer Electronics, Pearson, 2007

REFERENCE BOOKS:

1. Philip Hoff, Philip Herbert Hoff, Consumer Electronics for Engineers , Cambridge University Press,1998
2. Douglas Kinney, A Beginners Guide to Consumer Electronics Repair: Hand Book and Tutorial, iUniverse, 2006

Department of Electronics and Communication Engineering

DIGITAL SIGNAL PROCESSING LABORATORY

III B.Tech II semester

L	T	P	C
0	0	2	1

COURSE OUTCOMES:

At the end of the course the student should be able to

1. Formulate programs for performing time & frequency operation on signals and systems.
2. Design and implement impulse response filters and Multirate system for a given sequence
3. Analyze and Observe Magnitude and phase characteristics (Frequency response Characteristics) of digital IIR-Butterworth, Chebyshev filters
4. Analyze and Observe Magnitude and phase characteristics (Frequency response Characteristics) of digital FIR filters using window techniques
5. Develop various DSP Algorithms using MATLAB Software package

Note: Minimum 12 Experiments have to be conducted

1. Generation of Sinusoidal Waveform / Signal based on Recursive Difference Equations.
2. To find DFT / IDFT of given DT Signal.
3. To find Frequency Response of a System given in Transfer Function/ Differential equation form.
4. Implementation of FFT of given Sequence.
5. Determination of Power Spectrum of a given Signal(s).
6. Implementation of LP FIR Filter for a given Sequence/Signal.
7. Implementation of HP IIR Filter for a given Sequence/Signal.
8. Generation of Narrow Band Signal through Filtering.
9. Generation of DTMF Signals.
10. Implementation of Decimation Process.
11. Implementation of Interpolation Process.
12. Implementation of I/D Sampling Rate Converters.
13. Step and Ramp Response of First order and Second Order Systems.

Department of Electronics and Communication Engineering

ADVANCED COMMUNICATION SKILLS LABORATORY

III B.Tech II semester

L	T	P	C
0	0	2	1

COURSE OUTCOMES:

At the end of the course the student should be able to

1. Develop sound communication skills in various situations with the help of enriched vocabulary.
2. Practice reading techniques for a faster and better comprehension.
3. Exhibit strong writing skills to express ideas effectively.
4. Demonstrate effective presentation skills.
5. Use appropriate verbal and non-verbal skills for a successful career.

UNIT-I:
Activities on Fundamentals of inter-personal Communication and Building Vocabulary: Starting a conversation – responding appropriately and relevantly – using the right body language - Role Play in different situations & Discourse Skills – using visuals – Synonyms and antonyms, word roots, one word substitutes, prefixes and suffixes, study of word origin, business vocabulary, analogy, idioms and phrases, collocations & usage of vocabulary.

UNIT-II:
Activities on Reading Comprehension:
General Vs Local comprehension, reading for facts, guessing meanings from context, scanning, skimming, inferring meaning, critical reading & effective googling.

UNIT-III:
Activities on Writing Skills:
Structure and presentation of different types of writing – letter writing/ Resume writing/ Statement of purpose - E-correspondence/ Technical report writing / Portfolio writing – planning for writing – improving one's writing.

UNIT-IV:
Activities on Presentation Skills:
Oral presentations (individual and group) through JAM sessions/seminars/PPTs and written presentations through posters/projects/reports/e-mails/assignments etc.

UNIT-V:
Activities on Group Discussion and interview Skills:
Dynamics of group discussion, intervention, summarizing, modulation of voice, body language, relevance, fluency and organization of ideas and rubrics for evaluation. Concept and process, pre-interview planning, opening strategies, answering strategies, interview through tele-conference & video – conference and Mock Interviews.

REFERENCE BOOKS:

1. Technical Communication by Meenakshi Raman &Sangeeta Sharma, Oxford University, 2nd Edition, 2011.
2. Functional English for Success, Orient Longman, 2014.

QUANTITATIVE METHODS & LOGICAL REASONING
(From Training and Placement Dept.)

III B.Tech II semester

L	T	P	C
2	0	0	1

COURSE OUTCOMES:

At the end of the course the student should be able to

1. To perform well in various competitive exams and placement drives.
2. To solve basic and complex mathematical problems in short time.
3. To become strong in Quantitative Aptitude and Reasoning which can be applied for GRE, GATE, GMAT or CAT exam also.
4. To develop problem solving skills and analytical abilities, which play a great role in corporate and industry set up.

UNIT – I:

Number System:

Speed Maths, Numbers, Factors, Prime & Co Primes, LCM & HCF, Divisibility Rules, Finding Unit Place Digit and Last Two Digits of an Expression

Ratio, Proportion and Variations:

Definition of Ratio, Ratio of Proportion, Comparison of Ratios, Compound ratio, Direct and Indirect Proportion

Percentages:

Converting Fractions and Decimal into Percentages, Successive Percentage, Populations, Expenditure and Savings

Profit and loss:

Relation between Cost Price and Selling Price, Discount and Marked Price, Gain or Loss Percentages on Selling Price

Simple and Compound Interest:

Problems on Interest (**I**), Amount (**A**), Principal (**P**) and Rate of Interest(**R**)difference between the Simple Interest and Compound Interest for 2 and 3 years.

UNIT – II:

Partnership:

Relation between Partners, Period of Investment and Shares

Averages, Ages and Allegation:

Average of Different Groups, Change in Averages by Adding, Deleting and Replacement of Objects, Problems on ages, Allegation Rule, Mean Value of the Mixture, Replacement of Equal Amount of Quantity.

Time and Work:

Men and Days, Work and Wages, Pipes and Cisterns, Hours and Work, Alternate Day Concept,

Time and Distance:
Difference between the Average and Relative Speeds, Reaching the Destination Late and Early, Stoppage Time Per Hour, Time and Distance between Two Moving Bodies : Train Crossing Man - same and opposite directions, Speed of Boat and Stream,

UNIT – III:
Progressions and Quadratic Equations:
Arithmetic, Geometric and Harmonic Progressions, Arithmetic Mean, Geometric Mean and Harmonic Mean and their Relations.General form of Quadratic Equation, Finding the Roots of Quadratic Equation, Nature of the Roots.
Permutation and Combination:
Fundamental Rules, Problems on Permutations & combinations.
Probability:
Definition of probability, Notations and Formulae, Problems on Probability.
Data Interpretation and Data Sufficiency: Tabular and Pie-charts, Bar and Line Graphs, Introduction to Data Sufficiency, Problems on Data Sufficiency.

UNIT – IV:
Deductions:
Statements and conclusions using Venn diagram and Syllogism Method
Series completion:
Number series, Alphabet series, Letter Series.
Coding and Decoding:
Letter coding, Number coding, Number to letter coding, Matrix Coding, Substitution, Mixed Letter Coding, Mixed Number Coding, Deciphering Individual Letter Codes by Analysis.
Analytical Reasoning Puzzles:
Problems on Linear, Double line-up and Circular Aarrangements, Selections and Comparisons.
Blood Relations:
Defining the various Relations among the Members of a Family, Solving Blood Relation Puzzles by using Symbols and Notations.Problems on Coded Relations.

UNIT – V:
Direction sense Test:
Sort of directions in puzzles distance between two points, problems on shadows, Application of triangular triplets.
Clocks:
Relation between Minute-Hour Hands, Angle vs Time, Exceptional Cases in Clocks
Calendars:
Definition of a Leap Year, Finding the Odd days, Finding the Day of any Random Calendar Date, repetition of Calendar Years.
Cubes and Dices:
Finding the Minimum and Maximum Number of Identical Pieces and Cuts, Painting of Cubes and cuts, Problems on Dice.
Venn Diagrams:
Circular Representation of given words, Geometrical Representation of Certain class, Set heory based Problems.

Text Books:

1. Verbal Reasoning, GL Barrons, Pinterest, Latest Edition 2019
2. A Modern Approach to Logical Reasoning &Quantitative Aptitude, R S Agarwal, S.Chand, Publications, Revised edition, 2019

Reference Books:

1. Quantitative Aptitude, G.L Barrons, Pinrest 2019
2. Quantitative Aptitude, Abhijit Guha, Mc Graw Hills, Edition 2019

Department of Electronics and Communication Engineering

BoS Members' Signatures:

1. Dr. K. Vasanth, Professor, Head & Chairman of BoS ECE Dept., VJIT.	2.Dr.P. Chandrasekhar Reddy, Professor of ECE,JNTUH CEH, University Nominee.	3.Dr. K.S. Rao, Director, Anurag Group ofInstitutions, External Member.	4. Dr. P. Chandra Sekhar, HoD, Dept., of ECE, OsmainaUniversity, External Member.
5. Dr. Y. Pandurangaiah, Professor, Vardhaman College of Engineering, Shamshabad, External Member.	6. Mr. A. Hariharan, Associate Director, PACTRA EDGE, Hyderabad, External Member.	7. Mr. N. Venkatesh, Sr. Director, Sillicon Labs, Hyderabad, External Member.	8. Dr. S. Thulasi Prasad, Professor,ECE,VJIT, Internal Member.
9. Dr. P. Ganesan, Professor, ECE,VJIT, Internal Member.	10. Mr. M. Rajendra Prasad, Associate Professor, ECE,VJIT, Internal Member.	11. Mrs. A. Jaya Lakshmi, Associate Professor, ECE,VJIT, Internal Member.	**Date of Bos Meeting On** **15/07/2021**

EMBEDDED SYSTEM DESIGN

IV B.Tech I Semester

L	T	P	C
2	1	0	3

Course Outcomes:

At the end of the course the student should be able to

1. Expected to understand the selection procedure of Processors in the embedded domain.
2. Design Procedure for Embedded Firmware.
3. Expected to visualize the role of Real time Operating Systems in Embedded Systems
4. Expected to evaluate the Correlation between task synchronization and latency issues
5. To Enumerate the need for Task Communications in a Multiprocessor Environment

UNIT I:
Introduction to Embedded Systems:
Definition of Embedded System, Embedded Systems Vs General Computing Systems, History of Embedded Systems, Classification, Major Application Areas, Purpose of Embedded Systems, Characteristics and Quality Attributes of Embedded Systems.

UNIT II:
Typical Embedded System:
Core of the Embedded System: General Purpose and Domain Specific Processors, ASICs, PLDs, Commercial Off-The-Shelf Components (COTS), Memory: ROM, RAM, Memory according to the type of Interface, Memory Shadowing, Memory selection for Embedded Systems, Sensors and Actuators, Communication Interface: Onboard and External Communication Interfaces.

UNIT III:
Embedded Firmware:
Reset Circuit, Brown-out Protection Circuit, Oscillator Unit, Real Time Clock, Watchdog Timer, Embedded Firmware Design Approaches and Development Languages.

UNIT IV:
RTOS Based Embedded System Design:
Operating System Basics, Types of Operating Systems, Tasks, Process and Threads, Multiprocessing and Multitasking, Task Scheduling.

UNIT V:
Task Communication:
Shared Memory, Message Passing, Remote Procedure Call and Sockets, Task Synchronization: Task Communication/Synchronization Issues, Task Synchronization Techniques, Device Drivers, How to Choose an RTOS.

TEXT BOOKS:

1. Shibu K V, Introduction to Embedded Systems, McGraw-Hill Education, 2009.
2. Lyla B. Das, Embedded Systems an Integrated Approach, Pearson Education, 2013.

REFERENCE BOOKS:

1. Raj Kamal , Embedded systems architecture, programming and design, McGraw-Hill Education, 2003
2. Frank Vahid, Tony Givargis , Embedded System Design A Unified Hardware/Software Introduction, John Wiley, 2003

Department of Electronics and Communication Engineering

VLSI DEISGN

IV B.Tech I Semester

L	T	P	C
2	1	0	3

COURSE OUTCOMES:

At the end of the course the student should be able to

1. Enumerate different steps involved in Integrated Circuits technology for MOS transistor and explain the primary and secondary effects of MOSFET and BICMOS.
2. Summarize the fabrication process involved in VLSI circuits
3. Outline the design process involved in VLSI design flow for design of MOS transistors.
4. Understand and apply the concepts of memories in design.
5. Design digital circuits using Verilog HDL.

UNIT-I:

Introduction:

Introduction to IC Technology — MOSFET – CMOS - BiCMOS

Basic Electrical Properties:

Electrical Properties- MOS- primary characteristics - threshold Voltage – Secondary characteristics- Ratioed Circuits- CMOS, BiCMOS Inverter – analysis- design.

UNIT-II:

VLSI Circuit Design Processes:

VLSI Design Flow - MOS Layers - Stick Diagrams - Design rules - wires – Contacts – Transistors- Layout Diagrams – NMOS – PMOS - CMOS Inverters – Gates - Scaling of MOS circuits.

UNIT-III:

Gate Level Design:

Logic Gates – Pass transistors, Transmission gate- Switch logic - Alternate gate circuits, Latches- Time delays - Driving large capacitive loads - Wiring capacitance, Fan — in, Fan — out, Choice of layers.

Programmable Logic Devices:

ROM – PLA - PAL-Design Approach - CPLDs – FPGA -Parameters influencing low power design.

UNIT-IV:

Introduction to Verilog HDL:

Overview of Digital Design with Verilog HDL, typical HDL-flow, Concurrency, Simulation and Synthesis, Functional verification;

Gate Level Modeling:

Introduction, Modeling using basic Verilog gate primitives, description of AND, OR, NOT type gates, Design of Flip – Flops with Gate Primitives, Delays

UNIT-V:

Dataflow Modeling:

Continuous assignments, delay specification, expressions, operators, operands, operator types;

Behavioral Modeling:

Structured procedures, initial and always, blocking and non-blocking statements, The Case Statement, for Loop, While Loop, Design of Flip flop, Shift register

TEXT BOOKS:

1. Kamran Eshraghian, Douglas A. Pucknell, SholehEshraghian, Essentials of VLSI Circuits and Systems, Prentice, 2005.
2. T.R. Padmanabhan, Digital Design Through Verilog HDL, Wiley, 2003.

REFERENCE BOOKS:

1. John P. Uyemura, CMOS logic circuit Design, Springer, 1999.
2. Lal Kishore K, Prabhakar V S V, VLSI Design, I.K International, 2010.

Department of Electronics and Communication Engineering

DIGITAL IMAGE PROCESSING
(Professional Elective-3)

IV B.Tech I Semester

L	T	P	C
3	0	0	3

COURSE OUTCOMES:

At the end of the course the student should be able to

1. State the Digital Image Fundamentals and operation associated with various stages of image processing.
2. Illustrate the mathematics involved in various stages of image processing.
3. Demonstrate the operations various stages of image processing.
4. Contrast the different types of operation and its impact on images.
5. Understand the anatomy of image compression in Image Transmission

UNIT-I:
Fundamentals of Image Processing:
Elements of Digital Image Processing Systems – Image sensing and Acquisition- Elements of Visual Perception – structure of human eye – light- luminance- brightness and contrast- image formation- Basic steps of image processing- Sampling -Quantization and Digital Image representation - Basic relationships between pixels – neighborhood, adjacency, connectivity, distance measures..

UNIT-II:
Image Enhancement in Spatial & frequency domain:
Image Enhancement in Spatial domain:
Introduction-Point Processing-Histogram processing- Arithmetic and logical operations-Fundamentals of Spatial filtering-masking-Spatial filters for Smoothing - Spatial filters for Sharpening.
Image Enhancement in Frequency domain:
Need for transform-Basics of filtering in frequency domain-Image smoothing in frequency domain-Image sharpening in frequency domain

UNIT-III:
Image Restoration:
Introduction- Degradation model –Noise models-Spatial domain filtering for restoration- Mean Filters – Order Statistics filters – Adaptive filters –frequency domain filtering for noise removal - Band reject Filters – Band pass Filters – Notch Filters –Degradation function estimation– Inverse filtering – Wiener filter.

UNIT-IV:

Image Segmentation and Morphological processing:

Image Segmentation:

Segmentation concepts - Point - Line - Edge Detection-Thresholding based segmentation-Local- Global and Adaptive Thresholding- Region based segmentation-Region growing-Region splitting and merging.

Morphological processing:

Introduction- structuring element – erosion – dilation – Opening - closing.

UNIT-V:

Image Compression:

Introduction-Redundancy in images-Fidelity Criteria-Image compression model-Lossless compression-Huffman coding -Lossless Predictive coding- Lossy compression– lossy predictive coding- Transform coding –Image compression standards- JPEG and JPEG 2000.

TEXT BOOKS:

1. Rafael C. Gonzales, Richard E. Woods, Digital Image Processing, Pearson, 2007.
2. Anil K. Jain, Fundamentals of Digital Image Processing, Pearson, 2005.

REFERENCE BOOKS:

1. Rafael C. Gonzalez, Richard E.. Woods, Richard Eugene Woods, Steven L. Eddins, Digital Image processing using MATLAB, Tata McGraw Hill, 2010.
2. William K Pratt, Digital Image Processing, John Wiley & Sons, 2002.

Department of Electronics and Communication Engineering

CELLULAR AND MOBILE COMMUNICATIONS
(Professional Elective-3)

IV B.Tech I Semester

L	T	P	C
3	0	0	3

COURSE OUTCOMES:
At the end of the course the student should be able to

1. *Understand the principles of mobile communications, radio models, Antennas for Mobile communication, Equalization and applications.*
2. *Interpret the propagation models of Mobile and its effect on Antenna, Diversity and applications.*
3. *Relate the concepts of propagation models with channel interference*
4. *Explain the propagation models, channel interference, antenna design for the recent mobile systems*
5. *Recite the Handoff and Dropped calls in Cellular mobile communications*

UNIT I:

Introduction to Cellular Mobile Radio Systems:

Limitations of Conventional Mobile Telephone Systems, Basic Cellular Mobile System, First, Second, Third and Fourth Generation Cellular Wireless Systems, Uniqueness of Mobile Radio Environment- Fading -Time Dispersion Parameters, Coherence Bandwidth, Doppler Spread and Coherence Time.

Fundamentals of Cellular Radio System Design:

Concept of Frequency Reuse, Co-Channel Interference, Co-Channel Interference Reduction Factor, Desired C/I From a Normal Case in a Omni Directional Antenna System, System Capacity Improving Coverage and Capacity in Cellular Systems- Cell Splitting, Sectoring, Microcell Zone Concept.

UNIT II:

Co-Channel Interference:

Measurement Of Real Time Co-Channel Interference, Design of Antenna System, Antenna Parameters and Their Effects, Diversity Techniques-Space Diversity, Polarization Diversity, Frequency Diversity, Time Diversity.

Non-Co-Channel Interference:

Adjacent Channel Interference, Near End Far End Interference, Cross Talk, Effects on Coverage and Interference by Power Decrease, Effects of Cell Site Components.

UNIT III:

Cell Coverage for Signal and Traffic:

Signal Reflections in Flat And Hilly Terrain, Effect of Human Made Structures, Phase Difference Between Direct and Reflected Paths, Constant Standard Deviation, Straight Line Path Loss Slope, General Formula for Mobile Propagation Over Water and Flat Open Area, Near and Long Distance Propagation, Path Loss From a Point to Point Prediction Model in Different Conditions, Merits of Lee Model.

Cell Site and Mobile Antennas:

Space Diversity Antennas, Umbrella Pattern Antennas, Minimum Separation of Cell Site Antennas, Mobile Antennas.

UNIT IV:

Frequency Management and Channel Assignment:

Numbering And Grouping, Setup Access And Paging Channels, Channel Assignments to Cell Sites and Mobile Units, Channel Sharing and Borrowing, Sectorization, Overlaid Cells, Non Fixed Channel Assignment.

UNIT V:

Handoffs and Dropped Calls:

Handoff Initiation, Types of Handoff, Delaying Handoff, Advantages of Handoff, Power Difference Handoff, Forced Handoff, Mobile Assisted and Soft Handoff, Intersystem Handoff, Introduction to Dropped Call Rates and their Evaluation.

TEXT BOOKS:

1. Lee W.C.Y. , Mobile Cellular Telecommunications, Mc Graw Hill,1989.
2. Theodre S Rappaport , Wireless Communications, Principles, Practice, Pearson Education India, 2009

REFERENCE BOOKS:

1. Gordon L. Stuber , Principles of Mobile Communications, Springer, 2001.
2. Simon Haykin, Michael Moher, Modern Wireless Communications, Pearson, 2005.

RADAR ENGINEERING
(Professional Elective-3)

IV B.Tech I Semester

L	T	P	C
3	0	0	3

COURSE OUTCOMES:

At the end of the course the student should be able to

1. Understand the concepts of radar fundamentals, noise analysis and evaluation of radar.
2. Differentiate various types of radar transmitters and receivers.
3. Relate the different types of radar transmitter and receiver.
4. Categorize the type of radar system and noise analysis based on applications.
5. Correlate the different methods of Radar Reception and Receivers

UNIT – I:

Basics of Radar:

Introduction- Maximum Unambiguous Range- Radar Waveforms-- Radar Block Diagram and Operation- Radar Frequencies and Applications. Prediction of Range Performance- Minimum Detectable Signal- Receiver Noise.

Radar Equation:

Simple and Modified form of Radar Range Equation with Illustrative Problems - SNR- Envelop Detector-False Alarm Time and Probability- Integration of Radar Pulses- Radar Cross Section of Targets (simple targets - sphere- cone-sphere)- Transmitter Power- PRF and Range Ambiguities- System Losses (qualitative treatment)- Illustrative Problems.

UNIT – II:

CW and Frequency Modulated Radar:

Doppler Effect- CW Radar – Block Diagram- Isolation between Transmitter and Receiver- Non-zero IF Receiver- Receiver Bandwidth Requirements- Applications of CW radar- Illustrative Problems.

FM-CW Radar:

Range and Doppler Measurement- Block Diagram and Characteristics- FM-CW altimeter- Measurement Errors- Multiple Frequency CW Radar.

UNIT – III:

MTI and Pulse Doppler Radar:

Introduction- Principle- MTI Radar with Power Amplifier Transmitter and Power Oscillator Transmitter- Delay Line Cancellers – Filter Characteristics- Blind Speeds- Double Cancellation- Staggered PRFs- Range Gated Doppler Filters- MTI Radar Parameters- Limitations to MTI Performance- MTI versus Pulse Doppler Radar.

UNIT – IV:

Tracking Radar:

Tracking With Radar- Sequential Lobing- Conical scan-Mono pulse Tracking Radar-Amplitude Comparison Mono pulse (One-And Two-Coordinates)-Phase Comparison Monopulse-Tracking In Range- Acquisition and Scanning Patterns- Comparison Of Trackers.

UNIT – V:

Detection of Radar Signals in Noise:

Introduction- Matched Filter Receiver-Response Characteristics and Derivation- Correlation Function and Cross-Correlation Receiver- Efficiency of Non-Matched Filters- Matched Filter with Non-White Noise.

Radar Receivers:

Noise Figure and Noise Temperature- Display-Types- Duplexers-Branch types And Balanced type- Circulators as Duplexers. Introduction to Phased Array Antennas-Basic concepts-Radiation Pattern- Beam Steering and Beam Width changes- Advantages and Limitations-Applications.

TEXT BOOKS:

1. Merrill I. Skolnik , Introduction to radar systems, Tata McGraw Hill special Indian edition, 2007.
2. Kulkarni M , Microwave and Radar Engineering , UMESH Publications, 2003

REFERENCE BOOKS:

1. Byron Edde, Radar: Principles, Technology, Applications, Pearson, 2004.
2. Peyton Z. Peebles, Radar Principles, Wiley, 1998.

Department of Electronics and Communication Engineering

BIOMEDICAL INSTRUMENTATION
(Professional Elective-4)

IV B.Tech I Semester

L	T	P	C
3	0	0	3

COURSE OUTCOMES:

At the end of the course the student should be able to

1. Summarize the requirement of biomedical instrumentation and adversity involved in human measurement.
2. Understand the concept of Bio Potentials in a Human Body
3. Utilize the concept of electrode and its responses used in real time.
4. Outline the divergent responses involved in cardiovascular and respiratory system.
5. Compare the various processes involved in bio telemetry.

UNIT-I:
Introduction:
The age of Biomedical Engineering, Development of Biomedical Instrumentation, Man–Instrumentation system, Components, Physiological system of the body, Problem encountered in measuring a living system. Transducers & Electrodes: The Transducers & Transduction principles, Active transducers, Passive Transducers, Transducer for Biomedical Applications.

UNIT-II:
Sources of Bioelectric potentials:
Resting & Action potentials, propagation of active potential, The Bioelectric potentials-ECG, EEG, EMG, and Invoked responses Electrodes: Electrode theory, Biopotential Electrodes–Microelectrodes Body surface electrodes, Needle Electrodes, Biochemical Transducers, Reference electrodes, PH electrodes, Blood Gas electrodes.

UNIT-III:
Cardiovascular Measurements:
Electrocardiography – ECG amplifiers, Electrodes & leads, ECG recorders - Three channel, Vector Cardiographs, ECG system for stress testing, Continuous ECG recording (Holterrecording), Blood pressure measurement, Blood flow measurement, Heart sound measurements. Patient Care & Monitoring- Elements of Intensive Care monitoring, patient monitoring displays, Diagnosis, Calibration & Reparability of patient monitoring equipment, pacemakers & Defibrillators.

UNIT-IV:

Measurements in Respiratory system:

Physiology of respiratory system Measurement of breathing mechanics- Spiro meter, Respiratory Therapy equipment's: Inhalators ventilators & Respirators, Humidifiers, Nebulizers & Aspirators. Diagnostic Techniques: Ultrasonic Diagnosis Echocardiography, Echo Encephalography, Ophthalmic scans, X-Ray & Radio-isotope Instrumentation, Computerized Axial Tomography Scanners

UNIT-V:

Bio Telemetry:

The components of Biotelemetry system Implantable units, Telemetry for ECG measurements during exercise, for Emergency patient monitoring. Physiological Effects of Electric Current Safety of Medical Electronic Equipments, Shock hazards from Electrical equipment and prevention against THEM.

TEXT BOOKS:

1. LeslieCormwell, Biomedical Instrumentation and Measurements, Prentice Hall India,1980
2. Arumugam M, Biomedical Instrumentation, Anuradha Publications, 1994

REFERENCE BOOKS:

1. Khandpur R.S, Biomedical Instrumentation, Tata McGraw-Hill, 2003 .
2. Willis J Tompkins, Biomedical DSP: C Language Examples and Laboratory Experiments for the IBM PC, Prentice Hall India, 2006.

SATELLITE COMMUNICATIONS
(Professional Elective-4)

IV B.Tech I Semester

L	T	P	C
3	0	0	3

COURSE OUTCOMES:

At the end of the course the student should be able to

1. Demonstrate the historical background, basic concepts and frequency allocations for satellite communications.
2. Compare and contrast between various multiple access systems for satellite communication system.
3. Understand the propagation effects of signal in Satellite transmission
4. Design of satellite links for specified CNR.
5. Visualize satellite subsystems like telemetry, tracking, command and monitor power systems etc.

UNIT-I:
Introduction to Satellite Communication:
Principles and architecture of satellite Communication, Brief history of Satellite systems, advantages, disadvantages, applications and frequency bands used for satellite communication.
Orbital Mechanics:
Orbital equations, Kepler's laws, Apogee and Perigee for an elliptical orbit, evaluation of velocity, orbital period, angular velocity etc. of a satellite, concepts of Solar day and Sidereal day. Placement of Satellite in a Geo-stationary orbit

UNIT-II:
Satellite sub systems:
Attitude and orbit control system, TT& C subsystem, control subsystem, power systems, communication subsystems, satellite antenna equipment
Satellite link:
Basic Transmission Theory, System noise temperature and G/T ratio, Basic link analysis, Interference analysis , Design of satellite links for a specified C/N (with and without frequency reuse), Link budget

UNIT – III:
Propagation effects:
Introduction, Atmospheric Absorption, Cloud attenuation, Tropospehericand Ionospheric scintillation, and low angle fading , Rain induced attenuation, Rain induced cross polarization interference.
Multiple Access:
Frequency division multiple access(FDMA), inter modulation, calculation of C/N, Time division multiple access(TDMA) – frame structure, Burst structure, Satellite switched TDMA, on-board processing, Demand Assignment multiple Access (DAMA), CDMA spread spectrum transmission and reception.

UNIT – IV:

Earth station Technology:

Transmitters, Receivers, Antenna, Tracking systems, Terrestrial interface, Power test methods, Lower orbit considerations. Satellite Navigation and Global Positioning systems: radio and satellite navigation, GPS position location principles, GPS receivers

UNIT – V:

Typical Phenomena in Satellite Communication:

Solar Eclipse on satellite and its effects, Remedies for Eclipse, Sun Transit Outage phenomena, its effects and remedies, Doppler frequency shift phenomena and expression for Doppler shift.

TEXT BOOKS:

1. Timothy pratt, Charles Bostian, Jeremy Allnutt , Satellite communications, John Wiley, 2003
2. Pritchand, Satellite communications engineering, Pearson, 1993.

REFERENCE BOOKS:

1. MadhavendraRichharia, Satellite communications: Design principles, Macmillan,2017
2. Tri T. Ha , Digital satellite communications, McGraw-Hill_, 1990

Department of Electronics and Communication Engineering

TELECOMMUNICATION SWITCHING SYSTEMS AND NETWORKS

(Professional Elective-4)

IV B.Tech I Semester

L	T	P	C
3	0	0	3

COURSE OUTCOMES:

At the end of the course the student should be able to

1. Understand different switching system methodologies, network traffic, networks and its applications.
2. Explain different signaling methods used in Telecommunication Networks.
3. Enumerate traffic in telecommunications network
4. Relate different data communication networks.
5. Demonstrate the applications of modern telecommunication concepts.

UNIT – I:

Telecommunication Switching Systems:

Introduction, Elements of switching systems, switching network configuration, Rotary switches, Uni selector, Two motion selector, Trucking principle ,principles of cross bar switching, Crossbar Switch Configuration, Cross point Technology, Crossbar Exchange Organization

UNIT – II:

Electronic Space Division Switching:

Stored Program Control, Centralized SPC, Distributed SPC, Software Architecture, Application Software, Enhanced services, Two-Stage Networks, Three-Stage Networks, n-Stage Networks.

Time Division Switching:

Basic Time Division Space Switching, Basic Time Division Time Switching, Time Multiplexed Space Switching, Time Multiplexed Time Switching, Combination Switching, Three Stage Combination Switching, n - Stage Combinational Switching.

UNIT - III :

Telecommunications Traffic:

Introduction, The Unit of Traffic, Congestion, Traffic Measurement, A Mathematical Model, Lost-Call Systems-Theory, Traffic Performance, Loss Systems in Tandem, Use of Traffic Tables, Queuing Systems-The Second Erlang Distribution, Probability of Delay, Finite Queue Capacity, Systems with a Single Server, Queues in Tandem, Delay Tables, Applications of Delay Formulae.

UNIT – IV:

Telephone Networks:

Subscriber loop systems, switching hierarchy and routing, transmission plan, transmission systems, numbering plan, charging plan, Signaling techniques: In channel signaling, common channel signaling, Cellular mobile telephony.

Data Networks:

Data transmission in PSTNs, Switching techniques for data transmission, data communication architecture, link to link layers, end to end layers, satellite based data networks, LAN, MAN, Internetworking

UNIT – V:

Integrated Services Digital Network (ISDN):

Introduction, motivation, new services, Network and protocol architecture, Transmission channels, User-Network interfaces, functional grouping, reference points, signaling, numbering, addressing, BISDN.

SONET:

Devices, Frame, Frame Transmission, Synchronous Transport Signals, STS I, Virtual Tributaries, and Higher rate of service.

TEXT BOOKS:

1. ThiagarajanViswanathan, Telecommunication Switching Systems and Networks, Prentice Hall of India, 2010.
2. Flood J E, Telecommunications Switching, Traffic and Networks- Pearson, 2016.

REFERENCE BOOKS:

1. John. C. Bellamy, Digital Telephony, John Wiley, 2010.
2. Roger L. Freeman, Telecommunication System Engineering, John Wiley, 2010.

AUTOMOTIVE ELECTRONICS
(Open Elective-3)

IV B.Tech I Semester

L	T	P	C
3	0	0	3

COURSE OUTCOMES:

At the end of the course the student should be able to

1. Understand the working principles, characteristics and troubleshoot of automotive subsystem and its electronic engine control
2. Recite the basic idea behindSensors and Actuators in Automotive Control System
3. Enumerate Digital Engine Control systems for Automobiles
4. Realization of Digital Engine Control Systems and control units in automotive systems
5. Interpret the concepts of Automotive Networking and Automotive Diagnostics

UNIT -1:

Automotive Fundamentals Overview:

Evolution of Automotive Electronics, Automobile Physical Configuration, Survey of Major Automotive Systems, The Engine – Engine Block, Cylinder Head, Four Stroke Cycle, Engine Control, Ignition System - Spark plug, High voltage circuit and distribution, Spark pulse generation, Ignition Timing, Diesel Engine, Drive Train - Transmission, Drive Shaft, Differential, Suspension, Brakes, Steering System , Starter Battery –Operating principle

The Basics of Electronic Engine Control:

Motivation for Electronic Engine Control – Exhaust Emissions, Fuel Economy, Concept of an Electronic Engine control system, Definition of General terms, Definition of Engine performance terms, Engine mapping, Effect of Air/Fuel ratio, spark timing and EGR on performance, Control Strategy, Electronic Fuel control system, Analysis of intake manifold pressure, Electronic Ignition.

UNIT-II:

Automotive Control System applications of Sensors and Actuators:

Typical Electronic Engine Control System, Variables to be measured

Automotive Sensors:

Airflow rate sensor, Strain Gauge MAP sensor, Engine Crankshaft Angular Position Sensor, Magnetic Reluctance Position Sensor, Hall effect Position Sensor, Shielded Field Sensor, Optical Crankshaft Position Sensor, Throttle Angle Sensor (TAS), Engine Coolant Temperature (ECT) Sensor, Exhaust Gas Oxygen (O2/EGO) Lambda Sensors, Piezoelectric Knock Sensor.

Automotive Actuators:

Solenoid, Fuel Injector, EGR Actuator, Ignition System

UNIT –III:

Digital Engine Control Systems:

Digital Engine control features, Control modes for fuel Control (Seven Modes), EGR Control, Electronic Ignition Control - Closed loop Ignition timing, Spark Advance Correction Scheme, Integrated Engine Control System - Secondary Air Management, Evaporative Emissions Canister Purge, Automatic System Adjustment, System Diagnostics.

Control Units:

Operating conditions, Design, Data processing, Programming, Digital modules in the Control unit, Control unit software.

UNIT –IV:

Automotive Networking:

Bus Systems – Classification, Applications in the vehicle, Coupling of networks, Examples of networked vehicles , Buses - CAN Bus, LIN Bus, MOST Bus, Bluetooth, Flex Ray, Diagnostic Interfaces

Vehicle Motion Control:

Typical Cruise Control System, Digital Cruise Control System, Digital Speed Sensor, Throttle Actuator, Digital Cruise Control configuration, Cruise Control Electronics (Digital only), Antilock Brake System (ABS)

UNIT –V:

Automotive Diagnostics:

Timing Light, Engine Analyzer, On-board diagnostics, Off-board diagnostics, Expert Systems, Occupant Protection Systems – Accelerometer based Air Bag systems.

Future Automotive Electronic Systems:

Alternative Fuel Engines, Electric and Hybrid vehicles, Fuel cell powered cars, Collision Avoidance Radar warning Systems, Low tire pressure warning system, Heads Up display, Speech Synthesis, Navigation – Navigation Sensors - Radio Navigation, Signpost navigation, dead reckoning navigation, Voice Recognition Cell Phone dialing, Advanced Cruise Control, Stability Augmentation, Automatic driving Control

TEXT BOOKS:

1. William B. Ribbens, Understanding Automotive Electronics an Engineering Perspective, Elsevier Science, 2017,
2. Robert Bosch Gmbh , Bosch Automotive Electrics and Automotive Electronics Systems and Components, Networking and Hybrid Drive, Springer Fachmedien Wiesbaden, 2013.

REFERENCE BOOKS:

1. Babu A K, Automotive Electrical and Electronics, Khanna Publishing, 2018
2. William B. Ribbens, Norman P. Mansour, Charles W. Battle, Understanding Automotive Electronics Radio Shack, 1980

Department of Electronics and Communication Engineering

INTRODUCTION TO COMMUNICATION ENGINEERING

(Open Elective -3)

IV B.Tech I Semester

L	T	P	C
3	0	0	3

COURSE OUTCOMES:

At the end of the course the student should be able to

1. Understand the working principles, characteristics and applications of different modulation techniques
2. Recite the basic concepts behind the satellite communications
3. Enumerate the principles of Cellular mobile communications
4. Realization of the principle of operation and its applications of radar systems
5. Interpret the concept of Wireless LAN technologies which support for wireless communication

UNIT- I:

Basics of Communication Engineering:

Introduction to communication systems – Need for modulation – AM – FM - PM modulation – Digital modulation fundamentals – PCM-DPCM- Delta Modulation – properties - PSK,FSK,ASK –types techniques –properties

UNIT -II:

Satellite communication:

Satellite Orbits and Trajectories: Definition, Basic Principles, Orbital parameters, Types of Satellite orbits, Orbital perturbations, Satellite stabilization, Orbital effects on satellite's performance, Eclipses, Look angles: Azimuth angle, Elevation angle.

Satellite subsystem: Power supply subsystem, Attitude and Orbit control, Tracking, Telemetry and command subsystem, Payload.

Earth Station: Types of earth station, Architecture, Design considerations, Testing, Earth station Hardware, Satellite tracking.

UNIT-III:

Cellular and Mobile communications:

The cellular concept – Frequency reuse – Interference and system capacity – Trunking and Grade of service – Improving coverage and capacity in cellular systems - Handoff - Roaming management - Handoff detection – channel Assignment techniques - GSM Network signaling - GSM Mobility management GSM short message service - International roaming for GSM - GSM operation, Mobile number Mobile number portability's, VoIP service for mobile networks.

UNIT-IV:

Radar Engineering:

Introduction, Maximum Unambiguous Range, Radar Waveforms, Definitions with respect to pulse waveform - PRF, PRI, Duty Cycle, Peak Transmitter Power, Average transmitter Power. Simple form of the Radar Equation, Radar Block Diagram and Operation, Radar Frequencies, Applications of Radar, The Origins of Radar,

UNIT –V:

Wireless Networks:

Introduction-WLAN technologies: Infrared, UHF narrowband, spread spectrum -IEEE802.11: System architecture, protocol architecture, physical layer, MAC layer, 802.11b, 802.11a – Hiper LAN: WATM, BRAN, HiperLAN2 – Bluetooth: Architecture - IEEE802.16-WIMAX: Physical layer, MAC, Spectrum allocation

TEXT BOOKS:

1. Kennedy, Electronic Communication Systems, Tata McGraw-Hill – 1999.
2. Yi-Bing Lin and Imrichchlantae, —Wireless and Mobile Network Architecturel, John Wiley 2006

REFERENCE BOOKS:

1. Satellite Communications, by Dennis Roddy(Fourth edition),McGraw Hill.
2. Yi-Bing Lin and ImrichChlantae, Wireless and Mobile Network Architecture, John Wiley, 2006

Department of Electronics and Communication Engineering

EMBEDDED& VLSI LABORATORY

IV B.Tech I Semester

L	T	P	C
0	0	2	1

COURSE OUTCOMES:

At the end of the course the student should be able to

1. Code the ARM cortex M0+ processor instruction set.
2. Articulate the concept of interfacing I/O devices with FRDM kit.
3. Synthesize a Verilog code for digital circuits
4. Devise the digital circuit in CPLD/FPGA
5. Formulate a system design using Embedded and VLSI technologies

Perform any 10 Experiments from each lab:

Embedded System Design Lab:

1. Blinking of LED : Hello World
2. Breath out 2 LEDs
3. Color Circle
4. ADC Potentiometer
5. Analog serial plotter
6. Interface to Accelerometer sensor using FRDM kit
7. Serial port communication using FRDM kit
8. Interface to touch sensor using FRDM kit
9. Radio frequency transmission operation using FRDM kit
10. LED intensity control using touch sensor using FRDM kit
11. Interface and plot LDR using FRDM kit
12. Interface and plot temperature sensor using FRDM kit

VLSI lab:

1. Verification of Logic Gates
2. Verification of Demorgon's Law
3. Design of 8 to 1 multiplexer
4. Design of 1 to 8 Demultiplexer
5. Design of 2 to 4 Encoder
6. Design of 4-bit comparator
7. Design of 4 bit binary to gray converter
8. Design of full adder using 3 modeling styles
9. Design of flip flops SR, D, JK, and T
10. Design Ripple Counter
11. Design Modulo Counter
12. Design Shift Register
13. Design Inverter using PMOS / NMOS
14. Design of full adder using decoder and multiplexer
15. Design System using finite state Machine

Department of Electronics and Communication Engineering

ANTENNA AND MICROWAVE ENGINEERING LABORATORY

IV B.Tech I Semester

L	T	P	C
0	0	2	1

COURSE OUTCOMES:

At the end of the course the student should be able to

1. Contrast the different ways of measuring antenna parameters.
2. Differentiate the different Radiation pattern of the antennas
3. Study the characteristics of various microwave components
4. Articulate the performance of Microwave components
5. Formulate a antenna design using Antenna and Microwave technologies

PART — A: (SOFTWARE) (ANY 6 EXPERIMENTS):

1. Study of Electromagnetic structure modelling
2. Measurement of Radiation Pattern and gain of Half wave Dipole Antenna
3. Measurement of Radiation Pattern and gain of monopole Antenna
4. Measurement of Radiation Pattern and gain of loop Antenna
5. Measurement of Radiation Pattern and gain of Helical Antenna
6. Measurement of Radiation Pattern and gain of Antenna Array
7. Measurement of Radiation Pattern and gain of Yagi-Uda Antenna
8. Measurement of Radiation Pattern and gain of Folded Dipole Antenna

PART — B: (HARDWARE) (ANY 6 EXPERIMENTS):

1. Reflex Klystron Characteristics
2. Gunn Diode Characteristics
3. Directional Coupler Characteristics
4. VSWR Measurement
5. Measurement of Waveguide Parameters
6. Measurement of Scattering parameters of a Magic Tee
7. Measurement of Scattering parameters of a Circulator
8. Attenuation Measurement

Department of Electronics and Communication Engineering

INDUSTRY ORIENTED MINI PROJECT

IV B.Tech I semester

L	T	P	C
0	0	0	3

COURSE OUTCOMES:

At the end of the course the student should be able to

1. Understand the working environment of an Industry
2. Create an avenue in the industry in terms of a mini project
3. Predict a timeline for the project
4. Evaluate the requirements of the projects in terms of different subsystems
5. Create a dissemination report for the mini project

METHOD OF EVALUATION:

The students in a group of 4 to 5 works on an industry oriented topic approved by the head of the department and prepare a comprehensive mini project report after completing the work to the satisfaction. The progress of the project is evaluated based on a minimum of two reviews. The review committee may be constituted by the Head of the Department. A mini project report is required at the end of the semester. The mini project work is evaluated based on oral presentation and the mini project report jointly by external and internal examiners constituted by the Head of the Department.

Department of Electronics and Communication Engineering

BoS Members' Signatures:

1. Dr. K. Vasanth, Professor, Head & Chairman of BoS E C E D e p t . , VJIT.	2.Dr.P. Chandrasekhar Reddy, Professor of ECE,JNTUH CEH, University Nominee.	3.Dr. K.S. Rao, Director, Anurag Group ofInstitutions, External Member.	4. Dr. P. Chandra Sekhar, HoD, Dept., of ECE, OsmainaUniversity, External Member.
5. Dr. Y. Pandurangaiah, Professor, Vardhaman College of Engineering, Shamshabad, External Member.	6. Mr. A. Hariharan, Associate Director, PACTRA EDGE, Hyderabad, External Member.	7. Mr. N. Venkatesh, Sr. Director, Sillicon Labs, Hyderabad, External Member.	8. Dr. S. Thulasi Prasad, Professor,ECE,VJIT, Internal Member.
9. Dr. P. Ganesan, Professor, ECE,VJIT, Internal Member.	10. Mr. M. Rajendra Prasad, Associate Professor, ECE,VJIT, Internal Member.	11. Mrs. A. Jaya Lakshmi, Associate Professor, ECE,VJIT, Internal Member.	**Date of Bos Meeting On** **15/07/2021**

Department of Electronics and Communication Engineering

ELECTRONIC MEASUREMENTS AND INSTRUMENTATION

IV B.Tech II Semester

L	T	P	C
3	0	0	3

COURSE OUTCOMES:

At the end of the course the student should be able to

1. Acquire knowledge in Characteristics of Instruments, measurement on non electrical quantities
2. Analyze the performance of various measuring systems based on the response to the given inputs.
3. Design electronic instrumentation systems according the required specifications
4. Apply different principles to measure a quantity and to provide wide range of solutions for the problems in real time world
5. Recite the acquisition of Non Electrical quantities in a system

UNIT-I:

Measurements and measuring systems:

Functional Diagram of Instrumentation System, Static characteristics: Accuracy - Precision – Resolution – Sensitivity – measurement Errors, Dynamic Characteristics: Speed of response – fidelity – Lag - Dynamic error - Statistical Analysis, Basic meter movement, Ammeters: Multi-range - Universal Shunt, DC voltmeters: Multi-range - Range extension – Loading - Transistorized Voltmeter, AC voltmeters: Rectifier type - Thermocouple Type, Ohmmeters: Series type and Shunt type, Multimeter: Voltage - Current - Resistance measurements.

UNIT-II:

Oscilloscopes and signal generators:

Oscilloscopes:

Oscilloscope block diagram, Cathode Ray Tube, Vertical Deflection System, Delay Line, Horizontal Deflection System: Triggered Sweep - Delayed sweep, CRO Probes, Dual Beam CRO, Dual Trace CRO, Measurements with CRO: Amplitude – Time period - Frequency – Phase, Lissajous patterns, Sampling Oscilloscope, Analog Storage Oscilloscope, Digital Storage Oscilloscope.

Signal Generators:

Fixed and variable AF generators, AF Sine & Square wave generator, Function generators, Fixed and variable RF signal generators, Sweep frequency generator.

UNIT-III:

Signal analyzers:

Wave analyzers: Frequency Selective Wave Analyzer - Heterodyne Wave Analyzer - Application of Wave Analyzers, Harmonic Distortion Analyzers: Total Harmonic Distortion, Spectrum Analyzer.

UNIT-IV:

Bridges and transducers:

Bridges:

Wheat Stone Bridge, Kelvin Bridge, Maxwell Bride, Schering Bridge and Wien Bridge.

Transducers:

Classification of Transducers, Potentiometers, Strain gauges, Capacitive Transducers, Linear Variable Differential Transducer (LVDT), Piezoelectric Transducer, Thermocouple, Thermistor, Resistance Thermometer.

UNIT-V:

Measurement Of Non Electrical Quantities Data Acquisition Systems:

Measurement of Displacement, Velocity, Acceleration, Vibration, Force, Pressure, Fluid Flow, Liquid Level and Temperature. Data Acquisition System: Generalized Data Acquisition System - Configuration of DAS – Single Channel & Multi Channel DAS, Strip Chart Recorder, X-Y Recorder

TEXT BOOKS:

1. Albert D. Helfrick, Cooper William D, Modern Electronic Instrumentation and Measurement Techniques, Prentice-Hall of India, 1997.
2. Sawhney A K, PuneetSawhney , A Course in Electrical and Electronic Measurements and Instrumentation, Dhanpat Rai & Company, 2016

REFERENCE BOOKS:

1. David A. Bell, Electronic Instrumentation & Measurements, Prentice-Hall, 2003.
2. Kalsi H S, Electronic instrumentation, Tata Mcgraw Hill, 2015.

WIRELESS COMMUNICATIONS AND NETWORKS

IV B.Tech II Semester

L	T	P	C
3	0	0	3

COURSE OUTCOMES:

At the end of the course the student should be able to

1. Infer the basic concepts of different Access techniques, data service, technology and standards associated with wireless communication networks
2. Distinguish the multiple access techniques, standards, Technology used in wireless Communication and networks
3. Interpret the recent wireless standards on communications and networks.
4. appraise the various wireless networks in communication systems.
5. Distinguish the different wireless networks

UNIT –I:

Cellular Concept-System Design Fundamentals:

Introduction, Frequency Reuse, Channel Assignment Strategies, Handoff Strategies-Prioritizing Handoffs, Practical Handoff Considerations, Interference and system capacity – Co channel Interference, Channel planning for Wireless Systems, Adjacent Channel interference , Power Control for Reducing interference, Trunking and Grade of Service, Improving Coverage & Capacity in Cellular Systems- Cell Splitting, Sectoring .

UNIT –II:

Mobile Radio Propagation and Large-Scale Path Loss:

Introduction to Radio Wave Propagation, Free Space Propagation Model, Relating Power to Electric Field, The Three Basic Propagation Mechanisms, Reflection-Reflection from Dielectrics, Brewster Angle, Reflection from prefect conductors, Ground Reflection (Two-Ray) Model, Log-distance path loss model

UNIT –III:

Mobile Radio Propagation:

Small –Scale Fading and Multipath Small Scale propagation-Factors influencing small scale fading, Doppler shift, Impulse Response Model of a multipath channel- Relationship between Bandwidth and Received power, Direct RF Pulse System, Spread Spectrum Sliding Correlator Channel Sounding, Flat fading, Frequency selective fading, Fading effects Due to Doppler Spread-Fast fading, slow fading,

UNIT –IV:

Equalization and Diversity:

Introduction, Fundamentals of Equalization, Training A Generic Adaptive Equalizer, Equalizers in a communication Receiver, Linear Equalizers, Non linear Equalization-Decision Feedback Equalization (DFE), Maximum Likelihood Sequence Estimation (MLSE) Equalizer, Least Mean Square Algorithm, Recursive least squares algorithm. Diversity Techniques-Derivation of selection Diversity improvement, Derivation of Maximal Ratio Combining improvement, Practical Space Diversity Consideration- Selection Diversity, Feedback or Scanning Diversity, Frequency Diversity, Time Diversity.

UNIT –V:

Wireless Networks:

Introduction to wireless Networks, Advantages and disadvantages of Wireless Local Area Networks, WLAN Topologies, WLAN Standard IEEE 802.11,IEEE 802.11 Medium Access Control, Comparision of IEEE 802.11 a,b,g and n standards, IEEE 802.16 and its enhancements, Wireless PANs, Hiper LAN, WLL.

TEXT BOOKS:

1. Theodre S Rappaport , Wireless Communications, Principles, Practice, Pearson Education India, 2009.
2. William Stallings, Wireless Communication and Networking, Pearson Education,2003.

REFERENCE BOOKS:

1. KamiloFeher , Wireless Digital Communications, Prentice-Hall,1999.
2. Andrea Goldsmith , Wireless Communications, Cambridge University Press, 2005.

Department of Electronics and Communication Engineering

TECHNICAL SEMINAR

IV B.Tech II Semester

L	T	P	C
0	0	0	2

COURSE OUTCOMES:

At the end of the course the student should be able to

1. Synthesizing information on any one specialized topic from text books, peer revised journals, hand books and other technical resources.
2. Accumulate information regarding the topic
3. Create a presentation to disseminate the accumulated data as presentation
4. Generation a technical seminar report comprising of all relevant information with stipulated standards.
5. Evaluate the intensity of topic in real time

METHOD OF EVALUATION:

During the seminar session each student is expected to prepare and present a topic on engineering/ technology, for duration of about 8 to 10 minutes. In a session of three periods per week, 15 students are expected to present the seminar. Each student is expected to present at least twice during the semester and the student is evaluated based on that. At the end of the semester, he / she can submit a report on his / her topic of seminar and marks are given based on the report. A Faculty guide is to be allotted and he / she will guide and monitor the progress of the student and maintain attendance also. Evaluation is 100% internal.

Department of Electronics and Communication Engineering

COMPREHENSIVE VIVA - VOCE

IV B.Tech II Semester

L	T	P	C
0	0	0	2

COURSE OUTCOMES:

At the end of the course the student should be able to

1. Remember the basics of Electronics and communication Engineering
2. Understand the different methods of analyzing the circuits
3. Recite the importance of Electronics and communication in terms of application
4. Recap the knowledge of the subjects through modern applications
5. Comprehensive understanding of the subject

METHOD OF EVALUATION:

Comprehensive Viva-Voce will be conducted by a Committee consisting of Head of the Department and two Senior Faculty members of the Department along with an external examiner. The Comprehensive Viva-Voce is intended to assess the student's understanding of the subjects he/she studied during the B. Tech. course of study. The Comprehensive Viva Voce is evaluated by the Committee. There are no internal marks for the Comprehensive Viva-Voce.

MAJOR PROJECT

IV B.Tech II Semester

L	T	P	C
0	0	0	10

COURSE OUTCOMES:

At the end of the course the student should be able to

1. Understand the basics of project management
2. Identify an area of project work through extensive literature survey
3. Formulation of Ideas from the survey
4. Presentation of ideas in terms of presentation
5. Create a dissemination report for the project done

METHOD OF EVALUATION:

The students in a group of 3 to 4 works on a topic approved by the head of the department under the guidance of a faculty member and prepare a comprehensive project report after completing the work to the satisfaction of the supervisor. The progress of the project is evaluated based on a minimum of three reviews. The review committee may be constituted by the Head of the Department. A project report is required at the end of the semester. The project work is evaluated based on oral presentation and the project report jointly by external and internal examiners constituted by the Head of the Department.

(Accredited by NAAC & NBA, Approved by AICTE New Delhi & Permanently Affiliated to JNTUH)
Aziz Nagar Gate, C.B. Post, Hyderabad-500 075

Department of Electronics and Communication Engineering

BoS Members' Signatures

1. Dr. K. Vasanth, Professor, Head & Chairman of BoS ECE Dept., VJIT.	2.Dr.P. Chandrasekhar Reddy, Professor of ECE,JNTUH CEH, University Nominee.	3.Dr. K.S. Rao, Director, Anurag Group ofInstitutions, External Member.	4. Dr. P. Chandra Sekhar, HoD, Dept., of ECE, OsmainaUniversity, External Member.
5. Dr. Y. Pandurangaiah, Professor, Vardhaman College of Engineering, Shamshabad, External Member.	6. Mr. A. Hariharan, Associate Director, PACTRA EDGE, Hyderabad, External Member.	7. Mr. N. Venkatesh, Sr. Director, Sillicon Labs, Hyderabad, External Member.	8. Dr. S. Thulasi Prasad, Professor,ECE,VJIT, Internal Member.
9. Dr. P. Ganesan, Professor, ECE,VJIT, Internal Member.	10. Mr. M. Rajendra Prasad, Associate Professor, ECE,VJIT, Internal Member.	11. Mrs. A. Jaya Lakshmi, Associate Professor, ECE,VJIT, Internal Member.	**Date of Bos Meeting On** **15/07/2021**

ECE - Subjects offered to Other Departments - R20

S.No.	Year / Semester	Name of the Department	Name of the Subjects
1	II – I	ECE / EEE / CSE / IT / AI	ELECTRONIC DEVICES AND CIRCUITS **(EDC)**
2	II – I	CSE/IT/AI	ELECTRONIC DEVICES & CIRCUITS AND DIGITAL LOGIC DESIGN LABORATORY **(EDC LAB)**
3	II – I	CSE/IT/AI	DIGITAL LOGIC DESIGN **(DLD)**
4	II – II	AI	COMPUTER ORGANIZATION AND ARCHITECTURE **(COA)**
5	II – II	EEE	SWITCHING THEORY AND LOGIC DESIGN **(STLD)**
6	II – II	EEE	ELECTRONIC DEVICES & CIRCUITS LABORATORY **(EDC LAB)**
7	III – I	EEE	MICROPROCESSORS AND INTERFACING DEVICES **(MPID)**
8	III – I	EEE	IC APPLICATIONS **(ICA) (Professional Elective)**
9	III – II	EEE	SYSTEM DESIGN USING VERILOG HDL **(Professional Elective)**
10	IV – I	EEE	EMBEDDED SYSTEMS & IOT **(ES&IOT) (Professional Elective)**
11	IV – I	EEE	MICROPROCESSORS AND INTERFACING DEVICES LABORATORY **(MPID LAB)**

ANNEXURE – V

ELECTRONIC DEVICES AND CIRCUITS

II B.Tech EEE /CSE/IT/AI I Semester

L	T	P	C
3	0	0	3

Course Outcomes:

After going through this course the student will be able to:

1. Demonstrate the concepts of semiconductor theory.
2. Interpret the characteristics of different semiconductor devices with its applications.
3. Apply different biasing techniques of transistors for amplification.
4. Analyze transistor amplifiers using small signal model.
5. Ability to describe the behavior of special purpose diodes.

UNIT I:

Diode: PN junction Diode – Characteristics, Current equation, Temperature dependence, Static and Dynamic resistances, Equivalent circuit, Diffusion and Transition Capacitances,
Diode Applications: Rectifier - Half Wave Rectifier, Full Wave Rectifier, Bridge Rectifier, Rectifiers with Capacitive Filter, Clippers, Clampers.

UNIT II:

Bipolar Junction Transistor (BJT): Principle of Operation and characteristics - Common Emitter, Common Base, Common Collector Configurations, Operating point, DC & AC load lines, Transistor Hybrid parameter model, Determination of h-parameters from transistor characteristics, Conversion of h-parameters.

UNIT III:

Transistor Biasing and Stabilization: Bias Stability, Fixed Bias, Collector to Base bias, Self Bias, Bias compensation using Diodes and Transistors.
Analysis and Design of Small Signal Low Frequency BJT Amplifiers: Analysis of CE, CC, CB Amplifiers and CE Amplifier with emitter resistance, low frequency response of BJT Amplifiers, effect of coupling and bypass capacitors on CE Amplifier.

UNIT IV:

Junction Field Effect Transistor: Construction, Principle of Operation, Pinch-Off voltage, Volt-Ampere characteristic, comparison of BJT and FET, Biasing of FET, FET as voltage variable resistor, MOSFET construction and its characteristics in enhancement and depletion modes.

UNIT V:

FET Amplifiers: Small Signal Model, Analysis of CS, CD, CG JFET Amplifiers. Basic Concepts of MOSFET Amplifiers.

Special Purpose Devices: Zener Diode - Characteristics, Voltage Regulator; Principle of Operation - SCR, Tunnel diode, UJT, Varactor Diode.

TEXTBOOKS:

1. *Millman & Halkias*, Electronic devices and circuits, McGraw Hill , 2007.
2. *S. Salivahanan, N. Suresh Kumar, A. Vallavaraj* , Electronic Devices and Circuits, Tata *Mc Graw Hill , 2008.*

REFERENCE BOOKS:

1. *Boylestad R L & Louis* Nashelsky Electronic Devices and Circuits, Prentice Hall India, *2006.*
2. *Gupta J B,* Electronic Devices and Circuits, S. K. Kataria, 2009.

ELECTRONIC DEVICES & CIRCUITS AND DIGITAL LOGIC DESIGN LABORATORY
(Common for CSE / IT / AI)

II Year B.Tech. I Semester

L	T	P	C
0	0	2	1

COURSE OUTCOMES:

After going through this course the student will be able to:

1. Identify and use the basic components and instruments in electronics laboratory
2. Outline the characteristics of different semiconductor devices.
3. Interpret the ripple factor, regulations of rectifiers.
4. Sketch the frequency response of small signal amplifiers.
5. Understand the concepts of SCR & UJT and observe its characteristics.

Minimum 6 experiments from each part:

List of Experiments (EDC):

1. Forward & Reverse Bias Characteristics of PN Junction Diode.
2. Zener diode characteristics and Zener as voltage Regulator.
3. Half Wave Rectifier with & without filters.
4. Full Wave Rectifier with & without filters.
5. Input & Output Characteristics of Transistor in CB Configuration and h-parameter calculations.
6. Input & Output Characteristics of Transistor in CE Configuration and h-parameter calculations.
7. FET characteristics.
8. UJT Characteristics

List of Experiments (DLD):

1. Verify the functionality of logic gates &Flip-flops
2. Verification of De-Morgan's laws
3. Implementation and verification of full adder and full subtractor using logic gates.
4. Implementation and verification of 4X1 multiplexer &Demultiplexer using logic gates.
5. Implementation and verification of 2X4 Decoder and 1X4 De-multiplexer using logic gates.
6. Implementation of given function and verification using IC 74LS151 (8X1 multiplexer).
7. To design and verify the 4-bit ripple counter & decade counter
8. Verify the functionality of 4-bit magnitude comparator using IC 74LS85.
9. Verify the functionality of Universal Shift Register IC 74LS194/195

DIGITAL LOGIC DESIGN

(Common for CSE / IT / AI)

II B.Tech I Semester

L	T	P	C
3	0	0	3

Course Outcomes:

Student will be able to:

1. Understand various number systems, conversions, range and error detecting and correcting codes and their significance.
2. Evaluate the minimization of logic gates using Boolean algebraic principles and k-maps.
3. Design various simple and complex combinational circuits with real time applications.
4. Analyze the basic principles behind Flip flops & the design of sequential circuits with real time applications.
5. Illustrate various types of memory devices and their design.

UNIT – I:

Number Systems: Binary, Octal, Hex Decimal, and Conversions, range; Binary additions and subtractions (using 1c, and 2c), concept of overflow; representations of negative numbers using 1's and 2's complement and range; BCD numbers: Representation of 8421, 2421, Ex-3, Gray and self complementary codes; additions and subtractions on 8421 codes; Error detecting **codes:** even, odd parity, hamming codes; Error correcting codes: hamming codes,

UNIT –II:

Boolean Algebra and Digital Logic GATES, Basic Boolean laws and properties; Boolean functions; canonical and standard forms (SOP, POS); Gate minimization using three and four variable K-Map's with and without don't cares.

UNIT – III:

Definition of combinational circuits, Encoders, Decoders, Multiplexers, D-Multiplexers; design procedure for half, full adder and subtractor, decimal (8421) adder, Combinational Circuit Design for BCD code converters;

UNIT – IV:

Sequential circuits, latches, Flip Flops; Analysis of clocked sequential circuits, State Reduction and Assignment, Register, Ripple Counters, Synchronous Counters design, Other Counters-Ring Counter, Johnson Counter.

UNIT – V:

Types of Memory – Main memory – random access memory, ROM, Types of ROM; RAM,Types of RAM,Sequentialmemories,,PLD-PLA,PAL,PROM.

TEXT BOOKS:

1. M. Morris Mano, Digital Design, Third Edition, Pearson Education/PHI, 2001.
2. A.Anand Kumar, Fundamentals of Digital Circuits, PHI Edition, 2006.

REFERENCE BOOKS:

1. John F. Wakerly, Digital Design: Principles and Practices, 4th Edition, Pearson / Prentice Hall, 2005.
2. Roth, Fundamentals of Logic Design, Fifth Edition, Thomson, 2004

COMPUTER ORGANIZATION AND ARCHITECTURE

II Year B.Tech AI II Semester

L	T	P	C
3	0	0	3

Pre Requisites:

- Digital Logic Design

Course Outcomes:

At the end of the course the student should be able to

1. Recall the structure and organization involved in digital computer design.
2. Identify the different memory and input- output system involved in system design.
3. Understand the basics of computer organization, computer parallelism and its design on program control and computer arithmetic operations.
4. Design and analyze solutions in the area of computer architecture
5. Comprehend the various details of multiprocessor and multicore processors in computer design

UNIT – I:

Introduction to computer organization- Digital Computers, Instruction codes, stored program organization, computer registers, computer instructions , instruction cycle, types of instruction formats (Zero, one, two and three address), RISC instructions.

Addressing modes: mode field, implied, immediate register, register direct, register indirect, auto increment, decrement, indexed, relative, base address mode, Numerical examples and problems.

UNIT – II:

CPU-Organization: 8086 – CPU – Block diagram and pin diagram, concept of pipelining, minimum and maximum mode, segment register and generation of 20 bit address, concept of address, data, control and systems bus, Types of flags.

UNIT – III:

CPU and Main Memory interface- Programming the basic computer – Machine Assembly Languages. **Assembler:** basic assembly language instructions (ADD, SUB, LOAD, STORE, MOV, CMP, JUMP).

Micro-programmed control: control memory, address sequencing, micro program example and design of control unit.

UNIT – IV:

Memory Organization: Memory Hierarchy, Main Memory, Auxiliary memory, Associate Memory, Cache Memory.

I/O interface: I/O Bus and Interface modules, I/O versus Memory Bus.

Modes of Transfer: Example of programmed I/O, interrupt-initiated I/O, software considerations. Daisy- Chaining priority.

DMA: DMA Controller, DMA Transfer, Intel 8089 IOP.

UNIT – V:

Multi Processors: Characteristics of Multi-Processor;

Interconnection structures: Time shared common bus, multiport memory, crossbar switch, multi-stage switching network;

Introduction to Flynn's classification: SISD, SIMD, MISD, MIMD (Introduction).

TEXT BOOKS:

1. M. Morris Mano, Computer System Architecture, Pearson/PHI, 2011.
2. Douglas V Hall, Microprocessor and Interfacing, TATA McGraw Hill, 2006.

REFERENCE BOOKS:

1. Carl Hamacher, ZvonksVranesic, SafeaZaky, Computer Organization, McGraw Hill, 2002.
2. William Stallings, Computer Organization and Architecture, Pearson/PHI, 2009.

SWITCHING THEORY AND LOGIC DESIGN

II Year B.Tech EEE II Semester

L	T	P	C
3	0	0	3

Course Outcomes:
At the end of the course the student should be able to
CO1: Demonstrate the basic theorems of Boolean algebra, logic gates, combinational and sequential circuits and memories.
CO2: Analyze the combinational and sequential circuits and memories.
CO3: Design of logic circuits
CO4: Realization of gates using different logic families.
CO 5: Explain the design and operation of different semiconductor memories

Unit-I: Number System and minimization techniques:
Number System: Review of number system and base conversion, complements, signed binary numbers, Floating point number representation, Error detection (parity detection only).
Minimization techniques: Boolean Algebra, postulates ,basic logic gates, Canonical and Standard Form, NAND and NOR implementation, Minimization of switching function using theorem, The Karnaugh Map Method-Up to Five Variable Maps, Tabular Method.

UNIT-II: Combinational Circuits:
Adders& Subtractor, Binary Adder-Subtractor, Decimal Adder, Binary Multiplier, Magnitude Comparators, Multiplexers, De-multiplexers, Decoders, Encoders and Code converters, Hazards and Hazard Free Relations.

UNIT-III: Sequential circuits-I:
Basic Architectural Distinctions between Combinational and Sequential circuits, Latches, Flip Flops: SR, JK, Race Around Condition in JK, JK Master Slave, D and T Type Flip Flops, Excitation Table of all Flip Flops, Design of a Clocked Flip-Flop, Timing and Triggering Consideration, Clock Skew, Conversion from one type of Flip-Flop to another.

Unit-IV: Sequential Circuits-II:
Synchronous – Asynchronous – Comparison, Design of Single mode Counter, Ripple Counter, Ring Counter, Shift Register, Shift Register Sequences, Ring Counter Using Shift Register, MOD Counters. Finite state machine-capabilities and limitations, Mealy and Moore models.

UNIT-V: Logic Families and Semiconductor Memories:
Logic Families: DCTL, RTL, DTL, TTL and CML Logic –gate realization - Comparison,
Semiconductor Memories: Introduction to ROM, PAL, PLA, CPLD, FPGA.

TEXT BOOKS:

1. M. Morris Mano, *Digital Design*, Third Edition, Pearson Education/PHI, 2001.
2. A.Anand Kumar, *Fundamentals of Digital Circuits*, PHI Edition, 2006.

REFERENCE BOOKS:

1. John F. Wakerly, *Digital Design: Principles and Practices*, 4th Edition, Pearson / Prentice Hall, 2005.
2. Fredrinc J. Hill, Gerald R., *Introduction to Switching Theory and Logic Design*, Peterson, John Wiley & Sons Inc., 1969.

ELECTRONIC DEVICES AND CIRCUITS LABORATORY

II B.Tech EEE II Semester

L	T	P	C
0	0	2	1

Course Outcomes:

After going through this course the student will be able to:

1. Identify and use the basic components and instruments in electronics laboratory
2. . Outline the characteristics of different semiconductor devices.
3. Interpret the ripple factor, regulations of rectifiers.
4. Sketch the frequency response of small signal amplifiers.
5. Understand the concepts of SCR & UJT and observe its characteristics.

PART A: (Only for Viva-voce Examination)

Electronic Workshop Practice (In 3 Lab Sessions):

1. Identification, Specifications, Testing of R, L, C Components (Color Codes), Potentiometers, Switches (SPDT, DPDT, and DIP), Coils, Gang Condensers, Relays, Bread Boards and PCBs
2. Identification, Specifications and Testing of Active Devices, Diodes, BJTs, Low power JFETs, MOSFETs, Power Transistors, LEDs, LCDs, SCR and UJT.
3. Study and operation of
   a. Multimeters (Analog and Digital)
   b. Function Generator
   c. Regulated Power Supplies
   d. CRO.

PART B: (For Laboratory Examination – Minimum of 12 experiments)

1. Forward & Reverse Bias Characteristics of PN Junction Diode.
2. Zener diode characteristics and Zener as voltage Regulator.
3. Half Wave Rectifier with & without filters.
4. Full Wave Rectifier with & without filters.
5. Input & Output Characteristics of Transistor in CB Configuration and h-parameter calculations.
6. Input & Output Characteristics of Transistor in CE Configuration and h-parameter calculations.
7. FET characteristics.
8. Lissajous patterns using CRO
9. Frequency Response of CC Amplifier.
10. Frequency Response of CE Amplifier.
11. Frequency Response of Common Source FET amplifier.
12. SCR characteristics.
13. UJT Characteristics
14. Clippers
15. Clampers

MICROPROCESSORS AND INTERFACING DEVICES

III B.Tech EEE I Semester

L	T	P	C
3	0	0	3

Course Outcomes:

At the end of the course the student should be able to

1. Illustrate the internal architecture of 8086 and 8051.
2. Understand and apply the fundamentals of assembly level programming of microprocessors and microcontroller.
3. Explain the use of interrupts with suitable examples.
4. Demonstrate the interfacing of various peripheral devices with the microprocessor 8086.
5. Design electrical circuitry to the Microcontroller I/O ports in order to interface the controller to external devices.

UNIT-I:

8086 Microprocessor: Introduction to 8085 microprocessor- 8086 architecture- Functional Diagram- Register Organization- Memory segmentation- Memory addresses- physical memory organization- Signal descriptions of 8086- common function signals- Minimum and Maximum mode operation- Timing diagrams- Interrupt structure.

UNIT-II:

Assembly Language Programming using 8086: Instruction formats- addressing modes- instruction set- assembler directives-procedures-macros- Simple programs.

UNIT-III:

Interfacing with 8086 Microprocessor:8255 Programmable Peripheral Interface-Various Modes of Operation-Interfacing Keyboard- Display-Stepper motor- ADC-DAC-8259 Programmable Interrupt Controller -8257DMA controller.

UNIT-IV:

Communication Interface: Serial communication standards- serial data transfer schemes- 8251 USART architecture and Interfacing- RS-232-TTL to RS 232C and RS232C to TTL conversion. Simple programs on serial data transfer-IEEE-488

UNIT-V:

Introduction to Microcontrollers: Overview of 8051 microcontroller- Architecture- I/O ports and Memory organization- addressing modes and instruction set of 8051- Simple programs

TEXT BOOKS:

1. A. K. Ray and K.M. Bhurchandani, Advanced Microprocessors and Peripherals, TMH- 2nd Edition 2006.
2. DV Hall, Microprocessor and Interfacing, Mc Graw Hill, 2006

REFERENCES:

1. K.Uma Rao- AndhePallavi, The 8051Microcontrollers- Architecture and Programming and Applications, Pearson- 2009.
2. Kenneth. J. Ayala, The 8051 Micro controller, Cengage Learning, 2004

INTEGRATED CIRCUITS AND APPLICATIONS
(Professional Elective)

III Year B.Tech EEE I Semester

L	T	P	C
3	0	0	3

Course Outcomes:

CO1: Remembering the characteristics of different integrated circuits families
CO2: Inferring the different applications of operational amplifiers under different configurations
CO3: Recognizing the importance of special function integrated circuits on different engineering applications
CO4: Interpreting the need for data converters for real time applications.
CO5: Design and analysis of first order active filter and waveform generators using operational amplifiers

UNIT - I:
Integrated Circuits: Classification, chip size and circuit complexity, Classification of Integrated circuits, comparison of various logic families, standard TTL NAND Gate-Analysis & characteristics, TTL open collector O/Ps, Tristate TTL, MOS & CMOS open drain and tri-state outputs, CMOS transmission gate, IC interfacing- TTL driving CMOS & CMOS driving TTL.

UNIT - II:
OP-AMP and Applications: Basic information of OP-AMP, ideal and practical OP-AMP, internal circuits, OP-AMP characteristics, DC and AC characteristics, 741 OP-AMP and its features, modes of operation-inverting, non-inverting, differential. Basic application of OP-AMP, instrumentation amplifier, ac amplifier, V to I and I to V converters, sample & hold circuits, multipliers and dividers, Differentiators and Integrators, Comparators, introduction to voltage regulators.

UNIT - III:
Active Filters & Oscillators: Introduction, 1st order LPF, HPF filters, Band pass, Band reject and all pass filters. Oscillator types and principle of operation - RC, Wien and quadrature type, waveform generators - triangular, sawtooth, square wave and VCO.

UNIT - IV:
Timers & Phase Locked Loops: Introduction to 555 timer, functional diagram, monostable and astable operations and applications, Schmitt Trigger. PLL - introduction, block schematic, principles and description of individual blocks of 565.

UNIT - V:

D-A and A-D Converters: Introduction, basic DAC techniques, weighted resistor DAC, R-2R ladder DAC, inverted R-2R DAC, Different types of ADCs - parallel comparator type ADC, counter type ADC, successive approximation ADC and slope ADC. DAC and ADC specifications.

TEXT BOOKS:

1. D. Roy Chowdhury, Linear Integrated Circuits, New Age International(p) Ltd, 2018
2. Ramakanth A. Gayakwad, Op-Amps & Linear ICs, PHI, 2015.

REFERENCES BOOKS:

1. R.F. Coughlin & Fredrick F. Driscoll, Operational Amplifiers & Linear Integrated Circuits, PHI, 2000.
2. Floyd and Jain, Digital Fundamentals, Pearson Education, 2017.

SYSTEM DESIGN USING VERILOG HDL

(Professional Elective)

III B.Tech EEE II Semester

L	T	P	C
3	0	0	3

Course Outcomes:

By the end of this course, students should be able to:

1. Understanding the process of simulation and synthesis of Digital Circuit using Verilog HDL.
2. Demonstrate gate level, data flow of digital systems.
3. Implement behavioural and switch level modelling of digital systems.
4. Compare different modelling techniques for digital systems.
5. Develop test benches for combinational and sequential circuits.

UNIT – I:

Introduction to VerilLog HDL: Verilog as HDL, Levels of Design Description, Concurrency, Simulation and Synthesis, Function Verification, System Tasks, Programming Language Interface, Module, Simulation and Synthesis Tools

Language Constructs and Conventions: Introduction, Keywords, Identifiers, White Space, Characters, Comments, Numbers, Strings, Logic Values, Strengths, Data Types, Scalars and Vectors, Parameters, Operators.

UNIT – II:

Gate Level Modelling: Introduction, AND Gate Primitive, Module Structure, Other Gate Primitives, Illustrative Examples, Tristate Gates, Array of Instances of Primitives, Design of Flip-Flops with Gate Primitives, Delay, Strengths and Construction Resolution, Net Types, Design of Basic Circuit.

Modelling at Dataflow Level: Introduction, Continuous Assignment Structure, Delays and Continuous Assignments, Assignment to Vector, Operators.

UNIT – III:

Behavioural Modelling: Introduction, Operations and Assignments, Functional Bifurcation, 'Initial' Construct, Assignments with Delays, 'Wait' Construct, Multiple Always Block, Behavioural Level, Blocking and Non-Blocking Assignments, The 'Case' Statement, Simulation Flow, 'If' an 'if-Else' Constructs, 'Assign- De-Assign' Constructs, 'Repeat' Construct, for loop, 'The Disable' Construct, 'While Loop', Forever Loop, Parallel Blocks, Force-Release, Construct, Event.

UNIT – IV:

Switch Level Modeling: Basic Transistor Switches, CMOS Switches, BiDirectional Gates, Time Delays with Switch Primitives, Instantiation with 'Strengths' and 'Delays' Strength Contention with Trireg Nets.

System Tasks, Functions and Compiler Directives: Parameters, Path Delays, Module Parameters. System Tasks and Functions, File Based Tasks and Functions, Computer Directives, Hierarchical Access, User Defined Primitives.

UNIT – V:

Sequential Circuit Description: Sequential Models - Feedback Model, Capacitive Model, Implicit Model, Basic Memory Components, Functional Register, Static Machine Coding, Sequential Synthesis.

Components Test and Verification: Test Bench - Combinational Circuits Testing, Sequential Circuit Testing, Test Bench Techniques, Design Verification, Assertion Verification.

TEXT BOOKS:

1. T.R. Padmanabhan, B Bala Tripura Sundari, Design through Verilog HDL, Wiley 2009.
2. Zainalabdien Navabi, Verliog Digital System Design, TMH, 2005

REFERENCE BOOKS:

1. Stephen Brown, Zvonkoc Vranesic, Fundamentals of Digital Logic with Verilog Design, TMH, 2007
2. Sunggu Lee , Advanced Digital Logic Design using Verilog, State Machines & Synthesis for FPGA, Cengage Learning, 2012.

EMBEDDED SYSTEMS & IOT
(Professional Elective)

IV B. Tech. EEE I Semester

L	T	P	C
3	0	0	3

Course Outcomes:
At the end of the Course, the student will be able to:
1. Understand the differences between the embedded system and general computing system identify the purpose of embedded systems.
2. Implement embedded systems using different memory devices and communications interfaces.
3. Solve the communication/Synchronization issues with a view to choose the best RTOS.
4. Understand the concepts of IOT.
5. Design IOT devices for real time applications

UNIT I:
Introduction to Embedded Systems:
Definition of Embedded System, Embedded Systems Vs General Computing Systems, History of Embedded Systems, Classification, Major Application Areas, Purpose of Embedded Systems, Characteristics and Quality Attributes of Embedded Systems.

UNIT II:
Typical Embedded System:
Core of the Embedded System: General Purpose and Domain Specific Processors, ASICs, PLDs, Commercial Off-The-Shelf Components (COTS), Memory: ROM, RAM, Memory according to the type of Interface, Memory Shadowing, Memory selection for Embedded Systems, Sensors and Actuators, Communication Interface: Onboard and External Communication Interfaces.

UNIT III:
RTOS &Task Communication:
RTOS:OS Basics-Tasks, Process and Threads, Multiprocessing and Multitasking, Task Scheduling.
Task Communication: Shared Memory, Message Passing, Remote Procedure Call and Sockets, Task Synchronization: Task Communication/Synchronization Issues, Task Synchronization Techniques, Device Drivers, How to Choose an RTOS.

UNIT IV:
Introduction to IoT and Architecture
Introduction, Characteristics, Physical design, Logical design, Evolution of IoT, Enabling technologies, IoT Levels, Domain Specific IoTs, IoT and Machine to machine communication, Need for cloud in IoT

UNIT V:

IoT Communication Protocols and IoT Systems Use Cases

IoT nodes, IoT Edge, 6LOWPAN, ipv4/ipv6, MQTT, COAP,
Smart cities, smart homes, automotive, agriculture, Healthcare, Activity Monitoring.
Industrial IoT

TEXT BOOKS:

1. *Raj Kamal , Embedded Systems: Architecture, Programming and Design , Tata McGraw-Hill, 2011*
2. *Dr. Guillaume Girardin , Antoine Bonnabel, Dr. Eric Mounier, 'Technologies Sensors for the Internet of Things Businesses & Market Trends 2014 -2024',Yole Development Copyrights ,2014*

REFERENCE BOOKS:

1. *Shibu K V, Introduction to Embedded Systems, McGraw-Hill Education, 2009.*
2. *Peter Waher, 'Learning Internet of Things', Packt Publishing, 2015*
3. *Editors OvidiuVermesan Peter Friess,'Internet of Things – From Research and Innovation to Market*

MICROPROCESSORS AND INTERFACING LABORATORY

IV B.Tech EEE I Semester

L	T	P	C
0	0	2	1

Course Outcomes:

At the end of the course the student should be able to

1. Apply the fundamentals of assembly level programming of microprocessors and Microcontrollers.
2. Build a program on a microprocessor using instruction set of 8086 and 8051.
3. Evaluate Assembly language program for 8086 and 8051 microcontroller to interface peripheral devices for simple applications.
4. Understand the development of prototype using combination of hardware and software.
5. Develop assembly language programs for various applications using 8051 microcontroller

Note: Minimum of 12 experiments to be conducted.

8086 MICROPROCESSOR:

1. Arithmetic Operations (addition, subtraction, multiplication and division)
2. Addition of two BCD numbers.
3. Ascending order/Descending order of an array of numbers.
4. Finding Largest/Smallest numbers in an array of numbers.
5. Generation of Fibonacci series.
6. Hexadecimal to Decimal conversions
7. ASCII to Decimal conversion
8. Program for sorting an array for 8086.
9. Program for searching for a number or character in a string for 8086.
10. Program for string manipulations for 8086.

MASM PROGRAMMING:

1. Arithmetic Operations (addition, subtraction, multiplication and division)
2. Addition of two BCD numbers.
3. Ascending order/Descending order of an array of numbers.
4. Finding Largest/Smallest numbers in an array of numbers.
5. Generation of Fibonacci series.
6. Hexadecimal to Decimal conversions

8051 MICROCONTROLLER:

1. Arithmetic Operations (addition, subtraction, multiplication and division)
2. Addition of two BCD numbers.
3. Ascending order/Descending order of an array of numbers.
4. Finding Largest/Smallest numbers in an array of numbers.
5. Generation of Fibonacci series.
6. Masking of Bits.
7. Hexadecimal to Decimal conversion.

INTERFACING WITH 8086 MICROPROCESSOR:

1. Stepper motor interfacing to 8086.
2. Elevator simulator interfacing to 8086.
3. seven- segment display interfacing to 8086.
4. Interfacing ADC and DAC to 8086.
5. Digit Key – interfacing to 8086.

Department of Electronics and Communication Engineering

BoS Members' Signatures:

1. Dr. K. Vasanth, Professor, Head & Chairman of BoS ECE Dept., VJIT.	2.Dr.P. Chandrasekhar Reddy, Professor of ECE,JNTUH CEH, University Nominee.	3.Dr. K.S. Rao, Director, Anurag Group ofInstitutions, External Member.	4. Dr. P. Chandra Sekhar, HoD, Dept., of ECE, OsmainaUniversity, External Member.
5. Dr. Y. Pandurangaiah, Professor, Vardhaman College of Engineering, Shamshabad, External Member.	6. Mr. A. Hariharan, Associate Director, PACTRA EDGE, Hyderabad, External Member.	7. Mr. N. Venkatesh, Sr. Director, Sillicon Labs, Hyderabad, External Member.	8. Dr. S. Thulasi Prasad, Professor,ECE,VJIT, Internal Member.
9. Dr. P. Ganesan, Professor, ECE,VJIT, Internal Member.	10. Mr. M. Rajendra Prasad, Associate Professor, ECE,VJIT, Internal Member.	11. Mrs. A. Jaya Lakshmi, Associate Professor, ECE,VJIT, Internal Member.	**Date of Bos Meeting On** **15/07/2021**

Vidya Jyothi Institute of Technology R20

(An Autonomous Institution)
(Accredited by NAAC & NBA, Approved by AICTE New Delhi & Permanently Affiliated to JNTUH)
Aziz Nagar Gate, C.B. Post, Hyderabad-500 075

Department of Electronics and Communication Engineering

Differences between R15, R18, R19 and R20 Course structure and Syllabus (I Year I & II Semester)

S.No.	R15	R18	R19	R20
		I SEMESTR		
1.	English-I	Mathematics-I	Mathematics-I	Mathematics-I
2.	Mathematics - I	Applied Physics	Chemistry	Applied Physics
3.	Engineering Physics-I	Applied Physics Lab	Chemistry Lab	Physics Lab
4.	C Programming – I	Basic Electrical Engineering	English	English
5.	Engineering Chemistry	Basic Electrical Engineering Lab	English Language Skills Lab (ELSL)	English Language Skills Lab (ELSL)
6.	Engineering Graphics / Electrical circuits	Engineering Graphics & Modeling	Programming for Problem Solving-I	Programming for Problem Solving-I
7.	English Language Communication Skills Lab-I	English Language Skills Lab (ELSL)	Programming for Problem Solving Lab-I	Programming for Problem Solving Lab-I
8.	C Programming Lab – I	Programming for Problem Solving-I	Engineering Graphics & Modeling	Engineering Graphics & Modeling
9.	Engineering Physics and Chemistry Lab	Programming for Problem Solving Lab-I		
10.	IT & Engineering Workshop			
		II SEMESTER		
1.	English-II	Mathematics-II	Mathematics-II	Mathematics-II
2.	Electrical Circuits Theory / Engineering Graphics	Chemistry	Applied Physics	Chemistry
3.	Engineering Physics-II	Chemistry Lab	Applied Physics Lab	Chemistry Lab
4.	C Programming – II	English	Basic Electrical Engineering	Basic Electrical Engineering
5.	Mathematics – II	English Communication Skills Lab (ECSL)	Basic Electrical Engineering Lab	Basic Electrical Engineering Lab
6.	Mathematics – III	Programming for Problem Solving-II	Engineering Workshop	Engineering Workshop
7.	English Language Communication Skills Lab-II	Programming for Problem Solving Lab-II	English Communication Skills Lab (ECSL)	English Communication Skills Lab (ECSL)
8.	C Programming Lab –II	Engineering Workshop	Programming for Problem Solving-II	Programming for Problem Solving-II
9.	Engineering Physics Lab		Programming for Problem Solving Lab-II	Programming for Problem Solving Lab-II

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Department of Electronics and Communication Engineering

Differences between R15, R18, R19 and R20 Course structure and Syllabus **(II Year I & II Semester)**

S.No.	R15	R18	R19	R20
		I SEMESTR		
1.	Mathematics – IV	Complex Analysis and Fourier Transforms	Complex Analysis and Fourier Transforms	Complex Analysis and Fourier Transforms
2.	Electronic Devices and Circuits	OOP Through JAVA	OOP Through JAVA	OOP Through JAVA
3.	Signals and Systems	Electronic Devices and Circuits	Electronic Devices and Circuits	Electronic Devices and Circuits
4.	Switching Theory and Logic Design	Probability Theory and Stochastic Processes	Probability Theory and Stochastic Processes	Probability Theory and Stochastic Processes
5.	Electronic Measurements & Instruments	Signals and Systems	Signals and Systems	Signals and Systems
6.	Probability Theory and Stochastic Processes	Network Analysis and Transmission Lines	Professional Communications	Professional Communications
7.	Electronic Devices and Circuits Lab	Electronic Devices and Circuits Laboratory	Electronic Devices and Circuits Laboratory	Electronic Devices and Circuits Laboratory
8.	Basic Simulation Lab	Basic Simulation Laboratory	Basic Simulation Laboratory	Basic Simulation Laboratory
9.	Mandatory Course-1 (DM)	Gender Sensitization	Cyber Law	Gender Sensitization
		II SEMESTER		
1.	Principles of Electrical Engineering	Switching Theory and Logic Design	Switching Theory and Logic Design	Switching Theory and Logic Design
2.	Electronic Circuit Analysis	Electrical Technology	Electrical Technology	Electrical Technology
3.	Pulse and Digital Circuits	Professional Communications	Network Analysis and Transmission Lines	Network Analysis and Transmission Lines
4.	Electromagnetic Theory and Transmission Lines	Analog and Digital Communications	Analog and Digital Communications	Analog and Digital Communications
5.	Digital System Design	Analog and Pulse Circuits	Analog and Pulse Circuits	Analog and Pulse Circuits
6.	Environmental Science	Electromagnetic Waves	Electromagnetic Waves	Electromagnetic Waves
7.	ECA Lab	Analog & Digital Comm. Laboratory	Analog & Digital Comm. Laboratory	Analog & Digital Comm. Laboratory
8.	PDC Lab	Analog and Pulse Circuits Laboratory	Analog and Pulse Circuits Laboratory	Analog and Pulse Circuits Laboratory
9.	Mandatory Course-II (IPR)	Environmental Science	Environmental Science	Environmental Science

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Department of Electronics and Communication Engineering

Differences between R15, R18, R19 and R20 Course structure and Syllabus **(III Year I Semester)**

S.No.	R15	R18	R19	R20
		I SEMESTR		
1	Analog Communications	Control Systems	Control Systems	Control Systems
2	Linear & Digital IC Applications	Microprocessors & Microcontrollers	Microprocessors & Microcontrollers	Microprocessors & Microcontrollers
3	Control Systems Engineering	Linear & Digital IC Applications	Linear & Digital IC Applications	Linear & Digital IC Applications
	Professional Elective – 1:	Antenna And Propagation	Antenna And Propagation	Antenna And Propagation
4	1. Computer Organization and Architecture	**Professional Elective-1**	**Professional Elective-1**	**Professional Elective-1**
5	2. Soft Computing	1. Computer Architecture	1. Computer Architecture	1. Computer Architecture
6	3. Biomedical Instrumentation	2. Information Theory and Coding	2. Information Theory and Coding	2. Information Theory and Coding
	Open Elective – 1:	3. Introduction to Mems	3. Introduction to Mems	3. Introduction to Mems
7	1. Introduction to Microcontrollers & Applications	**Open Elective-1**	**Open Elective-1**	**Open Elective-1**
8	2. Basic Electronics & Instrumentation	1. Introduction to Microcontrollers	1. Introduction to Microcontrollers	1. Introduction to Microcontrollers
9	Analog Communications Lab	2. Basic Electronics	2. Basic Electronics	2. Basic Electronics
10	Linear & Digital IC Applications Lab	Microprocessor and Microcontrollers Laboratory	Microprocessor and Microcontrollers Laboratory	Microprocessor and Microcontrollers Laboratory
11	Advanced English Language & Communication Skills Lab	Linear & Digital IC App. Laboratory	Linear & Digital IC App. Laboratory	Linear & Digital IC App. Laboratory
12	Quantitative Methods & Logical Reasoning	Personality Development & Behavioral Skills	Personality Development & Behavioral Skills	Personality Development & Behavioral Skills

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Department of Electronics and Communication Engineering

Differences between R15, R18, R19 and R20 Course structure and Syllabus **(III Year II Semester)**

S.No.	R15	R18	R19	R20
		II SEMESTR		
1	Managerial Economics and Financial Analysis	Managerial Economics & Financial Analysis	Managerial Economics & Financial Analysis	Managerial Economics & Financial Analysis
2	VLSI Design	Digital Signal Processing	Digital Signal Processing	Digital Signal Processing
3	Digital Signal Processing	Microwave Engineering	Microwave Engineering	Microwave Engineering
4	Microprocessors and Microcontrollers	Data Communication and Networking	Data Communication and Networking	Data Communication and Networking
	Professional Elective – 2:	**Professional Elective-2**	**Professional Elective-2**	**Professional Elective-2**
5	1. Optical Communications	1. Digital Signal Processors and Architectures	1. Digital Signal Processors and Architectures	1. Digital Signal Processors and Architectures
6	2. Programming in MATLAB	2. Modeling and Simulation using MATLAB	2. Modeling and Simulation using MATLAB	2. Modeling and Simulation using MATLAB
7	3. Satellite & Wireless Communications	3. Optical Communications	3. Optical Communications	3. Optical Communications
		Fast Track	**Fast Track**	**Fast Track**
	Open Elective – 2:	**Open Elective-2**	**Open Elective-2**	**Open Elective-2**
8	1. Fundamentals of Embedded Systems	1. Basic Electronic Instrumentation	1. Basic Electronic Instrumentation	1. Basic Electronic Instrumentation
9	2. Principles of Communications	2. Consumer Electronics	2. Consumer Electronics	2. Consumer Electronics
10	Microprocessors and Microcontrollers Lab	Digital Signal Processing Laboratory	Digital Signal Processing Laboratory	Digital Signal Processing Laboratory
11	Digital Signal Processing & e-CAD Lab	Adv. Communication Skills Laboratory	Adv. Communication Skills Laboratory	Adv. Communication Skills Laboratory
12	Personality Development & Behavioral Skills	Quantitative Methods & Logical Reasoning	Quantitative Methods & Logical Reasoning	Quantitative Methods & Logical Reasoning

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Department of Electronics and Communication Engineering

Differences between R15, R18, R19 and R20 Course structure and Syllabus **(IV Year I & II Semester)**

S.No.	R15	R18	R19	R20
		I SEMESTR		
1	Digital Communication	Embedded System Design	Embedded System Design	Embedded System Design
2	Embedded System Design	VLSI Design	VLSI Design	VLSI Design
3	Antennas & Microwave Engineering	**Professional Elective-3**	**Professional Elective-3**	**Professional Elective-3**
	Professional Elective – 3:	1. Digital Image Processing	1. Digital Image Processing	1. Digital Image Processing
4	1. Digital Image Processing	2. Cellular and Mobile Communications	2. Cellular and Mobile Communications	2. Cellular and Mobile Communications
5	2. Spread Spectrum Communications	3. Radar Engineering	3. Radar Engineering	3. Radar Engineering
6	3. Multimedia and Signal Coding	**Professional Elective-4**	**Professional Elective-4**	**Professional Elective-4**
	Professional Elective – 4:	1. Biomedical Instrumentation	1. Biomedical Instrumentation	1. Biomedical Instrumentation
7	1. DSP Architectures	2. Satellite Communications	2. Satellite Communications	2. Satellite Communications
8	2.Telecommunication Switching Systems and Networks	3. Telecommunication Switching Systems and Networks	3. Telecommunication Switching Systems and Networks	3. Telecommunication Switching Systems and Networks
9	3. Low Power VLSI	**Fast Track**	**Fast Track**	**Fast Track**
	Open Elective – 3:	**Open Elective-3**	**Open Elective-3**	**Open Elective-3**
10	1. Introduction to MATLAB	1. Automotive Electronics	1. Automotive Electronics	1. Automotive Electronics
11	2. Circuit Simulation using PSpice	2. Introduction to Communication Engineering	2. Introduction to Communication Engineering	2. Introduction to Communication Engineering
12	Embedded System Design Lab	Embedded & VLSI Laboratory	Embedded & VLSI Laboratory	Embedded & VLSI Laboratory
13	Microwave Engineering & Digital Communications Lab	Antenna and Microwave Engineering Laboratory	Antenna and Microwave Engineering Laboratory	Antenna and Microwave Engineering Laboratory
14	Industry Oriented Mini-Project	Industry Oriented Mini Project	Industry Oriented Mini Project	Industry Oriented Mini Project
		II SEMESTR		
1	Cellular and Mobile Communications	Electronic Measurements & Instrumentation	Electronic Measurements & Instrumentation	Electronic Measurements & Instrumentation
2	Computer Networks	Wireless Communications and Networks	Wireless Communications and Networks	Wireless Communications and Networks
3	Radar Engineering	Technical Seminar	Technical Seminar	Technical Seminar
4	Major Project	Comprehensive Viva Voce	Comprehensive Viva Voce	Comprehensive Viva Voce
5	Seminar	Major Project	Major Project	Major Project
6	Comprehensive Viva-Voce			