COURSE STRUCTURE
AND
DETAILED SYLLABUS

ELECTRONICS AND COMMUNICATION ENGINEERING

For
B.TECHFOUR YEAR DEGREE PROGRAMME
(Applicable for the batches admitted from 2018-2019)

VAAGDEVI COLLEGE OF ENGINEERING
(Autonomous)
Bollikunta, Warangal-506 005
Telangana State, India.

VAAGDEVI COLLEGE OF ENGINEERING
AUTONOMOUS

B.TECH. ELECTRONICS & COMMUNICATION ENGINEERING

COURSE STRUCTURE
(R18 Regulations applicable for the batches admitted from Academic Year 2018-19)

I SEMESTER

S.No.	Course Code	Title of the Course	L	T	P	Credits
1	B18MA01	Linear Algebra & Calculus	3	1	0	4
2	B18CS01	Programming for Problem Solving	4	0	0	4
3	B18PH01	Applied Physics	4	0	0	4
4	B18EN01	English	2	0	0	2
5	B18PH02	Applied Physics Lab	0	0	3	1.5
6	B18ME02	Engineering Workshop & IT Workshop	0	0	3	1.5
7	B18CS02	Programming for Problem Solving Lab	0	0	2	1
8	B18MC01	Induction Program				
		Total Credits	**13**	**01**	**10**	**18**

II SEMESTER

S.No.	Course Code	Title of the Course	L	T	P	Credits
1	B18MA02	Differential Equations & Vector Calculus	3	1	0	4
2	B18CH01	Engineering Chemistry	3	1	0	4
3	B18ME01	Engineering Graphics	1	0	4	3
4	B18EE04	Electrical Circuits	3	0	0	3
5	B18EC01	Electronic Devices and Circuits	3	0	0	3
6	B18EC02	Electronic Devices and Circuits Lab	0	0	2	1
7	B18EN02	English language & Communication Skills Lab	0	0	2	1
8	B18MC02	Environmental Science	0	0	2	0
		Total Credits	**13**	**02**	**10**	**19**

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III SEMESTER

S.No.	Subject code	Subject	L	T	P	Credits
1	B18MA03	Numerical Methods & Complex Variables	3	1	0	4
2	B18EC03	Signals and systems	3	1	0	4
3	B18EC04	Electronic Circuits Analysis	3	1	0	4
4	B18EC05	Switching Theory and Logic Design	3	0	0	3
5	B18EE05	Electrical Technology	3	0	0	3
6	B18EC06	Electronic Circuits Analysis Lab	0	0	2	1
7	B18EC07	Simulation Lab	0	0	2	1
8	B18CS56	Python Scripting Language Lab	0	0	2	1
9	B18MC03	NSS/NCC	0	0	2	0
		Total Credits	**15**	**03**	**08**	**21**

IV SEMESTER

S.No.	Subject code	Subject	L	T	P	Credits
1	B18EC08	Pulse and Digital Circuits	3	1	0	4
2	B18EC09	Electromagnetic Theory and Transmission Lines.	3	1	0	4
3	B18EC10	Analog Communications & Digital Communications	3	1	0	4
4	B18EC11	Probability Theory and Stochastic Process	3	0	0	3
5	B18EC12	Computer Organization	3	0	0	3
6	B18EC13	Pulse and digital circuits Lab	0	0	2	1
7	B18EE06	Electrical Technology Lab	0	0	2	1
8	B18EC14	Analog Communications & Digital Communications lab	0	0	2	1
9	B18MC07	Gender Sensitization	0	0	2	0
		Total Credits	**15**	**03**	**06**	**21**

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V SEMESTER

S.No.	Subject code	Subject	L	T	P	Credits
1	B18EC15	Linear & Digital IC Applications	3	1	0	4
2	B18EC16	Digital Signal Processing	3	0	0	3
3	B18CS53	Computer Networks	3	0	0	3
4	 B18EE15 B18EC17 B18CS52	**Professional Elective-I** Control Systems Telecommunication Switching Systems & Networks OOPS Through JAVA	3	0	0	3
5	B18MB01	Managerial Economics & Financial Analysis	3	0	0	3
6	B18EC18	LDIC Lab	0	0	3	1.5
7	B18EC19	Digital Signal Processing Lab	0	0	2	1
8	B18CS54	Computer Networks Lab	0	0	3	1.5
9	B18MC09	Human Values and Professional Ethics	0	0	2	0
		Total Credits	**15**	**1**	**10**	**20**

VI SEMESTER

S.No.	Subject code	Subject	L	T	P	Credits
1	B18EC20	Microprocessors & Microcontrollers	3	1	0	4
2	B18EC21	VLSI Design	3	0	0	3
3	B18EC22	Antennas & Wave Propagation	3	0	0	3
4	 B18EC23 B18CS57 B18EC24	**Professional Elective-II** Bio Medical Instrumentation Data Communication Networks Digital Image Processing	3	0	0	3
5	 B18EC25 B18EC26 B18EC27	**Professional Elective-III** Radar Systems Digital Signal Processor & Architecture Real Time Operating Systems	3	0	0	3
6	B18EC28	VLSI & e-CAD Lab	0	0	2	1
7	B18EC29	Microprocessors & Microcontrollers Lab	0	0	3	1.5
8	B18EN03	Advanced English Communication skills lab	0	0	3	1.5
9	B18MC05	Logical Reasoning & Quantative Aptitude	0	0	2	0
		Total Credits	**15**	**1**	**10**	**20**

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B.TECH. ELECTRONICS & COMMUNICATION ENGINEERING

COURSE STRUCTURE

(R18 Regulations applicable for the batches admitted from Academic Year 2018-19)

VII SEMESTER

S.No.	Subject code	Subject	L	T	P	Credits
1	B18EC30	Microwave Engineering	3	0	0	3
2	B18EC31	Embedded Systems Design	3	0	0	3
3	 B18EC32 B18EC33 B18CS35	**Professional Elective-IV** Cellular Mobile Communication FPGA Architecture & Applications Artificial Intelligence	3	0	0	3
4	 B18EC34 B18EC35 B18EC36	**Professional Elective-V** Information Theory & Coding Satellite Communication Speech processing	3	0	0	3
5		**Open Elective – I**	3	0	0	3
6	B18EC37	Microwave Engineering Lab	0	0	2	1
7	B18EC38	Embedded Systems Design Lab	0	0	2	1
8	B18EC39	Mini Project and Internship	0	0	0	2
9	B18EC40	Project Phase – I	0	0	8	4
		Total Credits	**15**	**0**	**12**	**23**

VIII SEMESTER

S.No.	Subject code	Subject	L	T	P	Credits
1	 B18EC41 B18EC42 B18CS40	**Professional Elective-VI** Fiber Optical Communications Low power VLSI Design Internet of Things	3	0	0	3
2		**Open Elective – II**	3	0	0	3
3		**Open Elective – III**	3	0	0	3
4	B18EC43	Technical Seminar	0	0	2	1
5	B18EC44	Project Phase – II	0	0	16	8
		Total Credits	**9**	**0**	**16**	**18**

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B.TECH. ELECTRONICS & COMMUNICATION ENGINEERING

COURSE STRUCTURE

(R18 Regulations applicable for the batches admitted from Academic Year 2018-19)

List Of Open Electives

S.No.	Subject code	Subject	L	T	P	Credits
1	B18CS04	DBMS	3	0	0	3
2	B18ME36	Power Plant Engineering				
3	B18CE53	Disaster Management				
4	B18CS33	Cloud Computing				
5	B18MB03	Entrepreneurship Development				
6	B18CE52	Air Pollution Control				
7	B18ME38	Robotics				
8	B18EE52	Power Electronics And Drives				
9	B18EE51	Industrial Electronics				
10	B18MB06	Intellectual Property Rights				
11	B18CS17	Machines Learning				

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VAAGDEVI COLLEGE OF ENGINEERING
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(B18MA01) LINEAR ALGEBRA AND CALCULUS
(Common to all Branches)

B.Tech: I Semester **L T P C**
3 1 0 4

Pre-requisites: Mathematical Knowledge of 12^{th} / Intermediate level

Objectives: To learn
- Types of matrices and their properties.
- Concept of a rank of the matrix and applying this concept to know the consistency and solving the system of linear equations.
- Concept of Eigen values and Eigen vectors and to reduce the quadratic form to canonical form
- Concept of Sequence.
- Concept of nature of the series.
- Geometrical approach to the mean value theorems and their application to the mathematical problems
- Evaluation of surface areas and volumes of revolutions of curves.
- Evaluation of improper integrals using Beta and Gamma functions.
- Partial differentiation, concept of total derivative
- Finding maxima and minima of function of two and three variables.

UNIT-I: Matrices
Matrices: Types of Matrices, Symmetric; Hermitian; Skew-symmetric; Skew-Hermitian; orthogonal matrices; Unitary Matrices; Rank of a matrix by Echelon form and Normal form, Inverse of Non-singular matrices by Gauss-Jordan method; System of linear equations; solving system of Homogeneous and Non-Homogeneous equations, Gauss elimination method; Gauss Seidel Iteration Method.

UNIT-II: Eigen Values and Eigen vectors
Linear Transformation and Orthogonal Transformation: Eigen values and Eigen vectors and their properties: Diagonalization of a matrix; Cayley-Hamilton Theorem (without proof); finding inverse and power of a matrix by Cayley-Hamilton Theorem; Quadratic forms and Nature of the Quadratic Forms; Reduction of Quadratic form to canonical forms by Orthogonal transformation.

UNIT-III: Sequences & Series
Sequence: Definition of a Sequence, limit; Convergent, Divergent and Oscillatory sequences. Series: Convergent, Divergent and Oscillatory Series; Series of positive terms; Comparison test, p-test, D-Alembert's ratio test; Raabe's test; Cauchy's Integral test; Cauchy's root test; logarithmic test. Alternating series: Leibnitz test; Alternating Convergent series: Absolute and Conditionally Convergence.

UNIT-IV: Calculus
Mean value theorems: Rolle's theorem, Lagrange's Mean value theorem with their Geometrical Interpretation and applications, Cauchy's Mean value Theorem. Taylor's Series.
Applications of definite integrals to evaluate surface areas and volumes of revolutions of curves (Only in Cartesian coordinates), Definition of Improper Integral: Beta and Gamma functions and their applications.

UNIT-V: Multivariable calculus (Partial Differentiation and applications)
Definitions of Limit and continuity.
Partial Differentiation; Euler's Theorem; Total derivative; Jacobian; Functional dependence & independence, Maxima and Minima of functions of two variables and three variables using method of Lagrange multipliers.

Course outcomes:

After learning the contents of this paper the student must be able to

- Write the matrix representation of a set of linear equations and to analyse the solution of the system of equations.
- Find the Eigen values and Eigen vectors and Reduce the quadratic form to canonical form using orthogonal transformations.
- Analyse the nature of sequence and series.
- Solve the applications on the mean value theorems and Evaluate the improper integrals using Beta and Gamma functions.
- Find the extreme values of functions of two variables with/ without constraints.

Text Books

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010
2. Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John wiley & Sons, 2006.

References

1. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002.
2. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008.
3. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11th Reprint, 2010.

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VAAGDEVI COLLEGE OF ENGINEERING
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(B18CS01) PROGRAMMING FOR PROBLEM SOLVING

B.Tech: I Semester **L T P C**
4 0 0 4

Pre-requisites:

Course Objectives:
To provide the necessary knowledge on general engineering problem solving methodologies and to provide necessary foundations for step by step computer program development and to present the basic concepts in C programming language and to prepare the students to write modular and readable C Programs. Also the Course introduces the essential concepts like abstract data types, user defined data types, to analyze the performance of algorithms and how to use such knowledge for later processing with the help of files and aims to train the students to write working programs to solve problems.

UNIT -1
Introduction to Computers: Block Diagram of Computer, Memory Hardware ,Software, Operating Systems, Steps in Problem Solving, Algorithms , Flowcharts, Pseudo code, Types of Programming Languages, Introduction to C, History of C, Structure of a C Program.
(Chapter 1: 1.1 - 1.10 , 1.17 – 1.20)
Introduction to C Programming: The C Character Set, Identifiers and - Keywords, Data Types, Constants and Variables, Declarations, Expressions & Statements, Input / Output Statements (Formatted and Unformatted), Creating and Running a C program.
(Chapter 2: 2.1 – 2.27 & Chapter 4: 4.1 – 4.17)
Operators and Expressions : Unary Operators ,Arithmetic Operators, Relational and Logical Operators, Assignment Operators, Conditional operator, Bitwise Operators, special operators, Precedence & Associativity, Type Casting and Type Conversion. *(Chapter 3 : 3.1 – 3.17)*

UNIT – 2
Control Statements: Branching Statements – if, if-else, else- if, nested-if. Switch statement. Un-conditional Branching Statement- goto. Looping Statements- while, do-while, for, nested loops. Break & Continue.
(Chapter 6 : 6.1 – 6.47)
Functions : Introduction, Defining a Function, Types of Functions, Accessing a Function, Function Prototypes, Passing Arguments to a Function – call by value, Recursion. *(Chapter 7: 71. - 7.26)*
Storage Classes: Automatic Variables, External (Global) Variables, Static Variables, Register.
(Chapter 8: 8.1 – 8.13)

UNIT – 3
Arrays: Definition - Single Dimensional Arrays, Multi Dimensional Arrays, Declaration, Initialization, Reading & Writing elements in to an Array, Passing Arrays to Functions. Linear Search , Binary search, Bubble sort
(Chapter 9: 9.1 – 9.29 & Reference book 2:)
Strings: Declaration and Initialization of Strings, Reading and Writing a String, String Manipulation Functions , String as Array of Characters, Array of strings, Sorting of Strings. *(Chapter 10: 10.1 – 10.15)*
Structures and Unions: User-Defined Data Types , Defining a Structure, Processing a Structure, Array of Structures, Nested Structures, Passing Structures To Functions. Unions. Typedef. Enumerated types - enum.
(Chapter 12:12.1, 12.2, 12.3, 12.5,12.7)

UNIT – 4

Pointers: Introduction, Pointer Declarations, Pointer to Pointer, Operations on Pointers -Pointer Arithmetic, Dynamic Memory Allocation – Malloc(), Calloc(), Realloc(), Free(). Pointers and Functions - call by Reference, Pointers and Arrays (one dimensional, two dimensional), Array of Pointers. Structures and Pointers, Self-Referential Structures.
(Chapter 11: 11.1 – 11.31 & Chapter 12: 12.4 ,12.6)

UNIT- 5

File Handling: Introduction, Text Files and Binary Files, File Handling Functions-Opening and Closing a File, File Opening Modes, Reading and Writing a File. Random Access File Functions – fseek() , rewind(), ftell(). *(Chapter 13: 13.1 – 13.31)*
Command Line Arguments, C Preprocessor Directives (*Chapter 15: 15.7,15.20)*

Course Outcomes:

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

- Understand how problems are posed and how they can be analyzed for obtaining solutions.
- Understanding the fundamentals of C programming.
- Learn the sequencing, branching, looping and decision making statements to solve scientific and engineering problems.
- Implement different operations on arrays and creating and using of functions to solve problems.
- Design and implement different types of file structures using standard methodology.

Text Book:

1. Byron Gottfried, ***"Programming with C"*** , Third Edition(Schaum's Outlines) McGraw Hill.

Reference Books:

1. B.A. Forouzan and R.F. Gilberg , *"C Programming and Data Structures"* , Cengage Learning (3rd Edition)
2. Pradip Dey & Manas Ghosh, *"Programming in C"*, 2nd Edition , Oxford University Press,2013.
3. E. Balaguruswamy , *"Programming in ANSI C "* ,McGraw-Hill Education, 2008.

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

(B18PH01) APPLIED PHYSICS
(Common to all Branches)

B.Tech: I Semester **L T P C**
4 0 0 4

Pre-requisites:

Course Objectives:
- The aim of Physics provide an adequate exposure and develop insight about the basic principles of physics along with the engineering applications.
- The acquaintance of basic physics principles would help the engineers to understand the tools and techniques used in the industry and provide the necessary foundations for inculcating innovative approach.
- Student will be able to demonstrate competency and understanding of the concepts found in Quantum Mechanics, lasers, Semiconductor and photo detectors, a broad base of knowledge in physics.
- Hence physics the foundation on which stands the elaborate structure of technology.

Unit I: Quantum Mechanics
Failures of classical mechanics, Introduction to Quantum mechanics, Wave nature of Particles, Time-dependent and time independent Schrodinger equation for wave function, Significance of Ψ, probability current, Expectation values, Free-particle wave function and wave-packets, Uncertainty principle. Particle in one dimension box.

Unit II: Wave Optics
Huygen's principle, superposition of waves and interference of light by wave front splitting and amplitude splitting; Young's double slit experiment, Thin film interference, Newton's rings, Michelson interferometer. Farunhofer diffraction from a single slit,double slit and circular aperture, Diffraction gratings and their resolving power.

Unit III Lasers
Characteristics of lasers, absorption, spontaneous emission, stimulated emission. Einstein's theory of matter radiation interaction and A and B Coefficients; amplification of light by population inversion, Ruby laser, He-Ne laser, CO_2 laser, Nd-YAG laser, applications of lasers in science, Engineering and Medicine.

Unit IV: Physics of Semi-Conductor Opto-electronics:
Origin of Energy Band formation in Solids, Classification of materials in to conductors, semi-conductors and insulators, Introduction to intrinsic and extrinsic semiconductors, Fermi level, Effect of carrier concentration and temperature on Fermi level, . Energy Diagram of P-N diode, LED, Types of semi conductor photo detectors P-N junction formation, working principles and characteristics of PIN diode, Avalanche diode, and Solar Cell.

Unit V: Optical Fibres
Optical Fibres introduction, Total internal reflection, Acceptance angle and Cone, Numerical aperture, Types of Optical Fibres, step and graded index fibres, losses in optical fibres, applications of optical fibres.

Course outcomes:
After the completion of this course, the students should be able to
- Illustrate fabrication of semi conductors, photo detectors, design basis of quantum mechanics
- Recall facts of wave optics extend & construct basics of wave optics.
- Interpret about lasers, which leads to new innovations and improvements
- Elaborate and formulate the study of characterization properties of opto-devices, organize the students to prepare new materials for various engineering applications

- Apply basic knowledge on principles and recalls facts of light properties, and motivate for new innovations. analyze applications of optical fibers

Text Books

1. A Text Book of Engineering Physics, Dr. M.N. Avadhanulu, Dr. P.G. Kshrisagar-S.Chand.
2. Modern Engineering Physics (Vol-I & II), Dr. K. Vijaya Kumar, Dr. S. Chandralingam – S.Chand.
3. Engineering Physics, P.K.Palani Swamy, Scitech Publicatiobs.
4. Electric Devices & Circuits – Millman & Halkies.

References

1. Haliday and Resnick, Physics-Wiley
2. J. Singh Semiconductor Optoelectronics: Physics and Technology, Mc. Graw-Hill inc(1995).

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

(B18EN01) ENGLISH

B.Tech: I Semester **L T P C**
2 0 0 2

Pre-requisites:

INTRODUCTION In view of the growing importance of English as a tool for global communication and the consequent emphasis on training students to acquire language skills, the syllabus of English has been designed to develop linguistic, communicative and critical thinking competencies of Engineering students. In English classes, the focus should be on the skills development in the areas of vocabulary, grammar, reading and writing. For this, the teachers should use the prescribed text for detailed study. The students should be encouraged to read the texts leading to reading comprehension and different passages may be given for practice in the class. The time should be utilized for working out the exercises given after each excerpt, and also for supplementing the exercises with authentic materials of a similar kind, for example, newspaper articles, advertisements, promotional material etc. *The focus in this syllabus is on skill development, fostering ideas and practice of language skills in various contexts and cultures.*

Learning Objectives: The course will help to a. Improve the language proficiency of students in English with an emphasis on Vocabulary, Grammar, Reading and Writing skills. b. Equip students to study academic subjects more effectively and critically using the theoretical and practical components of English syllabus. c. Develop study skills and communication skills in formal and informal situations.

Course Outcomes: Students should be able to

- Recall the enrichment of comprehension and fluency will be adaptable.
- Gain confidence in using language in varied situations
- Develops neutralization of accent for intelligibility.
- Adapt effective speaking abilities.
- Develops and Communicates by stating main ideas relevantly and coherently in speaking & writing.

SYLLABUS
UNIT –I Social Media
Vocabulary Building: Speech Units.
Grammar: Redundancies and Cliches.
Reading: Comprehension and inferencing, reading for facts and opinions.
Basic Writing Skills: E-mail, E-mail etiquette
Paragraph writing – Types, Structures and Features of a Paragraph - Creating Coherence-Organizing Principles of Paragraphs in Documents.

UNIT –II Superheroes
Vocabulary: Idiomatic Expressions.
Grammar: Question tags.
Reading: Reading for Comprehension
Writing: Gadget review.

UNIT –III History
Vocabulary: The concept of word formation-the use of Prefixes and Suffixes.
Grammar: Prepositions.
Reading: Scanning, reading for Comprehension
Writing: Types of Paragraphs.

UNIT –IV Aliens
Vocabulary: One word substitutes
Grammar: Articles.

Reading: Comprehension and inference
Writing: Writing Practices—Description.

UNIT –V Inventors
Vocabulary: Contracted forms of verbs
Grammar: Tense and Aspects.
Reading: Skimming
Writing: Technical Reports- Information transfer-Describing trends.

UNIT –VI Indian Architecture
Vocabulary: Synonyms and Antonyms
Grammar: Conjunctions
Reading: Understanding a historical essay
Writing: Describing structures.

UNIT –VII War
Vocabulary: Homonyms, Homophones and Homographs
Grammar: Subject-verb agreement
Reading: Reading to summarise
Writing: Letter of enquiry.

UNIT –VIII Sports
Vocabulary: Word stress
Grammar: Common Errors
Reading: Scanning a text
Writing: Letters of complaint.

UNIT –IX Fashion
Vocabulary: Words often confused
Grammar: Active and Passive Voice
Reading: Reading a procedure
Writing: Types of essays, argumentative essay.

UNIT –X Genetics
Vocabulary: Abbreviations and acronyms
Grammar: Common Errors in Tenses
Reading: Categorizing Information
Writing: Report writing.

Prescribed Textbook:
-***English for Technical Communication*** by **Sudarshana, N.P. and C. Savitha,** Cambridge University Press.

References:
1. Swan, M. (2016). Practical English Usage. Oxford University Press.
2. Kumar, S and Lata, P.(2018). Communication Skills. Oxford University Press.
3. Wood, F.T. (2007).Remedial English Grammar. Macmillan.
4. Zinsser, William. (2001). On Writing Well. Harper Resource Book.
5. Hamp-Lyons, L. (2006).Study Writing. Cambridge University Press.
6. Exercises in Spoken English. Parts I –III. CIEFL, Hyderabad. Oxford University Press.

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

(B18PH02) APPLIED PHYSICS LAB

B.Tech: I Semester **L T P C**
0 0 3 1.5

Pre-requisites:

Objectives:

The purpose of doing the experiments in laboratory is not simply to verify a principle but also to explore the other related phenomena and to find their applicability. The students are suggested to work in this direction and get benefit out of it.

1. To get practical knowledge which is related to the engineering course in the development of new technologies.
2. To impart fundamental knowledge in handling the equipments in Physics laboratory.

Sl. No. **Name of the Experiment**

1. Determination of wavelength and radius of curvature of plano convex lens using Newton Rings Experiment.
2. Study of LED & LASER diode Characteristics.
3. Study PHOTO diode Characteristics.
4. Determination of energy gap of material of p-n junction.
5. Bending losses of optical fibres and evaluation of numerical aperture of a given optical fibre.
6. Study P-N diode Characteristics.
7. Study of Characteristics of solar cell.
8. Determination of wavelength of Laser source – Diffraction grating.
9. Determination of frequency of AC supply – sonometer.
10. Determination of dispersive power of a material of a prism-spectrometer.

Outcomes:

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

- Operate different equipments related to light & electronics.
- Develop experimental skills to design new experiments & circuit design.
- Understand about modern equipment like solar cell, optical fiber etc.,
- Have Exposure to develop novel semi conductor devices.

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

(B18ME02) ENGINEERING WORKSHOP & IT WORKSHOP
(Common to ECE & CSE)

B.Tech: I Semester **L T P C**
0 0 3 1.5

Pre-requisites

COURSE OBJECSTIVES:
1. Know the usage of various tools and their application in carpentry, tin smithy.
2. Know the usage of various tools and their application in black smithy, foundry, welding and house wiring.
3. Make lap joint and dove tail joint in carpentry.
4. Make scoop, funnel and tray like items in tin smithy.
5. Use one – way, two-way switches, parallel and series connections in house wiring.
6. Know the basics of welding.

UNIT – I
TRADES FOR EXERCISES: (Any six trades from the following for Mechanical Engineering Branch & Any four trades for all other Branches with minimum of two exercises in each trade)
1. Carpentry
2. Fitting
3. Tin – Smithy
4. Black Smithy
5. House – wiring
6. Foundry
7. Plumbing
8. Soldering

UNIT - II
TRADES FOR DEMONSTRATION & EXPOSURE
1. Demonstration of Power tools & wiring
2. Welding.
3. Machine Shop

UNIT – III
IT WORKSHOP I: Computer hardware, identification of parts, Disassembly, Assembly of computer to working condition, simple diagnostic exercises.

IT WORKSHOP II: Installation of operating system windows and Linux simple diagnostic exercises.

TEXTBOOKS:
1. Workshop Manual – P.Kannaiah / K.L.Narayana/Scitech Publishers.
2. Workshop Manual – Venkat Reddy/BS Publication / 6th Edition.

COURSE OUTCOMES:
The students will be able to
- Know the usage of various tools and their applications in carpentry, tin smithy.
- Understand the usage of various tools and their application in black smithy, foundry, welding and house wiring.
- Make lap joint and dove tail joint in carpentry, scoope, funnel and tray items in tin smithy.

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

(B18CS02) PROGRAMMING FOR PROBLEM SOLVING LAB

B.Tech: I Semester **L T P C**
0 0 2 1

Pre-requisites

Objectives:

To provide the necessary knowledge and practical training on general engineering problem solving methodologies and to provide necessary foundations for step by step computer program development and to present the basic concepts in C programming language and to prepare the students to write modular and readable C Programs. Also the Lab Course implements the essential concepts like abstract data types, user defined data types, to analyze the performance of algorithms and how to use such knowledge for later processing with the help of files and aims to train the students to write working programs to solve problems

WEEK-1

1.a) Write a C program to find the areas of shapes like circle, square, rectangle and triangle
1.b) Write a C program to demonstrate Type Casting and Type Conversion.

WEEK-2

2.a) Write a C program to find the roots of a quadratic equation.
2.b) Write a C program to find greatest of any 3 numbers.
2.c) Write a C program, which takes two integer operands and one operator from the user, performs the operation and then prints the result. (Consider the operators +,-,*, /, % and use Switch Statement)

WEEK-3

3.a) Fibonacci sequence is defined as follows: the first and second terms in sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence. Write a C program to generate the first n terms of the sequence.
3.b) Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.
3.c) Write a C program to find the second largest number in a set of n numbers.

WEEK-4

4.a) Write a C program to generate Pascal's triangle.
4.b) Write a C program to find the LCM(Least Common Multiple) and GCD (greatest common divisor) of two given integers.
4.c) Write a C program to construct a pyramid of numbers.

WEEK-5

5.a) Write a C program to find sum of series 1+x^1+x^2+x^3+.....+x^n using functions.
5.b) Write a C program to find factorial of a given number using Recursion.
5.c) Write a C program to demonstrate the use of Storage Classes

WEEK-6

6.a) Write a C program to find both the largest and smallest number in a list of integers.
6.b) Write a C program to reverse the elements of an array (i.e., the first value should become last value etc.)
6.c) Write a C program to insert an element at a given position in an Array using functions.

WEEK-7

7. Write a C program to perform all of the following:
   a) Matrix Addition and subtraction
   b) Matrix Multiplication
   c) Find Transpose and test if a matrix is symmetric or not
   d) test if a matrix is identity matrix or not

WEEK-8

8.a) Write a C program to perform linear search
8.b) Write a C program to perform binary search
8.c) Write a C program to sort the elements using bubble sort

WEEK-9

9.a) Write a C program to insert a sub-string in to a given main string at a given position.
9.b) Write a C program to count number of characters, words and sentences in a given text.
9.c) Write a C program to determine if the given string is a palindrome or not.
9.d) Write a C program to sort the given names in alphabetical order.

WEEK-10

10.a) Write a C program to implement array of structures.(use student structure).
10.b) Write a menu driven C program that uses functions to perform the following operations on complex numbers stored in a structure:
   i. Reading a complex number
   ii. Writing a complex number
   iii. Addition of two complex numbers
   iv. Multiplication of two complex numbers
10.c) Write a C program to demonstrate Unions and enum.

WEEK-11

11.a) Write a C program for Pointer Arithmetic.
11.b) Write a C program to swap two numbers using Call by value and Call by reference.
11.c) Write a C program to demonstrate calling of a function (like add, subtract, multiply) using a function pointer.

WEEK-12

12.a) Write a C program using pointer to create a two dimensional matrix, to input values in to the matrix and to display the matrix and its transpose. Free the memory properly.
12.b) Write a C program to demonstrate on structures and pointers.
12.c) Write a C program for dynamic creation of structures using pointers

WEEK-13

13.a) Write a C program to count no of alphabets, no of digits, no of special symbols, no of white spaces and no of tabs in a given text file.
13.b) Write a C program which copies one text file to another text file and verify the correctness.
13.c) Write a C program which copies one binary file to another binary file and verify the correctness.

WEEk-14

14.a) Write a C program to produce reverse of the content of a text fie into another text file and verify the result.

14.b) Write a C program to merge two text files into a third text file (i.e., the contents of the first file followed by those of the second are put in the third file) and verify the correctness.

WEEK-15

15.a) Write a command-line C program to reverse the first n characters in a file.
(Note: The file name and n are specified on the command line.)

15.b) Write a C Program that removes all comment lines from a C source file.

Course Outcomes:

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

- Understand how problems are posed and how they can be analyzed for obtaining solutions..
- Understand basic structure of the C programming, declaration and usage of variables.
- Write C programs using operators. Implement different operations on arrays and creating and using of functions to solve problems.
- Learn the sequencing, branching, looping and implement different types of file structures and decision making statements to solve scientific and engineering problems.

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

(B18MC01) Induction Programme
(Common to all Branches)

B. Tech. I Semester

When new students enter an institution, they come with diverse backgrounds, thoughts and preparations. It is very important to help them adjust to the new environment. The following are the activities of induction program in which the students would be fully engaged throughout the day for entire duration of the program.

1. **Physical Activity:** This would involve a daily routine of physical activity with games and sports. Each student should pick one game and learn it for three weeks. This would also involve gardening or other suitably designed activity.

2. **Creative Arts:** Every student would select one skill related to arts whether visual arts or performing arts. The student would practice it every day for the duration of the induction program.

3. **Universal Human Values:** This will help the students to experience the joy of learning, stand up to peer pressure, take decisions with courage, be aware of relationships with inmates, etc.

4. **Proficiency Modules:** During the induction program crash courses have to be conducted to improve English skills.

5. **Lectures by Eminent people:** This period can be utilized for lectures by eminent personalities. It would give the students exposure to people who are in public life and are socially active.

6. **Literary:** Literary activity would encompass reading, writing and debating, enacting a play, etc.

7. **Familiarization to Dept./Branch & Innovations:** The students are explained about different methods of study. They are further explained about the different aspects of their branches, departments and the role they play in the society. The different laboratories, workshops & other facilities available in the departments are introduced to the students. Notwithstanding the above activities of the induction program, any other relevant activity may be planned to enthuse, encourage and benefit the students.

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

(B18MA02) DIFFERENTIAL EQUATIONS & VECTOR CALCULUS
(Common to all Branches)

B.Tech: II Semester **L T P C**
3 1 0 4

Pre-requisites: Mathematical Knowledge of 12^{th} / Intermediate level

Objectives: To learn
- Methods of solving the differential equations of first and higher order.
- Evaluation of multiple integrals and their applications
- The physical quantities involved in engineering field related to vector valued functions
- The basic properties of vector valued functions and their applications to line, surface and volume integrals

UNIT-I: First Order ODE
Exact, linear and Bernoulli's equations; Applications: Newton's law of cooling, Law of natural growth and decay; Equations not of first degree: equations solvable for p, equations solvable for y, equations solvable for x and Clairaut's type.

UNIT-II: Ordinary Differential Equations of Higher Order
Second order linear differential equations with constant coefficients: Non-Homogeneous terms of the type e^{ax}, sin ax, cos ax, polynomials in x, $e^{ax}V(x)$; method of variation of parameters; Equations reducible to linear ODE with constant coefficients: Legendre's equation, Cauchy-Euler equation.

UNIT-III: Multivariable Calculus (Integration)
Evaluation of Double Integrals (Cartesian and polar coordinates); change of order of integration (only Cartesian form); Evaluation of Triple Integrals: Change of variables (Cartesian to polar) for double and (Cartesian to Spherical and Cylindrical polar coordinates) for triple integrals. Applications: Areas (by double integrals) and volumes (by double integrals and triple integrals), Centre of mass and Gravity (constant and variable densities) by double and triple integrals (applications involving cubes, sphere and rectangular parallel piped).

UNIT-IV: Vector Differentiation
Vector point functions and scalar point functions. Gradient, Divergence and Curl. Directional derivatives, Tangent plane and normal line. Vector Identities. Scalar potential functions. Solenoidal and Irrotational vectors.

UNIT-V: Vector Integration
Line, Surface and Volume Integrals. Theorems of Green, Gauss and Stokes (without proofs) and their applications.

Course outcomes:
After learning the contents of this paper the student must be able to
- Identify whether the given differential equation of first order is exact or not
- Solve higher order differential equation and apply the concept of differential equation to real world problems
- Evaluate the multiple integrals and apply the concept to find areas, volumes, centre of mass and Gravity for cubes, sphere and rectangular parallelopiped
- Utilize the concept of gradient divergence and curl of a vector field to predict area and volumes.
- Evaluate the line, surface and volume integrals and converting them from one to another.

Text Books

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Editions, 2010
2. Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006

References

1. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002
2. Paras Ram, Engineering Mathematics, 2nd Edition, CBS Publishers
3. S.L. Ross, Differential Equations, 3rd Ed., Wiley India, 1984.

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

(B18CH01) ENGINEERING CHEMISTRY
(Common to ECE & CSE)

B.Tech : II Semester **L T P C**
3 1 0 4

Pre-requisites:

Course Objectives:-
- To bring adaptability to the concepts of chemistry and to acquire the required skills to become a perfect engineer.
- To impart the basic knowledge of molecular and electronic modifications which makes the student to understand the technology based on them.
- To acquire the knowledge of electrochemistry, different batteries, solar cells, corrosion and water treatment which are essential for the Engineers and in industry.
- To acquire the skills and knowledge to organic reactions and importance of polymers in engineering and everyday life.

UNIT-I: Molecular structure (8 Lectures)
Metallic bonding, valence bond theory, crystal field theory and the energy level diagrams of transition metal ions (splitting of d-orbitals in octahedral and tetrahedral geometry) and their magnetic properties. Atomic and molecular orbitals. LCAO, molecular orbital theory of diatomic molecules. N_2 & O_2.

UNIT-II: Organic reactions and Polymers (8 Lectures)
Organic Chemistry: Introduction to types of organic reactions involving substitution, addition, elimination, oxidation by $KMnO_4$, OsO_4, reduction by $LiAlH_4$, $NaBH_4$
Polymers: Introduction to polymers, classification of polymers, mechanism of free radical addition polymerization, properties of polymers-crystallinity, melting point, boiling point and glass transition temperature. Conducting polymers-classification, mechanism of conduction in conducting polymers-poly acetylene and ploy aniline, applications.

UNIT-III: Electrochemistry (12 Lectures)
Introduction to electrochemistry, conductance-specific, equivalent and molar conductance, units and their relation. Numerical Problems. Applications of conductance – conductometric titrations.
Electrochemical and Electrolytic cells, Galvanic cell, Electro chemical series-applications, measurement of e.m.f. and single electrode potential, Nernst's equation and its applications, Types of electrodes: Reference electrodes (SHE, SCE and QH), Ion-selective electrode-glass electrode, applications of electrode potentials-determination of pH and potentiometric titrations. Batteries: primary cells-lithium cells. Secondary cells – Pb-acid storage cell, lithium-ion cells. Fuels cells-hydrogen-oxygen fuel cell. Methanol-oxygen fuel cell-advantages nd applications.

UNIT-IV: Water Technology & Corrosion (10 Lectures)
Introduction, types of hardness, units and Numerical problems. Estimation of hardness of water-EDTA method. Boiler troubles-scales and sludges. Treatment of Boiler feed water-Ion-exchange process. De-salination of brackish water-Reverse Osmosis. Domestic water treatment-specifications and steps involved in the treatment of potable water.
Corrosion: Introduction, causes of corrosioin, types of corrosion-dry and wet corrosion-mechanism of electrochemical corrosion. Caustic embrittlement and boiler corrosion. Factors affecting corrosion and corrosion control methods-proper designing, cathodic protection(sacrificial anodic protection and impressive current cathodic protection) and surface coatings (anodic and cathodic), Methods of application of metal coatings-Hot dipping(galvanization and tinning) and electroplating of copper.

UNIT-V: Phase rule and Surface chemistry (10 Lectures)
Phase rule: Definition of terms, phase rule equation, phase diagrams: one component system – water system, two component system- Ag-Pb system, Iron-carbon phase diagram-cooling curves, annealing and case hardening.

Surface Chemistry: Adsorption-types of adsorption, adsorption isotherms- Freundlich adsorption isotherm and Langmuir adsorption isotherm, applications of adsorption.

Course Outcomes: The basic concepts included in this course will help the student to gain:

- Recall previous knowledge regarding atomic and molecular structure.
- Design polymeric engineering materials. Recall basic organic reactions
- Construct batteries and classify different electronics and electrical like cells , electrodes, e.t.c…help them to construct different electrical/ electronic parts.
- Examine which type of impurities is present in water, specification of drinking water and explain the corrosion behavior/ activity of metals.
- Apply phase rule and adsorption to construct the materials by analyzing their compositions.

Suggested Reading:

1. Text book of Engineering Chemistry by Jain & Jain.
2. Text book of Engineering Chemistry, CENGAGE learning by Prasanta Rath, B. Ramadevi, Ch. Venkata Ramana Reddy & Subhendu Chakroborty.
3. University chemistry, by B. H. Mahan
4. Engineering Chemistry by Shashi Chawla

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

(B18ME01) ENGINEERING GRAPHICS
(Common to ECE & EEE)

B.Tech: II Semester **L T P C**
1 0 4 3

Pre-requisites:

COURSE OBJECTIVES:

1. Use various engineering drawing instruments.
2. Learn the basic convention of drawings, dimensioning, scales and conic sections like ellipse, parabola and parabola.
3. Learn projection of points, lines viewed in different positions.
4. Learn projections of plane surfaces and solids viewed in different positions.
5. Gain knowledge of sections of solids and their usage in real time applications.

Unit – I Introduction to Engineering Drawing:
Principles of Engineering Graphics and their significance, ISO and ANSI standards for coordinate dimensioning- usage of Drawing instruments, lettering

a. Conic sections including the Rectangular Hyperbola (General method only);
b. Roulettes-Cycloid, Epicycloid, Hypocycloid
c. Involute
d. Scales – Plain, Diagonal and Vernier Scales.

Unit –II Principles of Orthographic Projections in First Angle Projection- Conventions
Projections of Points
Projection of lines: Parallel, Perpendicular inclined to one plane and inclined to both the planes.

Unit-III
Projection of planes: Plane parallel, perpendicular and inclined to one reference plane. Planes inclined to both the reference planes – Auxiliary Planes;
Projection of Regular Solids-Projection of regular solids, Cube, prisms, pyramids, tetrahedron, cylinder, Cylinder and cone, axis inclined to one plane and both planes – Auxiliary Views Projections of Regular Solids.

Unit-IV
Sections and sectional views of right angular solid-Prism, Cylinder, Pyramid, Cone – Auxiliary Views; **Development of surfaces** of Right Regular Solids – Prism, Pyramid, Cylinder and Cone.

Unit-V Isometric Projections:
Chapter-I Principles of Isometric projection – Isometric Scale, Isometric Views, Conventions; Isometric Views of lines, Planes, Simple and compound Solids; Conversion of Isometric views to Orthographic views and Vice-versa, Conventions.

Chapter-II Overview of Computer Graphics: listing the computer technologies that impact on graphical communication, Demonstrating knowledge of the theory of CAD software -The Menu System, Toolbars Standard, Object Properties, Draw, Modify and Dimension.

Text Books

1. Agrawal B & Agrawal C.M. (2012), Engineering Graphics, TMH Publications.
2. Bhatt N.D., Panchal V.M. & Ingke P.R., (2014), Engineering Drawing, Charotar Publishing House.

References

1. Narayana, K.L. & P Kannaiah (2008), Text book on Engineering Drawing, Scitech Publishers.
2. (Corresponding set of) CAD Software Theory and User Manuals.
3. Engineering Graphics. P I Varghese Tata McGraw Hill Education Pvt. Ltd.
4. Engineering Drawing – P.J.Shan S.Chand Publishers.
5. Engineering Drawing – Johle/Tata McGraw Hill Book Publishers.

COURSE OUTCOMES:

The students will be able to

- Learn the development of surfaces.
- Understand the projections of solids
- Understand the isometric projections.
- Understand the orthographic projections.
- Make the use of drawings, dimensioning, scales and conic sections.
- Know the applications of this knowledge in production of machine parts.

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

(B18EE04) ELECTRICAL CIRCUITS

B.Tech : II Semester **L T P C**
3 0 0 3

Pre-requisites: None

Course Objectives:

- Designs of this subject to students to have a firm grasp the basics of electrical circuits.
- Emphasis on the basic theorems & network reduction techniques of analysis which helps to develop the ability to design practical circuits used for real time applications.
- A comprehensive coverage topic on single-phase & three-phase AC circuits provides a quick understanding of the concepts underlying the electrical machines analysis.
- Understanding the behavior of networks containing R, L, & C elements, when they suddenly switched on to a source in several practical conditions.
- Detail average of topics relative to filters & attenuators emphasis the students to have best knowledge in electronics circuits.
- Study of 2-port networks in detail, helps the students to analyze the problems in electronic circuits & singles.

UNIT-I:

Introduction to Electrical Circuits: **:** Basic definitions, types of elements, types of sources, circuit components, ohm's law, Kirchhoff's laws, inductive networks, capacitive networks, and Network reduction techniques- series, parallel resistive networks and star to delta and delta to star transformation, Source transformation Mesh and Nodal analysis and Simple problems.

Network theorems: Superposition, Reciprocity, Thevenins's, Norton's, Maximum power transfer theorems and simple problems.

UNIT-II:

Alternating Quantities: Principle of ac voltage waveforms and basic definition, root mean square and average value of alternating current and voltage, form factor and peak factor, Concept of reactance, Impedance, susceptance and admittance, Phase and phase difference phasor algebra of ac circuits, j-operator, singe phase series and parallel circuits, power in ac circuits, series and parallel Resonance, concept of Band width and Q-factor and illustrative Problems.

Three Phase AC Circuits: Production of 3 - Voltages, Voltageϕ& Current relationships of Line and Phase values for Star and Delta connections and illustrative Problems.

UNIT III:

Two-port networks: Z, Y, ABCD, h and g parameters, Conversion from one parameter to other parameters & their relations, Series, Parallel and Cascaded Networks ,Characteristic impedance, Image Parameters and illustrative Problems.

UNIT-IV:

Steady state and transient analysis: Steady state and transient analysis of series RL, RC & RLC Circuits and parallel RL, RC & RLC Circuits for DC and AC excitation and illustrative Problems.

UNIT-V

Filters: Classification of Filters, Filter Networks, 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: Symmetrical Attenuators: T-Type Attenuator, Π (pi) Type Attenuator, Bridged T type Attenuator, Lattice Attenuator and illustrative Problems

TEXT BOOKS:

1. Engineering Circuit Analysis by Willian Hayt and Jack E.Kemmerlly McGraw Hill Company.
2. Circuits & Networks by A.Sudhakar and Shyammohan S .Palli, Tata Mc.Graw Hill
3. Electric circuits by A. Chakrabarthy, Dhanipat Rai &Sons.

REFERENCES:

1. Network analysis by ME Van Valkenberg.
2. Engineering circuits analysis by C.L.Wadhwa, New Age International.
3. Electrical circuits by David A.Bell, Oxford University Press
4. Electric circuits theory by K.Rajeswaran, Pearson Education 2004.
5. Electrical Circuit Analysis by Roy Chowdhary

Course Outcomes: After the course completion, the students are able to:

- Learn basics of electrical circuits such as laws, transformation and network theorems and network reduction techniques.
- Generate voltage and current waveforms for 3phase AC circuits and study the relationship between voltage and current in star and delta connections
- Analyze two port networks with ABCD parameters.
- Analyze the steady state and transient operation of series and parallel RLC circuits
- Classify various types for filters and attenuators and study their characteristics.

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

(B18EC01) ELECTRONIC DEVICES AND CIRCUITS
(Common to ECE & EEE)

B.Tech: II Semester **L T P C**
3 0 0 3

Pre-requisites:

Objectives:
This is a fundamental course, basic knowledge of which is required by all the circuit branch engineers. This course focuses:

- To familiarize the student with the principle of operation, analysis and design of Junction diode, BJT and FET transistors and amplifier circuits.
- To understand diode as rectifier.
- To study principle of filter circuits and various types.

UNIT - I:
P-N Junction Diode: Qualitative Theory of P-N Junction, P-N Junction as a Diode, Diode Equation, Volt-Ampere Characteristics, Temperature dependence of VI characteristic, Ideal versus Practical – Resistance levels (Static and Dynamic), Transition and Diffusion Capacitances, varactor diode, Diode Equivalent Circuits, Load Line Analysis, Breakdown Mechanisms in Semiconductor Diodes, Zener Diode Characteristics.

UNIT-II:
Rectifiers and Filters : The P-N junction as a Rectifier, Half wave Rectifier, Full wave Rectifier, Bridge Rectifier, Harmonic components in a Rectifier Circuit, Inductor Filters, Capacitor Filters, L- Section Filters, π- Section Filters, Comparision of Filters, Voltage Regulation using Zener Diode.

UNIT-III:
Bipolar Junction Transistor and UJT: The Junction Transistor, Transistor Construction, BJT Operation, Transistor Current Components, BJT Symbol, Common Base, Common Emitter and Common Collector Configurations, Limits of Operation , BJT Specifications, Transistor as an Amplifier, BJT Hybrid Model, Comparison of CB, CE, and CC Amplifier Configurations.

UNIT-IV:
Transistor Biasing and Stabilization: Operating Point, The DC and AC Load lines, Need for Biasing, Bias Stability, Stabilization Factors, Stabilization against variations in V_{BE} and β, Fixed Bias, Collector Feedback Bias, Emitter Feedback Bias, Voltage Divider Bias, Bias Compensation using Diodes and Transistors, Thermal Runaway, Thermal Stability, Analysis of a Transistor Amplifier Circuit using h- Parameters.

UNIT-V:
Field Effect Transistor and FET Amplifiers
Field Effect Transistor: The Junction Field Effect Transistor (Construction, principle of operation, symbol) – Pinch-off Voltage - Volt-Ampere characteristics, The JFET Small Signal Model, MOSFET (Construction, principle of operation, symbol), MOSFET Characteristics in Enhancement and Depletion modes.

TEXT BOOKS:
1. Millman's Electronic Devices and Circuits – J. Millman, C.C. Halkias, and Satyabrata Jit, 2 Ed.,1998, TMH.
2. Electronic Devices and Circuits – Mohammad Rashid, Cengage Learing, 2013
3. Electronic Devices and Circuits – David A. Bell, 5 Ed, Oxford University Press.

REFERENCE BOOKS:

1. Integrated Electronics – J. Millman and Christos C. Halkias, 1991 Ed., 2008, TMH.
2. Electronic Devices and Circuits – R.L. Boylestad and Louis Nashelsky, 9 Ed., 2006, PEI/PHI.
3. Electronic Devices and Circuits - K. Lal Kishore, 2 Ed., 2005, BSP.
4. Electronic Devices and Circuits – S.Salivahanan, N.Suresh Kumar, A.Vallavaraj, 2 Ed., 2008, TMH.

Course Outcomes:

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

- Explain the semiconductor theory and characteristics of the PN junction diode and Zener diode.
- Compare and contrast the rectifiers with and without filters.
- Understand the construction and voltage- current characteristics of Junction Transistor and illustrate the different configurations of transistor
- Design and analyze the different biasing circuits and amplifier circuits.
- Acquire knowledge about the construction, theory and characteristics of FET and MOSFET.

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

(B18EC02) ELECTRONIC DEVICES AND CIRCUITS LAB
(Common to ECE & EEE)

B.Tech I Year II Semester

L	T	P	C
0	0	2	1

Course objectives

- This course intends to provide an overview of the principles and operation of electronic components.
- To understand the operation of power supply circuits, rectifiers and voltage regulators.
- To understand the characteristics of the active devices.
- To Understand the construction of simple electronic circuits.

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) Bread Boards, PCB's
2. Identification, Specifications and Testing of Active Devices, Diodes, BJT's, Low power JFET's, Power Transistors, LED's, LCD's, SCR, UJT.
3. Study and operation of
   i) Multimeters (Analog and Digital)
   ii) Function Generator
   iii) Regulated Power Supplies
   iv) CRO.

PART B: (For Laboratory Examination – Minimum of 10 experiments)

1. Forward & Reverse Bias Characteristics of PN Junction Diode
2. Zener diode characteristics & Zener 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.
6. Input & Output Characteristics of Transistor in CE Configuration and h-parameter calculations.
7. FET characteristics.
8. UJT characteristics.
9. Design of self bias circuit
10. Comparison of performance of self bias and fixed bias circuits.
11. Frequency response of CE amplifier
12. Frequency response of common source FET amplifier.

PART C: Equipment required for Laboratories:

1. Regulated Power supplies (RPS) -0-30 V
2. CRO's
3. Function Generators -0-1 MHz.
4. Multimeters
5. Ammeters (Analog or Digital)
6. Voltmeters (Analog or Digital)
7. Electronic Components -Resistors, Capacitors, BJTs,

Course Outcomes.

After completion of this course Student able

- Identify and find the values of resistors, capacitors and inductors.
- Measure voltage, frequency and phase of any waveform using CRO
- Demonstrate the characteristics and operation of electronic devices.
- Demonstrate various amplifier circuits.

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

(B18EN02) ENGLISH LANGUAGE AND COMMUNICATION SKILLS LAB

B.Tech: II Semester **L T P C**
0 0 2 1

The **Language Lab** focuses on the production and practice of sounds of language to familiarize the students with the use of English in everyday situations both in formal and informal contexts. **Course Objectives:**

- To facilitate computer-assisted multi-media instruction enabling individualized and independent language learning
- To sensitize students to the nuances of English speech sounds, stress and intonation.
- To bring about a consistent accent and intelligibility in students' pronunciation of English by providing an opportunity for practice in speaking
- To improve the fluency of students in spoken English and neutralize the influence of the sounds of their mother tongue
- To train students to use language appropriately for public speaking and interviews

Learning Outcomes:
Students will be able to attain -

- Capable in Better Understanding of nuances of language through audio-visual experience and group activities.
- Able to develop Neutralization of accent for intelligibility.
- Capable to Speak out with clarity and confidence thereby enhances the employability skills of the students by acquiring knowledge and techniques.
- Extends to speak fluent English, through advanced vocabulary to improve quality in speaking.

Syllabus

English Language and Communication Skills Lab (ELCS) shall have two parts:

a. Computer Assisted Language Learning (CALL) Lab
b. Interactive Communication Skills (ICS) Lab
Listening Skills
Objectives
1. To enable the students develop their listening skills so that they may appreciate its role in developing LSRW skills language and improve their pronunciation
2. To impart the students with necessary training in listening so that they can understand the speech of people of different backgrounds and regions

Students should be given practice in listening to the sounds of the language, to be able to recognize them and find the distinction between different sounds, to be able to mark stress and recognize and use the right intonation in sentences.
• Listening for general content • Listening to fill in information • Intensive listening • Listening for specific information

Speaking Skills
Objectives
1. To involve the students in speaking activities in various contexts
2. To enable the students express themselves fluently and appropriately in social and professional contexts
• Oral practice: Just A Minute (JAM) Sessions • Describing objects/situations/people • Role play – Individual/Group activities

➢ **The following course content is prescribed for the English Language and Communication Skills Lab based on Unit-6 of AICTE Model Curriculum 2018 for B. Tech First English.**

Exercise-I
CALL Lab: *Understand:* Listening Skill- Its importance – Purpose- Process- Types- Barriers. *Practice*: Introduction to Phonetics – Speech Sounds – Vowels and Consonantal Phonemes.

ICS Lab: *Understand:* Communication at Work Place- Spoken vs. Written language. *Practice:* Ice-Breaking Activity and JAM Session- Situational Dialogues – Greetings – Taking Leave – Introducing Oneself and Others.

Exercise-II
CALL Lab: *Understand:* Structure of Syllables – Word Stress and Rhythm– Weak Forms and Strong Forms in Context. *Practice:* Basic Rules of Word Accent - Stress Shift - Weak Forms and Strong Forms in Context.

ICS Lab: *Understand:* Features of Good Conversation – Non-verbal Communication. *Practice:* Situational Dialogues – Role-Play- Expressions in Various Situations –Making Requests and Seeking Permissions - Telephone Etiquette.

Exercise-III
CALL Lab: *Understand:* Intonation-Errors in Pronunciation-the Influence of Mother Tongue (MTI).
Practice: Common Indian Variants in Pronunciation – Differences in British and American Pronunciation.

ICS Lab: *Understand:* How to make Formal Presentations. *Practice:* Formal Presentations.

Exercise-IV
CALL Lab: *Understand:* Listening for General Details. *Practice:* Listening Comprehension Tests.

ICS Lab: *Understand:* Public Speaking – Exposure to Structured Talks. *Practice:* Making a Short Speech – Extempore.

Exercise-V
CALL Lab: *Understand:* Listening for Specific Details. *Practice:* Listening Comprehension Tests.

ICS Lab: *Understand:Debate/Group Discussion/* Interview Skills. *Practice:Mock Group Discussion/* Mock Interviews.

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

(B18MC02) ENVIRONMENTAL SCIENCE

B.Tech: II Semester **L T P C**
0 0 2 0

Course Objectives:-

- Understanding the importance of ecological balance for sustainable development.
- Understanding the impacts of developmental activities and mitigation measures.
- Understanding the environmental policies and regulations

UNIT-I: Ecosystems: Definition, Scope, and Importance of ecosystem. Classification, structure, and function of an ecosystem, Food chains, food webs, and ecological pyramids. Flow of energy, Biogeochemical cycles, Bioaccumulation, Biomagnification, ecosystem value, services and carrying capacity, Field visits.

UNIT-II: Natural Resources: Classification of Resources: Living and Non-Living resources, **water resources:** use and over utilization of surface and ground water, floods and droughts, Dams: benefits and problems. **Mineral resources:** use and exploitation, environmental effects of extracting and using mineral resources, **Land resources:** Forest resources, **Energy resources:** growing energy needs, renewable and non renewable energy sources, use of alternate energy source, case studies.

UNIT-III: Biodiversity And Biotic Resources: Introduction, Definition, genetic, species and ecosystem diversity. Value of biodiversity; consumptive use, productive use, social, ethical, aesthetic and optional values. India as a mega diversity nation, Hot spots of biodiversity. Field visit. Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts; conservation of biodiversity: In-Situ and Ex-situ conservation. National Biodiversity act.

UNIT-IV: Environmental Pollution and Control Technologies: Environmental Pollution: Classification of pollution, **Air Pollution:** Primary and secondary pollutants, Automobile and Industrial pollution, Ambient air quality standards. **Water pollution:** Sources and types of pollution, drinking water. **Soil Pollution:** Sources and types, Impacts of modern agriculture, degradation of soil. **Noise Pollution:** Sources and Health hazards, standards, **Solid waste:** Municipal Solid Waste management, composition and characteristics of e-Waste and its management. **Pollution control technologies:** Wastewater Treatment methods: Primary, secondary and Tertiary. Overview of air pollution control technologies, Concepts of bioremediation. **Global Environmental Issues and Global Efforts:** Climate change and impacts on human environment. Ozone depletion and Ozone depleting substances (ODS). Deforestation and desertification. International conventions / Protocols: Earth summit, Kyoto protocol, and Montreal Protocol. NAPCC-Gol Initiatives.

UNIT-V: Environmental Policy, Legislation & EIA: Environmental Protection act, Legal aspects Air Act-1981, Water Act, Forest Act, Wild life Act, Municipal solid waste management and handling rules, biomedical waste management and handling rules, hazardous waste management and handling rules. DIA: EIA structure, methods of baseline data acquisition. Overview on Impacts of air, water, biological and Socio-economical aspects. Strategies for risk assessment, Concepts of Environmental Management Plan (EMP). **Towards Sustainable Future:** Concept of Sustainable Development Goals, Population and its explosion, Crazy Consumerism, Environmental Education, Urban Sprawl, Human health, Environmental Ethics, Concept of Green Building, Ecological Foot Print, Life Cycle assessment (LCA), Low carbon life style.

Course Outcomes:

- Recall previously learned ecosystem and find how the biodiversity changes went in the environment.
- Demonstrate outlines of types of pollutions and explain in related to day to day life.
- Apply models of food chains and energy flow models to solve the identified parameters.
- Classify the types of pollutants and distinguish the functions of sustainable development that take part in the environment.
- Design the experiments with BOD,COD, OD and estimate the micro organisms which cause contamination and can propose solutions.

TEXT BOOKS:

1. Textbook of Environmental Studies for Undergraduate Courses by Erach Bharucha for University Grants Commission.
2. Environmental Studies by R. Rajagopalan, Oxford University Press.

REFERENCE BOOKS:

1. Environmental Science: towards a sustainable future by Richard T. Wright. 2008 PHL Learning Private Ltd. New Delhi.
2. Environmental Engineering and science by Gilbert M. Masters and Wendell P.Ela. 2008 PHI Learning Pvt. Ltd.
3. Environmental Science by Daniel B. Botkin & Edward A. Keller, Wiley INDIA edition.
4. Environmental Studies by Anubha Kaushik, 4th Edition, New age international publishers.
5. Text book of Environmental Science and Technology – Dr. M. Anji Reddy 2007, BS Publications.
6. Introduction to Environmental Science by Y. Anjaneyulu, BS. Publications.

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VAAGDEVI COLLEGE OF ENGINEERING
AUTONOMOUS

(B18MA03) NUMERICAL METHODS & COMPLEX VARIABLES

B.Tech ECE: III Semester **L T P C**
3 1 0 4

Pre-requisites: Mathematical Knowledge at pre-university level

Course Objectives:
To learn
- The importance of numerical methods identifying the root of an equation geometrically and finding its approximate value by different techniques.
- Solving initial value problems using numerical methods.
- Differentiation and integration of complex valued functions.
- Expansion of complex functions using Taylor's and Laurent's series.
- Evaluation of integrals using Cauchy's residue theorem.

Unit – I: Solutions of algebraic and transcendental equations: Introduction, Numerical solution of algebraic and transcendental equations by Bisection Method, Regula-Falsi method, Newton-Raphson's method.

Unit – II: Numerical Integration & solutions of ordinary Differential Equations: Numerical Integration with Trapezoidal rule, Simpson's 1/3rd rule, Simpson's (3/8) rule Solutions of first order ordinary differential equations by Taylor's series, Euler's Method, Euler's -Modified Method, Runge-kutta methods.

UNIT-III: Functions of a Complex Variables: Introduction Limit, Continuity and Differentiability, analyticity, properties. Cauchy-Riemann equations in Cartesian & polar coordinates (without proof), Harmonic and conjugate harmonic functions, Milne-Thompson method.

UNIT-IV: Complex Integration: Line Integral, Cauchy's Integral theorem (without proof), Cauchy's Integral formulae (without proof)
Power series: Taylors Series (without proof) Laurent's series (without proof) singular points, isolated single point, Pole of order m, essential singularity.

U**NIT-V: Residue & Evaluation of Integrals :** Residues, Cauchy's residue theorem (without proof)
Evaluation of Real Integrals: (a) $\int_0^{2\pi} f(\sin\theta,\cos\theta)d\theta$, (b) $\int_{-\infty}^{\infty} f(x)dx$ Bilinear Transformation-fixed points, cross ratio properties, invariance of circles.

Text Books
1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010.
2. S.S. Sastry, Introductory methods of numerical analysis, PHI, 4th Edition, 2005.
3. J. W. Brown and R. V. Churchill, Complex Variables and Applications, 7th Ed., Mc-Graw Hill, 2004

Reference Books:
1. M. K. Jain, SRK Iyengar, R.K. Jain, Numerical methods for Scientific and Engineering Computations , New Age International publishers.
2. Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons,2006.
3. Fundamentals of Complex Analysis by Saff E.B and A.D snider Pearson.
4. Advanced Engineering Mathematics by Louis C.Barrett, Mc. Graw Hill.

Course outcomes:

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

- Find a better approximate root of a given equation.
- Estimate the derivative at a given value and integral of function.
- Analyze the complex function with reference to their analyticity, integration using Cauchy's integral and residue theorems
- Taylor's and Laurent's series expansions of complex function
- Evaluate bilinear transformation.

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VAAGDEVI COLLEGE OF ENGINEERING
AUTONOMOUS

(B18EC03) SIGNALS AND SYSTEMS

B.Tech ECE: III Semester **L T P C**
3 1 0 4

Pre Requisites: None

Course Objective:
This is a core subject, basic knowledge of which is required by all the engineers. This course focuses on:
- To get an in-depth knowledge about signals, systems and analysis of the same using various transforms.

UNIT-I:
Signal Analysis and Fourier Series
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, Exponential and Sinusoidal signals, Concepts of Impulse function, Unit Step function, Signum function.
Fourier Series: Representation of Fourier series, Continuous time periodic signals, Properties of Fourier Series, Dirichlet's conditions, Trigonometric Fourier Series and Exponential Fourier Series, Complex Fourier spectrum.

UNIT-II:
Fourier Transforms
Fourier Transforms: Deriving Fourier Transform from Fourier Series, Fourier Transform of arbitrary signal, Fourier Transform of standard signals, Fourier Transform of Periodic Signals, Properties of Fourier Transform, Fourier Transforms involving commonly used functions Introduction to Hilbert Transform.

UNIT- III:
Laplace Transforms
Laplace Transforms: Review of Laplace Transforms (L.T), Concept of Region of Convergence (ROC) for Laplace Transforms, Partial fraction expansion, Inverse Laplace Transform, Constraints on ROC for various classes of signals, Properties of L.T, Relation between L.T and F.T of a signal, Solution Of Differential Equation Using Laplace Transform, Circuit Analysis Using Laplace Transform

UNIT-IV:
Signal Transmission Through Linear Systems: Classification of Systems, Impulse response, Response of a Linear System, Linear Time Variant (LTV) System, Transfer function of a LTI system, Filter characteristics of Linear Systems, Ideal LPF, HPF and BPF characteristics, Distortion less transmission through a system, Signal bandwidth, System bandwidth, Causality and Paley-Wiener criterion for physical realization, Relationship between Bandwidth and Rise time.

UNIT-V:
Convolution and Correlation of Signals: Concept of convolution in Time domain and Frequency domain, Graphical representation of Convolution, Convolution property of Fourier Transforms, Cross Correlation and Auto Correlation of functions, Properties of Correlation function, Energy density spectrum, Parseval's Theorem, Power density spectrum, Relation between Auto Correlation function and Energy/Power spectral density function, Relation between Convolution and Correlation, Detection of periodic signals in the presence of Noise by Correlation, Extraction of signal from noise by filtering.

Text Books:
1. Signals, Systems & Communications - B.P. Lathi, 2013, BSP.
2. Signals and Systems - A.V. Oppenheim, A.S. Willsky and S.H. Nawab, 2 Ed., PHI.

Reference Books:

1. Signals & Systems - Simon Haykin and Van Veen,Wiley, 2 Ed.
2. Signals and Systems – Iyer and K. Satya Prasad, Cengage Learning
3. Signals and Systems – A.Rama Krishna Rao – 2008, TMH.
4. Introduction to Signal and System Analysis – K.Gopalan 2009, Cengage Learning.
5. Fundamentals of Signals and Systems - Michel J. Robert, 2008, MGH International Edition.
6. Signals, Systems and Transforms - C. L. Philips, J.M.Parr and Eve A.Riskin, 3 Ed., 2004, PE.

Course Outcomes:

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

- Apply the knowledge of vectors, orthogonal basis to signals. Analyze the spectral characteristics of continuous-time periodic signals using Fourier series.
- Demonstrate and apply Fourier transform on various signals.
- Apply the Laplace transform and Fourier transform for the analysis of continuous-time signals.
- Analyze systems based on their properties and determine the response of LTI system.
- Understand the concepts of convolution and correlation of signals.

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VAAGDEVI COLLEGE OF ENGINEERING
AUTONOMOUS

(B18EC04) ELECTRONIC CIRCUITS ANALYSIS

B.Tech ECE: III Semester **L T P C**
3 1 0 4

Pre Requisites: (B18EC01)Electronic Devices and Circuits

Course Objective:
To familiarize the student with the analysis and design of basic transistor amplifier circuits and their frequency response characteristics, feedback amplifiers, oscillators, power amplifiers and tuned amplifiers.

UNIT- I
Transistor Low Frequency Analysis: Two port devices and hybrid model – transistor hybrid model and h parameters - determination of h-parameters from the characteristics – Analysis of transistor amplifier using h-parameters, emitter follower -comparison of transistor amplifier configurations, CE amplifier with an emitter resistance; miller's theorem, design of single stage RC coupled amplifier using BJT. Effect of coupling and bypass capacitors. Low frequency FET model –Common source and Common drain amplifiers.

UNIT- II
Transistor High Frequency Analysis: Hybrid pi CE transistor model – Hybrid pi conductances and capacitances - CE short circuit current gain and current gain with resistance- CE transistor amplifier response. Gain - Bandwidth Product, Emitter follower at high Frequencies. High frequency FET model Common source and common drain amplifiers at high frequencies.
Multi Stage Amplifiers: Different Coupling Schemes used in Amplifiers - RC Coupled Amplifier, Transformed Coupled Amplifier, Direct Coupled Amplifier, Analysis of Cascaded RC Coupled BJT amplifiers, Cascode Amplifier, Darlington Pair.

UNIT- III
Feed Back Amplifiers: Concept 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, Illustrative Problems.
Oscillator: Classification of Oscillator, Conditions for Oscillations, Generalized analysis of LC oscillations - Hartley and colpitts Oscillators, RC phase shift Oscillator, Wien - Bridge & Crystal Oscillators, Stability of Oscillators.

UNIT IV:
Power Amplifiers: Classification, Class A Large Signal Amplifiers, Transformed Coupled Class A Audio Power Amplifier, Efficiency of Class A Amplifier, Class B Amplifier, Efficiency of Class B Amplifier, Class - B Push - Pull Amplifier, Complementary Symmetry Class B Push - Pull Amplifier, Distortion in Power Amplifier, Thermal Stability and Heat Sinks.

UNIT V:
Tuned Amplifiers: Introduction, Q - Factor, Small Signal Tuned Amplifier, Effect of Cascading Single Tuned Amplifiers on Bandwidth, Effect of Casading Double Tuned Amplifiers on Bandwidth, Stagger Tuned Amplifiers, Stability of Tuned Amplifiers.

Text Books :
1. Integrated Electronics – J. Millman and C. C. Halkias, 1991 Ed., 2008, TMH.
2. Electronic Devices and Circuits, B. P. Singh, Rekha Singh, Pearson, 2013.
3. Design of Analog CMOS integrated Circuits - Behzad Razavi, 2008, TMH.

References Books:

1. Electronic Devices and Circuits – Rashid Cengage Learning, 2013
2. Electronic Devices and Circuits Theory – Robert L. Boylestad and Louis Nashelsky, 9 Ed., 2008 PE.
3. Micro Electronic Circuits – Sedra A.S. and K.C. Smith, Oxford University Press.
4. Electronic Circuit Analysis – K. Lal Kishore, BS Publications, 2004
5. Electronic Devices and Circuits - S. Salivahan, N.Suresh Kumar, A Vallavaraj, 2 Ed., 2009, TMH.

Course Outcomes:

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

- Construct and analyze the Low frequency model of transistor and evaluate the h-parameters.
- Analyze the single and multi stage amplifiers in high frequency region.
- Design and construct the negative feedback amplifiers and oscillators according to the required specifications.
- Determine the efficiencies of large signal amplifiers.
- Compare and contrast various tuned amplifiers.

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VAAGDEVI COLLEGE OF ENGINEERING
AUTONOMOUS

(B18EC05) SWITCHING THEORY AND LOGIC DESIGN

B.Tech ECE: III Semester **L T P C**
3 0 0 3

Pre Requisites: None

Course objectives:
This course provides in-depth knowledge of switching theory and the design techniques of digital circuits, which is the basis for design of any digital circuit. The main objectives are:

- To learn basic techniques for the design of digital circuits and fundamental concepts used in the design of digital systems.
- To understand common forms of number representation in digital electronic circuits and to be able to convert between different representations.
- To implement simple logical operations using combinational logic circuits
- To design combinational logic circuits, sequential logic circuits.
- To impart to student the concepts of sequential circuits, enabling them to analyze sequential systems in terms of state machines.
- To implement synchronous state machines using flip-flops.

UNIT-I: Number System and Boolean Algebra And Switching Functions:
Review of number systems, Complements of Numbers, Codes- Binary Codes, Binary Coded Decimal Code and its Properties, Unit Distance Codes, Error Detecting and Correcting Codes.
Boolean Algebra: Basic Theorems and Properties, Switching Functions, Canonical and Standard Form, Algebraic Simplification of Digital Logic Gates, Properties of XOR Gates, Universal Gates, Multilevel NAND/NOR realizations.

UNIT-II:
Minimization and Design of Combinational Circuits:
Introduction, the minimization of switching function using theorem, The Karnaaugh Map Method-Up to Five Variable Maps, Don‘t Care Map Entries, Tabular Method, Design of Combinational Logic: Adders, Subtractors, comparators, Multiplexers, Demultiplexers, Decoders, Encoders and Code converters.

UNIT-III:
Sequential Machines Fundamentals and Applications:
Introduction: 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, Conversion from one type of Flip-Flop to another., Shift Registers, Applications of Shift Registers.

UNIT-IV:
Sequential Circuits-I:
Introduction, State Diagram, Analysis of Synchronous Sequential Circuits, Approaches to the Design of Synchronous Sequential Finite State Machines, synthesis of synchronous sequential circuits, serial binary adder, Sequence Detector, Parity-bit Generator, Design of Asynchronous & Synchronous Counters, Design of Synchronous Modulo N –Counters.
UNIT-V:
Sequential Circuits-II:
Finite state machine-capabilities and limitations, Mealy and Moore models-minimization of completely specified and incompletely specified sequential machines.
Algorithmic State Machines: Salient features of the ASM chart-Simple examples-System design using data path and control subsystems-control implementations-examples of Weighing machine and Binary multiplier.

Text Books:

1. Switching and Finite Automata Theory- Zvi Kohavi & Niraj K. Jha, 3rdEdition, Cambridge.
2. Switching Theory and Logic Design – A Anand Kumar, PHI,2013.

Reference Books:

1. Digital Design- Morris Mano, PHI, 3rd Edition.
2. Introduction to Switching Theory and Logic Design – Fredriac J. Hill, Gerald R. Peterson, 3rd Ed,John Wiley & Sons Inc.
3. Digital Fundamentals – A Systems Approach – Thomas L. Floyd, Pearson, 2013.
4. Digital Logic Design - Ye Brian and HoldsWorth, Elsevier
5. Fundamentals of Logic Design- Charles H. Roth, Cengage LEanring, 5th, Edition, 2004.
6. Digital Logic Applications and Design- John M. Yarbrough, Thomson Publications, 2006.
7. Digital Logic and State Machine Design – Comer, 3rd, Oxford, 2013.

Course Outcomes:

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

- Utilize and explain the functionality of logic gates (AND, NAND, OR, NOR, XOR, XNOR, NOT).
- Design different combinational circuits using minimization techniques.
- Explain various flip flops, and design of registers and counters.
- Apply the design procedures to design basic sequential circuits.
- Analyze and design of small sequential circuits and to use standard sequential functions/building blocks to build more complex circuits.

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VAAGDEVI COLLEGE OF ENGINEERING
AUTONOMOUS

(B18EE05) ELECTRICAL TECHNOLOGY

B.Tech ECE: III Semester **L T P C**
3 0 0 3

Pre Requisites: Electrical Circuits

Course Objectives:
In this course it is aimed to introduce to

- This course introduces the basic concept of circuit analysis which is foundation for all subjects of Electrical engineering.
- To understand the magnetic circuit concept
- To understand functioning of different types of dc machines.
- To estimate losses and estimation of various dc machines.
- To understand functioning of different types of ac machines.

UNIT-I: Network Topology Definitions – Graph – Tree, Basic cutset and Basic Tieset matrices for planar networks – Loop and Nodal methods of analysis of Networks with dependent & independent voltage and current sources - Duality & Dual networks.

UNIT-II: Magnetic Circuits Magnetic Circuits – Faraday‘s laws of electromagnetic induction – concept of self and mutual inductance – dot convention – coefficient of coupling – composite magnetic circuit - Analysis of series and parallel magnetic circuits

UNIT-III: D.C. Machines Principle of operation – E.M.F Equation, Types of Generators, Magnetization and load characteristics of DC Generators. DC Motors: Types of DC Motors, characteristics of DC motors, Losses and Efficiency, Swinburne‘s Test, Speed Control of DC Shunt Motor, Flux and Armature Voltage control methods.

UNIT-IV: Transformers: Principle of Operation of Single Phase transformer, Types, Constructional Features, Phasor Diagram on No Load and Load, Equivalent Circuits, Losses and Efficiency of Transformer and Regulation, OC and SC Tests (Simple Problem). Three Phase Induction Motor: Production of Rotating Magnetic Field, Constructional features, principle of operation, Torque Equation, Torque – Slip Characteristics, Applications.

UNIT-V: Synchronous Generator: Constructional Features & Principle of Operation, Principles of Operation of Synchronous Motor. Single Phase Induction Motor: Production of Rotating Field in Various type of 1-Phase Motors Split phase, Capacitor Start, Capacitor run, Shaded Pole motors and Applications.

Text Books:
1. Edward Hughes ―Electrical & Electronics Technology‖ 10th Edition, Pearson Education, 2010.

Reference Books:
1. M.S.Naidu&S.Kamakshaiah, ―Introduction to Electrical Engineering‖ Tata Mc Graw Hill Ltd, New Delhi.
2. B.L.Thereja, A.K. Thereja, ―Electronics Technology ―S.Chand& Company Vol 1 & Vol 2 Ltd 2005 Education.
3. Chakravarthy A. Sudhipanth and Chandan Kumar ―Basic Electrical Engg‖ Tata Mc Graw Hill Ltd, New Delhi.

Course outcomes: After the course completion, the students are able to

- Learn various ways of representing electrical networks and explore methods of analyzing the networks
- Understand and analyze the dual networks
- Study the basics of magnetic circuits and its analysis
- Study and analyze the Construction, basic principles of operation and characteristics of DC machines, Transformers and AC machines
- Explore various testing and applications of all machines

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VAAGDEVI COLLEGE OF ENGINEERING
AUTONOMOUS

(B18EC06) ELECTRONIC CIRCUITS ANALYSIS LAB

B.Tech ECE: III Semester **L T P C**
0 0 2 1

Pre Requisites: None

Course objectives:

- To introduce the students the operational principle, models, and the analysis of common emitter & common amplifier
- To study the operational principle and analysis of multi stage amplifiers
- To study the operational principle and analysis of power amplifiers.
- To introduce the students various oscillators.

List of Experiments (12 experiments to be done):

Part - I: Electronic Circuits
Minimum eight experiments to be conducted:
I) Design and Simulation in Simulation Laboratory using any Simulation Software.

1. Common Emitter Amplifier.
2. Common Source Amplifier.
3. Two Stage RC Coupled Amplifier
4. Current shunt Feedback Amplifier
5. Cascade Amplifier.
6. Wien Bridge Oscillator using Transistors
7. RC Phase Shift Oscillator using Transistors
8. Class A Power Amplifier (Transformer less)
9. Class B Complementary Symmetry Amplifier
10. Common base (BJT) / Common gate(JFET) Amplifier.

II) Testing in the Hardware Laboratory (Minimum 4 Experiments):

1. Class A Power Amplifier (with transformer load)
2. Class C Power Amplifier
3. Single Tuned Voltage Amplifier
4. Hartley & Colpitt's Oscillators
5. Darlington Pair
6. Common collector Amplifier
7. Any feedback amplifier.

Course Outcomes:
After the completion of this course, the students should be able to:

- Understand the concept of multistage amplifiers, analysis of multistage amplifier and plot frequency response.
- Design, construct and test amplifier circuits and interpret the results.
- Operate electronic test equipment and hardware/software tools to characterize the behavior
- Synthesize and evaluate single stage and two stage amplifiers.

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VAAGDEVI COLLEGE OF ENGINEERING
AUTONOMOUS

(B18EC07) SIMULATION LAB

B.Tech ECE: III Semester **L T P C**
0 0 2 1

Pre Requisites: None

Course objectives:
- Introduces the students the basics of MATLAB software
- To generate & analysis of the various signals
- To find convolution and correlation between the signals using MATLAB software.
- To generate gaussian noise computation of its mean, meansquare value and its skew and removal of noise by auto correlation /cross correlation.

Note:
- All the experiments are to be simulated using MATLAB/SCILAB or equivalent software
- Minimum of 15 experiment are to be completed

List of Experiments:
1. Basic Operations on Matrices.
2. Generation of Various Signals and Sequences (Periodic and Aperiodic), such as Unit Impulse, Unit Step, Square, Saw tooth, Triangular, Sinusoidal, Ramp, Sinc.
3. Operations on Signals and Sequences such as Addition, Multiplication, Scaling, Shifting, Folding.
4. Finding the Even and Odd parts of Signal/Sequence and Real and Imaginary parts of Signal.
5. Convolution for Signals and sequences.
6. Auto Correlation and Cross Correlation for Signals and Sequences.
7. Verification of Linearity and Time Invariance Properties of a given Continuous/Discrete System.
8. Computation of Unit sample, Unit step and Sinusoidal responses of the given LTI system and verifying its physical realiazability and stability properties.
9. Gibbs Phenomenon Simulation.
10. Finding the Fourier Transform of a given signal and plotting its magnitude and phase spectrum.
11. Verification of convolution property of Fourier Transform.
12. Solution of differential equations
13. Waveform Synthesis using Laplace Transform.
14. Locating the Zeros and Poles and plotting the Pole-Zero maps in S-plane.
15. Generation of Gaussian noise (Real and Complex), Computation of its mean, M.S. Value and its Skew, Kurtosis, and PSD, Probability Distribution Function.
16. Removal of noise by Autocorrelation / Cross correlation.
17. Extraction of Periodic Signal masked by noise using Correlation.
18. Verification of Weiner-Khinchine Relations.
19. Checking a Random Process for Stationarity in Wide sense.
20. Computation of Energy and Average Power

Course Outcomes:
After the completion of this course, the students should be able to:
- Illustrate different types of signals and methods of generating them using MATLAB.
- Demonstrate the importance of convolution and correlation for different applications.
- Capable to understand the characterization of random signals and explains the concept and relevance of noise in signal processing applications.
- Design and develop functional simulation, timing analysis using MATLAB.

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VAAGDEVI COLLEGE OF ENGINEERING
AUTONOMOUS

(B18CS56) PYTHON SCRIPTING LANGUAGE LAB

B.Tech ECE: III Semester **L T P C**
0 0 2 1

Pre Requisites: Basic Programing and Data Structures

Course Objectives:

The purpose of the course is to make students

- To develop Python programs with conditionals and loops.
- To define Python functions and call them.
- To use Python data structures – lists, tuples, dictionaries.
- To do input/output with files in Python.

List of programs

1. Understand and implement python installation process.
2. Demostrate the use of variables in python
3. Develop and understanding of expressions and working of expressions.
4. Understand the control sturctures and their usage in python. Also write a script to demonstrate the use of
   i) if
   ii) if,else
   iii) elif
   iv) nested if
5. Understand the usage of foor loop, while loop, break and continue statements. Also write script to demostrate the use of these staments.
6. Understand the concept of functions and use to find solution to a problem of your choice.
7. Uderstand the concept of arrays, lists and use them to store text data
8. Uderstand the concept of dictionaries and use them to store text data
9. Use standard library string functions to extract and display data
10. Find the utility of date and time functions and put them to appripriate use in your application scenario.
    Develop an application eg. Calculator demonstarting collective use of the concepts
11. Understand file handling mechanism and implement
    a. creating a file
    b. opening a file
    c. reading
    d. writing into a file
12. Understand file handling mechanism and implement
    a. copying files
    b. appending data into the file
13. Understand the exception handling mechanism and write a script to handle exceptions.
14. Create user defined exception and demonstarte the usage in an example application.

Additional experiments

Students can take up a case study/ project and implemnet it throughout the lab and submit a project report at the end of semester.

Students can implement searching and sorting techniques.

Text books:

1) Python Programming: A Modern Approach, Vamsi Kurama, Pearson.
2) Learning Python, Mark Lutz, Orielly.

Reference Books

1) Think Python, Allen Downey, Green Tea Press
2) Core Python Programming, W.Chun, Pearson.
3) Introduction to Python, Kenneth A. Lambert, Cengage

Course Outcomes:

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

- Read, write, execute by hand simple Python programs.
- Structure simple Python programs and decomposing program into functions.
- Represent compound data using Python lists, tuples, dictionaries.
- Read and write data from/to files in Python Programs.

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

(B18MC03) NSS/NCC

B.Tech: I Semester **L T P C**

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VAAGDEVI COLLEGE OF ENGINEERING
AUTONOMOUS

(B18EC08) PULSE AND DIGITAL CIRCUITS

B.Tech ECE: IV Semester **L T P C**
3 1 0 4

Pre Requisites: Electronic Devices and Circuits
Course Objectives:

- To explain the complete response of R-C and R-L-C transient circuits.
- To explain clippers, clampers, switching characteristics if transistors and sampling gates.
- To construct various multivibrators using transistor, design of sweep circuits and sampling gates.
- To discuss and realize logic gates using diodes and transistors.

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

UNIT II
Non-Linear Wave Shaping : Diode clippers, Transistor clippers, clipping at two independent levels, Comparators, applications of voltage comparators. Clamping operation, clamping circuit taking Source and Diode resistances into account, Clamping circuit theorem, practical clamping circuits, effect of diode characteristics on clamping voltage, synchronized clamping.

UNIT III
Switching Characteristics Of Devices : Diode as a switch, piecewise linear diode characteristics, Transistor as a switch, Break down voltage consideration of transistor, saturation parameters of Transistor and their variation with temperature, Design of transistor switch, transistor-switching times, Silicon-controlled-switch circuits, **Realization logic gates:** AND, OR and NOT gates using diodes & transistors.

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

UNIT V
Time Base Generators – basic principles, Transistor miller time base generator, Transistor Bootstrap time base generator, Current time base generators, Methods of linearity and improvement.
Sampling Gates: Basic Operating principles of Sampling Gates, Unidirectional and Bi-directional Sampling Gates, four Diode Sampling Gate, Reduction of pedestal in Gate Circuits.

Text Books:
1. Pulse, Digital and Switching Waveforms - J. Millman and H. Taub, McGraw-Hill, 1991.
2. Solid State Pulse circuits - David A. Bell, PHI, 4th Edn., 2002

Reference Books
1. Pulse and Digital Circuits – A. Anand Kumar, PHI, 2005.
2. Fundamentals of pulse and digital circuits-Ronald.J.Tocci,3 ed. ,2008
3. Pulse and Digital Circuits-Motheki S.Prakash rao,2006,TMH
4. Wave Generation and Shaping - L. Strauss.

Course Outcomes:

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

- Design the circuits for generating desired wave shapes (non-sinusoidal) for different applications like computers, control systems and counting and timing systems.
- Analyze the applications of diode as Integrator, differentiator, clippers and clamper circuits.
- Analyze the switching characteristics and applications of diode and transistor.
- Analyze and design Multivibrators for various applications, synchronization techniques and sweep circuits
- Design the time base generators and sampling gates with the knowledge of basic principles

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VAAGDEVI COLLEGE OF ENGINEERING
AUTONOMOUS

(B18EC09) ELECTROMAGNETIC THEORY AND TRANSMISSION LINES

B.Tech ECE: IV Semester **L T P C**
3 1 0 4

Pre Requisites: None

Course Objectives:
- To introduce the student to the fundamental theory and concepts of electromagnetic waves and transmission lines, and their practical applications.
- To study the propagation, reflection, and transmission of plane waves in bounded and unbounded media.

UNIT-I
Electrostatics: Vector Analysis, Introduction to co-ordinate Systems (i.e. Cartesian , Spherical & Cylindrical), Coulomb's Law, Electric Field Intensity – Fields due to Different Charge Distributions, Electric Flux Density, Gauss Law and Applications, Electric Potential, Relations Between E and V, Maxwell's Two Equations for Electrostatic Fields, Energy Density, Illustrative Problems.

UNIT–II:
Magnetostatics: Biot-Savart's Law, Ampere's Circuital Law and Applications, Magnetic Flux Density, Maxwell's Two Equations for Magnetostatic Fields, Magnetic Scalar and Vector Potentials, Forces due to Magnetic Fields, Ampere's Force Law, Inductances and Magnetic Energy, Illustrative Problems.

UNIT –III:
Conductors, Dielectric & Capacitance & Poison's & Laplace Equation: Current Density & Continuity Equation**,** Convection and Conduction Currents, Dielectric Constant, Isotropic and Homogeneous Dielectrics, Relaxation Time, Capacitance – Parallel Plate, Poisson's and Laplace's Equations, Illustrative Problems.

UNIT-IV:
Maxwell's Equations (Time Varying Fields): Faraday's Law and Transformer EMF, Inconsistency of Ampere's Law and Displacement Current Density, Maxwell's Equations in Different Final Forms and Word Statements, Introduction to Conditions at a Boundary Surface, Poynting Vector and Poynting Theorem, Introduction to Electromagnetic waves: Properties & terminologies of Electromagnetic waves.

UNIT–V:
Transmission Lines: Types, Parameters, Transmission Line Equations, Primary & Secondary Constants, Expressions for Characteristic Impedance, Propagation Constant, Phase and Group Velocities, Infinite Line Concepts, Losslessness/Low Loss Characterization, Distortion – Condition for Distortionlessness and Minimum Attenuation, Loading - Types of Loading, Illustrative Problems.
Input Impedance Relations, SC and OC Lines, Reflection Coefficient, VSWR. UHF Lines as Circuit Elements; $\lambda/4$, $\lambda/2$, $\lambda/8$ Lines – Impedance Transformations, Significance of Z_{min} and Z_{max} , Smith Chart – Configuration and Applications, Single and Double Stub Matching, Illustrative Problems.

Text Books:
1. Elements of Electromagnetics – Matthew N.O. Sadiku, 4thEd., Oxford Univ.Press, 2008
2. Electromagnetic Waves and Radiating Systems – E.C. Jordan and K.G. Balmain, 2ndEd., 2000, PHI.
3. Transmission Lines and Networks – Umesh Sinha, Satya Prakashan, 2001, (Tech. India Publications), New Delhi.

Reference Books:
1. Engineering Electromagnetics – Nathan Ida, 2ndEd., 2005, Springer (India) Pvt. Ltd., New Delhi.
2. Networks, Lines and Fields – John D. Ryder, 2ndEd., 1999, PHI.
3. Engineering Electromagnetics – William H. Hayt Jr. and John A. Buck, 7thEd., 2006, TMH.

Course Outcomes:
After the completion of this course, the students should be able to:

- Apply vector calculus to electrostatic fields in different engineering situations. Use Gauss's Law, Coulomb's law to find fields and potentials for a variety of situations including charge distributions.
- Explain, illustrate & can apply the concept of magnetostatics in different engineering situations.
- Analyze & explain the concept of conductors, dielectrics & capacitance, electromagnetic waves characteristics & terminologies and; be able to compute the Pointing vector and identify the power flow direction.
- Study time varying Maxwell's equations and their applications is electromagnetic problems.
- Describes the transmission lines with equivalent circuit and explain their characteristics & use its knowledge in different engineering situations.

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VAAGDEVI COLLEGE OF ENGINEERING
AUTONOMOUS

(B18EC10) ANALOG COMMUNICATIONS & DIGITAL COMMUNICATIONS

B.Tech ECE: IV Semester **L T P C**
3 1 0 4

Pre Requisites: None

Course Objectives:

This course aims at:

- Developing and understanding the design of analog and digital communication systems.
- Study of analog and digital modulation techniques.
- Study of different error detecting and error correction codes like block codes, cyclic codes and convolution codes
- Establishing a firm foundation for the understanding of telecommunications systems, and the relationship among various technical factors when such systems are designed and operated.

UNIT I
Amplitude Modulation
Introduction to communication system, Need for modulation, Amplitude Modulation, Definition, single tone modulation, power relations in AM waves, Generation of AM waves, square law Modulator, Switching modulator, Detection of AM Waves: Square law detector, Envelope detector, Double side band suppressed carrier modulators, Balanced Modulators, Ring Modulator, Coherent detection of DSB-SC Modulated waves, Generation and demodulation of SSB.

UNIT II
Angle Modulation
Basic concepts, Frequency Modulation: Single tone frequency modulation, Spectrum Analysis of Sinusoidal FM Wave, Narrow band FM, Wide band FM, Constant Average Power, Transmission bandwidth of FM Wave - Generation of FM Waves, Direct FM, Detection of FM Waves: Balanced Frequency discriminator, Comparison of FM and AM.

UNIT-III:
Communication System
Communication Systems - Digital Communication Systems – Functionality of Blocks, Medium Classification, Performance Measure, Advantages of digital communication systems, sampling theorem
Base Band Transmission
Base band transmission - Wave form representation of binary digits - PCM, DPCM, DM, ADM systems, Matched filter, Inter symbol interference, Companding - A law and μ law.

UNIT-IV:
Band Pass Transmission
ASK, FSK, PSK, QPSK, QAM, Coherent and Non-coherent detection of ASK, FSK and PSK - Comparison of error performance of non- coherently and coherently detected ASK, FSK and PSK systems.
Source Coding Techniques
Shannon's Law, Shannon Fano coding, source codings-Huffmann code, variable length coding.

UNIT-V:
Error Control Codes
Matrix description of linear block codes, Error detection and error correction capabilities of linear block codes, Cyclic codes: Algebraic structure, encoding, Syndrome calculation, decoding,

Convolution Codes
Encoding, decoding using state, Tree and trellis diagrams, Decoding using Viterbi algorithm.

Text Books:
1. Electronics & Communication System – George Kennedy and Bernard Davis , TMH 2004.
2. Digital and analog communication systems- Sam Shanmugam, John Wiley,2005
3. Digital Communications- John G.Proakis, Masoud Salehi – 5 th Edition, Mcgraw-Hill, 2008

Reference Books:
1. Electronic Communication Systems – Modulation and Transmission - Robert J. Schoenbeck, 2nd Edition, PHI.
2. Digital communications- Simon Haykin, John Wiley, 2005
3. Digital Communications 3rd Ed - I. A.Glover, P. M. Grant, 2nd Edition, Pearson Edu,, 2008
4. Communication Systems ---- B.P.Lathi, BS Publications, 2006
5. Digital Communication – Theory, Techniques, and Applications – R.N.Mutagi, 2nd Edition, 2013

Course Outcomes:
After the completion of this course, the students should be able to:
- Analyze and simulate the concepts of AM and AM Demodulation in communication.
- Interpret with various angle modulation and demodulation systems
- Demonstrate the understanding of various baseband transmission techniques.
- Demonstrate the understanding of various digital modulation and demodulation techniques.
- Explain different error detection and error correction codes like block codes, cyclic codes and convolution codes.

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VAAGDEVI COLLEGE OF ENGINEERING
AUTONOMOUS

(B18EC11) PROBABILITY THEORY AND STOCHASTIC PROCESS

B.Tech ECE: IV Semester **L T P C**
3 0 0 3

Pre Requisites:

Course Objective:
The primary objective of this course is:
- To provide mathematical background and sufficient experience so that the student can read, write, and understand sentences in the language of probability theory, as well as solve probabilistic problems in signal processing and communication engineering.
- To introduce students to the basic methodology of probabilistic thinking and to apply it to problems.

UNIT I
Probability And Random Variables:
Probability theory – Random Variables Expected value of Random Variables, function of a Random Variables – Moments – Moment generating function – Binomial, Poisson, Geometric, Exponential, Normal distributions, functions of Random Variables, Chebyshev inequality.

UNIT II
Two Dimensional Random Variables
Two dimensional Random Variables joint distribution & properties – Marginal and conditional distributions, joint characteristic functions. Transformation of Random Variables – central limit theorem – simple problems.

UNIT III
Random Processes
Classification of Random processes – Stationary – WSS and SSS processes, Gaussian random process Poisson Random process – Pure Birth process – Renewal Process – Markov Chain and transition probabilities.

UNIT IV
Correlation Functions:
Autocorrelation function and its properties – Cross Correlation function and its properties, covariance and its properties, Linear System with Random inspects.
Spectral Density
Power spectral Density Function – Properties – System in the form of convolution – Unit Impulse Response of the System – Einstein – Weiner-Khinchine Relationship – Cross Power Density Spectrum – Properties.

UNIT V
Information Theory:
Information theory and entropy, conditional entropy and redundancy, bandwidth-S/N Tradeoff, Hartley Shannon law, mutual information, information loss due to Noise.

Text Book
1 T. Veerarajan, "*Probability, Statistics and Random Processes*", Tata McGraw – Hill Publishing Company Limited, New Delhi, 2004.

Reference Books

1. Trivedi K S, " *Probability and Statistics with reliability, Queueing and Computer Science Applications*",Prentice Hall of India,New Delhi, 1984

Course Outcomes:

Upon completion of the subject, students will be able to:

- Understand the basic concepts of probability theory and random processes.
- Solve simple engineering problems with the knowledge of two dimensional random variables.
- Compare and contrast the various random processes.
- Analyze the autocorrelation and cross correlation functions and their properties.
- Understand concepts of information theory and Shannon law.

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VAAGDEVI COLLEGE OF ENGINEERING
AUTONOMOUS

(B18EC12) COMPUTER ORGANIZATION

B.Tech ECE: IV Semester **L T P C**
3 0 0 3

Pre Requisites:

Course Objectives:
- To understand basic components of computers.
- To explore the I/O organizations in depth.
- To explore the memory organization.
- To understand the basic chip design and organization of 8086 with assembly language programming.

UNIT I
Basic Structure Of Computers : Computer Types, Functional unit, Basic OPERATIONAL concepts, Bus structures, Software, Performance, multiprocessors and multi computers. Data Representation. Fixed Point Representation. Floating - Point Representation. Error Detection codes.
Computer Arithmetic : Addition and subtraction, multiplication Algorithms, Division Algorithms, Floating - point Arithmetic operations. Decimal Arithmetic unit Decimal Arithmetic operations.

UNIT II
Register Transfer Language And Microoperations : Register Transfer language.Register Transfer Bus and memory transfers, Arithmetic Mircrooperatiaons, logic micro operations, shift micro operations, Arithmetic logic shift unit. Instruction codes. Computer Registers Computer instructions-Instruction cycle,Memory - Reference Instructions. Input - Output and Interrupt. STACK organization. Instruction formats. Addressing modes. DATA Transfer and manipulation. Program control. Reduced Instruction set computer.

UNIT III
Micro Programmed Control : Control memory, Address sequencing, microprogram example, design of control unit, Hard wired control. Microprogrammed control.

UNIT IV
The Memory System : Basic concepts of semiconductor RAM memories. Read-only memories Cache memories performance considerations, Virtual memories secondary storage. Introduction to RAID.
Input-Output Organization : Peripheral Devices, Input-Output Interface, Asynchronous data transfer Modes of Transfer Priority Interrupt Direct memory Access, Input -Output Processor (IOP) Serial communication; Introduction to peripheral component, Interconnect (PCI) bus. Introduction to standard serial communication protocols like RS232, USB, IEEE1394.

UNIT V
Pipeline And Vector Processing: Parallel processing, pipelining, Arithmetic Pipeline, Instruction Pipeline, RISC Pipeline Vector Processing, Array Processors.
Multiprocessors: characteristics or multiprocessors Interconnection Structures, Interprocessor Arbitration. Inter Processor Communication and Synchronization Cache Coherance. Shared Memory Multiprocessors.

Text Books:
1. Computer Organization – Carl, Hamacher, Zvonko Vranesic, Sofwatzaky, 5th Edition Mcgram hill.
2. Computer Systems Architecture – M. Morris Mano III rd Edition Pearson.

References:

1. Computer Organization and Architecture-William Stallings Sixth Edition, Pearson/PHI
2. Structured Computer Organization - Andrew S. Tanenbaum, 4th Edition PHI/Pearson
3. Fundamentals or Computer Organization and Design, Sivaraama Dandamudi springer Int, Edition
4. Computer Architecture a quantitative approach, John L. Hennessy and David A. Patterson, Fourth Edition Elsevier
5. Computer Architecture: Fundamentals and principles of Computer Design, Joseph D. Dumas II, BS Publication.

Course Outcome:

After this course students understand

- Explain the I/O and memory organization in depth.
- Develop assembly language programs for various applications.
- Estimate the basic components of computers and Extend the design of Digital Logic Circuits and apply to Computer Organisation.
- Analyse the memory organization and Evaluate the performance of Computer systems
- Understand the basic chip design and organization of 8086 with assembly language programming and Compare RISC and CISC Architectures.

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VAAGDEVI COLLEGE OF ENGINEERING
AUTONOMOUS

(B18EC13) PULSE AND DIGITAL CIRCUITS LAB

B.Tech ECE: IV Semester

L	T	P	C
0	0	2	1

Pre Requisites:

Course Objectives:

- To design and construct the R-C circuits clippers, clampers.
- To construct various multivibrators using transistor
- To construct and realize logic gates using diodes and transistors.

Minimum Twelve experiments to be conducted:

1. Linear wave Shaping
2. Non-linear wave shaping Clippers
3. Non-linear wave shaping Clampers
4. Transistor as a switch.
5. Study of logic gates and some applications.
6. Study of flip-flops and some applications.
7. Sampling g gates.
8. Astable multivibrator.
9. Monostable multivibrator.
10. Bistable multivibrator.
11. Schmitt trigger.
12. UJT relaxation oscillator.
13. Bootstrap sweep circuit.
14. Constant current sweep generator using BJT.

Equipment required for laboratories:

1. RPS – 0 – 30V
2. CRO-0-20MHz.
3. Function Generators 0-1MHz
4. Components
5. Multi Meters

Course Outcomes

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

- Understand the applications of diode as integrator, differentiator,clippers and clamper circuits.
- Demonstrate basic logic gates and sampling gates.
- Design and analyze various multivibrator circuits and schmittrigger circuit.
- Design and analyze UJT relaxation oscillator and boot-strap sweep circuits

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VAAGDEVI COLLEGE OF ENGINEERING
AUTONOMOUS

(B18EE06) ELECTRICAL TECHNOLOGY LAB

B.Tech ECE: IV Semester **L T P C**
0 0 2 1

Pre Requisites: None
Course objectives:

- To solve the network theorems Pratically
- To Verify the Characteristics of various DC Machines
- To Verify the Characteristics of various AC Machines

List of Experiments

The following experiments are required to be conducted compulsory experiments:

1. Verification of Kirchhoff's Laws.
2. Verification of RMS value of complex wave.
3. Verification of Superposition and Reciprocity theorems.
4. Verification of Maximum power transfer theorems.
5. Verification of Thevenin's and Norton's theorems.
6. Speed Control of a DC Shunt Motor.
7. Swinburne's test on DC Shunt Machine.
8. Brake test on DC Shunt Motor.
9. OC & SC test on single phase Transformer.
10. Load Test on Single phase Transformer.

Course outcomes: After the course completion, the students are able to

1. Verify network theorems
2. Design the range of apparatus for various testing of DC machines and study their characteristics
3. Evaluate the efficiency and regulations of DC machines based on the test results
4. Conduct various speed control methods of DC machines

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VAAGDEVI COLLEGE OF ENGINEERING
AUTONOMOUS

(B18EC14) ANALOG COMMUNICATIONS & DIGITAL COMMUNICATIONS LAB

B.Tech ECE: IV Semester **L T P C**
0 0 2 1

Pre Requisites:

Course Objectives:

- To design and analyze various modulation and demodulation techniques.

Note:

- Minimum 12 experiments should be conducted:

1. Amplitude modulation and demodulation.
2. SSB-SC Modulator & Detector (Phase Shift Method)
3. Frequency modulation and demodulation.
4. Study of spectrum analyzer and analysis of AM and FM Signals
5. Pulse Amplitude Modulation & Demodulation
6. Pulse Width & Pulse Position Modulation & Demodulation
7. Differential Pulse Code Modulation
8. Delta Modulation.
9. Frequency shift keying: Generation and Detection.
10. Phase Shift Keying: Generation and Detection.
11. Amplitude Shift Keying: Generation and Detection.
12. DPSK Generation and Detection
13. Convolution Encoder and Decoder.
14. Quadrature Amplitude Modulation and Demodulation

Course Outcomes:

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

- Understand the different types of modulation techniques.
- Assess different digital modulation and demodulation techniques.
- Apply suitable modulation schemes and coding for various applications.

*****

VAAGDEVI COLLEGE OF ENGINEERING
AUTONOMOUS

(B18MC07) GENDER SENSITIZATION

B.Tech ECE: IV Semester **L T P C**
0 0 2 0

Pre Requisites: None
Course Objectives:

- To develop students sensibility with regard to issue of gender in contemporary India.
- To provide a critical perspective on the socialization of men and women.
- To introduce students to information about some key biological aspects of genders.

- To expose the students to debates on the politics and economics of work.
- To help students reflect critically on gender violence.
- To expose students to more egalitarian interactions between men and women.

UNIT – I
A. Gender: Why Should We Study It? (T.B. Page Nos: 1-6)

B.Socialization: Making Women, Making Men
i. Introduction
ii. Preparing for womanhood
iii. Growing up male
iv. First lessons in caste
v. Different masculinities (T.B. Page Nos: 7-39)

UNIT – II
A. Housework: The Invisible Labour
i. "My mother does not work"
ii. "Share the load" (T.B. Page Nos: 40-55)

B. Missing Women: Sex Selection and Its consequences
i. Declining sex ratio
ii. Demographic consequences (T.B. Page Nos: 56-66)

UNIT – III

A. Knowledge: Through the Lens of Gender
i. Point of view
ii. Gender and the structure of knowledge
iii. Further reading: Unacknowledged women artists of Telangana. (T.B. Page Nos: 67-89)

B. Sexual Harassment: Say No!
i. Sexual harassment, not eve-teasing
ii. Coping with everyday harassment
iii. Further reading: "Chupulu" (T.B. Page Nos: 90-107)

C. Women' Work: Its Politics and Economics
i. Fact and fiction
ii. Unrecognized and unaccounted work
iii. Further reading: Wages and conditions of work (T.B. Page Nos:108-123)

UNIT – IV

A. Domestic Violence: Speaking Out

i. Is home a safe place?
ii. When women unite [Film]
iii. Rebuilding lives
iv. Further reading: New forums for justice (T.B. Page Nos:124-144)

B. Whose History? Questions for Historians and Others

i. Reclaiming a past
ii. Writing other histories
iii. Further reading: Missing pages from modern Telangana history (T.B. Page Nos:145-176)

C. Gender Spectrum: Beyond the Binary

i. Two or many?
ii. Struggles with discrimination (T.B. Page Nos:177-195)

UNIT – V

A. Thinking about Sexual Violence

i. Blaming the victim
ii. "I fought for my life…"
iii. Further reading: The caste face of violence (T.B. Page Nos:196-211)

B. Just Relationships: Being Together as Equals

i. Mary Kom and Onler
ii. Love and acid just do not mix
iii. Love letters
iv. Mothers and fathers
v. Further Reading: Rosa Parks – The Braveheart (T.B. Page Nos:212-241)

C. Additional Reading: Our Bodies, Our Health (T.B. Page Nos:242-266)

Course Outcomes:

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

- Define the need and importance of women empowerment.
- Extend the levels of understanding and classification of gender disparities.
- Identify the need of equal distribution of work in the entire sector irrespective of gender.
- Construct the emergency needs of saving girl child.
- Improves thinking levels to find solution to the missing women and bring realization in the society.

TEXT BOOKS:

1. Towards A World of Equals, Published by 'A Bilingual Text book on Gender', telugu academy.

REFERENCE BOOKS:

1. I Fought For My Life… and won by Abdulali, Sohaila.
2. My Story… Our Story of Re-building Broken lives by Agnes, Flavia.
3. How I upstaged the 'Clevers' of my class by Babu, Mohammed Khadeer.
4. I want a wife by Brady, Judy.
5. A Worker Reads History by Brecht, Bertolt.

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VAAGDEVI COLLEGE OF ENGINEERING
AUTONOMOUS

(B18EC15) LINEAR & DIGITAL IC APPLICATIONS

B.Tech. ECE V Semester **L T P C**
3 1 0 4

Pre Requisites: Pulse and Digital Circuits & Switching Theory and Logic Design

Course Objectives:
- To introduce the basic building blocks of linear integrated circuits.
- To teach the linear and non-linear applications of operational amplifiers.
- To introduce the theory and applications of analog multipliers and PLL.
- To teach the theory of ADC and DAC.
- To introduce the concepts of waveform generation and introduce some special function ICs.
- To understand and implement the working of basic digital circuits.

UNIT – I
Introduction to integrated circuits: integrated circuit definition, classification, development of IC's, logic families: RTL, DTL, TTL, ECL, I^2L and CMOS – analysis

UNIT – II
OPAMP and Applications: Basic block diagram of OP-AMP, IC 741 introduction, pin diagram, ideal DC & AC characteristics, configurations (or) modes of operations, concepts of virtual ground. Basic op-amp applications, instrumentation amplifier, ac amplifier, Integrator, differentiator, electronic analog computation, comparator ,waveform generator's and active filter's

UNIT – III
555 Timer: Description, Monostable, Astable and Bistable mode of operations and their applications, Schmitt trigger. PPL: Basic principle, phase detector/comparator, VCO, and PLL applications.
D-A and A-D converters : Basic DAC and ADC techniques, and their types.

UNIT – IV
Hardware description language: VHDL design flow, program structures, operators, data types and constants, function's and procedure's, libraries and packages structures, design elements : Structural ,dataflow and behavior design elements, simulation and synthesis, HDL for logic gates

UNIT – V
HDL Design for Combination circuits: Adders, Multipliers, Decoder Encoder Multiplexer, Demultiplexer, priority encoder, comparators, hamming code generators.
HDL design for sequential circuits: Adders flip-flop types, Resisters, Counters, Memories and State Machine design

Text Books:
1. Op-amps and linear ics – ramakanth A. Gayakwad, PHI, 2003.
2. Linear integrated circuits- D. Roy Chowdhury, New Age Inernational (p) let,
3. Digital fundamentals – Floyd and Jain, Pearson Education, *th edition, 2005.
4. Digital design principles and practices – John. F. Wakerly 3/e, 2005. Operational amplifiers with linear integrated circuits, 4/e William D. Stanley, Pearson Education India, 2009.

Reference Books:

1. Op amps and linear integrated circuits concepts and applications james M. Fiore, Cengage Learning/Jaico, 2009.
2. Operational amplifiers with linear integrated Circuits by K.Lal Kishore Pearson, 2009.
3. Linear integrated circuits and applications – salivahana, TMH.
4. Modern digital electronics – RP Jain -4/e – TMH, 2010.

Course Outcomes:

On completion of this course, the students will:

- Understand the op Amp and its applications in lading wave form generators.
- Design and describe the concepts of timer using IC 535, basic principle of PLL operation and also able to understand various ADC and DAC techniques.
- Gain the programming concepts of HDL used for designing VLSI integration circuits.
- Able to do HDL based design of Combinational and sequential circuits including memories.

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

(B18EC16) DIGITAL SIGNAL PROCESSING

B.Tech. ECE V Semester

L	T	P	C
3	0	0	3

Pre Requisites: Signals and systems

Course Objectives:

- To provide background and fundamental material for the analysis and processing of digital signals.
- To familiarize the relationships between continuous time and discrete time signals and systems.
- To study fundamentals of time, frequency and Z-plane analysis and to discuss the inter-relationships of these analytic method.
- To study the designs and structures of digital (IIR & FIR) filters from analysis to synthesis for a given specifications.
- The impetus is to introduce a few real-world signal processing applications.
- To acquaint in FFT algorithms, multi-rate signal processing techniques and finite word length effects.

Unit I Theory of discrete time linear systems

Introduction, Classification of Signals and Systems, Discrete Time systems, Linearity, Time Invariance, Causality, Stability, Difference equations, Z-transform, Inverse Z transforms. Transfer function of linear discrete systems, Impulse response, Recursive, Non-recursive filters, Digital filter realization – Direct, canonic, cascade, parallel and ladder realizations

Unit II Discrete fourier transforms

Discrete Fourier Transform (DFT) definition, Properties of discrete Fourier transform, Convolution of sequences - linear convolution. **FFT algorithms:** Introduction to Radix 2 Fast Fourier transform (FFT), Properties of Radix 2 FFT, Decimation in time FFT, Data shuffling and Bit reversal, Decimation in frequency FFT Algorithms, Computing Inverse DFT by doing a direct DFT.

Unit III Theory and design of digital non recursive filters

Design characteristics of FIR filters with linear phase, Frequency response of linear phase FIR filters, Design of FIR filters using window functions.

Unit IV Theory and design of digital recursive filters

Review of design techniques for analog low pass filter, frequency transformation, Properties of IIR filter, IIR filter design, Different methods of IIR filter design.

Unit V General purpose digital signal processors

Introduction, Computer architectures for signal processing- Harvard architecture, Pipelining, Hardware multiplier, accumulator, replication, On chip memory/cache and Extended paralleslism. General-purpose digital signal processors-Fixed point and floating point DSP. Selecting digital signal processors, .Implementation of DSP algorithms on general purpose DSP, FIR digital filtering.

Text Books

1. J.G.Proakis , D.G. Manolakis and D. Sharma, Digital Signal Processing - Principles, Algorithms and Applications, Pearson Education, 2006
2. Simon Haykin & Barry van veen, Signals and Systems, 2nd edition, John Wiley publication, 2004/2005

Reference Books

1. Oppenhiem V.A. and Schaffer, Discrete - time Signal Processing, Prentice Hall of India,2005
2. Leudeman L.C, Fundamentals of Digital Signal Processing, Harper & Row Publication,2006
3. Emmanuel C.Ifeachor, Digital Signal Processing -A Practical Approach , Pearson Education, 2006
4. Andreas Antoniou, Digital Signal Processing, Tata McGraw-Hill,-2006

Course Outcomes:

On completion of this subject, the student should be able to:

- Explain the time domain and frequency domain representation of the signals.
- Identify the different types of the systems and their responses.
- Understand the inter relationship between DFT and various transforms and fast computation of DFT and appreciate the FFT processing.
- Classify the different types of windowing techniques.
- Design a digital filters for a given specifications and Apply the knowledge to real world processing applications.

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VAAGDEVI COLLEGE OF ENGINEERING
AUTONOMOUS

(B18CS53) COMPUTER NETWORKS

B.Tech. ECE V Semester

L	T	P	C
3	0	0	3

Pre Requisites: None

Course Objectives:

- To introduce the fundamental various types of computer networks.
- To demonstrate the TCP/IP and OSI models with merits and demerits.
- To introduce UDP and TCP Models.

UNIT - I:

Overview of the Internet: Protocol, Layering Scenario, TCP/IP Protocol Suite: The OSI Model, Internet history standards and administration; Comparison of the OSI and TCP/IP reference model.
Physical Layer: Guided transmission media, wireless transmission media.
Data Link Layer - design issues, CRC codes, Elementary Data Link Layer Protocols, sliding window protocol.

UNIT - II:

Multi Access Protocols - ALOHA, CSMA, Collision free protocols, Ethernet- Physical Layer, Ethernet Mac Sub layer, data link layer switching & use of bridges, learning bridges, spanning tree bridges, repeaters, hubs, bridges, switches, routers and gateways.

UNIT - III:

Network Layer: Network Layer Design issues, store and forward packet switching connection less and connection oriented networks-routing alhorithms-optimality principle, shortest path, flooding, Distance Vector Routing, Control to Infinity Problem, Hierarchical Routing, Congestion cointrol algorithms, admission control.

UNIT - IV:

Internetworking: Tunneling, Internetwork Routing, Packet fragmentation, IPv4, IPv6 Protocol, IP addresses, CIDR, IMCP, ARP, RARP, DHCP.
Transport Layer: Services provided to the upper layers elements of transport protocol-addressing connection establishment, connection release, Connection Release, Crash Recovery

UNIT - V:

The Internet Transport Protocols UDP-RPC, Real Time Transport Protocols, The Internet Transport Protocols- Introduction to TCP, The TCP Service Model, The TCP Segment Header, The Connection Establishment, The TCP Connection Release, The TCP Connection Management Modeling, The TCP Sliding Window, The TCP Congestion Control, The future of TCP.
Application Layer- Introduction, providing services, Applications layer paradigms, Client server model, Standard client-server application-HTTP, FTP, electronic mail, TELNET, DNS, SSH –

Text Books

1. Data Communications and Networking - Behrouz A. Forouzan, Fifth Edition TMH, 2013.
2. Computer Networks - Andrew S Tanenbaum, 4th Edition, Pearson Education.

References books

1. An Engineering Approach to Computer Networks - S. Keshav, 2nd Edition, Pearson Edication.
2. Understanding communications and Networks, 3rd Edition, W. A. Shay, Cengage Learning.

3. Introduction to Computer Networks and Cyber Security, Chwan-Hwa (John) Wu, J. David Irwin, CRC Press.
4. Computer Networks, L. L. Peterson and B. S. Davie, 4th edition, ELSEVIER.
5. Computer Networking: A Top-Down Approach Featuring the Internet, James F. Kurose, K. W. Ross, 3rd Edition, Pearson Eduction.

Course Outcomes:

- He/She Will be in a position to understand WorldWide concepts.
- Students should be able to demonstrate and explore the basics of Computer Networks and various protocols.
- Will be in position to administrate a network and flow of information.
- Able to contrast different internetwoking protocols.
- Able to demonstrate different Internet Transport Protocols

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VAAGDEVI COLLEGE OF ENGINEERING
AUTONOMOUS

(B18EE15) CONTROL SYSTEMS
(Professional Elective – I)

B.Tech. ECE V Semester

L	T	P	C
3	0	0	3

Pre-Requisites:
Engineering Physics, Mathematics-I&II & Electrical Circuits

Course Objectives:
In this course it is aimed to introduce

- The principles and applications of control systems in everyday life.
- The basic concepts of block diagram representation,
- Introduce concept of stability of systems in frequency domain and time domain.
- Concept of state space representation and multi input and multi output systems.

UNIT-I: Introduction

Concepts of Control Systems- Open Loop and closed loop control systems and their differences- Different examples of control systems- Classification of control systems, Feed-Back Characteristics, Effects of feedback. Mathematical models – Differential equations, Impulse Response and transfer functions- Translational and Rotational mechanical systems.

Transfer function representation

Transfer Function of DC Servo motor - AC Servo motor- Synchro transmitter and Receiver, Block diagram representation of systems considering electrical systems as examples -Block diagram algebra – Representation by Signal flow graph - Reduction using mason's gain formula.

UNIT-II: Time Response Analysis

Standard test signals - Time response of first order systems – Characteristic Equation of Feedback control systems, Transient response of second order systems - Time domain specifications – Steady state response - Steady state errors and error constants – Effects of proportional derivative, proportional integral systems.

UNIT-III: Stability Analysis

The concept of stability – Routh- Hurwitz stability criterion – Absolute stability and conditional 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.

Frequency Response Analysis:

Introduction, Frequency domain specifications-Bode diagrams-Determination of Frequency domain specifications and transfer function from the Bode Diagram-Phase margin and Gain margin-Stability Analysis from Bode Plots.

UNIT-IV: Stability Analysis in Frequency Domain

Polar Plots, Nyquist Plots and applications of Nyquist criterion to find the stability–Effects of adding poles and zeros to G(s)H(s) on the shape of the Nyquist diagrams.

Classical Control Design Techniques:

Compensation techniques – Lag, Lead, and Lead-Lag Controllers design in frequency Domain, PID Controllers- Numerical Problems.

UNIT-V: State Space Analysis of Continuous Systems

Concepts of state, state variables and state model, derivation of state models from block diagrams, Diagonalization - Solving the Time invariant state Equations- State Transition Matrix and its Properties. Concepts on Controllability and Observability.

Text Books:

1. Control Systems Engineering – by I. J. Nagrath and M. Gopal, New Age International (P) Limited, Publishers, 2nd edition.
2. Automatic Control Systems 8th edition– by B. C. Kuo 2003– John wiley and sons.
3. Modern Control Engineering – by Katsuhiko Ogata – Prentice Hall of India Pvt. Ltd., 3rd edition, 1998.

Reference Books:

1. Control Systems by N.K.Sinha, New Age International (P) Limited Publishers, 3rd Edition, 1998.
2. Control Systems Engg. by NISE 3rd Edition – John wiley
3. Control Systems by S.Kesavan, Hitech Publications.
4. "Modeling & Control of Dynamic Systems" by Narciso F. Macia George J. Thaler, Thomson Publishers.
5. Solutions and Problems of Control Systems by A.K.Jairath, CBS Publictions,1992.

Course Outcomes: After going through this course, the student able to

- Understand the concept of feedback and analyze the control system components by their Mathematical modeling.
- Estimate the time domain specifications and steady state error.
- Apply various time domain and frequency domain techniques to assess the system performance.
- Improve the system performance by designing a suitable controller and/or a compensator for a specific application.
- Test system Controllability and Observability using state space representation and applications of state space representation to various systems.

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VAAGDEVI COLLEGE OF ENGINEERING
AUTONOMOUS

(B18EC17) TELECOMMUNICATION SWITCHING SYSTEMS AND NETWORKS
(Professional Elective – I)

B.Tech. ECE V Semester **L T P C**
3 0 0 3

Pre Requisites: None

Course Objectives:
- To learn switching, singling and traffic in the context of telecommunication network.
- To expose through the evolution of switching systems from manual and electromechanical systems to stored-program-controlled digital systems.
- To study signalling, packet switching and networks.

UNIT-I:
Switching Systems: Evolution of Telecommunications; Basics of a Switching System; Functions of a Switching System; Crossbar Switching-Principle of Crossbar Switching; Crossbar Switch Configurations; Cross-Point Technology; Crossbar Exchange Organization; A General Trunking; Electronic Switching; Digital Switching Systems.
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; Some Other Useful Results; Systems with a Single Server; Queues in Tandem; Delay Tables; Applications of Delay Formulae.

UNIT-II:
Switching Networks: Single Stage Networks; Gradings-Principle; Two Stage Networks; Three Stage Networks; Four 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.
Control of Switching Systems: Call Processing Functions-Sequence of Operations; Signal Exchanges; State Transition Diagrams; Common Control; Reliability; Availability and Security; Stored Program Control.

UNIT-III:
Signaling: Introduction; Customer Line Signaling; Audio Frequency Junctions and Trunk Circuits; FDM Carrier Systems-Outband Signaling; Inband (VF) Signaling; PCM Signaling; Inter Register Signaling; Common Channel Signaling Principles-General Signaling Networks; CCITT Signaling System Number 6; CCITT Signaling System Number 7; The High Level Data Link Control Protocol; Signal Units; The Signaling Information Field.

UNIT-IV:
Packet Switching: Introduction; Statistical Multiplexing; Local Area And Wide Area Networks-Bus Networks; Ring Networks; Comparison of Bus and Ring Networks; Optical Fiber Networks; Large Scale Networks-General; Datagrams and Virtual Circuits; Routing; Flow Control; Standards; Frame Relay; Broadband Networks-General; The Asynchronous Transfer Mode; ATM Switches.

UNIT-V:

Networks: Introduction; Analog Networks; Integrated Digital Networks; Integrated Services Digital Networks; Cellular Radio Networks; Intelligent Networks; Private Networks; Charging; Routing – General, Automatic Alternative Routing.

Text Books

1. J. E Flood, "Telecommunications Switching and Traffic Networks," Pearson Education, 2006.
2. Tyagarajan Viswanathan, "Telecommunications Switching Systems and Networks," Prentice Hall of India Pvt. Ltd., 2006.

Reference Books

1. John C Bellamy, "Digital Telephony," John Wiley International Student Edition,3rd Edition, 2000.
2. Behrouz A. Forouzan, "Data Communications and Networking," TMH, 2nd Edition, 2002.
3. Tomasi," Introduonction to Data Communication and Networking," Pearson Education, 1st Edition, 2007.

Course Outcomes:

On completion of this course, it is expected that the student will be able to:

- Understand the physical configurations of telecommunication network evaluate.
- Different switching networks scwsed
- Analyze recommendations of CCITT
- Understand use and implementation of packet switching.
- Evaluate advance cellular networks.

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VAAGDEVI COLLEGE OF ENGINEERING
AUTONOMOUS

(B18CS52) OOPS THROUGH JAVA
(Professional Elective – I)

B.Tech. ECE V Semester **L T P C**
3 0 0 3

Pre-Requisites: Data Structures through C++

Course Objectives:
Modern Computerization methods have matured in the problem solving aspects and presently use the concepts of object oriented treatment of issues. Data sets are used with more functional aspects using the concept of classes and objects with a distinct programming methodology which has become predominant. Many other important software development techniques are based upon the fundamental ideas employed in object-oriented programming. The CSE students are already exposed to preliminaries using C++. Now this course introduces Java and OOPs programming at a higher platform.

UNIT-I
OOP Concepts: Data Abstraction, Encapsulation, Inheritance, Benefits of inheritance, Polymorphism, Classes and Objects, Procedural and Object oriented Programming paradigms.
Java Programming: History of Java, Comments, Data Types, Variables, Constants, Scope and Life Time of Variable, Operators, Operator Hierarchy, Expressions, Type Conversion and Casting, Enumerated Types, Control Flow-Block Scope, Conditional Statements, loops, break, continue statements, simple java stand alone programs, arrays, console input and output, formatting output, constructors, methods, parameter passing, static fields and methods, access control, this reference, overloading methods and Constructors, recursion, garbage collection, Nested Classes, Inner Classes.

UNIT-II
Inheritance: Inheritance hierarchies super and sub classes, Member access rules, super keyword, method over riding, preventing Inheritance: final classes and methods, the Object class and its methods.
Interfaces- Interfaces vs. Abstract classes, defining an interface, implementing interfaces, accessing implementations through interface references, extending interface.
Packages- Defining, Creating and Accessing a Package, Understanding CLASSPATH, importing Packages.

UNIT-III
Exception Handling- Dealing with Errors, benefits of Exception Handling, the classification of exceptions-exception Hierarchy, checked exceptions and unchecked exceptions, Usage of try, catch, throw, throws and finally, re-throwing exceptions, exception specification, built in exceptions, creating own exception sub classes.(TextBook-1: PageNumber:207-225)
Files- streams-byte streams, character streams, text Input/output, binary input/output random access file operations, File management using File class, exploring String Class.

UNIT-IV
Collection Framework in Java- Introduction to Java Collections, Overview of Java Collection Frame work, Generics, Commonly used Collection classes-Array List, Vector, Hash Table, Stack, Enumeration, Iterator, String Tokenizer, Random, Scanner, calendar and Properties.
Multi Threading- Differences between multiple processes and multiple threads, thread states, creating threads, interrupting threads, thread priorities, synchronizing threads, inter-thread communication, producer consumer pattern.

UNIT-V
GUI Programming with Java- The AWT class Hierarchy, Introduction to Swing, Swing vs. AWT, Hierarchy for Swing Components, Containers- JFrame, JApplet, JDialog, JPanel, Overview of some swing

components- JButton, JLabel, JTextField, JTextArea, simple swing applications, Layout Management-Layout manager types-border, grid and flow. (TextBook-1 PageNumbers: 735-820, 965-990).

Event Handling- Events, Event Sources, Event classes, Event Listeners, Relationship between Event sources and Listeners, Delegation event model, Examples: handling a button click, handling mouse events, Adapter classes. (TextBook-1 PageNumbers: 707-729).

Applets: Inheritance hierarchy for applets, differences between applets and applications, Life Cycle of an applet, passing parameters to applets, applet security issues.

TEXT BOOKS:

1. Java The Complete Reference, 8th Edition. Hebert Schildt. Indian edition.

Reference books

1. Java for Programmers, P.J. Dietel and H.M Dietel,Peearson Education (OR) JAVA: How to Program P.J. Dietel and H.M. Dietel, PHI.
2. Object Oriented Programming through Java, P. Radha Krishna, University Press.
3. Thinking in Java, Bruce Ecel, Pearson Education
4. Programming in Java, S. Malhotra and S. Choudary, Oxford Univ. Press.

Course Outcomes:

- A strong foundation in core Computer Science and Engineering, both theoretical and applied concepts.
- An ability to apply knowledge of mathematics, science, and engineering to real-world problems.
- Ability to model, understand, and develop complex software for System Software as well as Application Software.
- An ability to function effectively within teams.
- An ability to communicate effectively, both in writing and oral.
- The broad education necessary to understand the impact of Computer Science and Engineering solutions in the scientific, societal, and human contexts.

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VAAGDEVI COLLEGE OF ENGINEERING
AUTONOMOUS

(B18MB01) MANAGERIAL ECONOMICS & FINANCIAL ANALYSIS

B.Tech. ECE V Semester **L T P C**
3 0 0 3

Pre Requisites: None

Course Objectives:
To enable the student to understand and appreciate, with a practical insight, the importance of certain basic issues governing the business operations namely. Demand and supply, production function, cost analysis, markets forms of business organizations, capital budgeting and financial accounting and financial analysis by using ratios.

UNIT – I
Introduction to Managerial Economics: Definition, Nature and Scope Managerial Economics Demand Analysis: Demand Determinants, Law of Demand and its exceptions, Definition, Types, Measurement and Significance of Elasticity of Demand. Demand Forecasting, Factors governing demand forecasting, methods of demand forecasting (survey methods, statistical methods, expert opinion method, test marketing, controlled experiments, judgmental approach to demand forecasting)

UNIT – II
Production and Cost Analysis: Production Function – Isoquants and Isocosts, MRTS, Least Cost Combination of Inputs, Production function, Laws of Returns, Internal and External Economies of Scale. Cost Analysis: Cost concepts, Opportunity cost, Fixed Vs. Variable costs, Explicit costs Vs.Implicit costs, Out of pocket costs vs. Imputed costs. Break-even Analysis (BEA)-Determination of Break-Even Point (simple problems)-Managerial Significance and limitations of BEA.

UNIT – III
Introduction to Markets & Pricing strategies: Market structures: Types of competition, Features of Perfect competition, Monopoly and Monopolistic Competition. Price-Output Determination in case of Perfect Competition and Monopoly. Pricing Strategies, Business & New Economic Environment: Characteristic features of Business, Features and evaluation of Sole Proprietorship, Partnership, Joint Stock Company, Public Enterprises and their types, Changing Business Environment in Post-liberalization scenario.

UNIT – IV
Capital and Capital Budgeting: Capital and its significance, Types of Capital, Estimation of Fixed and Working capital requirements, Methods and sources of raising finance, Nature and scope of capital budgeting, features of capital budgeting proposals, methods of Capital Budgeting: Payback Method, Accounting Rate of Return (ARR) and Net Present Value Method (simple problems)

UNIT – V
Introduction to Financial Accounting & Financial Analysis: Double-Entry Book Keeping, Journal, Ledger, Trial Balance – Final Account (Trading Account, Profit and Loss Account and Balance Sheet with simple adjustments.) Computation, Analysis and Interpretation of Liquidity Ratios (Current Ration and quick ratio), Activity Ratios (Debt-Equity ratio, Interest Coverage ratio), and Profitability ratios (Gross Profit Ratio, Net Profit ratio, Operating Ratio, P/E Ratio and EPS).

Text Books:
Aryasri: Managerial Economics and Financial Analysis, 2/e, TMH, 2005.
Varshney & Maheswari: Managerial Economics, Sultan Chand, 2003.

Reference Books

1) Ambrish Gupta, Financial Accounting for Management, Pearson Education, New Delhi, 2004.
2) Shim & Siegel: Financial Accounting (Schaum's Outlines), 2/e TMH, 2004
3) Chary: Production and Operations Management, 3/e, TMH, 2004.
4) Domnick Salvatore: Managerial Economics In a Global Economy, 4th Edition, Thomson, 2003.
5) Narayanaswamy: Financial Accounting-A Managerial Perspective, PHI, 2005.
6) Peterson & Lewis: Managerial Economics, 4th Edition, Pearson Education, 2004.
7) Raghunatha Reddy & Narasimhachary: Managerial Economics & Financial Analysis, Scitech, 2005.
8) S.N.Maheswari & S.K. Maheswarial, Financial Accounting, Vikas, 2005.
9) Truet and Truet: Managerial Economics: Analysis, Problems and Cases, Wiley, 2004.
10) Dwivedi: Managerial Economics, 6th Ed., Vikas, 2002.
11) Yogesh Maheswari: Managerial Economics, 2nd Ed., PHI, 2005

Course Outcomes:

- Understand the nature, scope and importance of Managerial Economics.
- Know what is demand, analyze demand and how elasticity of demand is used for pricing decisions and to evaluate methods for forecasting demand.
- Know how production function is carried out to achieve least cost combination of Inputs and how to analyze cost.
- Understand the characteristics of different kinds of markets and outline different form of business organization and analyze how capital budgeting techniques are used for investment decisions.
- Know how to prepare final accounts and how to interpret them, analyze and interpret financial statements using ratio analysis.

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VAAGDEVI COLLEGE OF ENGINEERING
AUTONOMOUS

(B18EC18) LDIC LAB

B.Tech. ECE V Semester **L T P C**
0 0 3 1.5

Pre Requisites: None

Course Objects

- To design and analyses of adder, subtractor using IC741.
- To understand the operations of differentiator and integrator using IC 741.
- To design and analyses of active filer.
- To construct and understand of the different multivibrator using IC 555.
- To construct and analyses different waveform generators IC741.
- To understand and verification of various 74 series TTL.

Part A : TO VERIFY THE FOLLOWING FUNCTIONS

1) Adder, Subtractor, Comparator using IC 741 Op-Amp.
2) Integrator and Differentiator using IC 741 Op-Amp.
3) Design Active Low Pass & High Pass Filter
4) RC Phase shift and Wien Bridge Oscillators using IC741 Op-Amp
5) IC 555 Timer in Monostable operation
6) Schmitt trigger circuits using IC 741 & IC 555.
7) IC 565- PLL Applications.
8) Voltage Regulator using IC 723.

EQUIPMENT REQUIRED:

1. 20 MHz / 40 MHz / 60 MHz Oscilloscope.
2. 1 MHz Function Generator (Sine, Square, Traingular and TTL).
3. Regulated Power Supply.
4. Multimeter / Volt Meter.

Part B : TO VERIFY THE FUNCTIONALITY of the following 74 series TTL ICs.

1) D Flip-Flop (74S74) and JK Master-Slave Flip-Flop (74LS73)
2) Decade counter (74LS90) and UP-Down Counter (74LS192)
3) 3-8 decoder – 74LS138.
4) 4 bit comparator 74LS85.
5) 8X1 Multiplexer – 74151
6) 2x4 demultiplexer – 74155

Course Outcomes

At the end of the lab

- Design circuits using operational amplifiers for various applications practically.
- Understand the different logical gates & decoders, flip-flops.
- Apply the knowledge of OP-AMPS to design various analog circuits.
- Compare linear and digital integrated IC's

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VAAGDEVI COLLEGE OF ENGINEERING
AUTONOMOUS

(B18EC19) DIGITAL SIGNAL PROCESSING LAB

B.Tech. ECE V Semester

L	T	P	C
0	0	2	1

Pre Requisites: None

Course Objectives:

- To study the designs and structures of digital (IIR & FIR) filters from analysis to synthesis for a given specifications.
- To acquaint in FFT algorithms, multi-rate signal processing techniques.
- To provide background and fundamental material for the analysis and processing of digital signals.

Note:

- Minimum of 12 experiments are to be conducted.
- The programs shall be implemented in software (using MATLAB/Scilab/labview/ c programming/OCTAVE equivalent) and hardware (using/TI/Analog device/ Motorla/ Equivalent DSP processors).

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 given 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
7. Implementation of HP FIR filter for a given sequence
8. Implementation of LP IIR filter for a given sequence
9. Implementation of HP IIR filter for a given sequence
10. Generation of Sinusoidal signal through filtering
11. Generation of DTMF signals
12. Implementation of Decimation Process
13. Implementation of Interpolation Process
14. Implementation of I/D sampling rate converters
15. Audio application such as to plot a time and frequency display of microphone plus a cosine using DSP. Read a .wav file and match with their respective spectrograms.
16. Noise removal: Add noise above 3 KHz and then remove, interference suppression using 400 Hz tone.
17. Impulse response of first order and second order systems.

Course Outcomes:

- Analyze signals using the discrete Fourier transform (DFT).
- Understand circular convolution, its relationship to linear convolution, and how circular convolution can be achieved via the discrete Fourier transform.
- Analyze the decimation in time and frequency FFT algorithms for efficient computation of the DFT.
- Design digital filters on paper and implement the design by using MATLAB.

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VAAGDEVI COLLEGE OF ENGINEERING
AUTONOMOUS

(B18CS54)COMPUTER NETWORKS LAB

B.Tech. ECE V Semester **L T P C**
0 0 3 1.5

Pre Requisites: None

Course Objectives:
1. To understand the working principle of various communication protocols.
2. To understand the network simulator environment and visualize a network topology and observe its performance
3. To analyze the traffic flow and the contents of protocol frames

List of Experiments:
1. Implement the data link layer framing methods such as character, character-stuffing and bit stuffing.
2. Write a program to compute CRC code for the polynomials CRC-12, CRC-16 and CRC CCIP
3. Develop a simple data link layer that performs the flow control using the sliding window protocol, and loss recovery using the Go-Back-N mechanism.
4. Implement Dijsktra's algorithm to compute the shortest path through a network
5. Take an example subnet of hosts and obtain a broadcast tree for the subnet.
6. Implement distance vector routing algorithm for obtaining routing tables at each node.
7. Implement data encryption and data decryption
8. Write a program for congestion control using Leaky bucket algorithm.
9. Write a program for frame sorting technique used in buffers.
10. Wireshark
    i. Packet Capture Using Wire shark
    ii. Starting Wire shark
    iii. Viewing Captured Traffic
    iv. Analysis and Statistics & Filters.
11. How to run Nmap scan
12. Operating System Detection using Nmap
13. Do the following using NS2 Simulator
    i. NS2 Simulator-Introduction
    ii. Simulate to Find the Number of Packets Dropped
    iii. Simulate to Find the Number of Packets Dropped by TCP/UDP
    iv. Simulate to Find the Number of Packets Dropped due to Congestion
    v. Simulate to Compare Data Rate& Throughput.
    vi. Simulate to Plot Congestion for Different Source/Destination
    vii. Simulate to Determine the Performance with

Course Outcomes:
1. Implement data link layer farming methods
2. Analyze error detection and error correction codes.
3. Implement and analyze routing and congestion issues in network design.
4. Implement Encoding and Decoding techniques used in presentation layer
5. To be able to work with different network tools

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VAAGDEVI COLLEGE OF ENGINEERING
AUTONOMOUS

(B18MC09) HUMAN VALUES AND PROFESSIONAL ETHICS

B.Tech : V SEMESTER **L T P C**
0 0 2 0

Pre-requisites: NONE
Course Objectives:

- To help the students appreciate the essential complementarity between 'VALUES' and 'SKILLS' to ensure sustained happiness and prosperity which are the core aspirations of all human beings.
- To facilitate the development of a Holistic perspective among students towards life, profession and happiness, based on a correct understanding of the Human reality and the rest of existence. Such a holistic perspective forms the basis of Value based living in a natural way.
- To highlight plausible implications of such a Holistic understanding in terms of ethical human conduct, trustful and mutually satisfying human behaviour and mutually enriching interaction with Nature.

Unit-I Human Values: Morals, values, ethics – integrity – work ethics – service learning – civic virtue – respect for others – living peacefully – Caring – sharing – honesty – courage – valuing time – cooperation – commitment – empathy – self-confidence – spirituality – character.
Unit II Professional Ethics: Profession and professionalism – Two models of professionalism – Professional etiquette – Three types of Ethics or morality Responsibility in Engineering standards – Engineering Ethics – Positive and Negative faces.
Unit III Professional Responsibilities: Ethical standards Vs Professional Conduct – Zero Tolerance for Culpable Mistakes – Hazards and Risks- Risk benefit analysis-congeniality, collegiality and loyalty. Respect for authority – conflicts of interest – occupational crime.
Unit IV Professional Rights: Professional rights and employee rights communicating risk and public policy – Whistle blowing – Collective bargaining. Professionals /engineers as managers, advisors, experts, witnesses and consultants – moral leadership-
Unit V Ethics in global context: Global issues in MNCs-Problems of bribery, extortion, and grease payments – Problem of nepotism, excessive gifts.
Course Outcomes:
After the completion of this course, the students should be able to

- Perceive the importance of ethics and values in life and society.
- Develop moral responsibility and mould them as best professionals.
- Create ethical vision and achieve harmony in life.
- Provide a critical perspective on the socialization of men and women.
- Perceive the important issues related to gender in contemporary India.

TEXT BOOK:

1. Aryasri, *Human Values and Professional Ethics*, Maruthi Publications.

REFERENCE BOOKS:

1. S B George, *Human Values and Professional Ethics*, Vikas Publishing.
2. KR Govindam & Saenthil Kumar *Professional Ethics and Human Values*, Anuradha Publications.
3. S K Chakraborthy & D Chakraborthy: *Human Values and Ethics*, Himalaya.
4. M. Govindarajan, S. Natarajan, & V.S. Senthilkumar: *Engineering Ethics (Includes Human Values)*, HI Learning Pvt. Ltd., New Delhi -110001.

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VAAGDEVI COLLEGE OF ENGINEERING
AUTONOMOUS

(B18EC20) MICROPROCESSORS AND MICROCONTROLLERS

B.Tech. ECE VI Semester **L T P C**
3 1 0 4

Pre Requisites: Computer Organization

Course Objectives:
The course objectives are:
- To develop an in-depth understanding of the operation of microprocessors and microcontrollers, machine language programming & interfacing techniques.

Unit I Architecture of Microprocessors
Introduction to Microprocessors & Microcontrollers and. Overview of 8085 microprocessor. Overview of 8086 microprocessor. Signals and pins of 8086 microprocessor. Physical memory organization, maximum mode & minimum mode with timing diagrams.

Unit II Assembly language of 8086
Machine language Instruction format, Addressing modes, Instruction set of 8086, Assembler Directives and Operators, Assembly software programs with algorithms

Unit III Interfacing with 8086
Interfacing with RAMs, ROMs Interfacing with peripheral ICs like 8255, 8279, etc. Interfacing with key boards, ADCs, and DACs serial data transfer schemes USART 8251 serial data communication, interrupt vector table, interrupt structure with 8259 etc.

Unit IV introduction to microcontrollers: overview of 8051 microcontroller, architecture, Input ports, memory organization, addressing modes and instruction set of 8051, simple programs

Unit V 8051 Real time control: programming timer interrupts, programming external hardware interrupts, programming the serial communication interrupt, programming 8051 timers and counters.

Text Books:
1. D. V. Hall, Microprocessors and interfacing, TMGH, 2nd Edition 2006
2. Kenneth. J. Ayala, The 8051 microcontroller, 3rd ed.,cengage learning.

Reference Books
1. Ramesh S.Gaonkar, “Microprocessor - Architecture, Programming and Applications with the 8085”, Penram International publishing private limited, fifth edition.
2. Doughlas V Hall, “Digital Systems and Microprocessors”, McGraw Hill. 3rd Edition 2003
3. A.K. Ray & K.M.Bhurchandi, “Advanced Microprocessors and peripherals- Architectures, Programming and Interfacing”, TMH, 2002 reprint.
4. Mohamed Ali Mazidi, Janice Gillispie Mazidi, “The 8051 microcontroller and embedded systems”, Pearson education, 2004.

Course Outcomes:

Upon completion of the course:

- Illustrate the internal organization of popular 8086/8051 microprocessors/microcontrollers.
- Contrast hardware and software interaction and integration.
- Design microprocessors and microcontrollers based systems and develop microcontroller based systems for real time applications
- Develop knowledge about microcontroller 8051 and its programming.
- Explain the Memory organization, classification and their applications and
- Assess programming, interfacing etc of various devices with microprocessors and external world.

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VAAGDEVI COLLEGE OF ENGINEERING
AUTONOMOUS

(B18EC21) VLSI DESIGN

B.Tech. ECE VI Semester **L T P C**
3 0 0 3

Pre Requisites: Electronic Devices and Circuits & Linear & Digital IC Applications

Course Objectives
- Give exposure to different steps involved in the fabrication of ICs using MOS transistor, CMOS/BICMOS transistors and passive components.
- Explain electrical properties of MOS and BICMOS devices to analyze the behavior of inverters designed with various loads.
- Give exposure to the design rules to be followed to draw the layout of any logic circuit.
- Provide concept to design different types of logic gates using CMOS inverter and analyze their transfer characteristics. Provide design concepts to design building blocks of data path of any system using gates.
- Understand basic programmable logic devices and testing of CMOS circuits.

UNIT –I:
Introduction: Introduction to IC Technology – MOS, PMOS, NMOS, CMOS & BiCMOS
Basic Electrical Properties: Basic Electrical Properties of MOS and BiCMOS Circuits: I_{ds}-V_{ds} relationships, MOS transistor threshold Voltage, g_m, g_{ds}, Figure of merit ωo; Pass transistor, NMOS Inverter, Various pull ups, CMOS Inverter analysis and design, Bi-CMOS Inverters.

UNIT -II:
VLSI Circuit Design Processes: VLSI Design Flow, MOS Layers, Stick Diagrams, Design Rules and Layout, 2 m CMOS Design rules for wires, Contacts and Transistors Layout Diagrams for NMOS and CMOS Inverters and Gates, Scaling of MOS circuits.

UNIT –III:
Gate Level Design: Logic Gates and Other complex gates, Switch logic, Alternate gate circuits, Time delays, Driving large capacitive loads, Wiring capacitance, Fan – in, Fan – out, Choice of layers.

UNIT -IV:
Data Path Subsystems: Subsystem Design, Shifters, Adders, ALUs, Multipliers, Parity generators, Comparators, Zero/One Detectors, Counters.
Array Subsystems: SRAM, DRAM, ROM, Serial Access Memories.

UNIT -V:
Programmable Logic Devices: PLAs, FPGAs, CPLDs, Standard Cells, Programmable Array Logic, Design Approach, Parameters influencing low power design.
CMOS Testing: CMOS Testing, Need for testing, Test Principles, Design Strategies for test, Chip level Test Techniques.

TEXT BOOKS:
1. Essentials of VLSI circuits and systems – Kamran Eshraghian, Eshraghian Dougles and A. Pucknell, PHI, 2005 Edition
2. CMOS VLSI Design – A Circuits and Systems Perspective, Neil H. E Weste, David Harris, Ayan Banerjee, 3rd Ed, Pearson, 2009.
3. VLSI Design – M. Michael Vai, 2001, CRC Press.

Reference Books

1. Introduction to VLSI Systems: A Logic, Circuit and System Perspective – Ming-BO Lin, CRC Press, 2011
2. CMOS logic circuit Design - John .P. Uyemura, Springer, 2007.
3. Modern VLSI Design - Wayne Wolf, Pearson Education, 3rd Edition, 1997.
4. VLSI Design- K .Lal Kishore, V. S. V. Prabhakar, I.K International, 2009.
5. Introduction to VLSI – Mead & Convey, BS Publications, 2010.

Course Outcomes

Upon successfully completing the Course, the student should be able to:

- Understand IC technology and basic electrical properties of MOS and BiCMOS.
- Design the layout circuits using various design rules.
- Develop and design the gate level circuits
- Gain the knowledge to design data path subsystems like Adders, Shifters, ALUs etc.
- Illustrate different programmable logic devices and CMOS testing.

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VAAGDEVI COLLEGE OF ENGINEERING
AUTONOMOUS

(B18EC22) ANTENNAS AND WAVE PROPAGATION

B.Tech. ECE VI Semester **L T P C**
3 0 0 3

Pre Requisites: Electromagnetic Theory and Transmission Lines.

Course Objectives:

- Understand basic terminology and concepts of Antennas.
- To attain knowledge on the basic parameters those are considered in the antenna design process and the analysis while designing that.
- Analyze the electric and magnetic field emission from various basic antennas and mathematical formulation of the analysis.
- To have knowledge on antenna operation and types as well as their usage in real time field.
- Aware of the wave spectrum and respective band antenna usage and also to know the propagation of the waves at different frequencies through different layers in the existing layered free space environment structure.

Unit I: Antenna Fundamentals

Radiation mechanism-single wire, two wire, dipole and current distribution on thin wire. Radiated field components -Hertizan dipole, half wave dipole, monopole antenna. Antenna Parameters- radiation pattern, beam width, field region, radiation power density, directivity and gain, bandwidth, polarization, input impedance, efficiency, antenna effective length and area, antenna temperature.

Unit II: Design of Arrays

Linear Array - Two element array, N-element linear array- broadside array, End fire array- Directivity, radiation pattern. pattern multiplication. Non-uniform excitation- Binomial, Chebyshev distribution Planar array – Array factor, Circular array - array factor, Directivity (Qualitative study). Measurements - radiation pattern- gain- directivity and impedance measurements.

Unit III: Design of Antennas

Wire Antennas- long wire, V-Antenna, Rhombic antenna, Helical antenna, folded dipole and their characteristics,Yagi-Uda antenna. Frequency independent antenna - spiral and log periodic antenna. Aperture antennas – Horn antenna, Parabolic reflector antenna, Micro strip antenna. MEMS antenna.

Unit IV Wave Propagation

Wave Propagation - I: Propagation Mechanism- Reflection, refraction and Transmission, Scattering and diffraction.Propagation Model- Path Loss, Free space loss, Plane earth Loss, Different Modes of Wave Propagation, Ground Wave Propagation (Quantitative Treatment) - Introduction, Plane Earth Reflections, Space and Surface Waves, Wave Tilt, Curved Earth Reflections, Space Wave Propagation - Introduction, Field Strength Variation with Distance and Height, Effect of Earth's Curvature, Absorption, Super retraction, M-Curves and Duct Propagation, Scattering Phenomena, Tropospheric Propagation.

UNIT - V:

Wave Propagation - II: Sky Wave Propagation - Introduction, 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. Fading of signal -Types of fading- Diversity reception.

Text Books

1. Antennas for All Applications – John D. Kraus and R. J. Marhefka, and Ahmad S. Khan TMH, New Delhi, 4th ed., (Special Indian Edition) 2010.
2. Electromagnetic Waves and Radiating Systems – E.C. Jordan and K.G. Balmain, PHI, 2nd ed., 2000.

Reference Books:

1. Antennas and Wave Propagation – K.D. Prasad, Satya Prakashan, Tech India Publications, New Delhi, 2001.
2. Transmission and Propagation – E.V.D. Glazier and H.R.L. Lamont, The Services Text Book of Radio, vol. 5, Standard Publishers Distributors, Delhi.
3. Electronic and Radio Engineering – F.E. Terman, McGraw-Hill, 4th edition, 1955.
4. Antennas – John D. Kraus, McGraw-Hill (International Edition), 2nd Ed. 1988.
5. Antenna Theory - C.A. Balanis, John Wiley & Sons, 3rd ed., 2005.

Course Outcomes:

Student will be:

- Define the parameters like antenna efficiency, beam efficiency, radiation resistance etc. in the design of an antenna.
- Explain the designed antenna and field evaluation under various conditions and formulate the electric as well as the magnetic fields Equation set for Far field and near field conditions.
- Design a lens structure and also the bench step for antenna parameter measurement of testing for their effectiveness.
- Analyse the Electric and Magnetic field emission from various basic antennas and mathematical formulation of the analysis
- Understand the design issues, operation of fundamental antennas like Yagi-Uda, Horn antennas and helical structure and also their operation methodology in practice.

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VAAGDEVI COLLEGE OF ENGINEERING
AUTONOMOUS

(B18EC23) BIOMEDICAL INSTRUMENTATION
(Professional Elective – II)

B.Tech. ECE VI Semester

L	T	P	C
3	0	0	3

Pre Requisites: Electronic Measurements& Instrumentation

Course Objectives

The following are the course objectives

- To study bioamplifier, biosignals and measurement of physiological parameters.
- To know about different bioelectrodes and activities of heart.
- To understand therapeutic and cardic instrumentation.
- To study EEG and EMG machines, recordings and interpretations.

UNIT-I

Components of Medical Instrumentation System: Bloamplifier, Static and Dynamic Characteristics of Medical Instruments, Biosignals and Characteristics, Problems encountered with Measurements from Human beings. Organization of Cell, Derivation of Nernst equation for Membrane Resting Potential Generation and Propagation of Action Potential, Conduction through Nerve to Neuromuscular Junction.

UNIT -II

Bio Electrodes: Biopotential Electrodes-External Electrodes, Internal Electrodes, Biochemical Electrodes. Mechanical Function, Electrical Conduction System of the Heart, Cardiac Cycle, Relation between Electrical and Mechanical Activities of the Heart.

UNIT -III

Cardiac Instrumentation: Blood Pressure and Blood Flow Measurement, Specification of ECG Machine, Einthoven Triangle, Standard 12-Lead Configurations, Interpretation of ECG waveform with respect to Electro Mechanical Activity of the Heart.

UNIT -IV

Therapeutic Equipment: Pacemaker, Defibrillator, Shortwave Diathermy, Hemodialysis Machine.
Respiratory Instrumentation: Mechanism of Respiration, Spirometry, Pnemuotachograph Ventilators.

UNIT -V

Neuro-Muscular Instrumentation: Specification of EEG and EMG Machines, Electrode Placement for EEG and EMG Recording, Interpretation of EEG and EMG.

Text Books

1. Biomedical Instrumentation and Measurements — by Leslie Cromwell, F.J. Weibell, E.A. Pfeiffer, PHI.
2. Medical Instrumentation, Application and Design — by John G.Webster, John Wiley.

Reference Books

1. Principles of Applied Biomedical Instrumentation — by L.A. Geoddes and L.E. Baker, John Wiley and Sons.
2. Hand-book of Biomedical Instrumentation — by R.S. Khandpur, McGraw-Hill, 2003.
3. Biomedical Telemetry — by Mackay, Stuart R., John Wiley.

Course Outcomes

At the end of the course, the student will be able to

- Understand the functions of bio amplifiers, characteristics of medical instruments and bio signals.
- Discuss the various internal, external Bio electrodes and relations between electrical and mechanical activities of heart.
- Compare various concepts of Cardiac Instrumentation and gain the knowledge about
- Analyze the Therapeutic Equipment and their operation.
- Acquires knowledge about neuro-muscular Instrumentation like ECG EMG and EEG.

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VAAGDEVI COLLEGE OF ENGINEERING
AUTONOMOUS

(B18CS57) DATA COMMUNICATIONS NETWORKS
(Professional Elective – II)

B.Tech. ECE VI Semester

L	T	P	C
3	0	0	3

Pre-requisites: None

Objectives:
- To expose the students to the basic principles of the technology of data communications and networking.
- To understand the concept of data communication and its components.
- To comprehend the use of different types of transmission media and network devices, error detection and correction in transmission of data.
- To understand the concept of flow control, error control, LAN protocols and functions performed by Network Management System.

UNIT-I: Introduction
Introduction: Data Communications, Networks, The Internet, Protocols and Standards, Network Models, Layered Tasks, The OSI Model, TCP/IP Protocol Suite, Addressing.
Physical Layer and Media: Data and Signals, Analog and Digital.
Transmission Media: Guided Media, Unguided Media.

UNIT-II: Data Link Layer
Data link layer: Error Detection and Correction, Framing, Flow and Error Control, Protocols, Noiseless Channels, Noisy Channels, HDLC, Point to Point Protocol, Multiple Access, Random Access, Controlled Access, Channelization,
Wired LANs : Ethernet **Wireless LANs :**IEEE 802.11, Bluetooth.
Network Devices :Repeaters, Hubs, Bridges, Switches, Routers, and Gateways.
Sonet/SDH: Architecture, Sonet Layers, Sonet Frames, **Virtual Circuit Networks:** Frame Relay and ATM, Frame Relay, ATM, ATM LANs.

UNIT-III: Network Layer
Network Layer: Logical Addressing, IPv4 Addresses, **CIDR, Subnets, Classfull and special addressing,** IPv6 Addresses, Transition from IPv4 to IPv6, Network Layer: Address Mapping, Error Reporting and Multicasting, Address Mapping, ICMP, IGMP, ICMPv6,
Network Layer: Delivery, Forwarding, Unicast Routing Protocols, Multicast Routing Protocols.

UNIT-IV: Transport Layer
Transport Layer: Process to Process Delivery: UDP, TCP and SCTP, Data Traffic, Congestion, Congestion Control, Two Examples, Quality of Service, Techniques to improve QoS.

UNIT-V:Application Layer
APPLICATION LAYER : DNS,The DNS Name Space, Domain Resource Records, Name Servers, **ELECTRONIC MAIL**- Architecture and Services, The User Agent, Message Formats ,Message Transfer, Final Delivery, The World Wide Web, Architectural Overview, Static Web Pages, Dynamic Web Pages and Web Applications, HTTP—The Hypertext Transfer Protocol, The Mobile Web, Web Search.

Course Outcomes:

CO-1: A strong foundation in core Computer Science and Engineering, both theoretical and applied concepts.
CO-2: An ability to apply knowledge of mathematics, science, and engineering to real-world problems.
CO-7: The broad education necessary to understand the impact of Computer Science and Engineering solutions in the scientific, societal, and human contexts.
CO-8: A recognition of the need for, and an ability to engage in life-long learning.

Text Books

1. Data Communications and Networking, Fourth Edition by Behrouza A.Forouzan,TMH.
2. Computer Networks,A.S.Tanenbaum,5th edition,Pearson education

Reference Books

1. Introduction to Data communications and Networking,W.Tomasi,Pearson education.
2. Data and Computer Communications,G.S.Hura and M.Singhal,CRC Press,Taylor and Francis Group.
3. An Engineering Approach to Computer NetworksS. Keshav,2nd Edition,Pearson Education.
4. Understanding communications and Networks, 3rd Edition, W.A.Shay,Cengage Learning.

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VAAGDEVI COLLEGE OF ENGINEERING
AUTONOMOUS

(B18EC24) DIGITAL IMAGE PROCESSING
(Professional Elective – II)

B.Tech. ECE VI Semester **L T P C**
3 0 0 3

Pre Requisites: None

Course Objectives
Provide the student with the fundamentals of digital image processing.

- Give the students a taste of the applications of the theories taught in the subject. This will be achieved through the project and some selected lab sessions. Introduce the students to some advanced topics in digital image processing.
- Give the students a useful skill base that would allow them to carry out further study should they be interested and to work in the field.

UNIT- I
Digital Image Fundamentals & Image Transforms: Digital Image Fundamentals, Sampling and Quantization, Relationship between Pixels,
Image Transforms: 2-D FFT, Properties, Walsh Transform, Hadamard Transform, Discrete Cosine Transform, Haar Transform, Slant Transform, Hotelling Transform.

UNIT -II
Image Enhancement (Spatial Domain): Introduction, Image Enhancement in Spatial Domain, Enhancement Through Point Operation, Types of Point Operation, Histogram Manipulation, Linear and Non — Linear Gray Level Transformation, Local or Neighborhood Operation, Median Filter, Spatial Domain High-Pass Filtering.
Image Enhancement (Frequency Domain): Filtering in Frequency Domain, Obtaining Frequency Domain Filters from Spatial Filters, Generating Filters Directly in the Frequency Domain, Low Pass (Smoothing) and High Pass (Sharpening) Filters in Frequency Domain.

UNIT -III
Image Restoration: Degradation Model, Algebraic Approach to Restoration, Inverse Filtering, Least Mean Square Filters, Constrained Least Squares Restoration, Interactive Restoration.

UNIT-IV
Image Segmentation: Detection of Discontinuities, Edge Linking And Boundary Detection, Thresholding, Region Oriented Segmentation.
Morphological Image Processing: Dilation and Erosion: Dilation, Structuring Element Decomposition, Erosion, Combining Dilation and Erosion, Opening and Closing, The Hit or Miss Transformation.

UNIT-V
Image Compression: Redundancies and their Removal Methods, Fidelity Criteria, Image Compression Models, Huffman and Arithmetic Coding, Error Free Compression, Lossy Compression, Lossy and Lossless Predictive Coding, Transform Based Compression, JPEG 2000 Standards.

Text Books
1. Digital Image Processing – Rafael C. Gonzalez, Richard E. Woods, 3rd Edition, Pearson, 2008
2. Digital Image Processing- S Jayaraman, S Esakkirajan, T Veerakumar- TMH, 2010.

Reference Books

1. Digital Image Processing and Analysis-Human and Computer Vision Application with using CVIP Tools – Scotte Umbaugh, 2nd Ed, CRC Press, 2011
2. Digital Image Processing using MATLAB — Rafael C. Gonzalez, Richard E Woods and Steven L. Eddings, 2nd Edition, TMH, 2010.
3. Fundamentals of Digital Image Processing — A.K.Jain, PHI, 1989
4. Digital Image Processing and Computer Vision — Somka, Hlavac, Boyle- Cengage Learning (Indian edition) 2008.
5. Introductory Computer Vision Imaging Techniques and Solutions- Adrian low, 2008, 2nd Edition
6. Introduction to Image Processing & Analysis — John C. Russ, J. Christian Russ, CRC Press, 2010.
7. Digital Image Processing with MATLAB & Labview — Vipula Singh, Elsevie r.

Course Outcomes

- Gain the knowledge of digital image fundamentals and image transforms.
- Discuss the analysis of image enhancement in spatial and frequency domain.
- Understand the different methods to restore an image.
- Inspect different image segmentation techniques and understand morphological image processing.
- Analyze the different image compression techniques.

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VAAGDEVI COLLEGE OF ENGINEERING
AUTONOMOUS

(B18EC25) RADAR SYSTMES
(Professional Elective – III)

B.Tech. ECE VI Semester

L	T	P	C
3	0	0	3

Pre Requisites: None

Course Objectives

- Radar fundamentals and analysis of the radar signals.
- To understand various technologies involved in the design of radar transmitters and receivers.
- To learn various radars like MTI, Doppler and tracking radars and their comparison.

UNIT —I

Basics of Radar: Introduction, Maximum Unambiguous Range, Simple form of Radar Equation, Radar Block Diagram and Operation, Radar Frequencies and Applications. Prediction of Range Performance, Minimum Detectable Signal, Receiver Noise, Modified Radar Range Equation, Illustrative Problems.

Radar Equation : SNR, Envelope 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, 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 Cancelers — 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, Monopulse Tracking Radar — Amplitude Comparison Monopulse (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 Fitter with Nonwhite Noise.

Radar Receivers – Noise Figure and Noise Temperature. Displays — types. Duplexers — Branch type and Balanced type. Circulators as Duptexers. Introduction to Phased Array Antennas – Basic Concepts, Radiation Pattern, Beam Steering and Beam Width changes, Applications. Advantages and Limitations.

Text Book

1. Introduction to Radar Systems — Merrill.I. Skolnik, TMH Special Indian Edition, 2nd Ed.. 2007.

Reference Books

1. Radar Principles, Technology. Applications — Byron Edde, Pearson Education, 2004.
2. Radar Principles – Peebles. Jr., P.Z.. Wiley. New York, 1998.
3. Principles of Modern Radar: Basic Principles – Mark A. Richards, James A. Scheer, William A. HoIm. Yesdee, 2013

Course Outcomes

Alter completion of the course, the student will be able to

- Illustrate the importance of radar fundamentals and analysis of the radar equation.
- Understand the working principle of CW and FM-CW radar and its applications.
- Understand the working principle of MTI and pulse Doppler radar.
- Understand the different radar tracking methods.
- Understand about radar receivers and also extraction radar signal in noise.

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VAAGDEVI COLLEGE OF ENGINEERING
AUTONOMOUS

(B18EC26) DIGITAL SIGNAL PROCESSORS AND ARCHITECTURES
(Professional Elective – III)

B.Tech. ECE VI Semester **L T P C**
3 0 0 3

Pre Requisites: Digital Signal Processing

Course Objectives
The objectives of the course are:
- To recall digital transform techniques.
- To introduce architectural features of programmable DSP Processors and Analog Devices..
- To give practical examples of DSP Processor architectures for better understanding.
- To develop the programming knowledge using Instruction set of DSP Processors.
- To understand interfacing techniques to memory and I/O devices.

UNIT -I
Introduction to Digital Signal Processing: Introduction, A Digital signal- processing system, The sampling process, Discrete time sequences. Discrete Fourier Transform (DFT) and Fast Fourier Transform (FET), Linear time- invariant 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, AID Conversion errors, DSP Computational errors, D/A Conversion Errors, Compensating filter.

UNIT —II
Architectures 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, Data Addressing modes of TMS32OC54XX Processors, Memory space of TMS32OC54XX Processors, Program Control, TMS32OC54XX instructions and Programming, On-Chip Peripherals, Interrupts of TMS32OC54XX processors, Pipeline Operation of TMS32OC54XX Processors.

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-21 81 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. Digital Signal Processing — Avtar Singh and S. Srinivasan, Thomson Publications, 2004.

2. A Practical Approach To Digital Signal Processing – K Padmanabhan, R Vijayarajeswaran, Ananthi. S, New Age International, 2006/2009
3. Embedded Signal Processing with the Micro Signal Architecture Publisher: Woon-Seng Gan, Sen M. Kuo, Wiley-IEEE Press, 2007

Reference Books

1. Digital Signal Processors, Architecture, Programming and Applications — B. Venkataramani and M. Bhaskar, 2002, TMH.
2. Digital Signal Processing — Jonatham Stein, 2005, John Wiley.
3. DSP Processor Fundamentals, Architectures & Features — Lapsleyet al. 2000, S. Chand & Co.
4. Digital Signal Processing Applications Using the ADSP-2100 Family by The Applications Engineering Staff of Analog Devices, DSP Division, Edited by Amy Mar, PHI The Scientist and Engineer‘s Guide to Digital Signal Processing by Steven W. Smith, Ph.D., California Technical Publishing, ISBN 0-9660176-3-3, 1997
5. Embedded Media Processing by David J. Katz and Rick Gentile of Analog Devices, Newnes, ISBN 0750679123, 2005.

Course Outcomes

Upon completion of the course, the student

- Distinguish between the architectural features of General purpose processors and DSP processors.
- Discuss and understand the architectures of TMS320054xx and ADSP 2100 DSP devices.
- Explain the DSP computational building blocks and addressing capabilities.
- Demonstrate simple assembly language programs using instruction set of TMS32OC54xx.
- Analyze the interface of various devices to DSP Processors.

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VAAGDEVI COLLEGE OF ENGINEERING
AUTONOMOUS

(B18EC27) REAL TIME OPERATING SYSTEMS
(Professional Elective – III)

B.Tech. ECE VI Semester **L T P C**
3 0 0 3

Pre Requisites: None

Course Objectives
The course will enable the students to:
- To study the operations performed by OS as a resource manager
- Understand the basics of operating system concept.
- To understand RTOS concepts, types and choosing RTOs.
- Use and describe the implementation of a real-time operating systems on an embedded computer system formulate an embedded computes system design problem including multiple constraints, create a design that satisfies the constraints.
- Create computer software and hardware implementation that operate according to well known standards.

UNIT –I Real Time Operating Systems:
Operating system Basics, types of OS,Os services, process management, timer functions, event functions, memory management, interrupt routines in RTOS environment and handling of interrupt source calls. Real time operating system, tasks, process and threads, multiprocessing and multitasking, task scheduling.

UNIT –II 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 on RTOS.

UNIT - III Interprocess communications (IPC)
Signal functions, semaphore functions, message queue-functions, mail box functions, pipe functions, socket functions.

UNIT –IV Real Time Operating System Programming
MICROC/OS-II and V_X-works, Basic functions of RTOSES, RTOS MCOS-II, RTOS Vx works. RTOS-II windows CE, RT-Linux.

UNIT –V
Design examples & case studies of programming modeling and programming with RTOS- I
Case study of embedded system design and coding for an automatic chocolate vending machine (ACVM) using mucos RTOS, case study for digital camera hard ware and software architecture.
Design examples case studies for program modeling and programming with RTOS – II
Case study of an embedded system for a smart card, case study of mobile phone software for key inputs.

Text books
1. Introduction to enmedded systems – Shibu K.V Mc Graw Hill.

Reference books
1. Embedded systems rajkamal, TMH.
2. An embedded software primer – David E.Simon, Pearson education.
3. Embedded system design-Frank Vohid, Tony Givargis, John wiley.

Course Outcomes

Upon completion of the course, the student

- Learn basics of OS and RTOS
- Implement the design in hardware and software and meaure performance against the design constraints.
- Learn basics of Linux and RT Linux.
- Contrast hardware and software interaction and integration.

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VAAGDEVI COLLEGE OF ENGINEERING
AUTONOMOUS

(B18EC28) VLSI & ECAD LAB

B.Tech. ECE VI Semester **L T P C**
0 0 2 1

Pre Requisites: None

Course Objectives: this course present the design and implementation of digital circuits at different levels of designing.

List of Experiments

Design and implementation of the following CMOS digital/analog circuits using **Cadence / Mentor Graphics / Synopsys /Equivalent** CAD tools. The design shall include Gate-level design, Transistor-level design, Hierarchical design, Verilog HDL/VHDL design, Logic synthesis, Simulation and verification, Scaling of CMOS Inverter for different technologies, study of secondary effects (temperature, power supply and process corners), Circuit optimization with respect to area, performance and/or power, Layout, Extraction of parasitics and back annotation, modifications in circuit parameters and layout consumption, DC/transient analysis, Verification of layouts (DRC, LVS)

E-CAD programs:

Programming can be done using any complier. Download the programs onto FPGA/CPLD boards and perform logical verification physically on board apart from verification by simulation with any of the front end tools.

1. HDL code to realize all the logic gates
2. Design of 2-to-4 decoder
3. Design of 8-to-3 encoder (without and with priority)
4. Design of 8-to-1 multiplexer and 1-to-8 demultiplexer
5. Design of 4 bit binary to gray code converter
6. Design of 4 bit comparator
7. Design of Full adder using 3 modeling styles
8. Design of flip flops: SR, D, JK, T
9. Design of 4-bit binary, BCD counters (synchronous/ asynchronous reset) or any sequence counter
10. Finite State Machine Design

VLSI programs:

- Introduction to layout design rules. Layout, physical verification, placement & route for complex design, static timing analysis, IR drop analysis and crosstalk analysis of the following:
  1. Basic logic gates
  2. CMOS inverter
  3. CMOS NOR/ NAND gates
  4. CMOS XOR and MUX gates
  5. Static / Dynamic logic circuit (register cell)
  6. Latch
  7. Pass transistor
  8. Layout of any combinational circuit (complex CMOS logic gate).
  9. Analog Circuit simulation (AC analysis) – CS & CD amplifier

***Note:** Any **SIX of** the above experiments from each part are to be conducted (Total 12)*

Course Outcomes:

- Develops the knowledge of working with High end Simulation tools like Mentor Graphics, Tanner EDA etc.
- Design digital circuits at different levels using programming concepts.
- Implement any type of digital systems.
- Program any available FPGA and CPLD using implementation tool.

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VAAGDEVI COLLEGE OF ENGINEERING
AUTONOMOUS

(B18EC29) MICROPROCESSORS AND MICROCONTROLLERS LAB

B.Tech. ECE VI Semester

L	T	P	C
0	0	3	1.5

Pre Requisites: None

Course Objectives:

To develop an in-depth understanding of the operation of microprocessors and microcontrollers, machine language programming & interfacing techniques.

Note: Minimum of 12 experiments are to be conducted.

The following programs/experiments are to be written for assembler and to be executed the same with 8086 and 8051 kits.

List of Experiments:

1. Programs for 16 bit arithmetic operations for 8086 (using Various Addressing Modes).
2. Program for sorting an array for 8086.
3. Program for searching for a number or character in a string for 8086.
4. Program for string manipulations for 8086.
5. Program for digital clock design using 8086.
6. Interfacing ADC and DAC to 8086.
7. Parallel communication between two microprocessors using 8255.
8. Serial communication between two microprocessor kits using 8251.
9. Interfacing to 8086 and programming to control stepper motor.
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. Communication between 8051 kit and PC.
15. Interfacing LCD to 8051.
16. Interfacing Matrix/ Keyboard to 8051.
17. Data Transfer from Peripheral to Memory through DMA controller 8237 / 8257.

Course Outcomes

- Demonstrate experimentally basic programming of Microprocessor.
- Recall the microprocessor interfacing with various peripherals for various applications.
- Apply the basic programming of microcontroller.
- Examine microprocessor interfacing with various peripherals for various applications.

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VAAGDEVI COLLEGE OF ENGINEERING
AUTONOMOUS

(B18EN03) ADVANCED ENGLISH COMMUNICATION SKILLS LAB

B.Tech. ECE VI Semester **L T P C**
0 0 3 1.5

1. Introduction

The introduction of the Advanced English Communication Skills Lab is considered essential at 3rd year level. At this stage, the students need to prepare themselves for their careers which may require them to listen to, read, speak and write in English both for their professional and interpersonal communication in the globalised context.

The proposed course should be a laboratory course to enable students to use 'good' English and perform the following:

- Gather ideas and information to organize ideas relevantly and coherently.
- Engage in debates.
- Participate in group discussions.
- Face interviews.
- Write project/research reports/technical reports.
- Make oral presentations.
- Write formal letters.
- Transfer information from non-verbal to verbal texts and vice-versa.
- Take part in social and professional communication.

2. Course Objectives:

This Lab focuses on using multi-media instruction for language development to meet the following targets:

- To improve the students' fluency in English, through a well-developed vocabulary and enable them to listen to English spoken at normal conversational speed by educated English speakers and respond appropriately in different socio-cultural and professional contexts.
- Further, they would be required to communicate their ideas relevantly and coherently in writing.
- To prepare all the students for their placements.

3. Syllabus:

The following course content to conduct the activities is prescribed for the Advanced English Communication Skills (AECS) Lab:

1. **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 and 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 and usage of vocabulary.
2. **Reading Comprehension** –General Vs Local comprehension, reading for facts, guessing meanings from context, scanning, skimming, inferring meaning, critical reading & effective googling.
3. **Writing Skills** – Structure and presentation of different types of writing – *letter writing/Resume writing/ e-correspondence/ Technical report writing/ Portfolio writing* – planning for writing – improving one's writing.
4. **Presentation Skills** – Oral presentations (individual and group) through JAM sessions/seminars/**PPTs** and written presentations through posters/projects/reports/ e-mails/assignments etc.
5. **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 and video-conference and Mock Interviews.

4. Minimum Requirement:

The Advanced English Communication Skills (AECS) Laboratory shall have the following infra-structural facilities to accommodate at least 35 students in the lab:

- Spacious room with appropriate acoustics
- Round Tables with movable chairs
- Audio-visual aids
- LCD Projector
- Public Address system
- P – IV Processor, Hard Disk – 80 GB, RAM–512 MB Minimum, Speed – 2.8 GHZ
- T. V, a digital stereo & Camcorder
- Headphones of High quality

5. Prescribed Lab Manual: A book titled ***A Course Book of Advanced Communication Skills Lab*** published by Universities Press, Hyderabad.

6. Suggested Software:

The software consisting of the prescribed topics elaborated above should be procured and used.

- **Oxford Advanced Learner's Compass**, 8th Edition
- **DELTA's key to the Next Generation TOEFL Test: Advanced Skill Practice.**
- **Lingua TOEFL CBT Insider**, by Dreamtech
- **TOEFL & GRE** (KAPLAN, AARCO & BARRONS, USA, Cracking GRE by CLIFFS)
- **The following software from 'train2success.com'**
  - **Preparing for being Interviewed**
  - **Positive Thinking**
  - **Interviewing Skills**
  - **Telephone Skills**
  - **Time Management**
  - **Skillmate**
  - **Presentation skills, Cambridge** (with VCD)

7. Books Prescribed:

1. **Technical Communication** by Meenakshi Raman & Sangeeta Sharma, Oxford University Press 2009.
2. **English Language Communication : A Reader cum Lab Manual** Dr A Ramakrishna Rao, Dr G Natanam & Prof SA Sankaranarayanan, Anuradha Publications, Chennai 2008.
3. **Advanced Communication Skills Laboratory Manual** by Sudha Rani, D, Pearson Education 2011.
4. **Technical Communication** by Paul V. Anderson. 2007. Cengage Learning pvt. Ltd. New Delhi.
5. **Business and Professional Communication:** Keys for Workplace Excellence. Kelly M. Quintanilla & Shawn T. Wahl. Sage South Asia Edition. Sage Publications. 2011.

Suggested Books:

1. **The Basics of Communication: A Relational Perspective**. Steve Duck & David T. McMahan. Sage South Asia Edition. Sage Publications. 2012.
2. **English Vocabulary in Use** series, Cambridge University Press 2008.
3. **Management Shapers Series** by Universities Press(India)Pvt Ltd., Himayatnagar, Hyderabad 2008.
4. **Handbook for Technical Communication** by David A. McMurrey & Joanne Buckley. 2012. Cengage Learning.
5. **Communication Skills** by Leena Sen, PHI Learning Pvt Ltd., New Delhi, 2009.
6. **Handbook for Technical Writing** by David A McMurrey & Joanne Buckely CENGAGE Learning 2008.
7. **Job Hunting** by Colm Downes, Cambridge University Press 2008.
8. **Master Public Speaking** by Anne Nicholls, JAICO Publishing House, 2006.
9. **English for Technical Communication for Engineering Students, Aysha Vishwamohan, Tata Mc Graw-Hil 2009.**
10. Books on **TOEFL/GRE/GMAT/CAT/ IELTS** by Barron's/DELTA/Cambridge University Press.

11. **International English for Call Centres** by Barry Tomalin and Suhashini Thomas, Macmillan Publishers, 2009.
12. **Towards Career Advancement** - Excerpts from a Professor's Folio by **P. Satyanarayana Prof. of English, Vaagdevi College of Engineering** , published by Vaagdevi Group of Colleges Engineering, Warangal (T.S.) India, 2015.

DISTRIBUTION AND WEIGHTAGE OF MARKS:

- The practical examinations for the Laboratory practice shall be conducted as per the University norms prescribed for the core engineering practical sessions.

- For the English Language lab sessions, there shall be continuous evaluation during the year for 30 sessional marks and 70 End Examination marks. Of the 30 marks, 20 marks shall be awarded for day-to-day work and 10 marks to be awarded by conducting Internal Lab Test(s). The End Examination shall be conducted by the teacher concerned, by inviting the External Examiner from outside. In case of the non-availability of the External Examiner, other teacher of the same department can act as the External Examiner.

Mini Project: As a part of Internal Evaluation

- **Seminar/ Professional Presentation**
- **A Report on the same has to be prepared and presented.**
- ***Teachers may use their discretion to choose topics relevant and suitable to the needs of students.***
- ***Not more than two students to work on each mini project.***
- ***Students may be assessed by their performance both in oral presentation and written report.***

Course Outcomes

- Developing effectively and appropriate vocabulary to be used contextually.
- Inculcating flair for Writing and felicity in written expression.
- Enhancing job prospects.
- Acquiring effective speaking abilities

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VAAGDEVI COLLEGE OF ENGINEERING
AUTONOMOUS

(B18MC05) LOGICAL REASONING & QUANTATIVE APTITUDE

B.Tech. ECE VI Semester

L	T	P	C
0	0	2	0

Pre Requisites: None

Course Objectives:

The purpose of this course ensure the students

- To improve logical thinking with general applications using mathematical concepts like sequences, series, number theory and probability.
- It also features students to analyze data interpretation and able of improve their mathematical skills in various general aspects like coding and decoding, Time and Work puzzles solving blood relations etc.

Unit – I: Logical Reasoning

1. Coding and Decoding
2. Distance and Directions
3. Classifications
4. Odd man out and series
5. Clocks and Calendars etc.

Unit – II: Logical ability

1. Blood relations
2. Seating Arrangements
3. Figure Analysis
4. Puzzles etc.

Unit – III: Number systems

1. LCM and HCF
2. Ratio and proportion
3. Simple interest and compound interest
4. Profit and Loss etc.

Unit – IV: Arithmetic ability

1. Time and work
2. Partnerships
3. Time speed and distance
4. Problems on Trains etc.

Unit – V: Mathematical ability

1. Sequence and series
2. Permutations and combination
3. General probability etc.

Reference Books:

1. A modern approach to verbal and non-verbal reasoning by Dr. R.S. Aggarwal.
2. Quantitative Aptitude by Abhijit Guha Tata Mc Graw-Hill Company Limited.
3. Quantitative Aptitude by P.A. Anand (Wiley)
4. Quantitative Aptitude by Dr. R.S. Agarwal.
5. Objective Arithmetic by S.L. Gulati.

Course Outcomes:

By studying logical reasoning and quantitative aptitude students are able

- To improve their logical thinking in terms of general and mathematical concepts.
- The main outcome is to improve students to compete in academic as well as competitive levels through which students are able to solve the real world problems.

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VAAGDEVI COLLEGE OF ENGINEERING
AUTONOMOUS

(B18EC30) MICROWAVE ENGINEERING

B.Tech. ECE VII Semester **L T P C**
3 0 0 3

Pre Requisites: Antennas & Wave Propagation

Course Objectives
The objectives of the course are:

- To develop the knowledge on transmission lines for microwaves, cavity resonators and wave guide components and applications.
- To enable the students understand and analyze the operation of Microwave tubes like klystron, magnetron, travelling wave tube, etc.,
- To familiarize with microwave solid state devices.
- To understand the scattering matrix parameters and its use.
- To introduce the student the microwave test bench for measure
- different parameters like attenuation, VSWR, etc.,

UNIT I:
Microwave Transmission Lines - I: Introduction, Microwave Spectrum and Bands, Applications of Microwaves. Rectangular Waveguides – Solution of Wave Equations in Rectangular Coordinates, TE/TM mode analysis, Expressions for Fields, Characteristic Equation and Cut-off Frequencies, Filter Characteristics, Dominant and Degenerate Modes, Sketches of TE and TM mode fields in the cross-section, Mode Characteristics – Phase and Group Velocities, Wavelengths and Impedance Relations, Illustrative Problems. Rectangular Guides - Power Transmission and Power Losses, Impossibility of TEM Mode. Micro strip Lines– Introduction, Zo Relations, Effective Dielectric Constant, Losses, Q factor.

UNIT II:
Cavity Resonators– Introduction, Rectangular Cavities, Dominant Modes and Resonant Frequencies, Q Factor and Coupling Coefficients, Illustrative Problems
Waveguide Components and Applications: Coupling Mechanisms – Probe, Loop, Aperture types. 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, Waveguide Multiport Junctions. Directional Couplers – 2 Hole, Bethe Hole types, Illustrative Problems
Ferrites– Composition and Characteristics, Faraday Rotation, Ferrite Components – Gyrator, Isolator, Circulator.
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, Illustrative Problems

UNIT III:
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, Effect of Repeller Voltage on Power O/P, Illustrative Problems.
Helix TWTs: Significance, Types and Characteristics of Slow Wave Structures; Structure of TWT and Amplification Process (qualitative treatment), Suppression of Oscillations, Gain Considerations.

UNIT IV:

Microwave Solid State Devices: Introduction, Classification, Applications. TEDs – Introduction, Gunn Diodes – Principle, RWH Theory, Characteristics, Basic Modes of Operation - Gunn Oscillation Modes, LSA Mode, Introduction to Avalanche Transit Time Devices.

UNIT V:

Scattering Matrix– Significance, Formulation and Properties, S Matrix Calculations for – 2 port Junctions, E plane and H plane Tees, Magic Tee, Circulator and Isolator, Illustrative Problems.

Microwave Measurements: Description of Microwave Bench – Different Blocks and their Features, Errors and Precautions, Microwave Power Measurement, Bolometers. Measurement of Attenuation, Frequency. Standing Wave Measurements – Measurement of Low and High VSWR, Cavity Q, Impedance Measurements.

Text Books

1. Microwave Devices and Circuits – Samuel Y. Liao, Pearson, 3rd Edition, 2003.
2. Microwave Principles – Herbert J. Reich, J.G. Skalnik, P.F. Ordung and H.L. Krauss, CBS Publishers and Distributors, New Delhi, 2004.

References Books

1. Foundations for Microwave Engineering – R.E. Collin, IEEE Press, John Wiley, 2nd Edition, 2002.
2. Microwave Circuits and Passive Devices – M.L. Sisodia and G.S.Raghuvanshi, Wiley Eastern Ltd., New Age International Publishers Ltd., 1995.
3. Microwave Engineering Passive Circuits – Peter A. Rizzi, PHI, 1999.
4. Electronic and Radio Engineering – F.E. Terman, McGraw-Hill, 4th Ed., 1955.
5. Microwave Engineering – A. Das and S.K. Das, TMH, 2nd Ed., 2009.

Course Outcomes

Upon completion of the course, the students will be able to

- Understand the significance of microwaves and microwave transmission lines.
- Analyze the characteristics of microwave tubes and compare them.
- Identify the different wave guide components and application.
- Learn the different types of microwave solid state devices.
- Gain knowledge of microwave Measurement.

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VAAGDEVI COLLEGE OF ENGINEERING
AUTONOMOUS

(B18EC31) EMBEDDED SYSTEMS DESIGN

B.Tech. ECE VII Semester **L T P C**
3 0 0 3

Pre Requisites: Microprocessors & Microcontrollers

Course Objectives
For embedded systems, the course will enable the students to:
- Understand the basics of an embedded system
- Program an embedded system
- To learn the method of designing an Embedded System for any type of applications.
- Design, implement and test an embedded system.

UNIT -I
ARM 32 Bit MCU's
Introduction to 16/32 Bit processors, ARM architecture and organization, ARM / Thumb programming model, ARM / Thumb instruction set and programming. SHAR Processor architecture and organization instruction and programming.

Unit II: I/O Devices and Networks
I/O Devices[Timers, Counters, Interrupt Controllers, DMA Controllers, A/D and D/A Converters, Displays, Keyboards, Infrared devices], Memory Interfacing, I/O Device Interfacing [GPIB, FIREWIRE, USB, IRDA], Networks for Embedded systems (CAN, I2C, SPI, USB, RS485, RS 232), Wireless Applications [Bluetooth, Zigbee].

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

Text Book
1. Introduction to Embedded Systems – Shibu K.V, Mc Graw Hill.
2. Computer as component by wyne wolf, Morgan Kaufhann

Reference Books
1. Embedded Systems Raj Kamal, TMH.
2. Embedded System Design – Frank Vahid, Tony Givargis, John Wiley.
3. Embedded Systems — Lyla, Pearson, 2013
4. An Embedded Software Primer – David E. Simon, Pearson Education.

Course Outcomes

Upon completion of this course, the student will be able to:

- Understand the architecture of Arm processors.
- Develop a system using IO devices and networks.
- Understand and design embedded systems.
- Understand types of memory and interacting to external world.
- Understand embedded firmware design approaches

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VAAGDEVI COLLEGE OF ENGINEERING
AUTONOMOUS

(B18EC32)CELLULAR AND MOBILE COMMUNICATIONS
(Professional Elective – IV)

B.Tech. ECE VII Semester **L T P C**
3 0 0 3

Pre Requisites: None

Course Objectives

- To provide the student with an understanding of the Cellular concept, Frequency reuse, Hand-off strategies.
- To enable the student to analyze and understand wireless and mobile cellular communication systems over a stochastic fading channel
- To provide the student with an understanding of Co-channel and Non- Co-channel interference
- To give the student an understanding of cell coverage for signal and traffic, diversity techniques and mobile antennas.
- To give the student an understanding of frequency management, Channel assignment and types of handoff.

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, Trunking and Grade of Service, 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, Directional Diversity, 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, Antenna Height 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, inter system Handoff, Introduction to Dropped Call Rates and their Evaluation.

Text Books

1. Mobile Cellular Telecommunications — W.C.Y. Lee, Mc Graw Hill, 2nd Edn., 1989.
2. Wireless Communications – Theodore. S. Rapport, Pearson Education, 2nd Edn., 2002.
3. Mobile Cellular Communication – Gottapu sashibhushana Rao, Pearson, 2012.

Reference Books

1. Principles of Mobile Communications — Gordon L. Stuber, Springer International, 2nd Edn., 2001.
2. Modern Wireless Communications-Simon Haykin, Michael Moher,Pearson Education, 2005.
3. Wireless Communications Theory and Techniques, Asrar U. H .Sheikh, Springer, 2004.
4. Wireless Communications and Networking, Vijay Garg, Elsevier Publications, 2007.
5. Wireless Communications —Andrea Goldsmith, Cambridge University Press, 2005.

Course Outcomes

By the end of the course, the student will be able to analyze and design wireless and mobile cellular systems.

- Estimate the impairments due to multi path fading channel.
- Explain an Importance of the fundamental techniques to overcome the different fading effects.
- Distinguish the co-channel and Non co-channel interference.
- Inspect cell coverage for signal and traffic, diversity techniques and mobile antennas.
- Relate and explain the functioning of frequency management, Channel assignment and types of handoff.

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VAAGDEVI COLLEGE OF ENGINEERING
AUTONOMOUS

(B18EC33) FPGA ARCHITECTURE & APPLICATIONS
(Professional Elective – IV)

B.Tech. ECE VII Semester

L	T	P	C
3	0	0	3

Pre Requisites: None

Course Objectives

- To introduce to the students the fundamentals of PLD‘s
- To understand the PLDS & testing of CMOS circuits.
- To study the architecture of various FPGA.

UNIT-I: Introduction to Programmable Logic Devices: Introduction, Simple Programmable Logic Devices – Read Only Memories, Programmable Logic Arrays, Programmable Array Logic, Programmable Logic Devices/Generic Array Logic; Complex Programmable Logic Devices – Architecture of Xilinx Cool Runner XCR3064XL CPLD, CPLD Implementation of a Parallel Adder with Accumulation.

UNIT-II: Field Programmable Gate Arrays: Organization of FPGAs, FPGA Programming Technologies, Programmable Logic Block Architectures, Programmable Interconnects, Programmable I/O blocks in FPGAs, Dedicated Specialized Components of FPGAs, Applications of FPGAs.

UNIT -III: SRAM Programmable FPGAs: Introduction, Programming Technology, Device Architecture, The Xilinx XC2000, XC3000 and XC4000 Architectures.

UNIT -IV: Anti-Fuse Programmed FPGAs: Introduction, Programming Technology, Device Architecture, The Actel ACT1, ACT2 and ACT3 Architectures.

UNIT -V: Design Applications: General Design Issues, Counter Examples, A Fast Video Controller, A Position Tracker for a Robot Manipulator, A Fast DMA Controller, Designing Counters with ACT devices, Designing Adders and Accumulators with the ACT Architecture.

Text books

1. Field Programmable Gate Array Technology - Stephen M. Trimberger, Springer International Edition.
2. Digital Systems Design - Charles H. Roth Jr, Lizy Kurian John, Cengage Learning.

Reference books

1. Field Programmable Gate Arrays - John V. Oldfield, Richard C. Dorf, Wiley India.
2. Digital Design Using Field Programmable Gate Arrays - Pak K. Chan/Samiha Mourad, Pearson Low Price Edition.
3. Digital Systems Design with FPGAs and CPLDs - Ian Grout, Elsevier, Newnes.
4. FPGA based System Design - Wayne Wolf, Prentice Hall Modern Semiconductor Design Series.

Course Outcomes

At the end of curse the students

- Learn the different types of PLD’s and architectures of Xilinx, CPLD’s.
- Develop the programming Technology skills of FPGA
- Demonstrate various types of FPGA‘s used for memories and architectures
- Conclude about Anti fused FPGA and their programming.
- Explain the importance of programming various FPGA and CPLD using simulators like Xilinx.

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VAAGDEVI COLLEGE OF ENGINEERING
AUTONOMOUS

(B18CS35) ARTIFICIAL INTELLIGENCE
(Professional Elective – IV)

B.Tech. ECE VII Semester

L	T	P	C
3	0	0	3

Pre Requisites: Basics of Programming, Basics of probability theory

Course Objectives

1. To Understand Problem State space and Search Techniques.
2. To analyse Issues related to Knowledge and its representation.
3. To analyse various structures of data.
4. To Understand the Natural language processing.
5. To understand working of Expert Systems.

UNIT - I:

Introduction to Artificial Intelligence: The AI problem domains, The underlying assumption, An AI technique, The level of the model, Criteria for success.

Problems, Problem Spaces and Search: Defining the problem as a state space search, Production systems, Problem characteristics, Production system characteristics, Issues in the design of search programs, Additional problems.

Heuristic Search Techniques: Generate-and-Test, Hill climbing, Best-first-search, Problem reduction, Constraint satisfaction, Means-Ends Analysis.

UNIT - II:

Knowledge Representation Issues: Knowledge representations and mappings, Approaches to knowledge representation, Issues in knowledge representation, The Frame problem.

Using Predicate Logic: Propositional Calculus, First order predicate calculus(FOPC), Syntax and symantics of FOPC **,** Representing simple facts in logic, Representing Instance and Is-a-relationships, Computable functions , Resolution, Natural Deduction.

Representing Knowledge Using Rules: Procedural versus Declarative knowledge, Forward versus Backward Reasoning.

UNIT - III:

Weak slot and filler structures: Semantic nets, Frames.

Strong slot and filler structures: Conceptual Dependencies, Scripts, CYC.

Game Playing: The Minimax Search procedure, Adding Alpha-Beta Cutoffs, Additional Refinements, Iterative Deepening.

UNIT - IV:

Reasoning in Uncertain Situations: Introduction, Logic-Based Abductive Inference, Abduction - Alternative to Logic.

Understanding Natural Language: Role of Knowledge in Language Understanding, Deconstructing Language - A Symbolic Analysis, Syntax, Combining Syntax and Semantic Knowledge with ATN Parsers, Natural Language Applications.

UNIT - V:

Strong Method Problem Solving: Overview of Expert System Technology, Rule-Based Expert Systems, Model-Based, Case Based and Hybrid Systems, Planning. Parallel and Distributed Reasoning Systems Introduction to Prolog-The Natural Language of Artificial Intelligence

Text books

1. Elaine rich, Kevin knight, Shivashanker B Nair "Artificial Intelligence", 3rd Edition, Tata McGraw-Hill, ISBN No: 9780070087705, 0070087709, 2012.
2. George F Luger, "Artificial Intelligence", Fifth Edition, Pearson Education Asia., ISBN No: 9788131723272, 2012.

Reference books

1. Rajendra Akerkar, "Introduction to Artificial Intelligence", Second Edition 2014, PHI Learning, ISBN No: 978-81-203-4997-1.
2. R.B. Mishra " Artificial Intelligence", PHI Learning , ISBN No: 978-81-203-3849-4, 2010.

Course Outcomes

Upon completion of course, the student will be able to learn the following

- Remember various AI concepts like the AI technique, level of models, there underlying assumptions etc
- Understand the concepts of AI search techniques
- Apply knowledge Representation techniques
- Analyze different structures of representation
- Evaluate AI search techniques
- Create Expert systems

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VAAGDEVI COLLEGE OF ENGINEERING
AUTONOMOUS

(B18CS34) INFORMATION THEORY AND CODING
(Professional Elective – V)

B.Tech. ECE VII Semester

L	T	P	C
3	0	0	3

Pre Requisites: None

Course Objectives

Learn the concepts of multimedia communication.

- Be aware of compression and decompression techniques.
- Be familiar with the methods for the generation of these codes and their decoding techniques.
- Understand encoding and decoding of digital data streams.
- Understand error–control coding.
- The student should be made to:

UNIT I INFORMATION THEORY FUNDAMENTALS Uncertainty, Information and Entropy – Source coding Theorem – Huffman coding –Shannon Fano coding – Discrete Memory less channels – channel capacity – channel coding Theorem – Channel capacity Theorem.

UNIT II DATA AND VOICE CODING Differential Pulse code Modulation – Adaptive Differential Pulse Code Modulation – Adaptive subband coding – Delta Modulation – Adaptive Delta Modulation – Coding of speech signal at low bit rates (Vocoders, LPC).

UNIT III ERROR CONTROL CODING Linear Block codes – Syndrome Decoding – Minimum distance consideration – cyclic codes – Generator Polynomial – Parity check polynomial – Encoder for cyclic codes – calculation of syndrome – Convolutional codes.

UNIT IV COMPRESSION TECHNIQUES Principles – Text compression – Static Huffman Coding – Dynamic Huffman coding – Arithmetic coding – Image Compression – Graphics Interchange format – Tagged Image File Format – Digitized documents – Introduction to JPEG standards.

UNIT V AUDIO AND VIDEO CODING Linear Predictive coding – code excited LPC – Perceptual coding, MPEG audio coders – Dolby audio coders – Video compression – Principles – Introduction to H.261 & MPEG Video standards.

Text Books

1. Simon Haykin, “Communication Systems”, 4th Edition, John Wiley and Sons, 2001.
2. Fred Halsall, “Multimedia Communications, Applications Networks Protocols and Standards”, Pearson Education, Asia 2002; Chapters: 3,4,5.

References Books

1. Mark Nelson, “Data Compression Book”, BPB Publication 1992. 2. Watkinson J, “Compression in Video and Audio”, Focal Press, London, 1995.

Course Outcomes

Students are able to

- Illustrate the basic notions of information and channel capacity.
- Demonstrate the different digital modulation schemes.
- Explain how error control coding techniques are applied in communication systems.
- Make use of different compression techniques to analyze the text and image.
- Justify the importance of audio and video schemes.

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VAAGDEVI COLLEGE OF ENGINEERING
AUTONOMOUS

(B18EC35) SATELLITE COMMUNICATIONS
(Professional Elective – V)

B.Tech. ECE VII Semester

L	T	P	C
3	0	0	3

Pre Requisites: Antennas & Wave Propagation

Course Objectives
- Overview of Satellite systems to other terrestrial systems and study of satellite orbits and launching.
- To study about space segment and components and link design procedures.
- To Study about various analog and digital modulation, multiplexing and multiple access techniques.
- To study about Earth Segment, Test equipment measurements, Communication satellites and Remote sensing satellites.
- Study of Satellite applications & specialized services

UNIT I: SATELLITE ORBITS AND TRAJECTORIES
Introduction, Kepler's Laws, Injection velocity and satellite trajectory, Types of Satellite orbits (geo stationary and non-geo stationary orbits), Orbital parameters, Orbital perturbations, Satellite stabilization, Orbital effects on satellite's performance, Look angles: Azimuth angle, Elevation angle, Look Angle Determination, Limits of visibility, Eclipses, Sub satellite point, Sun transit outage, Launching Procedures, Launch vehicles and propulsion-principles, rocket equation, powered flight, injection into final orbit.

UNIT II: SPACE SEGMENT AND SATELLITE LINK DESIGN
Spacecraft Technology - Structure, Primary power, Attitude and Orbit control, Thermal control and propulsion, Communication payload and supporting subsystems, Telemetry, Tracking and command. Satellite uplink and downlink Analysis and Design, link budget, E/N calculation- performance impairments-system noise, inter modulation and interference, Propagation Characteristics and Frequency considerations, Types of earth station, Architecture, Satellite tracking.

UNIT III: SATELLITE ACCESS AND CAPACITY ENHANCEMENT
Modulation and Multiplexing: FDM, TDM, Digital audio broadcast (DAB), Digital video broadcast (DVB), Multiple access technique: SDMA, OFDM, NOMA, Spread spectrum communication-FHSS, DSSS, SCPC Systems, MCPC Systems, Trade-off analysis, Disadvantages, Satellite Link Design Fundamentals: Transmission Equation, Satellite Link Parameters, Propagation considerations.

UNIT – IV EARTH SEGMENT AND COMMUNICATION SATELLITES
Earth Station Technology-- Terrestrial Interface, Transmitter and Receiver, Antenna Systems, Test Equipment Measurements on G/T, C/No, EIRP, Antenna Gain. Satellite Vs. Terrestrial Networks, Satellite Telephony, Satellite Television, Satellite radio.
Remote Sensing Satellites: Classification of remote sensing systems, orbits, Payloads, Types of images: Image Classification, Interpretation, Applications

UNIT – V SATELLITE APPLICATIONS
INTELSAT Series, INSAT, VSAT, TCP over satellite, GPS, INMARSAT, LEO, MEO, Direct Broadcast satellites (DBS), Direct to home Broadcast (DTH), Specialized services – Email, Video conferencing, Internet. Navigation Satellites: Development of Satellite Navigation Systems, GPS system, Applications.

Text Book
1. Satellite Communications Systems: Systems, Techniques and Technology, 5th edition, by G. Maral, M. Bousquet, Z. Sun, Publisher: John Willy and sons, 2010, ISBN: 978-0-470-71458-4
2. Satellite Communication Engineering, 2nd edition, CRC Press, by M.O. Kolawole, 2017.

References Book

1. Global Mobile Satellite Communications Applications: For Maritime ..., Volume 2, By Stojce Dimov Ilcev, Publisher: Springer, 2017.
2. Timothy Pratt – Charles Bostian & Jeremy Allmuti, Satellite Communications, John Willy & Sons (Asia) Pvt. Ltd, 2nd Edition 2004.

Course Outcomes

At the end of the course

- Understand the historical background, basic concepts and frequency allocations for satellite communication
- Demonstrate orbital mechanics, launch vehicles and launchers.
- Define the design of satellite links for specified CI N wh system design examples.
- Examine the satellite sub systems like Telemetry, tracking, command and monitoring power systems etc. And Explain satellite access techniques
- Judge the various multiple access systems for satellite communication systems and satellite packet communications.

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VAAGDEVI COLLEGE OF ENGINEERING
AUTONOMOUS

(B18EC36) SPEECH PROCESSING
(Professional Elective – V)

B.Tech. ECE VII Semester

L	T	P	C
3	0	0	3

Course Objectives:

UNIT –I:
Fundamentals of Digital Speech Processing: Anatomy & Physiology of Speech Organs, The process of Speech Production, Acoustic Phonetics, Articulatory Phonetics, The Acoustic Theory of Speech Production-Uniform lossless tube model, effect of losses in vocal tract, effect of radiation at lips, Digital models for speech signals.

UNIT –II:
Time Domain Models for Speech Processing: Introduction- Window considerations, Short time energy and average magnitude Short time average zero crossing rate, Speech vs Silence discrimination using energy and zero crossing, Pitch period estimation using a parallel processing approach, The short time autocorrelation function, The short time average magnitude difference function, Pitch period estimation using the autocorrelation function.

UNIT –III:
Linear Predictive Coding (LPC) Analysis: Basic principles of Linear Predictive Analysis: The Autocorrelation Method, The Covariance Method, Solution of LPC Equations: Cholesky Decomposition Solution for Covariance Method, Durbin's Recursive Solution for the Autocorrelation Equations, Comparison between the Methods of Solution of the LPC Analysis Equations, Applications of LPC Parameters: Pitch Detection using LPC Parameters, Formant Analysis using LPC Parameters.

UNIT –IV:
Homomorphic Speech Processing: Introduction, Homomorphic Systems for Convolution: Properties of the Complex Cepstrum, Computational Considerations, The Complex Cepstrum of Speech, Pitch Detection, Formant Estimation, The Homomorphic Vocoder. Speech Enhancement: Nature of interfering sounds, Speech enhancement techniques: Single Microphone Approach : spectral subtraction, Enhancement by re-synthesis, Comb filter, Wiener filter, Multi microphone Approach.

UNIT-V:
Automatic Speech & Speaker Recognition: Basic pattern recognition approaches, Parametric representation of speech, Evaluating the similarity of speech patterns, Isolated digit Recognition System, Continuous digit Recognition System
Hidden Markov Model (HMM) for Speech: Hidden Markov Model (HMM) for speech recognition, Viterbi algorithm, Training and testing using HMMS, Speaker Recognition: Recognition techniques, Features that distinguish speakers, Speaker Recognition Systems: Speaker Verification System, Speaker Identification System.

Text book:
1. Digital Processing of Speech Signals - L.R. Rabiner and S. W. Schafer. Pearson Education.
2. Speech Communications: Human & Machine - Douglas O'Shaughnessy, 2nd Ed., Wiley India, 2000.
3. Digital Processing of Speech Signals. L.R Rabinar and R W Jhaung, 1978, Pearson Education.

Reference book:

1. Discrete Time Speech Signal Processing: Principles and Practice - Thomas F. Quateri, 1st Ed., PE.
2. Speech & Audio Signal Processing- Ben Gold & Nelson Morgan, 1st Ed., Wiley.

Course Outcomes

Students are able to

- Learn the fundamentals of digital speech processing
- Demonstrate the different time domain models of speech processing.
- Understand the concepts of linear predictive coding for speech processing.
- Analyze the different techniques of speech processing
- Make use of different speech and speaker recognition techniques.

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VAAGDEVI COLLEGE OF ENGINEERING
AUTONOMOUS

(B18EC37) MICROWAVE ENGINEERING LAB

B.Tech. ECE VII Semester

L	T	P	C
0	0	2	1

Pre Requisites: None

Course objectives: this course presents the practice of microwave engineering components characteristics measurements of different parameters.

1. Reflex Klystron Characteristics
2. Gunn Diode Characteristics
3. Directional Coupler Characteristics
4. VSWR Measurement
5. Measurement of Waveguide Parameters
6. Measurement of Impedance of a given Load
7. Measurement of Scattering Parameters of a Magic Tee
8. Measurement of Scattering Parameters of a Circulator
9. Attenuation Measurement
10. Microwave Frequency Measurement
11. LASER diode characteristics.
12. LED characteristics
13. Study of fiber optic communication link.

Course outcomes:

After completion of the course the students must be able to know the following.

- Demonstrate a microwave bench for measuring microwave parameters.
- Measure parameters like attenuation, VSWR, etc.,
- Gain knowledge about Various components used for Microwave communication and their applications
- Analyze the characteristics of all microwaves engineering component.

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VAAGDEVI COLLEGE OF ENGINEERING
AUTONOMOUS

(B18EC38) EMBEDDED SYSTEMS DESIGN LAB

B.Tech. ECE VII Semester

L	T	P	C
0	0	2	1

Pre Requisites: None
Course objectives:

1. LCD interfacing with 8051
2. 4*4 matrix keypad with 8051
3. Interfacing stepper motor with 8051
4. Omterfacomg ADC amd DAC woth 8051
5. Write a program to toggle all the LED to port and with some time delay using ARM7
6. LCD interface with ARM7
7. 4*4 matrix keypad with ARM7
8. Interfacing Stepper motor with ARM7
9. LED & PWM & Verify the output in ARM7
10. Interfacing ADC & DAC
11. Interfacing DC Motor.
12. Interfacing real time clock and serial port.
13. Interfacing temperature sensor
14. Mail box.
15. Implementing zigbee protocol with ARM

Course outcomes:

- Develop the programming concepts of 8bit, 16bit, and 32 bit mico controllers.
- Analyze the different I/O devices and their interfacing concepts.
- Understand the concepts of real time applications.

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VAAGDEVI COLLEGE OF ENGINEERING
AUTONOMOUS
(B18EC39) MINI PROJECT AND INTERNSHIP

B.Tech. ECE VII Semester

L	T	P	C
0	0	0	2

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VAAGDEVI COLLEGE OF ENGINEERING
AUTONOMOUS
(B18EC40) PROJECT PHASE - I

B.Tech. ECE VII Semester

L	T	P	C
0	0	8	4

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VAAGDEVI COLLEGE OF ENGINEERING
AUTONOMOUS
(B18EC41) FIBER OPTICAL COMMUNICATIONS
(Professional Elective – VI)

B.Tech. ECE VIII Semester **L T P C**
3 0 0 3

Course Objectives

The objectives of the course are:

- To realize the significance of optical fibre communications.
- To understand the construction and characteristics of optical fibre cable.
- To develop the knowledge of optical signal sources and power launching.
- To identify and understand the operation of various optical detectors
- To understand the design of optical systems and WDM.

UNIT -I

Overview of Optical Fiber Communication: – Historical development, The general system, Advantages of Optical Fiber Communications, Windows in Optical fiber communication system,Optical Fiber Wave Guides- Introduction, Ray Theory Transmission, Total Internal Reflection, Acceptance Angle, Numerical Aperture, Skew Rays, Cylindrical Fibers- Modes, Vnumber, Mode Coupling, Step Index Fibers, Graded Index Fibers. Single Mode Fibers- Cut Off Wavelength, Mode Field Diameter, Effectivo Refractive Index, Fiber Materials Glass, Halide, Active Glass, Chalgenide Glass, Plastic Optical Fibers, photonic crystal fiber,photonic bandgap fiber, preparation of optical fiber

UNIT – II

Signal Distortion in Optical Fibers: Attenuation, Absorption, Scattering and Bending Losses, Core and Cladding Losses, Information Capacity Determination, Group Delay, Types of Dispersion – Material Dispersion, Wave- Guide Dispersion, Polarization Mode Dispersion, Intermodal Dispersion, Pulse Broadening, dispersion modified single mode fiber, nonlinear effect, soliton propagation,Optical Fiber Connectors- Connector Types, Single Mode Fiber Connectors, Connector Return Loss.

UNIT -III

Fiber Splicing: Splicing Techniques, Splicing Single Mode Fibers, Fiber Alignment and Joint Loss-Multimode Fiber Joints, Single Mode Fiber Joints, Optical Sources- LEDs, Structures, Materials, Quantum Efficiency, Power, Modulation, Power Bandwidth Product, modulation in LED, stimulated emission and spontaneous emission, Injection Laser Diodes- Modes, Threshold Conditions, External Quantum Efficiency, Laser Diode Ratio Equations, Resonant Frequencies, Reliability and comparison of LED & ILD. Source to Fiber Power Launching: – Output Patterns, Power Coupling, Power Launching, Equilibrium Numerical Aperture, Laser Diode to Fiber Coupling.

UNIT -IV

Optical Detectors: Physical Principles of PIN and APD, quantum efficiency,responsivity,longwavelength cutoff, Detector Response Time, Temperature Effect on Avalanche Gain, Comparison of Photo Detectors, Optical Receiver Operation- Fundamental Receiver Operation, Digital Signal Transmission, Error Sources, Receiver Configuration, Digital Receiver Performance, Probability of Error, Quantum Limit, Analog Receivers, SNR in PIN and APD detector, optical amplification:semiconductor optical amplifier, EDFA.

UNIT —V

Optical System Design: Considerations, Component Choice, Multiplexing, Point-to- Point Links, System Considerations, Link Power Budget with Examples, Overall Fiber Dispersion In Multi-Mode and Single Mode Fibers, Rise Time Budget with Examples. Transmission Distance, Line Coding in Optical Links, WDM, Necessity, Principles, Types of WDM, Measurement of Attenuation,Dispersion, refractive index profile,optical return loss, Eye Pattern, optical networks:basics, photonic integrated circuit.

Text Book

- Optical Fiber Communications — Gerd Keiser, TMH, 4th Edition, 2008.
- Optical Fiber Communications — John M. Senior, Pearson Education, 3rd Edition, 2009.

Reference Book

- Fiber Optic Communications — D.K. Mynbaev, S.C. Gupta and Lowell L. Schemer, Pearson Education, 2005.
- Text Book on Optical Fibre Communication and its Applications — S.C.Gupta, PHI, 2005.
- Fiber Optic Communication Systems — Govind P. Agarwal , John Wiley, 3rd Edition, 2004.
- Introduction to Fiber Optics by Donald J.Sterling Jr. — Cengage learning, 2004.
- Optical Communication Systems — John Gowar, 2nd Edition, PHI, 2001.

Course Outcomes

At the end of the course, the student will be able to

- Understand and analyze the constructional parameters of optical fibres.
- Be able to design an optical system.
- Estimate the losses due to attenuation, absorption, scattering and bending.
- Compare various optical detectors and choose suitable one for different applications.
- Develop the concepts of optical system design.

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VAAGDEVI COLLEGE OF ENGINEERING
AUTONOMOUS

(B18EC42) LOW POWER VLSI DESIGN
(Professional Elective – VI)

B.Tech. ECE VIII Semester

L	T	P	C
3	0	0	3

Pre Requisites: VLSI Design

Course objectives

- To design Low power CMOS designs, for digital circuits.
- To gain knowledge on low power circuit design styles for VLSI circuits.
- To understand software power estimation and optimization methods for VLSI circuits.

UNIT –I:

Fundamentals:

Need for Low Power Circuit Design, Sources of Power Dissipation – Switching Power Dissipation, Short Circuit Power Dissipation, Leakage Power Dissipation, Glitching Power Dissipation, Short Channel Effects –Drain Induced Barrier Lowering and Punch Through, Surface Scattering, Velocity Saturation, Impact Ionization, Hot Electron Effect.

UNIT –II:

Low-Power Design Approaches:

Low-Power Design through Voltage Scaling – VTCMOS circuits, MTCMOS circuits, Architectural Level Approach –Pipelining and Parallel Processing Approaches. Switched Capacitance Minimization Approaches

UNIT –III:

Low-Voltage Low-Power Adders and Multipliers:

Introduction, Standard Adder Cells, CMOS Adder‘s Architectures – Ripple Carry Adders, Carry Look-Ahead Adders, Carry Select Adders, Carry Save Adders, Types of Multiplier Architectures.

UNIT –IV:

Low-Voltage Low-Power Design Techniques:

Low-Voltage Low-Power Design Techniques –Trends of Technology and Power Supply Voltage, Low-Voltage Low-Power Logic Styles.

UNIT –V:

Low-Voltage Low-Power Memories:

Basics of ROM, Low-Power ROM Technology, Future Trend and Development of ROMs, Basics of SRAM, Memory Cell, Pre-charge and Equalization Circuit, Low-Power SRAM Technologies, Basics of DRAM, Self-Refresh Circuit, Future Trend and Development of DRAM.

Text Books

1. CMOS Digital Integrated Circuits – Analysis and Design – Sung-Mo Kang, Yusuf Leblebici,
TMH, 2011. 2. Low-Voltage, Low-Power VLSI Subsystems – Kiat-Seng Yeo, Kaushik Roy, TMH Professional
Engineering.

Reference Books

1. Introduction to VLSI Systems: A Logic, Circuit and System Perspective – Ming-BO Lin, CRC Press, 2011
2. Low Power CMOS Design – Anantha Chandrakasan, IEEE Press/Wiley International, 1998.
3. Low Power CMOS VLSI Circuit Design – Kaushik Roy, Sharat C. Prasad, John Wiley & Sons, 2000.

Course Outcomes

- Develop the knowledge of Low power CMOS designs, for digital circuits.
- Illustrate low power circuit design styles for VLSI circuits.
- Justify software power estimation and optimization methods for VLSI circuits.
- Outline the Low-Voltage Low-Power Memories.
- Demonstrate the fabrication process of integrated circuit using VTCMOS, MTCMOS.

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VAAGDEVI COLLEGE OF ENGINEERING
AUTONOMOUS

(B18CS40) INTERNET OF THINGS
(Professional Elective – VI)

B.Tech. ECE VIII Semester

L	T	P	C
3	0	0	3

Pre Requisites: None

Course Objectives:

- To introduce the terminology, technology and its applications
- To introduce the concept of M2M (machine to machine) with necessary protocols
- To introduce the Python Scripting Language which is used in many IoT devices
- To introduce the Raspberry PI platform, that is widely used in IoT applications
- To introduce the implementation of web based services on IoT devices

UNIT I

Introduction to Internet of Things –Definition and Characteristics of IoT , Physical Design of IoT – IoT Protocols, IoT communication models, IoT Communication APIs, IoT enabaled Technologies – Wireless Sensor Networks, Cloud Computing, Big data analytics, Communication protocols, Embedded Systems, IoT Levels and Templates, Domain Specific IoTs – Home, City, Environment, Energy, Retail, Logistics, Agriculture, Industry, health and Lifestyle

UNIT II

IoT and M2M – Software defined networks, network function virtualization, difference between SDN and NFV for IoT, Basics of IoT System Management with NETCOZF, YANG- ETCONF, YANG, SNMP NETOPEER

UNIT III

Introduction to Python - Language features of Python, Data types, data structures, Control of flow, functions, modules, packaging, file handling, data/time operations, classes, Exception handling Python packages - JSON, XML , HTTPLib , URLLib , SMTPLib .

UNIT IV

IoT Physical Devices and Endpoints - Introduction to Raspberry PI-Interfaces (serial, SPI, I2C)
Programming – Python program with Raspberry PI with focus of interfacing external gadgets, controlling output, reading input from pins.

UNIT V

IoT Physical Servers and Cloud Offerings – Introduction to Cloud Storage models and communication APIs Web server – Web server for IoT, Cloud for IoT, Python web application framework Designing a REST ful web API

Text Book

1. Internet of Things - A Hands-on Approach, Arshdeep Bahga and Vijay Madisetti,Universities Press, 2015, ISBN: 9788173719547
2. Getting Started with Raspberry Pi, Matt Richardson & Shawn Wallace, O'Reilly (SPD), 2014, ISBN: 9789350239759

Course Outcome

CO1: Interpret the vision of IOT from a global context.
CO2:Perceive building blocks of Internet of Things and its characteristics.
CO3:Learn the basic concepts of Python.
CO4:Implement the python programming using Raspberry.
CO5:Perceive the application areas of IOT.
CO6:Realize the revolution of Internet in Mobile Devices, Cloud & Sensor Networks
CO7:Determine the Market perspective of IOT.
CO8:Develop Python web applications and cloud servers for IOT.

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VAAGDEVI COLLEGE OF ENGINEERING
AUTONOMOUS
(B18EC43) TECHNICAL SEMINAR

B.Tech. ECE VIII Semester

L	T	P	C
0	0	2	1

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VAAGDEVI COLLEGE OF ENGINEERING
AUTONOMOUS
(B18EC44) PROJECT PHASE - II

B.Tech. ECE VIII Semester

L	T	P	C
0	0	16	8

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VAAGDEVI COLLEGE OF ENGINEERING
AUTONOMOUS

(B18EC36) DBMS
(Open Elective)

B.Tech. ECE **L T P C**
3 0 0 3

Pre Requisites: None

Course Objectives:

This Course provides an emphasis on how to organize, maintain and retrieve information efficiently and effectively from a Database and it presents an introduction to database management systems (DBMS) and relational data model. Also the course introduces the concepts of transactions and transaction processing and the issues and techniques relating to concurrency and recovery in multi-user database environments

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UNIT- I

Introduction - Database system Applications - Database System versus File Systems - View of Data– Instances and schema - Data Models - Database Languages -DDL-DML - Database Users and Administrator –Transaction Management - Database System Structure-Application Architectures – History of Database Systems.

UNIT- II

Database Design and ER model – Basic concepts - Entity sets and Relationship Sets – Constraints - Keys - Design Issues - Entity-Relationship Diagram- Weak Entity Sets - Extended E-R Features - Designing of an E-R Database Schema-Reduction of an E-R Schema to Tables.

UNIT – III

Introduction to the Relational Model – Structure of Relational Databases - Relational Algebra –Relational Calculus – Domain relational Calculus , Tuple Relational Calculus - Integrity and Security –Domain Constraints ,Referential Integrity Constraints-Triggers-security and Authorization – SQL- Basic Structure, Set operations ,Aggregate Operations –Null values- Nested Sub queries – Views –Modification of Database-Joined relations ,Data Definition Language.

UNIT – IV

Informal Design guidelines for Relation Schema-Functional Dependencies– Normal Forms based on Primary Keys-Decomposition – Desirable properties of Decomposition – First Normal Form,Second Normal Form–Third Normal Form- Boyce- Codd Normal Form - Multivalued Dependency-Fourth Normal Form-Fifth Normal Form-Transactions-Transaction Concept- Transaction state- Implementation of atomicity and Durability- Concurrent Executions – Serializability, Recoverability-Implementation of Isolation.

UNIT-V

Concurrency Control-Lock Based Protocols, Dead Lock Handling ,Multiple Granularity ,Time-stamp Based Protocols, Validation Based Protocols.

Recovery System: Failure Classification, Storage Structure , Recovery and Atomicity,Log Based recovery ,Shadow Paging, Recovery with concurrent transactions.

Storage and File Structure - File Organization – Organization of records in file - Data Dictionary Storage – Indexing and Hashing – Basic Concepts , Ordered Indices,B+Tree Index files, B- tree index files – Static Hashing – Dynamic Hashing – Comparison of Indexing and Hashing.

Textbook.

1. Database System Concepts, Silberschatz, Korth , sixth Edition, McGraw hill.
2. Database Systems,Ramez Elmasri Shamkant B.Navathe Pearson Education,6th edition

References :

Database Management Systems, Raghuramakrishnan, Johannes Gehrke, TATA Mc Graw Hill

1. Data base Systems design, Implementation, and Management, Peter Rob & Carlos Coronel 7th Edition.
2. Database Systems ,The Complete Book, Hector Garcia-Molina, Jeffrey D.Ullman,Jennifer Widom.
3. An Introduction to Database Systems, C.J. Date ,Eighth edition

Course Outcomes:

CO-1. Ability to understand the fundamental concepts of database management.
CO-2. Ability to analyze database models & Entity Relationship models and to draw the E-R diagram for the given case study.
CO-3. Apply relational Database Theory, and be able to write relational algebra expressions for queries.
CO-4. Utilize the knowledge of basics of SQL and construct queries using SQL.
CO-5. Apply Normalization Process to construct the database. Explain Basic Issues of transaction processing
CO-6. Understand Concurrency control and Recovery strategies of DBMS.
CO-7. Compare the basic Database storage structures and access techniques: File Organization,indexing methods including B- Tree and Hashing.

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VAAGDEVI COLLEGE OF ENGINEERING
AUTONOMOUS

(B18ME36) POWER PLANT ENGINEERING
(Open Elective)

B.Tech. ECE

L	T	P	C
3	0	0	3

Pre Requisites: None

Course objectives:

- Understand the sources of energy, nature and role of energy in India. To recognize and understand the different types of power plants, equipments and Layouts
- Understand the working principle of Steam power plant, equipment, Coal handling systems, ash handling systems.
- Understand working principle of Diesel power plant and Gas Turbine power plant .
- Know components of Hydro-Electric Power plant ,Typical Layouts, Types of Dams
- Know various nuclear fuels, various types of Nuclear Reactors.
- Understand Power plant Economics, Load Curves, Effluents from various power plants, Environmental standards

UNIT – I
INTRODUCTION TO THE SOURCES OF ENERGY
Resources and Development of Power in India.
Steam Power Plant: Plant Layout, Working of different Circuits, Fuel and handling equipments, types of coals, coal handling, choice of handling equipment, coal storage. Ash handling systems.
Combustion process: Properties of coal – overfeed and underfeed fuel beds, traveling grate stokers, spreader stokers, retort stokers, pulverized fuel burning system and its components, combustion needs and draught system, cyclone furnace, design and construction. Dust collectors, cooling towers and heat rejection. Corrosion and fed water treatment.

UNIT – II
INTERNAL COMBUSTION ENGINE PLANT
DIESEL POWER PLANT: Introduction – IC engines, types, construction. Plant layout with auxiliaries. Fuel supply system, air starting equipment, lubrication and cooling system, super charging.
Gas Turbine Plant: Introduction – classification – construction – Layout with auxiliaries – Principles of working of closed and open cycle gas turbines. Combined Cycle Power Plants and comparison.
Direct Energy Conversion: Solar energy, fuel cells, Thermo electric and Thermo ionic, NHD generation.

UNIT – III
HYDRO ELECTRIC POWER PLANT
Water power – Hydrological cycle/flow measurement – drainage area characteristics – Hydrographs – storage and Pondage – classification of dams and spill ways.
Hydro Projects and Plant: Classification – Typical layouts – plant auxiliaries – plant operation pumped storage plants. Application of Hydro power plant, safety measures in Hydro power station, performance of water turbine, comparison of Hydro electric power plant and steam power plant.

UNIT – IV
NUCLEAR POWER STATION
Nuclear fuel – breeding and fertile materials – Nuclear reactor – reactor operation.
Types of Reactors: Pressurized water reactor, Boiling water reactor, sodium-graphite reactor, fast Breeder Reactor, Homogeneous reactor, Gas cooled reactor, Radiation hazards and shielding – radioactive waste disposal.

UNIT – V

POWER PLANT ECONOMICS AND ENVIRONMENTAL CONSIDERATIONS

Capital cost, investment of fixed charges, operating costs, general arrangement of power distribution. Load curves, load duration curve. Definitions of connected load. Maximum demand, demand factor, average load, load factor, diversity factor – related exercises. Effluents from power plants and Impact on environment – Pollutants and pollution standards – Methods of Pollution control.

Text Books

1. P.C.Sharma, "Power Plant Engineering", S.K.Kataria Publication, 2013, ISBN-13: 9788189757205.
2. Arora and S.Domkundwar, "A course in Power Plant Engineering", 2nd Edition TMH, ISBN: 9780070435995.

Reference Books

1. Rajput, "A text book of Power Plant Engineering", Laxmi Publications, ISBN No.: 978-81-318-0255-7.
2. Ramalingam, "Power Plant Engineering", SciTech Publishers, ISBN-13: 9788183710626.
3. P.K.Nag, "Power Plant Engineering": II Edition, TMH, ISBN Number: 978-0070648159.
4. Elanchezhian, "Power Plant Engineering", I.K. International Publications, ISBN-13: 978-8189866303.

Course Outcomes:

This course helps the students to

- Understand the layout of power generation units for different energy sectors.
- Identify different subsystem and systems of power generation sector.
- Compare existing and emerging alternative energy sources
- Analyze the opportunities in contributing towards the solving of energy crisis.
- Discuss general arrangement of power distribution.

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VAAGDEVI COLLEGE OF ENGINEERING
AUTONOMOUS

(B18CE53) DISASTER MANAGEMENT
(Open Elective)

B.Tech. ECE

L	T	P	C
3	0	0	3

Pre Requisites: None

Course Objectives:
- To know the types of Disasters and its triggering factors.
- Understand the stages of disaster in hydrological disaster and kinds of data are required to support emergency management work during the disasters.
- Develop and understand the causes, effects, impacts and analysis of hydrological, geological and coastal hazards.
- Assess the potential of new, evolving technologies to meet vulnerabilitymapping, modelling and emergency management needs for geologicalhazards, hydrological and coastal hazards.

UNIT I
Disasters: Definition- Hazard Risk, Mitigation, Natural and human induced disasters types of hazards, disasters and catastrophes – Disaster Management.

UNIT II
Hydrological Hazards: Flooding – PMP – PMF – Inundation mapping -flood prone area analysis and management. Dam breach analysis - Drought- types of drought - Factors influencing drought - delimiting drought prone areas - drought index, SPI and Palmer.

UNIT III
Geological Hazards: Earthquakes; location, faults, causes, types, associated hazards and impacts, Richter scale and Modified Mercalli scale. Mass movements: Definition of landslide - types – causes - slope stability analysis.

UNIT IV
Coastal Hazards – storm surge - Tsunami and floods – cyclone – coastal vulnerability – shore line erosion – shore defence structures.

UNIT V
Mitigation and Management: Hazard, Risk and Vulnerability mapping and modeling using GIS. Case studies for earthquake zonation. Risk Assessment - Preparedness- GIS case studies for earthquake, landslide–risk assessment–GIS case studies forearthquake, landslide and cyclones.Emergency Management Systems (EMS) in theDisaster Management Cycle.

TEXTBOOKS:
1. Singhal J.P. “Disaster Management”, Laxmi Publications, 2010. ISBN-10: 9380386427 ISBN-13: 978-9380386423
2. Tushar Bhattacharya, “Disaster Science and Management”, McGraw Hill India Education Pvt. Ltd., 2012. ISBN-10: 1259007367, ISBN-13: 978-1259007361]
3. Gupta Anil K, Sreeja S. Nair. Environmental Knowledge for Disaster Risk Management, NIDM, New Delhi, 2011
4. Kapur Anu Vulnerable India: A Geographical Study of Disasters, IIAS and Sage Publishers, New Delhi, 2010.

REFERENCES:

1. Govt. of India: Disaster Management Act , Government of India, New Delhi, 2005
2. Government of India, National Disaster Management Policy,2009.

COURSE OUTCOMES:

The students will be able to

CO1. Understand different types of disaster and its triggering features
CO2. Understand and analyze hydrological disaster
CO3. Understand and develop models for geological disaster
CO4. Understand the coastal hazard and shore defense structures
CO5. Capable of preparing vulnerability mapping and risk assessment and developing Emergency Management System.

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VAAGDEVI COLLEGE OF ENGINEERING
AUTONOMOUS

(B18CS33) CLOUD COMPUTING
(Open Elective)

B.Tech. ECE

L	T	P	C
3	0	0	3

Pre-requisites: Mobile computing

Course Objectives:

- Understand the virtualization paradigms.
- To introduce the various levels of services that can be achieved by cloud.
- To describe the security aspects in cloud

UNIT -I

Systems Modeling, Clustering and Virtualization: Distributed System Models and Enabling Technologies. Computer Clusters for Scalable Parallel Computing. Virtual Machines and Virtualization of Clusters and Data centres.

UNIT –II

Foundations: Introduction to Cloud Computing, Migrating into a Cloud, Enriching the 'Integration as a Service' Paradigm for the Cloud Era. The Enterprise Cloud Computing Paradigm

.

UNIT -III

Infrastructure as a Service (IAAS) & Platform and Software as a Service (PAAS / SAAS): Virtual machines provisioning and Migration services, On the Management of Virtual machines for Cloud Infrastructures, Enhancing Cloud Computing Environments using a cluster as a Service. Secure Distributed Data Storage in Cloud Computing.

UNIT -IV

Python for Cloud, Python for AWS, and Python for Google cloud Platform, Python web application framework-Django cloud application development in python.

UNIT -V

Clustering And Applications: Cloud security, cloud computing for health Care, Cloud computing for Energy Systems, Cloud computing for Transportation system, Cloud computing for Manufactures Industry, Cloud computing for Education

Course Outcomes :

- **Understand** the main concepts, key technologies of virtualization
- **Describe** the architecture and infrastructure of cloud computing with all services of cloud and deployment models.
- **Analyze** the issues of cloud computing like cloud security
- **Identify** problems, analyze various cloud computing solutions using python

.

Text book:

1. Distributed and Cloud Computing. KaI Hwang. Geoffeiy C.Fox. Jack J.Dongarra.E)sevier. 2011.
2. Cloud computing principles and paradigms by rajkumar buyya
3. Cloud Computing: A Hands –on-Approach by Arshdeep Bahga and Vijay Madisetti

REFERENCE BOOKS:

1. Cloud Computing: A Practical Approach. Anthony T.Velte. Toby J.VeFte, Robert Elsenpeter. Tata McGraw Hill. rp2Oll.
2. Enterprise Cloud Computing Gautam Shroif, Cambridge University Press. 2010.
3. Cloud Computing: Implementation, Management and Security, John W. Rittinouse, James F Ransome. CRC Press, rp2012.
4. Cloud Application Architectures: Building Applications and Infrastructure in the Cloud. George Reese, O'RedI SPD, rp2Oll.

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VAAGDEVI COLLEGE OF ENGINEERING
AUTONOMOUS

(B18MB03) ENTREPRENEURSHIP DEVELOPMENT
(Open Elective)

B.Tech. ECE **L T P C**
3 0 0 3

Pre-requisites: None

Course Objective: The objective of the course is to make students understand the nature of entrepreneurship, and to motivate the student to start his/her own enterprise. The objective of the course is to enlighten with the fragrance of Corporate Good Governance and Business Ethics, so that they would become the best entrepreneurs / managers of the corporate world.

Unit – I

Nature of Entrepreneurship; Characteristics – Qualities and skills of an Entrepreneur – Functions of entrepreneur – Entrepreneur scenario in India and Abroad. Forms of Entrepreneurship: Small Business – Importance in Indian Economy – Types of ownership – Sole trading – Partnership – Joint stock company and other forms. First – Mover disadvantages, Risk Reduction strategies, Market scope strategy, Imitation strategies and Managing Newness

Unit – II

Aspects of Promotion: Generation of new entry opportunity, SWOT Analysis, Technological Competitiveness, legal regulatory systems, patents and trademarks, Intellectual Property Rights- Project Planning and Feasibility Studies- Major steps in product development. Financial Aspects: Sources of raising Capital, Debt-Equity, Financing by Commercial Banks, Government Grants and Subsidies, Entrepreneurship Promotion Schemes of Department of Industries (DIC), KVIC, SIDBI,NABARD, NSIC, APSFC, IFCI and IDBI. New Financial Instruments.

Unit - III

Introduction to Business Ethics: Necessity for Business Ethics-Need for Ethical guideline – Salient Issues in Ethics and Commerce- Ethics as a Luxury – Earlier attempts at Ethics in Industry – Justification for Ethics – Effect of Migration of National Character – Shadow Economy – Basic Principles in Ethics – Corporate Climate and corporate climate audits – Political Issues – Nature and theory of Ethics – The Naturalistic fallacy - G.E.Moore's Philosophy.

Unit – IV

Understanding Corporate Governance: Corporate Governance- Capitalism at crossroads – Historical perspective of Corporate Governance – Issues of Corporate Governance – Theoretical basis of Corporate Governance – Corporate Governance mechanisms – Indian Model of Governance – Good Corporate Governance – Corporate Governance committees – OECD Principles – Indian Committee and guidelines – The confederation of Indian Industry's initiative. Corporate Governance Models, Corporate Social Responsibility.

Unit – V

Corporate Social Responsibility: System Concept of Business Society – Social Responsibility – Social Responsibility tools – approaches to Ethics – Corporate Social Accountability - Business in a Social World – Ethics and Social Responsibility – professional ethics – Ethics of practicing company secretaries- Ethical investing.

Text Books:

1. Robert D Hisrich, Michael P Peters, Dean A Shepherd: Entrepreneurship, TMH, 2009
2. Vasanth Desai: Entrepreneurship, HPH, 2009
3. C.S.V.Murthy: Business Ethics & Corporate Governance, Himalaya, 2009.

References:

1. Bholanath Dutta: Entrepreneurship Text and Cases, Excel, 2009
2. David Martin: Corporate Governance, Viva, 2009
3. H. Nandan: Fundamentals of Entrepreneurship, PHI, 2009.
4. Barringer: Entrepreneurship, Pearson,2009.
5. Ronald D Francis & Mukti Mishra: Business Ethics, TMH, 2009
6. RK Mishra,Gitarani: Corporate Governance, Excel,2009
7. A.C.Frenando: Corporate Governance, Pearson, 2006
8. V.Balachandran & V.Chandrasekaran: Corporate Governance & Social esponsibility, PHI, 2009
9. A.C.Fernando: Business Ethics, Pearson, 2009
10. Laura P Hartman & Abha Chatterjee: Business Ethics, TMH, 2009
11. Tripat Kaur: Values and Ethics in Management, 2/e, Paragon International,2009.

Learning Outcome: By the end of this course the students should be able to understand the mindset of the entrepreneurs, identity ventures for launching, develop an idea on the legal framework and also understand strategic perspectives in entrepreneurship.

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VAAGDEVI COLLEGE OF ENGINEERING
AUTONOMOUS

(B18CE52) AIR POLLUTION AND CONTROL
(Open Elective)

B.Tech. ECE

L	T	P	C
3	0	0	3

Pre-requisites: None

Course Objectives:

To impart knowledge on the principle and design of control of Indoor/ particulate/ gaseousair pollutant and its emerging trends.

UNIT I INTRODUCTION

Structure and composition of Atmosphere – Definition, Scope and Scales of Air Pollution – Sources and classification of air pollutants and their effect on human health, vegetation, animals, property, aesthetic value and visibility- Ambient Air Quality and Emission standards –Ambient and stack sampling and Analysis of Particulate and Gaseous Pollutants.

UNIT II METEOROLOGY

Effects of meteorology on Air Pollution - Fundamentals, Atmospheric stability, Inversion, Windprofiles and stack plume patterns- Atmospheric Diffusion Theories – Dispersion models, Plume rise.

UNIT III CONTROL OF PARTICULATE CONTAMINANTS

Factors affecting Selection of Control Equipment – Gas Particle Interaction – Working principle,Design and performance equations of Gravity Separators, Centrifugal separators Fabric filters, Particulate Scrubbers, Electrostatic Precipitators – Operational Considerations.

UNIT IV CONTROL OF GASEOUS CONTAMINANTS

Factors affecting Selection of Control Equipment – Working principle, Design and performanceequations of absorption, Adsorption, condensation, Incineration, Bio scrubbers, Bio filters – Process control and Monitoring - Operational Considerations.

UNIT V INDOOR AIR QUALITY MANAGEMENT

Sources, types and control of indoor air pollutants, sick building syndrome and Building relatedillness-Sources and Effects of Noise Pollution – Measurement – Standards –Control and Preventive measures.

TEXTBOOKS:

1. Lawrence K. Wang, Norman C. Pareira, Yung Tse Hung, “Air Pollution Control Engineering”, Tokyo, springer science + science media LLC,2004.
2. Noel de Nevers, “Air Pollution Control Engineering”, Waveland press,Inc 2017.
3. Anjaneyulu. Y, “Air Pollution and Control Technologies“, Allied Publishers (P) Ltd., India2002.

REFERENCES:

1. David H.F. Liu, Bela G. Liptak, “Air Pollution”, Lweis Publishers, 2000.
2. Arthur C. Stern, “Air Pollution (Vol.I – Vol.VIII)”, Academic Press, 2006.
3. Wayne T.Davis, “Air Pollution Engineering Manual”, John Wiley & Sons, Inc, 2000.
4. M.N Rao and HVN Rao, “Air Pollution”,Tata McGraw Hill Publishing Company limited,2007.
5. C.S.Rao, “Environmental Pollution Control Engineering”,New Age International (P) Limited Publishers,2006.

COURSE OUTCOMES:

The students completing the course will have

CO1: an understanding of the nature and characteristics of air pollutants, noise pollution and basic concepts of air quality management

CO2: Ability to identify, formulate and solve air and noise pollution problems

CO3: Ability to design stacks and particulate air pollution control devices to meet applicable standards.

CO4: Ability to select control equipments.

CO5: Ability to ensure quality, control and preventive measures.

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VAAGDEVI COLLEGE OF ENGINEERING
AUTONOMOUS

(B18ME38) ROBOTICS
(Open Elective)

B.Tech. ECE **L T P C**
3 0 0 3

Pre-requisites: None

Course Objectives:

1. Students will be able to understand the concepts of robotics – classification by coordinate system and control system.
2. Students will be able to determine the degrees of freedom, end effectors, electric hydraulic and pneumatic devices.
3. Students will possess the concepts of homogeneous transformations.
4. Student will understand the Jacobean problems, Newton – Euler transmations.
5. Students will know about the actuators and feedback components, resolvers, encoders - velocity sensors.
6. Students will be able to know the applications of robots in manufacturing.

UNIT – I
INTRODUCTION
Automation and Robotics – An over view of Robotics – classification by coordinate system and control systems – Components of Industrial Robotics: Degrees of freedom – End effectors: Types of grippers: Mechanical, Magnetic, Vacuum cup – General considerations on gripper selection and design

UNIT – II
MOTION ANALYSIS
Basic rotation matrices – Composite rotation matrices – Euler Angles – Equivalent Angle and Axis – Homogeneous transformation – Problems.
Manipulator Kinematics: D.H.Notation– Joint coordinates and world coordinates – Forward and inverse kinematics – problems.
Differential Kinematics: Differential kinematics of planar and spherical manipulators – Jacobians – Problems.

UNIT – III
ROBOT DYNAMICS
Lagrange – Euler formulations – Newton – Euler formulations – Problems on planar two link manipulators.

UNIT – IV
TRAJECTORY PLANNING
Joint space scheme – cubic polynomial fit – Avoidance of obstacles – Types of motion – Slew motion – Joint interpolated motion – straight line motion – problems.

UNIT – V
ROBOT ACTUATORS AND FED BACK COMPONENTS
Actuators: Pneumatic and Hydraulic actuators. Electric Actuators: DC servo motors – stepper motors. Feedback components: position sensors – potentiometers, resolvers and encoders – Velocity sensors – Tactile sensors.
Robot Application in Manufacturing: Material handling – Assembly and Inspection.

Text Books:

1. Groover M P, "Industrial Robotics", Pearson Edu., 2012 1st Edition, ISBN Number: 0070265097, 9780070265097, 978-0070265097.
2. JJ Craig, "Introduction to Robotic Mechanics and Control", Pearson, 2008 3rd edition. ISBN-13: 978-0201543612

Reference Books:

1. Fu K S, "Robotics", McGraw Hill, 1st Ed., 2008, ISBN 13: **9780070226258.**
2. Richard D.Klafter, "Robotic Engineering", Prentice Hall, 1st Ed., 1989, ISBN-13: 9780137820535.

Course Outcomes:

The students will be able to

1. Apply the knowledge of robotics in real time human life applications.
2. Analyse the concept of CAD/CAM and automation to the robotics.
3. Compare knowledge of robot applications in manufacturing like, material handling, loading and unloading etc.
4. Experiment the robotics to the spot and continuous arc welding and spray painting.
5. Relate the Robot Application in Manufacturing.

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VAAGDEVI COLLEGE OF ENGINEERING
AUTONOMOUS

(B18EE52) POWER ELECTRONICS AND DRIVES
(Open Elective)

B.Tech. ECE

L	T	P	C
3	0	0	3

Prerequisite: Electrical Technology
Industrial Electronics

Course Objectives:

UNIT–I An Introduction to Electrical Drives

Electrical drives –Advantages of electrical drives – Parts of electrical drives – Choice of electrical drives – status of DC and AC drives Dynamics of electrical drives Fundamental torque equation–Speed torque conventions and multi-quadrant operation – Equivalent values of drive parameters–components of low torques, nature and classification of load torques –calculation of time and energy loss in transient operations –steady state stability –load equalization.

UNIT–II Controlled Converter Fed DC Motor Drives

Fundamentals of Electric Drives- Single-phase half and fully controlled converter fed separately excited and series DC motor drive – Output voltage and current waveforms – Speed-torque expressions – Speed-torque characteristics. Four-quadrant operation-Principle of operation of dual converters and dual converter fed DC motor drives - Braking methods: Dynamic – Plugging – Regenerative methods. Numerical problems.

UNIT–III DC–DC Converters Fed DC Motor Drives

Single quadrant – Two quadrant and four quadrant DC-DC converter fed separately excited and self-excited DC motors – Continuous current operation– Output voltage and current waveforms – Speed–torque expressions – Speed–torque characteristics –Four quadrant operation – Closed loop operation.

UNIT–IV Control of Induction Motor Drives

Variable voltage and variable frequency control– voltage source inverter control – closed loop control – current source inverter control – rotor resistance control – slip power recovery – speed control of single-phase induction motors.

UNIT–V Control of Synchronous Motor Drives

Operation from fixed frequency supply– synchronous motor variable speed drives – variable frequency control of multiple synchronous motors – Self-controlled synchronous motor drive employing load commutated thyristor inverter.

Text Books:

1. G. K. Dubey, “Power Semiconductor Controlled Drives”, Prentice Hall, 1989.
2. R. Krishnan, “Electric Motor Drives: Modeling, Analysis and Control”, Prentice Hall, 2001.
3. B. K. Bose, “Modern Power Electronics and AC Drives”, Prentice Hall,2001.

References:

1. G. K. Dubey, “Fundamentals of Electrical Drives”, Narosa, 2002.
2. W. Leonhard, “Control of Electric Drives”, Springer Science & Business Media, 2001.

Course Outcomes: At the end of this course students are able to

CO.1. Understand the fundamentals related to industrial drives.

CO.2. Analyze the operation of converter fed dc motors and four quadrant operations of dc motors using dual converters.

CO.3. Describe the chopper fed dc motors in various quadrants of operation.

CO.4. Differentiate the stator side control and rotor side control of three phase induction motor and understand the speed control of single phase induction motor.

CO.5. Explain the speed control mechanism of synchronous motors.

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VAAGDEVI COLLEGE OF ENGINEERING
AUTONOMOUS

(B18EE51) INDUSTRIAL ELECTRONICS

B.Tech. ECE

L	T	P	C
3	0	0	3

Prerequisite: Electrical Circuits & Electronic Devices and Circuits

Course Objectives:

UNIT-I Power Semiconductor Devices

Power Diode, Power BJT, Power MOSFET, IGBT, Characteristics of power BJT, power MOSFET and power IGBT, Thyristors–Silicon controlled rectifiers (SCR's) –Basic theory of operation of SCR–Static characteristics and Dynamic characteristics of SCR – Turn on and turn off methods— Snubber circuit design.

UNIT–II AC-DC Converters

Single-phase half wave-controlled rectifiers – R load and RL load with and without freewheeling diode – Single-phase full wave-controlled rectifiers – center tapped configuration and bridge configuration- R load and RL load with and without freewheeling diode. Single-phase semi-controlled rectifier with R and RL load Three-phase half wave-controlled rectifier with R and RL load – Three-phase fully controlled rectifier with R and RL load – Three-phase semi controlled rectifier with R and RL load. Dual Converters.

UNIT–III AC-AC Converters

AC Voltage Controllers: AC voltage controllers – Single phase two SCR's in anti-parallel with R and RL loads , modes of operation of Triac – Triac with R and RL loads – Derivation of RMS load voltage, current and power factor- wave forms.

UNIT–IV DC–DC Converters

Choppers– Time ratio control and Current limit control strategies – Step down Choppers- Derivation of load voltage and currents with R, RL and RLE loads- Step up Chopper – load voltage expression, DC Jones Chopper.

UNIT – V DC–AC Converters

Single- phase half bridge and full bridge inverters with R and RL loads – three-phase square wave inverters – 120^0 conduction and 180^0 conduction modes of operation – PWM inverters – Quasi-square wave pulse width modulation – Sinusoidal pulse width modulation.

Text Books:

1. M. H. Rashid, "Power Electronics: Circuits, Devices, and Applications", Pearson Education India, 2009.
2. N. Mohan and T. M. Undeland, "Power Electronics: Converters, Applications and Design", John Wiley & Sons, 2007.
3. P. S. Bhimbra "Power Electronics", Khanna Publications,2012.

References:

1. R. W. Erickson and D. Maksimovic, "Fundamentals of Power Electronics", Springer Science & Business Media, 2007.
2. L. Umanand, "Power Electronics: Essentials and Applications", Wiley India, 2009.
3. M.D. Singh & K.B. Kanchandhani "Power Electronics", Tata Mc Graw Hill, 2017.

Course Outcomes: At the end of this course students are able to

- Understand the differences between signal level and power level devices.
- Analyse phase-controlled rectifier circuits.
- Analyse the operation of AC-AC voltage regulators.
- Analyse the operation of DC-DC choppers.
- Analyse the operation of DC-AC converters.

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VAAGDEVI COLLEGE OF ENGINEERING
AUTONOMOUS

(B18MB06) INTELLECTUAL PROPERTY RIGHTS
(Open Elective)

B.Tech. ECE **L T P C**
3 0 0 3

Pre-requisites: None

Course Objectives:

In the interest of the national economic growth the innovations and improvements are to be owned and used for the production and distribution process. The students of technology will be benefited by knowing the process of obtaining recognition of their innovations. This course will enable them to know the legal process of registering the innovations.

UNIT – I

INTRODUCTION TO INTELLECTUAL PROPERTY: Introduction, types of intellectual property, International organizations, agencies and treaties, importance of intellectual property rights.

UNIT – II

TRADE MARKS: Purpose and function of trade marks, acquisition of trade mark rights, protectable matter, selecting and evaluating trade mark, trade marks registration processes.

UNIT – III

LAW OF COPY RIGHTS: Fundamental of copy right law, originally of material, rights of reproduction, rights of perform the work publicity, copy right ownership issues, copy right registration, notice of copy right, international copy right law.

LAW OF PATENTS: Foundation of patent law, patent searching process ownership rights and transfer.

UNIT- IV

TRADE SECRETS: Trade secrete law, determination of trade secrete status, liability for misappropriations of trade secrets, protection for submission trade secrete litigation.

UNIT-V

NEW DEVELOPMENT OF INTELLECTUAL PROPERTY: New developments in trade mark law: Copy right law, patent law, intellectual property audits.

TEXT BOOOKS & REFERENCES:

1. Intellectual property rights, Deborah, E. Bouchux, cengage learing
2. Intellectual property right – Unleashing the knowledge economy, prabuddha ganguli, Tate Mc Graw Hill Publishing company ltd.,

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VAAGDEVI COLLEGE OF ENGINEERING
AUTONOMOUS

(B18CS17) MACHINE LEARNING
(Open Elective)

B.Tech. ECE

L	T	P	C
3	0	0	3

Objectives:
- To be able to formulate machine learning problems corresponding to different applications.
- To understand a range of machine learning algorithms along with their strengths and weaknesses.
- To understand the basic theory underlying machine learning.
- To be able to apply machine learning algorithms to solve problems of moderate complexity.
- To be able to read current research papers and understands the issues raised by current research.

UNIT-I:
The ingredients of machine learning, Tasks: the problems that can be solved with machine learning, Models: the output of machine learning, Features, the workhorses of machine learning. Binary classification and related tasks: Classification, Scoring and ranking, Class probability estimation

UNIT- II:
Beyond binary classification: Handling more than two classes, Regression, Unsupervised and descriptive learning. Concept learning: The hypothesis space, Paths through the hypothesis space, Beyond conjunctive concepts

UNIT-III:
models: Decision trees, Ranking and probability estimation trees, Tree learning as variance reduction. Rule models: Learning ordered rule lists, Learning unordered rule sets, Descriptive rule learning, First-order rule learning

UNIT-IV:
Linear models: The least-squares method, The perceptron: a heuristic learning algorithm for linear classifiers, Support vector machines, obtaining probabilities from linear classifiers, Going beyond linearity with kernel methods. Distance Based Models: Introduction, Neighbours and exemplars, Nearest Neighbours classification, Distance Based Clustering, Hierarchical Clustering.

UNIT- V:
Probabilistic models: The normal distribution and its geometric interpretations, Probabilistic models for categorical data, Discriminative learning by optimising conditional likelihood Probabilistic models with hidden variables. Features: Kinds of feature, Feature transformations, Feature construction and selection. Model ensembles: Bagging and random forests, Boosting

Course Outcomes:
After the completion of this course the students should be able to :
1. Discuss different application on Machine Learning problems.
2. Describe various algorithms on Machine Learning mentioning its strengths and weaknesses.
3. Illustrate the basic theory focused on Machine Learning.
4. Improve the performance of Machine Learning algorithms with different parameters.
5. Analyze current research papers.
6. Understand the latest issues raised by current researchers.

TEXT BOOKS:

1. Machine Learning: The art and science of algorithms that make sense of data, Peter Flach, Cambridge.
2. Machine Learning, Tom M. Mitchell, MGH.

REFERENCE BOOKS:

1. Understanding Machine Learning: From Theory to Algorithms, Shai Shalev-Shwartz, Shai Ben-David, Cambridge.
2. Machine Learning in Action, Peter Harington, 2012, Cengage.

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