SRI VENKATESWARA UNIVERSITY: TIRUPATI

SRI VENKATESWARA UNIVERSITY COLLEGE OF ENGINEERING

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Course

B.Tech ELECTRONICS AND COMMUNICATION ENGINEERING

Choice Based Credit System (CBCS)

Academic Year 2017-2018

VISION

To be a lead department imparting quality and value embedded higher education and research emphasizing freedom of learning and practice.

MISSION

- Transforming students into full-fledged professionals and to become leaders in dynamic global environment.
- Augmenting knowledge and technologies in rapidly advancing fields of Electronics and Communication Engineering.
- Promoting in depth research and create centre of excellence in thrust areas.

Program Educational Objectives (PEOs) of ECE:

The Educational Objectives of UG Program in Electronics and Communication Engineering are:

1. To produce competent graduates in core areas of Electronics and Communication Engineering with adequate analytical capabilities and practical knowledge to attend to the current challenging tasks and to absorb futuristic trends.

2. To provide strong foundation in basic sciences and communication skills.

3. To keep the students abreast with the latest hardware and software design techniques and cutting edge technologies

4. To enhance the knowledge and skills continually throughout their career and to make them capable to adapt in diverse environments.

5. To imbibe leadership qualities among the students to take up challenging roles in their career by ensuring professional ethics with high sense of social responsibility.

Program Outcomes Of ECE:

The program outcomes are the skills and knowledge which the graduates have at the time of graduation:

A. An ability to apply knowledge of mathematics, science, and engineering to solve engineering problems.
B. Capability to design and conduct experiments, as well as to analyze and interpret data
C. Identify, formulate, and solve engineering problems
D. Solving different types of problems associated with multi-disciplinary areas
E. Apply ethical principles and professional ethics and norms of engineering practice
F. Equipped to design a engineering system, component, or process that meets the specific needs with proper eco system
G. Disseminating knowledge effectively with engineering community and in general society.
H. The broad knowledge provided to understand the impact of engineering solutions in a global, economic, environmental, and societal context
I. A recognition of the need for, and an ability to engage in life-long learning

J. A knowledge of contemporary issues

K. An ability to select and use the appropriate advanced techniques, skills, and modern engineering tools necessary for engineering practice, with an understanding of limitations.

L. Will be in a position to participate and become successful in competitive examinations like GATE, IES,GRE,CAT,Civil services etc.

Program Educational Objectives	**Program Outcomes**											
	A	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**	**K**	**L**
1		**X**	**X**	**X**		**X**					**X**	**X**
2	**X**		**X**	**X**		**X**	**X**				**X**	**X**
3		**X**		**X**		**X**		**X**		**X**	**X**	
4	**X**			**X**	**X**		**X**	**X**	**X**	**X**	**X**	**X**
5			**X**		**X**		**X**	**X**	**X**	**X**		**X**

Abstract about B. Tech syllabus in ECE

Department of Electronics and Communication Engineering is offering a B.Tech program with an intake of 60(Plus 10% of total intake in the Second year through EECET). The syllabus revision was carried out in 2010. A standard academic format common for all UG programs describing numbers of credits, weightage for lectures, laboratory work, and projects has been fixed considering the scope of the study. Induction program for students to be offered right at the start of the first year with a duration of Three Days which cover Physical activity like Creative Arts, Universal Human Values, Literary, Proficiency Modules, Lectures by Eminent People, Visits to local Areas Familiarization to Dept./Branch & Innovations. Students are encouraged to enroll in open electives through MOOCs. The MOOCs can be done through NPTEL, Coursera, Udemy, Skill share, EdX, Udacity, Pluralsight, etc. The project work is initiated in the VIII semester along with Mini Project / Internship which will make them get exposed to industrial needs. New courses are added to the curriculum whenever it is needed. This ensures they are on par with others.

Scheme of Instructions

I Semester-ECE

Course No.	Name of Course	Scheme of Instruction			Credits
	THEORY	Theory Hrs.	Tutorials	Practical Hrs.	
MAT01	Engineering Mathematics- I	3	2	-	4
CST01	Computer Programming	3	2	-	4
CET01	Environmental Studies	2	2	-	3
CET02	Basic Civil Engineering	3		-	3
MET02	Basic Mechanical Engineering	3		-	3
ENT01	English	3		-	3
CSP01	Computer Programming Lab			3	2
ENP01	English Communication Lab	-		3	2
		17	**6**	**6**	**24**

II Semester-ECE

Course No.	Name of Course	Scheme of Instruction			Credits
	THEORY	Theory Hrs.	Tutorial Hrs	Practical Hrs.	
MAT02	Engineering Mathematics II	3	2	-	4
CST02	Data structures	3	2	-	4
PHY01	Engineering Physics	3		-	3
CYT01	Engineering Chemistry	3		-	3
EET02	Circuit theory	4		-	4
MET01	Engineering Graphics	2		3	4
CSP02	Data Structures Lab	-		3	2
MEP01	Workshop practice	-		3	2
		18	**4**	**9**	**26**

III Semester-ECE

Course No.	Name of Course	Scheme of Instruction			Credits
	THEORY	Theory Hrs.	Tutorial Hrs	Practical Hrs.	
MAT03	Engineering Mathematics – III	3	2		4
EET03	Network Analysis	3	1		4
ECT02	Electronic Devices	2	2		3
ECT03	Signals & Systems	3	1		4
ECT04	Electromagnetic Fields & Waves	3	1		4
EET41	Electrical Technology	3	1		4
EEP41	Electrical Circuits and Machines Lab			3	2
ECP01	MATLAB and Simulation Lab			2	1
		17	**8**	**5**	**26**

IV Semester-ECE

Course No.	Name of Course	Scheme of Instruction			Credits
	THEORY	Theory Hrs.	Tutorial Hrs	Practical Hrs.	
ECT05	Electronic Circuits Analysis	3	1		4
ECT06	Pulse and Digital Circuits	2	2		3
ECT07	Switching Theory and Logic Design	2	2		3
ECT08	Random Signals and Stochastic Process	3	1		4
ECT09	Analog Communication	2	2		3
ECT10	Transmission line and waveguides	2	2		3
EET42	Control Systems	2	2		3
ECP02	Electronic Circuits Analysis Lab			3	2
ECP03	Analog Communication Lab			3	2
		16	**12**	**6**	**27**

V Semester-ECE (R16)

Course No.	Name of Course	Scheme of Instruction			Credits
	THEORY	Theory Hrs.	Tutorial Hrs	Practical Hrs.	
EOT01	Economics	2			2
AOT01	Accountancy	2			2
ECT11	Analog IC Applications	2	2		3
ECT12	Antennas and Wave Propagation	3	2		4
ECT13	Electronic Measurements and Instrumentation	2	2		3
ECT14	Digital Communication	3	1		4
ECT15	Computer Organization	2	2		3
ECP04	Digital Circuits Lab			3	2
ECP05	Digital Communication Lab			3	2
ECP06	Electronic Measurements Lab			2	1
		16	**9**	**8**	**26**

VI Semester-ECE (R16)

Course No.	Name of Course	Scheme of Instruction			Credits
	THEORY	Theory Hrs.	Tutorial Hrs	Practical Hrs.	
MET43	Management Science	3			3
ECT16	Digital IC Design Applications	2	2		3
ECT17	VLSI Design	2	2		3
ECT18	Microprocessors and Interfacing	3	1		4
ECT19	Microwave Techniques	2	2		3
ECT20	Digital Signal Processing	3	1		4
EC-OE01/ EC-OE02	Elective -I (Open Elective)	3	1		4
ECP07	IC Applications Lab			3	2
ECP08	VLSI Lab			2	1
		18	**9**	**5**	**27**

VII Semester-ECE (R16)

Course No.	Name of Course	Scheme of Instruction			Credits
	THEORY	Theory Hrs.	Tutorial Hrs	Practical Hrs.	
ECT21	Radar Engineering	3			3
ECT22	Optical Communication	3			3
ECT23	Mobile Communication	3			3
ECT24	Communication Networks	3	1		4
ECT25	Elective-II (Dept Elective)	3	1		4
ECP09	Microprocessors and Interfacing Lab			3	2
ECP10	Microwave and Optical Communication Lab			2	1
ECP11	DSP Lab			2	1
		15	**2**	**7**	**22**

VIII Semester-ECE (R16)

Course No.	Name of Course	Scheme of Instruction			Credits
	THEORY	Theory Hrs.	Tutorial Hrs	Practical Hrs.	
ECT26	Elective III (Discipline: e_ Learning)	3			3
ECT27	Elective IV (MOOCs)	3			3
ECP12	Mini Project / Internship	Continuous work			2
ECP13	Project Work	Continuous work			6
		6			**14**

LIST OF ELECTIVES

ELECTIVE – I		ELECTIVE - II		ELECTIVE - III		ELECTIVE – IV	
S.No.	Elective	S.No.	Elective	S.No.	Elective	S.No.	Elective
a	Television Engineering	a	Digital Image Processing	a	Object Oriented Programming Through Java	a	Data analytics
b	Data and computer communications	b	Advanced Microprocessors	b	Cyber Security	b	Embedded systems
c		c	Satellite Communications	c	DSP processors	c	Information Theory & Coding
d		d	Remote sensing	d	Neural Networks and Fuzzy logic	d	Operating Systems

S.V. UNIVERSITY COLLEGE OF ENGINEERING :TIRUPATI – 517502

4-Year B.Tech Degree Programme

MAT01 Engineering Mathematics – I

Instruction Hours / Week : 5 **Credits: 4**

Common to all branches and with effect from 2016-17

Course Objectives:

1. The emphasis is primarily on the development of analytical techniques.
2. To make students familiar with Differential Equations and its solutions.
3. To provide the basic knowledge in transformations and in particular Laplace transforms
4. Expansions of functions as a power series
5. Roll's and Mean value theorems and maxima, minima
6. Curve tracing and Evaluation of Multiple Integrals

Syllabus

Unit – 1

Differential Equations: Linear differential equations of second and higher order with constant coefficients-particularintegrals-homogeneous differential equations with variable coefficients-method of parameters-simulation equations.

Unit – 2

Laplace Transforms I: Laplace transforms of standard functions-inverse transforms-transforms of derivatives and integrals-derivatives of transforms-integrals of transforms.

Unit – 3

Laplace Transforms II: Transforms of periodic functions-convolution theorem-applications to solution of ordinary differential equations.

Unit – 4

Calculus: Roll's and Mean value theorems - Taylor's and Maclaurins's series-maxima and minima for functions of two variables - Infinite series - Convergence Tests series of positive terms - comparison, Ratio tests - Alternating series - Leibnitz's rule - Absolute and conditional convergence.

Unit – 5

Multiple Integrals: Curve tracing (both Cartesian and polar coordinate) - Evaluations of double and Triple integrals-change of order of integrations-change of variables of integrations-simple applications to areas and volumes.

Text Books:

1. B S Grewal, Higher Engineering Mathematics, 40th Edition, Khanna Publications, 2007.

2. M K Venkataraman, Engineering Mathematics, National Publishing Company, Chennai.
3. B V Ramana, Higher Engineering Mathematics, 6th Reprint, Tata McGraw-Hill, 2008.
4. Bali and Iyengar, Engineering Mathematics, 6th Edition, Laxmi Publications, 2006.

Course Outcomes:

1. Extends an ability to analyze differential equations and solve them
2. The students become familiar with the applications of differential equations to engineering problems.
3. In Mathematics, a transform is usually a device that converts one type into another type presumably easier to solve.
4. Use shift theorems to compute the Laplace transform, inverse Laplace transform and the solutions of second order, linear equations with constant coefficients.
5. Solve an initial value problem for an nth order ordinary differential equation using the Laplace transform.
6. Expand functions as power series using Maclaurin's and Talor's series
7. The problems in OR, Computer science, Probability, statistics deals with functions of two or more variables. To optimize something means to maximize or minimize some aspects of it.
8. Curve tracing is an analytical method of drawing an approximate shape by the study of some of its important characteristics such as symmetry, tangents, regions etc it is useful in applications of finding length, area, volume.
9. Multiple integral is a natural extension of a definite integral to a function of two, three variables and are useful in evaluating area and volume of any region bounded by the given curves.

MAT01: Engineering Mathematics – I	P01	**PO2**	**PO3**	**PO4**	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3		3	2	1	1	2	2	2	3	3	3		
CO2	3		3	2	1	1	2	2	2	3	3	3		
CO3	3		3	2	1	1	3	2	2	3	3	3		
CO4	3		3	3	1	1	3	2	2	3	3	3		
CO5	3		3	3	2	1	3	2	2	3	3	3		
CO6	3		3	2	1	1	2	2	2	3	3	3		
CO7	3		3	2	1	1	2	2	2	3	3	3		
CO8	3		3	2	1	1	2	2	2	3	3	3		
CO9	3		3	3	2	1	3	2	2	3	3	3		

S.V. UNIVERSITY COLLEGE OF ENGINEERING :TIRUPATI – 517502

4-Year B.Tech Degree Programme

CST01 Computer Programming

Instruction Hours / Week : 5 **Credits: 4**

Common to all branches and with effect from 2016-17

Prerequisites:

1. There are no prerequisites for this course, except that anyone who wants to learn C as well as should have analytical skills and logical reasoning.

Course Objectives:

1. This course starts from the basics of program development.
2. To understand the various steps in Program development
3. It covers various concepts of C and C++ programming languages
4. To learn how to write modular and readable C Programs
5. To understand the basic concepts such as Abstract Data Types, Linear and Non Linear Data structures.
6. To understand the notations used to analyze the Performance of algorithms.
7. It introduces searching and sorting algorithms
8. To understand and analyze various searching and sorting algorithms

Syllabus

Unit – 1

Introduction to Programming– Problem Solving Steps, SDLC, Algorithms, and flow charts.
Common features of C and C++ Programming Languages – Identifiers, Variables, Constants,data types, Operators and Expressions, Input / Outputoperations.Statements- Decision Making, Branching and Looping, continue, go to and break.Precedence and Associatively, Expression Evaluation, Type conversions.C and C++ Simple Programming examples

Unit – 2

Arrays and Strings – Concepts, arrays, one and two and multidimensionalarrays.Strings Handling: String Input / Output functions, arrays of strings, string manipulation functions, data conversion, C and C++ Simple Programming examples
Designing Structured Programs- Functions- basics, functions, Scope, Storage classes- auto, register, static, extern, scope rules, type qualifiers, recursion, Preprocessor directives.
Derived types – Structures – Declaration, definition and initialization of Structures, accessing structures, nested structures, arrays of structures, structures and functions, pointers to structures, self referential structures, unions, typedef, bit fields, enumerated types.C and C++ Simple Programming examples

Unit – 3

Pointers – Introduction, Pointers for inter function communication, pointers to pointers, compatibility, memory allocation functions, array of pointers, pointers to void, pointers to functions, command –line arguments. C and C++ Simple Programming examples

Data File Handling: Input and Output– Concept of a file, streams, standard input / output Functions, formatted input / output functions, text files and binary files, file input / output operations, file status functions (Eq.error handling), C and C++ Simple Programming examples.
Dynamic Memory Allocation: Allocating a Block and Multiple Blocks, releasing the used space and altering memory size. C and C++ Simple Programming examples

Unit – 4

Basics of Object OrientedProgramming (OOP) and **C++:**BenefitsofOOP, datatypes, declarations, expressions and operatorprecedence,scopeofvariables
IntroductiontoOOP and Concepts: Abstraction**,** Data hiding, EncapsulationClassesand objects,Constructors&Destructors,Operatoroverloading&type conversions.
Polymorphism: Pointers,virtualfunctionsandpolymorphism- pointers to objects,thispointer, pointers to derived classes, virtual and purevirtualfunctions,C++ Simple Programming examples

Unit – 5

Inheritance: Derived classes, syntax of derived classes, makingprivatemembersinheritable, single, multilevel,multiple, hierarchical,hybridinheritance.
Templates, Exception handling,consoleI/OandFileI/O:classtemplates,Functiontemplates, member functiontemplates, exception handling, managing console I/Ooperations, working with files. Programming guide lines and Simple C++ Programming examples

TEXT BOOKS:

1. Scheldt H, C: The Complete Reference, 4th Edition, Tata McGraw-Hill, 2002.
2. Balagurusamy E, Programming in ANSI C, 4th Edition, Tata McGraw-Hill, 2008
3. Robert Lefore, Object Oriented Programming in C++, 4th edition, PEARSON Education
4. Scheldt H , C++ : The Complete Reference, Tata McGraw-Hill

REFERENCES:

1. C Programming with problem solving, J.A. Jones & K. Harrow, dreamtech Press
2. Programming in C – Stephen G. Kochan, III Edition, PearsonEductaion.
3. C for Engineers and Scientists, H.Cheng, Mc.Graw-Hill International Edition
4. Data Structures using C – A.M.Tanenbaum, Y.Langsam, and M.J.Augenstein, Pearson Education / PHI
5. C Programming & Data Structures, P. Dey, M Ghosh R Thereja,Oxford University Press
6. C & Data structures – E V Prasad and N B Venkateswarlu, S.Chand& Co
7. Kernighan and Ritchie, The C programming language (2nd edition). Prentice Hall of India, 1988.
8. Coohoon and Davidson, C++ Program Design: An introductionto Programming and Object-Oriented Design. Tata McGraw Hill3rd edition. 2003.
9. G. Dromey, How to Solve it by Computer, Prentice-Hall Inc.,Upper Saddle River, NJ, 1982.Yashwant Kanetkar, Let's C, Allied Publishers, 1998.
10. Programming in C, PradipDey, ManasGhosh, Second Edition, OXFORD

Course Outcomes:

1. Able to design the flowchart and algorithm for real world problems

2. Able to learn and understand new programming languages
3. Able to construct modular and readable programs
4. Able to write C and C++ programs for real world problems using simple and compound data types
5. Adapt programming experience and language knowledge to other programming language contexts
6. Good programming style, standards and practices during program development

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

1. Develop C and C++ programs for computing and real life applications using basic elements like control statements, arrays, functions, pointers and strings; and data structures like stacks, queues and linked lists. Managing classes and Objects
2. Implement searching and sorting algorithms

CST01 : Computer Programming	P01	**PO2**	**PO3**	**PO4**	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3		3	2	1	1	2	2	2	3	3	3		3
CO2	3		3	2	1	1	2	2	2	3	3	3		3
CO3	3		3	2	1	1	3	2	2	3	3	3		3
CO4	3		3	3	1	1	3	2	2	3	3	3		3
CO5	3		3	3	2	1	3	2	2	3	3	3		3
CO6	3		3	2	1	1	2	2	2	3	3	3		3

S.V. UNIVERSITY COLLEGE OF ENGINEERING :TIRUPATI – 517502

4-Year B.Tech Degree Programme

CET01 Environmental Studies

Instruction Hours / Week :4 **Credits: 3**

Common to all branches and with effect from 2016-17

Course Educational Objective (CEOs):

1. To Impart basic knowledge about the environment and its allied problems
2. To apply knowledge in Economic development without destroying the environment
3. To have knowledge on renewable energy and non renewable energy sources
4. To know about the bio diversity and its concepts

Syllabus

Unit I

Environmental Studies and Natural Resources

Definition, Scope and importance of Environment, Environmental studies, Need for public awareness

Components of Environment- Atmosphere, Hydrosphere, Lithosphere.

Renewable and**Non Renewable Resources and associated problems**

- Water resources: Use and over utilization of surface and ground water, floods, drought, conflicts over water, dams benefits and problems.
- Forest resources: Use and over exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forests and tribal people.
- Land resources: Land as a resource, land degradation, Man induced landslides, soil erosion and desertification.
- Mineral resources: Use and overexploitation, Environmental effects of extracting and using mineral resources, case studies.
- Food resources: World food problems, changes caused agriculture and overgrazing, effects of modern agriculture, fertilizer – pesticide problems, water logging, salinity, Case studies.
- Energy resources: Growing energy needs, renewable and non renewable energy sources, use of alternate energy sources. Case studies.
- Role of an individual in conservation of natural resources.

Unit II

Ecosystem and Biodiversity :

Ecosystem - Concept of an ecosystem.

1. Structure and functions of an ecosystem.
2. Producers, consumers and decomposers.
3. Energy flow in the ecosystem.
4. Ecological succession.
5. Food chains, food webs and ecological pyramids.
6. Introduction, types, characteristic features, structure and function of the following ecosystem.
   (a) Forest ecosystem. (b) Grassland ecosystem
   (c)Desert ecosystem. (d) Aquatic ecosystem (ponds, streams, lakes, rivers, oceans, estuaries)

Biodiversity and its conservation:

- Definition, genetic species and ecosystem diversity.
- Biogeographically classification of India.
- Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values.

- Biodiversity at global, National and local levels.
- India as a mega-diversity nation.
- Hot-spots of biodiversity.
- Threats to biodiversity: habitat loss, poaching of wildlife, man – wildlife conflicts.

Conservation of biodiversity: in-situ and ex-situ conservation of biodiversity.

Unit III

Environmental pollution and Global Effects.

- Definition, Causes, Effects, and control measures of (a) Air pollution (b) Water pollution (c) Soil pollution (d) Marine pollution (e) Noise pollution (f) Thermal pollution (g) Nuclear hazards
- Solid waste Management: Causes, effects and control measures of urban and industrial wastes.
- Role of an individual in prevention of pollution.
- Pollution case studies.
- Disaster management: Floods, earthquakes, cyclone, landslides, Tsunami.
- Climate change-Global warming, Acid rain, Ozone depletion.

Unit IV

Environment Issues and Management

- Environment and Human health – Epidemic diseases, HIV/AIDS, Aviation Flue, Water Borne Diseases.
- Environmental Impact Assessment, Sustainable Development, Clean Production and Clean Development Mechanisms
- Environment Legislation: Environmental Protection Act, Water Act, Air Act, Wild Life Protection Act, Forest Conservation Act, Public Liability & Insurance Act, Issues involved in Enforcement of Environmental legislation.

Unit V

Social Issues and the Environment

- Population growth, Population Explosion, Population Control, Women and Child welfare.
- Urbanization, Industrialization, Development projects, Resettlement and Rehabilitation of people – Problems concerned, Case studies.
- Consumerism and Waste Products Conservation, Public Awareness, Water Conservation, Rain water harvesting, watershed management, Wasteland reclamation, Human Rights, Value education, Environmental ethics- Issues and possible solution.

Role of information Technology in Environment and Human Health.

Text books :

1. AnubhaKaushik& C P Kaushik, Environmental studies, New age International Publishers, 2008
2. Benny Joseph, Environmental studies, Tata McGraw-Hill Publishers, 2005
3. M Chandra Sekhar, Environmental Science, Hi-Tech Publishers, 2004
4. Keerthinarayana and Daniel Yesudian, Principles of Environmental Sciences and Engineering , Hi-Tech
Publishers, 2005

5. AmalK.Datta, Introduction to Environmental Science and Engineering, Oxford & IBH Publishing Co.Pvt.Ltd, 2000

6. SanthoshkumarGarg,RajeshawriGarg and RajniGarg, Ecological and Environmental studies, Khanna publishers, 2006

Reference books:

1. Gilbert M, Introduction to Environmental Engineering and Science, Masters Publication by Prentice – Hall of India Private Ltd., 1991

2. William P Cunningham and Mary Ann Cunningham, Principles of Environmental Science, Tata McGraw Hill Publishing Co.Ltd, 2002

Course Outcomes:

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

1. Acquire knowledge in
   - Diverse components of environment and natural resources
   - Ecosystem and biodiversity & its conservation methods
   - Population growth and human health
   - Green technology
2. Identify and resolve the issues related to sources of different types of pollutions
3. Provide solutions to individuals, industries and government for sustainable development of natural resources
4. Apply environmental ethics in protection of diversified ecosystems.

CET01 Environmental Studies	P01	**PO2**	**PO3**	**PO4**	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3		3	2	1	1	2	2	2	3	3	3		3
CO2	3		3	2	1	1	2	2	2	3	3	3		3
CO3	3		3	2	1	1	3	2	2	3	3	3		3
CO4	3		3	3	1	1	3	2	2	3	3	3		3

S.V. UNIVERSITY COLLEGE OF ENGINEERING :TIRUPATI – 517502

4-Year B.Tech Degree Programme

CET02 Basic Civil Engineering

Instruction Hours / Week : 3 **Credits: 3**

Common to EEE, ECE, CSE branches and with effect from 2016-17

Course Objectives:

1. To provide basic knowledge on different elements of civil engineering
2. To gain knowledge in various materials used for construction.
3. To become skilled at various aspects of surveying
4. To be familiar with the particulars of environmental concepts

Syllabus

UNIT I : CIVIL ENGINEERING MATERIALS

Introduction to materials – Timber, Cement, Steel, Bricks, Rocks & Stones, Tiles, Ceramics, glass, Paints, Varnishes and Distempers

Mixes: Mortars, Concrete

UNIT II: ELEMENTS OF BUILDING CONSTRUCTION

Types of buildings ,Functional requirements of a building, principles of planning of a building, brick masonry, floors and floorings, Doors and windows, stairs, roofs, types of foundation, failure of foundations and remedial measures.

UNIT III: SURVEYING

Objective of Surveying, Types of surveying, classification of surveying, principles of surveying, measurement of distance, measurement of distance, measurement of angles, leveling, determination of Areas and volumes

Basic principles and applications of remote sensing, Global positioning systems (GPS), Geographical Information System (GIS)

UNIT IV: TRANSPORTATION ENGINEERING

Roads: Introduction, Road transport characteristics, Benefit of a good system of roads, classification of roads.

Bridges: Necessity of bridges, site investigation, components of a bridge, classification of bridges.

UNIT V: WATER RESOURCES & ENVIRONMENTAL ENGINNEING

Water resources- quality and quantity, water quality standards for drinking and construction-Irrigation and types – crop seasons-Types of crops, reservoirs and types-rain water harvesting

TEXT BOOKS:

1. ELEMENTS OF CIVIL ENGINEERING, Edition: 3rd Edition : 2015, AnuragA.Kandya

2. S.S. Bhavikatti , BASIC CIVIL ENGINEERING, Vikas Publishing House Pvt Limited, 2004
3. Palanichamy M S, Basic Civil Engineering, 3rd Edition, Tata McGraw-Hill, 2000

REFERENCE BOOK:

1. Gopi S, Basic Civil Engineering, Pearson Education, 2010

Course Outcomes:

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

1. To find the suitability of various building materials at a particular location in the building construction.
2. Take accurate measurements, field booking, plotting and adjustment of errors can be understood
3. Analyze the status of water quality standards for drinking and construction
4. Classify the roads and bridges

CET02 Basic Civil Engineering	P01	**PO2**	**PO3**	**PO4**	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3		3	2	1	1	2	2	2	3	3	3		3
CO2	3		3	2	1	1	2	2	2	3	3	3		3
CO3	3		3	2	1	1	3	2	2	3	3	3		3
CO4	3		3	3	1	1	3	2	2	3	3	3		3

S.V. UNIVERSITY COLLEGE OF ENGINEERING :TIRUPATI – 517502

4-Year B.Tech Degree Programme

MET02 Basic Mechanical Engineering

Instruction Hours / Week :3 **Credits: 3**

Common to EEE, ECE, CSE branches and with effect from 2016-17

Course Objectives:

1. To give overall picture of mechanical engineering from the point of view of basic concepts.
2. To learn about basic laws of thermodynamics.
3. To give insight into IC engines, steam engines, and steam turbines, gas turbines.
4. To make known the basic manufacturing processes and machine tools.
5. To learn about power transmission devices.

Syllabus

UNIT – I

Introduction to Thermodynamics – Concept of a system – Types of Systems, Thermodynamic Equilibrium – Properties, State, Process and Cycle, Zeroth Law, Energy Interactions – Heat and work, Types of work.

First and Second Laws of Thermodynamics : First law, Cycle and process, Specific heats, Heat interactions in a closed system for various processes, Limitations of First law, Concept of Heat Engine (H.E.) and reversed heat engine (Heat pump and refrigerator) , Efficiency/COP, Second Law: Kelvin – Plank and Clausius Statements , Carnot Cycle, Carnot Efficiency, Property of Entropy – T- S and P – V diagrams

UNIT – II

Thermal Power Plant: Thermal power plant layout – Four circuits – Rankine cycle, Boilers: Fire tube Vs Water Tube; BobCock and Wilcox, Cochran Boilers, Steam Turbines, Impulse Vs. Reaction Turbines, Compounding of Turbines.

UNIT – III

Internal Combustion Engines (IC): I.C. 2 – Stroke and 4 – Stroke engines – S.I. engines and C.I. engines – Differences Heat transfer – Modes – Thermal resistance concept, Conduction, Composite walls and Cylinders. Combined Conduction and Convection – Overall Heat transfer Coefficient, Simple Numerical Problems in Heat transfer.

UNIT – IV

Manufacturing Processes : Engineering Materials ; Classification , Properties of materials, Metal Casting, Moulding, Patterns, Hot working and Cold working , Extrusion, Forging, Rolling and Drawing.

Machine Tools and Machining Processes – Lathe Machines and Lathe operations, Milling machines, Types – Milling operations , Shaper, Planer, Drilling and Grinding machines.
Welding – Gas welding, Arc Welding, Soldering and Brazing

UNIT – V

Power Transmission – Transmission of Mechanical Power, Belt drives, Simple Numerical Problems, Gear Drives – Simple Numerical Problems

Basics of Automotive vehicle – Brakes – Types - Clutch and Differential.

Text Books:

1. Mathur, M.L., Mehta F.S. and Tiwari R.P., Elements of Mechanical Engineering, Jain Brothers, New Delhi, 2011.
2. Roy K.P. and HazraChowdary, S.K., Elements of Mechanical Engineering, Media Promoters and Publishers Pvt., Ltd, 2002.
3. Rudramoorthy R., Thermal Engineering, Tata McGrawHill Book Company, New Delhi, 2003.
4. HazraChowdary, S.K., and Bose, Workshop Technology , Vol. I and II, Media Promoters and Publishers Pvt. Ltd., 2002.

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

1. Understand basics of thermodynamics and components of thermal plant
2. Identify engineering materials and their properties, manufacturing methods encountered in engineering practice.
3. Understand basics of heat transfer, refrigeration and internal combustion engines.
4. Understand mechanism of power transfer through belt, chain, rope and gear drives.
5. Understand functions and operations of machine tools including milling, grinding, and shaping machines.

MET02 Basic Mechanical Engineering	P01	**PO2**	**PO3**	**PO4**	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3		3	2	1	1	2	2	2	3	3	3		3
CO2	3		3	2	1	1	2	2	2	3	3	3		3
CO3	3		3	2	1	1	3	2	2	3	3	3		3
CO4	3		3	3	1	1	3	2	2	3	3	3		3
CO5	3		3	3	2	1	3	2	2	3	3	3		3

S.V. UNIVERSITY COLLEGE OF ENGINEERING :TIRUPATI – 517502

4-Year B.Tech Degree Programme

ENT01 English

Instruction Hours / Week : 3 **Credits: 3**

Common to all branches and with effect from 2016-17

Course Objectives:

1. To introduce students elements of grammar and composition of English language.
2. To familiarize students with literary texts such as short stories and prose passages.
3. To maintain linguistic competence through training in vocabulary, sentence structures and pronunciation.
4. To develop communication skills by cultivating the habit of reading comprehension passages.
5. To train the students to develop the language skills like listening, speaking, reading and writing.
6. To initiate them into use of self-instructed learner friendly modes of language learing through competence.

Syllabus

Unit-I

Effective Communication: Role and Importance of Communication, Features of Human Communication, Process of
Communication, Interpersonal Communication, Barriers, Types- Verbal, Non-Verbal.

Unit-II

Grammar: Articles, prepositions, tenses, reported speech, idioms and phrases

Unit-III

Listening Skills: Process of Listening, Tips for Effective Listening.

Speaking Skills: Basics of Spoken English, English Sounds, Rhythm and Intonation Telephonic Skills, Group Communication.

Reading Skills: Developing Reading Skills, Reading Strategies, Reading Comprehension.

Writing Skills: Paragraph Writing, Essay Writing, E-writing, Job applications, , Reports. Resume and Letter Writing.

Unit-IV

Soft Skills: Tem Work Skills, Interview Skills, Problem- Solving Skills Adoptability Skills, Presentation Skills and Group Discussions.

Unit- V Stories from Delight and Wisdom (An Anthology of Short Stories)

1. The Gift of Magi By O. Henry
2. The Diamond Necklace by Guy De Maupassant
3. My Brother, My Brother by Norah Burke
4. The Open Window by Saki
5. The Child by Premchand

Text Books:

1. Oxford guide to Effective writing and Speaking by John Seely, Oxford University Press, 2013,

ISBN- 978-0-19-871393-7
2. Delight and Wisdom published by Orient Blackswan, 2009, ISBN: 978-81-250-3716-3

Reference Books:

1. David Green, Structure and Composition in English, Macmillan Publishers India Limted.
2. Communicative English by E. Suresh Kumar, P. Sreehari, Orient BalckSwan, 2009.
ISBN: 13:9788125032502
3. English and Soft Skills by S P DhanavelpublishedbyOrientBlackswan, 2013. ISBN 9788125039808
4. Personality Development and Soft Skills by Barun K. MitrapublishedbyOxford University Press. 2012. ISBN : 13:97280198066217

Course Outcomes:

1. Student will be able to get a thorough knowledge of various topics of grammar of English language.
2. Student will be trained in close reading of language and its relation to literary form.
3. Student will be able to read English correctly with focus on fluency and pronunciation.
4. Student will be able to understand the use of English through computer software.
5. Student will be in a position to face computer based competition exams like TOEFL.
6. They will get an ability to communicate effectively and to write accurately using English language.

ENT01 English	P01	**PO2**	**PO3**	**PO4**	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	-	-	2	-	-	-	1	3	3	3	-	3	-	-
CO2	-	-	-	-	-	-	2	2	3	2	1	3	-	-
CO3	-	-	-	-	-	-	-		2	2	2	3	-	-
CO4	-	-	-	-	-	-	-	3	-	-	-	-	-	-
CO5	-	-	-	-	-	-	-	2	-	2	-	3	-	-
CO6	-	-	-	-	-	-	-	-	-	2	-	3	-	-

S.V. UNIVERSITY COLLEGE OF ENGINEERING :TIRUPATI – 517502

4-Year B.Tech Degree Programme

CSP01 Computer Programming Lab

Instruction Hours / Week : 3 **Credits: 2**

Common to all branches and with effect from 2016-17

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1. **envi**

Syllabus

1. **C and C++ Programming Languages shall be used for Implementation of the following Programs.**
2. **The following List is not exhaustive, The instructor changes the problems and number of programs for continuous evaluation Teaching Learning Process**

Week-1
1) Write a C program to make the following exchange between the variables a-> b -> c->d - > a
2) Write a C program to carry out the arithmetic operations addition, subtraction, multiplication, and division between two variables
3) Write a C program for printing prime numbers between 1 and n.

Week-2
1) Write a C program to construct a multiplication table for a given number.
2) Write a program to reverse the digit of a given integer.
3) Write a C program to find the sum of individual digits of a positive integer.
4) Write a C program to calculate the factorial of a given number

Week-3
1) Fibonacci sequence is defined as follows: the first and second terms in the 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.
2) Write a program to calculate tax, given the following conditions:
   a) If income is less than 1, 50,000 then no tax.
   b) If taxable income is in the range 1,50,001 – 300,000 then charge 10% tax
   c) If taxable income is in the range 3,00,001 – 500,000 then charge 20% tax
   d) If taxable income is above 5,00,001 then charge 30% tax

Week-4
Write a program to print the calendar for a month given the first Week- day of the month.

Input the first day of the month (Sun=0,Mon=1,Tue=2,Wed=3,.....) :: 3

Total number of days in the month : 31

Expected output

Sun	*Mon*	*Tue*	*Wed*	*Thu*	*Fri*	*Sat*
-	-	-	*1*	*2*	*3*	*4*
5	*6*	*7*	*8*	*9*	*10*	*11*
12	*13*	*14*	*15*	*16*	*17*	*18*
19	*20*	*21*	*22*	*23*	*24*	*25*
25	*26*	*27*	*28*	*29*	*30*	*31*

2) Write a C program to find the roots of a quadratic equation

Week-5
1) Write a program to print the Pascal triangle for a given number
2) Write a C program to find the GCD (greatest common divisor) of two given integers
3) Write a C program to construct a pyramid of numbers.
4) Write C code to define a function cash_dispense, which takes an amount as its

input, and returns the number of 1000, 500, 100, 50, 20, 10, 5, 2, 1 rupee denomination that make up the given amount

Week-6

1) Write C code to reverse the contents of the array. For example, [1,2,3,4,5] should become [5,4,3,2,1]
2) Write a C program that uses functions to perform the following:
   i) Addition of Two Matrices
   ii) Multiplication of Two Matrices
3) Write a program that will search and find out the position where the given key element exist in a user chosen array and print it as output.

Week-7

1) Write C code to compute the frequency table of survey responses given by 20 users. The survey responses range from 1 to 5 and are stored in an array. For example, 10 responses are stored in the array [1,1,5,2,3,3,5,5,2,2]. The frequency table will be as shown below:
   a. 1 = 2
   b. 2 = 3
   c. 3 = 2
   d. 4 = 0
   e. 5 = 3
2) Write a program to define a function to sort an array of integers in ascending order by using exchange sort.

Week-8

1) Write a C program to check whether a given string is a palindrome or not, without using any built-in functions.
2) Write a C program to determine if the given string is a palindrome or not by using string functions.
3) Write a function that accepts a string and delete the first character.
4) Write a function that accepts a string and delete all the leading spaces.

Week-9

Write a program to accept a string from user and display number of vowels, consonants, digits and special characters present in each of the words of the given string.

Week-10

1) Write a C program to define a union and structure both having exactly the same numbers using the sizeof operators print the sizeof structure variables as well as union variable
2) Declare a structure *time* that has three fields *hr, min, secs.* Create two variables,*start_time*and*end_time.* Input there values from the user. Then while *start_time* is not equal to *end_time* display GOOD DAY on screen.

Week-11

1) Write a program to read in an array of names and to sort them in alphabetical order. Use sort function that receives pointers to the functions strcmp, and swap, sort in turn should call these functions via the pointers.
2) Write a program to read and display values of an integer array. Allocate space dynamically for the array using the *malloc()*.
3) Write a program to calculate area of a triangle using function that has the input parameters as pointers as sides of the triangle.

Week-12

1) Two text files are given with the names text1 and text2. These files have several lines of text. Write a program to merge (first line of text1 followed by first line of text2 and so on until both the files reach the end of the file) the lines of text1 and text2 and write the merged text to a new file text3.
2) Write a program to split a given text file into n parts. Name each part as the name of the original file followed by .part<**n**> where n is the sequence number of the part file.

Reference Books:

1. Computer Science, A Structured Programming Approach Using C by Behrouz A. Forouzan& Richard F. Gilberg, Third Edition, Cengage Learning
2. C Programming A Problem-Solving Approach, Behrouz A. Forouzan& E.V. Prasad, F. Gilberg, Third Edition, Cengage Learning
3. Programming with C RemaTheraja, Oxford
4. “C Test Your Skills”, Kamthane, Pearson Education
5. Programming in C: A Practical Approach, Ajay Mittal, Pearson
6. Problem solving with C, M.T.Somasekhara, PHI
7. C Programming with problem solving, J.A. Jones & K. Harrow,Dreamtech Press
8. Programming withc, Byron S Gottfried, Jitender Kumar Chhabra, TMH, 2011

Course Outcomes:

1. Able to have fundamental concept.
2. Able to write, compile and debug programs in C language.
3. Able to formulate problems and implement algorithms in C.
4. Able to effectively choose programming components that efficiently solve computing problems in real-world.
5. Able to use different data types in a computer program.
6. Able to design programs involving decision structures, loops and functions.

CSP01 Computer Programming Lab	P01	**PO2**	**PO3**	**PO4**	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3		3	2	1	1	2	2	2	3	3	3		
CO2	3		3	2	1	1	2	2	2	3	3	3		
CO3	3		3	2	1	1	3	2	2	3	3	3		
CO4	3		3	3	1	1	3	2	2	3	3	3		
CO5	3		3	3	2	1	3	2	2	3	3	3		
CO6	3		3	2	1	1	2	2	2	3	3	3		

S.V. UNIVERSITY COLLEGE OF ENGINEERING :TIRUPATI – 517502

4-Year B.Tech Degree Programme

ENP01 English Communication Lab

Instruction Hours / Week : 3 **Credits: 2**

Common to all branches and with effect from 2016-17

Course Objectives:

1. To enable students to use language software.
2. To make them aware of western accents.

Syllabus

At least twenty exercises covering the topics: Stress, Introduction, Accent, Intonation, English vsHinglish and Important Skills using Computer-Aided Packages.

Text Book:

1. Barry Tomalin and Suhashini Thomas, International English for Call Centres, McMillan Publishers, India Limited, 2009.

Course Outcomes:

1. Students gain felicity in using language software.
2. They are exposed to different accents of the language.

ENP 01:English Communication Lab	P01	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	-	-	-	-	-	-	2	-	2	-	-	3	-	-
CO 2	-	-	-	-	-	-	-	-	-	-	-	2	-	-

MEP – 01 : WORKSHOP PRACTICE
(Common to All Branches)

L+T :	***--***	***Internal Assessment:***	***20+20=40 Marks***
Practical :	***4 hrs/ week***	***Semester End Examination:***	***60 Marks***
Semester :	***I***	***Credits:***	***2***

Course Educational Objectives :

1. Model and design various basic prototypes in the carpentry trade such as Lap joint, Lap Tee joint, Dove tail joint, Mortise & Tenon joint, Cross-Lap joint
2. Design and model various basic prototypes in the trade of Welding such as Lap joint, LapTee joint, Edge joint, Butt joint and Corner joint.
3. Make various basic prototypes in the trade of Tin smithy such as plain Cylindrical pipe and one end inclined, Cylindrical pipe both ends inclined, Hexagonal pipe one end inclined, and funnel preparations.
4. various basic House Wiring techniques such as connecting onewith one switch, connecting two lamps with one switch, connecting a fluorescent tube, Series wiring, Go down wiring

Syllabus

1. At least four models from each of carpentry and fitting trades.
2. At least two models from electrical wiring trade.
3. Demonstration of machining, foundry, welding and tin smithy.
4. At least four exercises covering identification of discrete components of computer and peripherals and, networking components; hardware trouble shooting and software installation.

Course Outcomes:

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

CO1: apply knowledge of mathematics, science, and engineering,

CO2: design and draft the objects.

CO3: design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.

CO4: function on multidisciplinary teams,

CO5:identify, formulates, and solves engineering problems,

CO6:of professional and ethical responsibility,

CO7:communicate effectively,

CO8: broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context,

CO9:recognition of the need for, and an ability to engage in life-long learning,

C10: knowledge of contemporary issues,

C11: use the techniques, skills, and modern engineering tools necessaryfor engineering practice.

C12: learn how to reduce the work repeatability.

MEP 01:Workshop Practice	P0 1	**PO 2**	**PO 3**	**P O 4**	PO 5	P O 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO 12	PSO 1	PS O2
CO1	**3**	**2**	**2**	**2**										
CO2														
CO3														

CO4														
CO5														
CO6														
CO7														
CO8														
CO9														
CO10														
CO11														
CO12														

S.V. UNIVERSITY COLLEGE OF ENGINEERING: TIRUPATI – 517502

4-Year B.Tech Degree Programme

MAT02 Engineering Mathematics – II

Instruction Hours / Week : 5 **Credits: 4**

Common to all branches and with effect from 2016-17

Course Objectives:

1. Rank of a matrix, Eigen values, Eigen vectors- Cayley Hamilton theorem- Quadratic forms- diagonalization
2. Gradient of a scalar, Divergence, Curl of a vector and related properties- line, surface, volume integrals Green's, Stokes' and Gauss divergence theorems and its applications.
3. Fourier Series- Harmonic analysis
4. Gamma and Beta Functions
5. Bessel function and Legender Polynomials

Syllabus

Unit – 1

Matrices: rank of a matrix-solution of system of linear equations-eigenvalues,vectors-cayley-hamilton theorem-quadratic forms-diagonalization.

Unit – 2

Vector Calculus: Gradient, Divergence, Curl of a vector and related properties-line, surface, volume integrals- Green's, Stokes's and Gauss Divergence theorems and its applications.

Unit – 3

Fourier Series: Fourier series-even and odd functions, periodic functions-half range sine and cosine series-harmonic analysis.

Unit – 4

Special Functions I: Gamma and Beta functions-series solutions of differential equations-ordinary points.

Unit – 5

Special Functions II: Bessel function-recurrence formulae-generating function for $J_n(X)$-Lengender polynomials-recurrence formulae-generating function for $P_n(X)$ - Rodrigue's formula - orthogonality of Lengender polynomials.

Text Books:

1. B S Grewal, Higher Engineering Mathematics, 40^{th} Edition, Khanna Publications, 2007.
2. M K Venkataraman, Engineering Mathematics, National Publishing Company, Chennai.
3. B V Ramana, Higher Engineering Mathematics, 6^{th} Reprint, Tata McGraw-Hill, 2008.
4. Bali and Iyengar, Engineering Mathematics, 6^{th} Edition, Laxmi Publications, 2006.

Course Outcomes:

1. Use ranks of matrices to decide whether the system of linear equations is consistent or not and hence solve.
2. Use Cayley-Hamilton theorem to find inverses or powers of matrices.
3. Use Eigen values and vectors to reduce Quadratic forms to normal form.
4. Ability to analyze motion problems from real lines to curves and surfaces in 3-D. Use tools such as divergence and curl of vector and gradient, directional derivatives that play significant roles in many applications.
5. To use Green's theorem to evaluate line integrals along simple closed contours on the plane
6. To use Stokes' theorem to give a physical interpretation of the curl of a vector field
7. To use the divergence theorem to give a physical interpretation of the divergence of a vector field.
8. Find the Fourier series representation of a function of one variable. It is representation of a function as a series of constants times sine and cosine functions of different frequencies in order to see periodic phenomenon have long fascinating mankind.
9. Evaluation of certain improper integrals is made simple with introduction of Gamma and Beta functions
10. Primary motivation for studying certain special functions is that they arise in solving certain ordinary differential equations that model many physical phenomenon. They constitute necessary items in the toolkit of anyone who wishes to understand the work with such models.

MAT 02: Engineering Mathematics –II	P01	**PO2**	**PO3**	**PO4**	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3		3	2		2	2	2	1	1	1	1		
C02	3		3	2		2	2	2	1	1	1	1		
CO3	3		3	2		2	2	2	1	1	3	3		
CO4	3		3	2		2	2	2	1	1	2	2		
CO5	3		3	2		2	2	2	1	1	1	1		
CO6	3		3	2		2	2	2	1	1	1	1		
CO7	3		3	2		2	2	2	1	2	1	1		
CO8	3		3	2		2	2	2	1	2	1	1		
CO9	3		2	1		1	1	1	1	1	1	1		

CO10	3		2	1		1	1	1	1	1	1	1		

S.V. UNIVERSITY COLLEGE OF ENGINEERING: TIRUPATI – 517502

4-Year B.Tech Degree Programme

CST02 Data Structures

Instruction Hours / Week: 5 **Credits: 4**

Common to all branches and with effect from 2016-17

Course Objectives:

1. To develop skills to design and analyze linear and nonlinear data structures.
2. Develop algorithms for manipulating linked lists, stacks, queues, trees and graphs.
3. Develop recursive algorithms as they apply to trees and graphs.
4. To get acquaintance with frequently used data structures in Software Engineering and Programming practices.
5. To Strengthen the ability to identify and apply the suitable data structure for the given real world problem
6. To develop a base for advanced computer science study.

Syllabus

UNIT I

Definitions of Data structures, Storage Structures and File Structures.Primitive and Non-primitive Data Structures, Linear and Nonlinear Data Structures.
Performance Analysis, Asymptotic Notation and Performance Measurement.
Linear Lists - ADT, Array Representation, Linked Representation and applications.

UNIT II

Stacks: Definition, The Abstract Data Type, Array Representation, Linked Representation. Queues: Definition, The Abstract Data Type, Array Representation, Linked Representation, Circular Queues, Applications. Linked Lists: Single Linked Lists – Insertion and Deletion, Double Linked Lists – Insertion and Deletion.

Skip List and Hashing: Dictionaries, the ADT of Skip List, Linear List Representation, Hash Table Representation.

UNIT III

Binary Trees - Definition and Properties, ADT, Array Representation, Linked Representation, and Applications.Heap- Definition and Applications.
Binary Search Trees - Definition, ADT, Implementation and Applications.
Introduction to Balanced Search Trees - AVL Trees, Red-Black Trees, and Splay Trees.

UNIT IV

Graphs - Definition and Properties, Modeling Problems as Graphs, ADT, Representations, Breadth First Search and Depth First Search.Priority Queues: Definition and Applications, Single and Double Ended Priority Queues, Linear Lists, Heaps, Leftist Trees, Binomial Heaps, Fibonacci Heaps, Pairing Heaps
Introduction to Algorithms for Solving Problems: Minimum Spanning Tree, Single Source Shortest Paths, All-Pairs Shortest Paths, and Maximum Flow.

UNIT V

Efficient Binary Search Trees: Optimal Binary Search Trees, AVL Trees, Red – Black Trees, Splay Trees. Multiway Search Trees: m – way Search Trees, B – Trees, B+ - Trees
External Searching -Concepts of Simple Indexing, Multilevel Indexing, B- Trees, B+ Trees, Static Hashing, Collision Resolution Techniques, Packing Density, Bucket Size and Extendible Hashing.

Text Books:

1. Sahni S, Data Structures, Algorithms and Applications in C++, 2nd Edition, Universities Press, 2005.
2. Malik D S, Data Structures using C++, Cengage Learning, 2003.
3. Fundamentals of Data Structures in C++ by Ellis Horowitz, SartajSahni, Dinesh Mehta, Universities Press, Second Edition.

REFERENCES:

1. Data Structures and Algorithms Using C++ by AnandaRaoAkepogu and RadhikaRajuPalagiri
2. Classic Data Structure by D. Samanta, Eastern Economy Edition.
3. Data Structures and Algorithms Made Easy by NarasimhaKarumanchi, Second Edition, Written in C/C++, CareerMonk Publications, Hyderabad
4. ADTs, Data Structures and Problem Solving with C++, Larry Nyhoff, Pearson
5. Data Structures using C++, D.S.Malik, 2nd Edition, Cengage Learning
6. Data Structures through C++, YashavantP.Kanetkar, BPB Publication
7. Data Structures using C and C++, YedidyahLangsam.MosheJ.Augenstein Aaron M.Tenenbaum, 2nd Edition,PHI
8. Data Structures using C & C++, Rajesh K.Shukla, Wiley-India
9. Tremblay J P and Sorenson P G, Introduction to Data Structures with Applications, 2nd Edition, McGraw-Hill, 1984.
10. Cormen T H, Leiserson C E, Stein C, and Rivest R L, Introduction to Algorithms, 2nd Edition, Prentice Hall of India, 2007.
11. Folk M J, Riccardi G, and Zoellick B, File Structures-An Object-Oriented Approach with C++, Pearson
12. T.H.Cormen, C.E.Leiserson, R.L.Rivest, C. Stein, Introduction to Algorithms, 2nd edition, Prentice-Hall India, 2001
13. J. Kleinberg and E. Tardos, Algorithm Design, Pearson International Edition, 2005.
14. Data Structures Using C and C++ YddishLangsam, Moshe J. Augenstein and Aaron M. Tanenbaum, Prentice Hall Of India (2nd Edition) (Chapters 1 to 8)

Course Outcomes:

After completion of the course the student will have:

1. A knowledge of various Methods and Notations for comparing the performance of various Data Structures.
2. A knowledge of developmentof linear data structures like stacks, Queues and their operations, Implementation using Arrays and Linked Lists.
3. A knowledge of propertiesof Binary Search Trees and balanced binary search trees.
4. A knowledge of properties of Splay Tress ,Red Black Trees ,AVL Tress and their implementation

A knowledge of efficient external searching techniques using Indexing, Hashing.

CST 02:Data Structures	P01	**PO2**	**PO3**	**PO4**	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	**3**					**2**								
CO2		**2**	**2**	**3**										
CO3			**2**	**3**										
CO4			**2**	**3**						**3**				

S.V. UNIVERSITY COLLEGE OF ENGINEERING: TIRUPATI – 517502

4-Year B.TechDegree Programme

PHT01 Engineering Physics

Instruction Hours / Week: 3 **Credits: 3**

Course Objectives:

1. To make students aware of basic crystallographic geometry, defect studies and estimation of crystal structure by diffraction techniques.
2. To provide students with sound knowledge of basic principles of quantum Mechanics and its applications in problem solving.
3. To understand the concept of electrical conductivity by classical and quantum free electron theories and distinguishing materials based on band theory of solids.
4. Basic principles of laser optics and applications and ultrasonics.
5. Quantum confinement and size dependent properties of nanomaterials, their synthesis and applications.

Syllabus

UNIT-I

Crystallography : Unit Cell – Bravais Lattice – Crystal systems – Crystal packing – Close Packed Structures – NaCl, ZnS and Diamond – Miller Indices – Bragg`s Law –Bragg`s Spectrometer and Crystal Structure determination – Defects in crystal Structure – Point Defects and Line Defects .

UNIT – II

Quantum Mechanics : Wave – Particle duality – de Broglie Concept of Matter Waves – Properties of Matter Waves – Davison and Germer Experiment – G.P.Thomson Experiment – Heisenberg's Uncertainty Principle – Schrödinger's Time Independent and Time Dependent Wave equation – Significance of Wave Function – Electron in an Infinite Square Potential Well – Probability Densities and Energy Levels.

UNIT – III

Band Theory of Solids : Classical Free Electron Theory of Metals – Success and Failures – Quantum Free Electron Theory – Fermi Factor – Electron in Periodic Potential – Bloch Theorem – Kronig – Penney Model – Distinction between Metals , Insulators and Semiconductors – Intrinsic and Extrinsic Semiconductors – Hall Effect.

UNIT – IV

Lasers : Introduction – Spontaneous and Stimulated emissions – Population Inversion – Types of Lasers – Ruby Laser – He-Ne Laser – Semiconductor Laser – Applications of Lasers.

Ultrasonics : Introduction – Production of Ultrasonic Waves by Magnetostriction and Piezoelectric methods – Detection and Applications of Ultrasonic Waves.

UNIT – V

NanoPhysics and Nanotechnology : Introduction to Nanomaterials –Properties: Optical Properties – Quantum Confinement – Electrical properties. Synthesis of Nanomaterials: Ball milling, Arc deposition method – Chemical Vapour Deposition-Pulsed laser deposition. Characteristics of C^{60} (Zero dimensional), Carbon Nanotubes (One Dimensional) and Graphene(Two Dimensional). Applications of Nanomaterials.

Text Books:

1. R.K.Gaur and S.L.Gupta ``Engineering Physics” Sultan and Chand Pub., New Delhi
2. S.P.BasavaRaju `` A Detailed Text Book of Engineering Physics” Sole Distributers, Subhash Stores Book Corner, Bangalore
3. HitendraK.Malik and A.K.Singh ``Engineering Physics” Tata MCGraw Hill Education PVt.Ltd., New Delhi
4. G.Senthil Kumar, `` Engineering Physics’’ VRH Publishers Pvt. Ltd, Hyderabad
5. M.S.RamachandraRao and Shubra Singh, ``Nanoscience and Nanotechnology`` Wiley IndiaPvt.Ltd, New Delhi

Reference Books

1. John Allison, ``Electronic Engineering Materials and Devices” Tata McGraw Hill Publications.
2. B.L Theraja, “Modern physics”, S.Chand& Company.
3. V. Raghavan “Material Science”, Tata McGraw Hill Publications.

Course Outcomes:

1. Students demonstrate appropriate competence and working knowledge of laws of modern physics in understanding advanced technical engineering courses.
2. Ability to understand the crystal geometries and estimation of crystal structure by X-ray diffraction techniques.
3. Students demonstrate the ability to identify and apply appropriate analytical and mathematical tools of physics in solving engineering problems.
4. Students demonstrate the ability to apply knowledge of band theory in the area of electronics and understanding the basic electron transportation phenomenon in micro devices.
5. Student’s ability to understand the principles in the production and applications of lasers and their effective utilization in optical communication and detection.
6. Students demonstrate the ability to understand size depended properties of nano dimensional materials and their effective utilization in making nano and micro devices for further microminiaturization of electronic devices.

PHT 01: Engineering Physics	P01	**PO2**	**PO3**	**PO4**	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	2	2	2	1	1	1	1	2	2	1		
CO2	3	3				1	1			1		1		
CO3	3	3	3	3	2	1	1	1	1	1	2			
CO4	2	**1**	**1**	**1**								1		
CO5	3	**2**	**2**	**2**	1	1				2	1	1		
CO6	1	**2**	**1**	**1**		3		2	1	2	1	1		

S.V. UNIVERSITY COLLEGE OF ENGINEERING: TIRUPATI – 517502

4-Year B.Tech Degree Programme

CYT01 Engineering Chemistry

Instruction Hours / Week: 3 **Credits: 3**

Common to all branches and with effect from 2016-17

Course Objectives:

1. To provide the information regarding hardness of water, effects of hard water in boilers and treatment methods to avoid bad effect on human health. And also to check the parameters of various water samples by experimental techniques.

2. To make students familiar with importance of electrochemical processes in nature and industry, like the coating of objects with metals or metal oxides through electro deposition, also to provide the information about new technological solar batteries.

3. To provide knowledge on the fuel properties to help in selecting good fuel for reducing the pollution based on its efficiency without much smoke and also to make aware of synthetic fuels.

4. To make aware of the design synthesis and analysis of polymers and their multi-faceted applications in Engineering, Airplane engineering and bio-medical engineering.

5. To make aware of compounding and processing of polymers and description of major polymers, structure property relations and application and to provide their relevance in the electric and electronic fields.

6. To provide the knowledge of manufacturing of cement and analysis of cement and also the classification and properties of refractories and ceramics.

Syllabus

UNIT-I:

WATER TREATMENT: Introduction – Effect of water on rocks and minerals – hardness of water – disadvantages of hard water – boiler feed water – scale and sludge formation in boilers – caustic embrittlement – boiler corrosion – priming and foaming – softening methods-lime soda, zeolite and ion exchange process-Specification of potable water and purification of Drinking water – chemical analysis of water-Hardness, acidity, alkalinity, chloride and dissolved oxygen.

UNIT –II:

ELECTRO CHEMISTRY AND CORROSION: Electrode potential – reference electrodes – hydrogen, calomel and glass electrode – PH and its determination –batteries – fuel cells – aluminum air battery – solar battery – lead acid storage cell.-Corrosion: Types of corrosion – factors influencing corrosion – theories of corrosion – prevention of corrosion – cathodic protection – metallic coatings – hot dipping, spraying, cementation, cladding and electro plating.

UNIT –III:

FUELS AND COMBUSTION: Introduction – classification of fuels – calorific value and its determination – bomb calorimeter – Boy's gas calorimeter – theoretical calculation of calorific value of fuel – coal – analysis of coal – metallurgical coke – petroleum –refining of petroleum- synthetic petrol – octane and cetane number– combustion – mass analysis from volume analysis and vice versa – analysis of flue gas by Orsat's apparatus.

UNIT –IV:

HIGH POLYMERS: Nomenclature of polymers – types of polymerization-Plastics – classification of plastics – moulding constituents of plastics– preparation, properties and applications of polythene, nylon, Teflon, and bakelite – Rubbers – vulcanization of rubber –compounding of rubber- synthetic rubbers-buna-N, thiocol and silicon rubbers- Lubricants-classification-mechanism-properties of lubricating oils-selection of lubricants for engineering applications.

UNIT–V:

BUILDING MATERIALS: Manufacture-dry and wet processes-setting and hardening of cement-analysis of cement. Refractories-classification-properties and engineering applications. Ceramics-classification-properties and engineering applications

Books Recommended:

1. Engineering Chemistry : PC Jain & M Jain-Dhanpatrai publishing company, New Delhi
2. Engineering Chemistry : BK Sharma
3. Engineering Chemistry : SS Dhara
4. Physical Chemistry : Puri& Sharma-Vishal Pulishing Company(VPC), Jalandhar
5. Physical Chemistry : Bahl&Tuli

6 Polymer Science- :Gowarikar
7 Physical Chemistry : Glasstone

Course Outcomes:

1. To understand the importance of the water and its quality
2. To identify uses of electrochemical processes in nature and industry
3. To understand properties of good fuel for reducing auto exhaust gases to the environment
4. To understand synthesis, properties and engineering applications of polymers
5. To know the procedure and analysis of cementing materials

CYT 01:Engineering Chemistry	P01	**PO2**	**PO3**	**PO4**	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	**1**	1						1					
CO2	**1**	1	**3**						1					
CO3	**1**	**2**	**2**	**2**				2	1					
CO4	**1**	**1**	**2**	**2**	2	2	3	2	1	**1**				
CO5		**2**			1		1	1		**1**				

EET02 *CIRCUIT THEORY*

Instruction Hours / Week: 3 **Credits: 3**

Course Objectives:

1. To provide fundamentals of electrical circuits.
2. To understand concepts of network topology, Two-port networks.
3. To learn the network theorems and its applications.
4. To understand transient analysis,, Analog filter design

UNIT – I

Basic Circuit Concepts: Active and passive elements – Ideal and practical sources – Source transformation – v-i characteristics of R, L, and C elements – Kirchhoff's laws – Star-delta transformation – Network reduction techniques - Mesh and Nodal Analysis – Concept of mutual inductance – Concept of coupling and dot convention

UNIT – II

A.C. Fundamentals: Periodic waveforms – Average and effective values of different waveforms – Form factor and crest factor

A.C. Circuits: Phase and phase difference – Phasor notation – Concept of reactance, impedance, susceptance, and admittance – Active and reactive power – Power factor – Power triangle -Response of R, L, and C elements for sinusoidal excitation – Steady state analysis of RL, RC, and RLC circuits for sinusoidal excitation – Phasor diagrams. Steady state analysis of ac circuits using mesh and nodal analysis.

UNIT – III

Resonance: Series and parallel resonance – Half power frequencies, bandwidth, Q factor and relations between them.

Locus diagrams: Current and Impedance locus diagrams of RL and RC series circuits and two branch parallel circuit

UNIT – IV

Network theorems: Superposition – Thevenin's and Norton's theorems – Millman's theorem – Reciprocity theorem – Tellegen's theorem – Compensation theorem and application of the theorems for dc circuits and sinusoidal steady state circuits – Maximum power transfer theorems for dc and ac circuits

UNIT –V

Three Phase Circuits: Advantages of three phase systems – Phase sequence – Balanced and Unbalanced systems – Magnitude and phasor relationships between line and phase voltages and currents in balanced star and delta circuits – Analysis of balanced and unbalanced three phase circuits with star and delta connected loads, Measurement of three phase power

Course Outcomes:

At the end of the course the student will be able to
CO1: An ability to apply the concepts of electrical circuits
CO2: An ability to solve networks using topology principles, network thermos, transient analysis

Learning Resources

1. Hayt, Kemmerly and Durbin, Engineering Circuit Analysis, 6th edition, Tata McGraw-Hill
2. Sudhakar and Shyammohan, Network analysis and synthesis, Tata McGraw-Hill
3. Ravish R. Singh, Electrical Networks, and Tata Mc. Graw Hill.
4. Edminster, Electric Circuits – (McGraw Hill Schuam series 1st edition)

EET 02 Circuit theory	P0 1	**PO 2**	**PO 3**	**P O 4**	PO 5	P O 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO 12	PSO 1	PS O2
CO1	3		3	2	1	1	2	2	2	3	3	3		
CO2	3		3	2	1	1	2	2	2	3	3	3		

S.V. UNIVERSITY COLLEGE OF ENGINEERING: TIRUPATI – 517502

4-Year B.Tech Degree Programme

MET01 Engineering Graphics

Instruction Hours / Week: 5 **Credits: 4**

Common to all branches and with effect from 2016-17

Course Objectives:

1. Students are to learn fundamentals of engineering graphics as it applied to basic engineering core course.
2. To provide the knowledge of construction of basic scales, conics, ellipse, parabola and hyperbola.
3. To impart knowledge about the construction of Cycloidal curves.
4. To understand the concepts of first angle and third angle projections of drawing.
5. To understand the concepts of projections of plane surfaces, solids, cylinders and cones.
6. To have thorough understanding of sections of solids and orthographic projections.

Syllabus

UNIT-I

Scales, plane scale, diagonal scale Practices
Conics- construction of Ellipse, parabola and Hyperbola by eccentricity method
Ellipse- Concentric circles and Oblong methods, Rectangular hyperbola

UNIT-II

Construction of cycloidal curves- epi cycloid and hypocycloid, Involutes- Circle, Polygon

UNIT-III

Projection of points-Principles of Projections, First and Third angle projections, projections of points
Projection of Lines- Projection of straight Lines, lines inclined to one plane and parallel to the other, Lines inclined to both planes, True length and true inclinations, Location of traces

UNIT-IV

Projection of Plane surfaces and solids-Projection of Polygonal surfaces and circular lamina inclined to both planes. Projection of right regular solids- Projection of simple solids such as Prisms, Pyramids, Cylinders and Cones with their axes perpendicular to anyone of the Principal planes and inclined to the other.

UNIT-V

Section of Solids- Sections of above solids in simple vertical position resting on their base, by cutting planes inclined to one reference plane and perpendicular to the other-True shape of the sections.
Orthographic Projections- Conversion of Pictorial views into orthographic views of simple objects.

Text Books:

1. **Bhatt N.D. and V.M. Panchal,** Engineering Drawing Revised Edition, Charotar Publications, 2001.
2. **Dhananjaya A Jolhe,** Engineering Drawing with an introduction to Auto CAD, Tata MeGrawhill -2009
3. **K.L.Narayana and P. Kannaih,** A text Book of Engineering Drawing, Scitech Publications – 1999.
4. **Venugopal.K,** Engineering Drawing and Graphics, New Age International Publishers

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

1. Make a distinction between first angle projection and third angle projection of drawing.
2. Draw hyperbola, parabola, Involutes and Cycloidal curves.
3. Draw sections of solids including cylinders, cones, prisms and pyramids.
4. Draw projections of lines, planes, solids and sections of solids.
5. Draw orthographic projections of lines, planes, and solids.

MET 01 Engineering Graphics	P0 1	**PO 2**	**PO 3**	**P O 4**	PO 5	P O 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO 12	PSO 1	PS O2
CO1	**3**	**2**	**2**	**3**			**3**							
CO2														
CO3														
CO4														
CO5														

S.V. UNIVERSITY COLLEGE OF ENGINEERING: TIRUPATI – 517502

4-Year B.Tech Degree Programme

CSP02 Data Structures Lab

Instruction Hours / Week: 3 **Credits: 2**

Common to all branches and with effect from 2016-17

Course Objectives:

1. Arm the students with the basic programming concepts.
2. Arm the students with the necessary constructs of C++ programming.
3. Choose the appropriate data structure and algorithm design method for a specified application.
4. To Gain knowledge in practical applications of data structures.

Syllabus

1. Write a C++ Program to create a sequential file with at least 5 records, each record having thestructure shown below:

USN	Name	Marks1	Marks2	Marks3
Non-zero positive integer	25 Characters	Positive Integer	Positive Integer	Positive Integer

Write necessary functions

a. To display all the records in the file.

b. To search for a specific record based on the USN. In case the record is not found, suitable message should be displayed. Both the options in this case must be demonstrated.

2. Write and demonstrate the following C++ functions:
   a. **newStrCpy**that does the same job as **strcpy**
   b. **newStrCat** that does the same job as **strcat** without using any library functions.
3. Write a C++ Program, which accepts the Internet Protocol (IP) address in decimal dot format(ex. 153.18.8.105) and converts it into 32-bit long integer (ex. 2568095849) using **strtok** library function and unions.
4. Write a C++ Program to construct a **stack of integers** and to perform the following operations on it:
   a. Push
   b. Pop
   c. Display

   The program should print appropriate messages for stack overflow, stack underflow, and stack empty.
5. Write a C++ Program to convert and print a given valid parenthesized **infix** arithmetic expression to **postfix** expression. The expression consists of single character operands and the binary operators+ (plus), - (minus), * (multiply) and / (divide).
6. Write a C++ Program to evaluate a valid **suffix/postfix** expression using stack. Assume that thesuffix/postfix expression is read as a single line consisting of non-negative single digit operands and binary arithmetic operators. The arithmetic operators are + (add), - (subtract), * (multiply) and / (divide).

7. Write a C++ Program to simulate the working of a **queue of integers** using an array. Provide the
   following operations:
   a. Insert
   b. Delete
   c. Display
8. Write a C++ Program to simulate the working of a **circular queue of integers** using an array. Providethe following operations:
   a. Insert
   b. Delete
   c. Display

9. Write a C++ Program using dynamic variables and pointers, to construct a **singly linked list** consisting of the following information in each node: student id (integer), student name (character string) and semester (integer). The operations to be supported are:
   a. The insertion operation
      i. At the front of a list
      ii. At the back of the list
      iii. At any position in the list
   b. Deleting a node based on student id. If the specified node is not present in the list an error Message should be displayed. Both the options should be demonstrated.
   c. Searching a node based on student id and updates the information content. If the specified Node is not present in the list an error message should be displayed. Both situations shouldbe displayed.
   d. Displaying all the nodes in the list.
   (Note: Only one set of operations among a, b and c with d may be asked in the examination)
10. Write a C++ Program using dynamic variables and pointers to construct a **stack of integers** using **singly linked list** and to perform the following operations:
    a. Push
    b. Pop
    c. Display
    The program should print appropriate messages for stack overflow and stack empty.
11. Write a C++ Program using dynamic variables and pointers to construct a **queue of integers** using **singly linked list** and to perform the following operations:
    a. Insert
    b. Delete
    c. Display
    The program should print appropriate messages for queue full and queue empty.
12. Write a C++ Program to support the following operations on a **doubly linked list** where each node consists of integers:
    a. Create a doubly linked list by adding each node at the front.
    b. Insert a new node to the left of the node whose key value is read as an input
    c. Delete the node of a given data, if it is found, otherwise display appropriate message.
    d. Display the contents of the list.
    (Note: Only either (a, b and d) or (a, c and d) may be asked in the examination)
13. Write a C++ Program
    a. To construct a **binary search tree** of integers.
    b. To traverse the tree using all the methods i.e., **inorder, preorder and postorder**.
    c. To display the elements in the tree.
14. Write recursive C++ Programs for
    a. Searching an element on a given list of integers using the

Binary Search method.

b. Solving the **Towers of Hanoi problem**.

Text Books:

1. Data structures and Algorithms using C++, AnandaRaoAkepogu and RadhikaRajuPalagiri, Pearson Education.
2. C++ Solutions for Mathematical Problems, Ghosh, Arun, New Age International Publishers.
3. Data Structures A Pseudocode Approach with C++, IndiaEdition, R.F.GilbergandB.A.Forouzan,Cengage Learning.
4. Programming Principles and Practice using C++,B.Stroustrup,Addison-Wesley(Pearson education).
5. Data Structures and STL, W.J.Collins,McGrawHill,International edition.
6. Data structures and Algorithms with OODesign patterns inC++,B.R.Priess,John Wiley& sons.
7. The Art,Philosophy, and Science of OOP with C++,RickMiller,SPD.
8. C++ for Programmers,P.J.Deitel and H.M.Deitel,PHI/Pearson

Course Outcomes:

1. Understand algorithmic thinking and apply it to programming.
2. Be able to design and analyze the time and space efficiency of the data structure.
3. Be capable to identity the appropriate data structure for given problem.
4. Have practical knowledge on the application of data structures.

CSP 02:Data Structures Lab	P01	**PO2**	**PO3**	**PO4**	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	**3**													
CO2		**3**	**2**	**2**										
CO3				**2**						**2**				
CO4														

S.V. UNIVERSITY COLLEGE OF ENGINEERING: TIRUPATI – 517502

4-Year B.Tech Degree Programme

MEP01 Workshop Practice

Instruction Hours / Week: 3 **Credits: 2**

Common to all branches and with effect from 2016-17

Course Objectives:

1. To impart training to the students in different crafts of workshop.
2. To make known about the importance of Carpentry, Welding in our daily life.
3. To identify what are runners, risers in a foundry shop, and welding equipment used in Gas welding and Arc welding.
4. To identify different smithy tools used in tin smithy.

Syllabus

Carpentry

Wood sizing exercise in planning, marking, sawing, chiseling and grooving to prepare

1. Half – lap joint
2. Dove – tail joint
3. Tenon joint

Fitting

Markings, cutting and filing to prepare

1. Straight fitting
2. V – fitting
3. Square fitting

Tin smithy

Markings, bending and cutting to prepare

1. Round tin
2. Square tin

Foundry

Ramming and placing of riser and runner to prepare the moulds for the following

1. Two – stepped pulley
2. Three – stepped pulley
3. Dumbell

Welding

Preparation of

1. Lap joint
2. Butt joint

3. T – joint

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

1. Prepare different types of joints by means of wood, i.e., wood working.
2. Prepare sand moulds by means of wooden patterns.
3. Identify different and prominent tools used in various sections of workshop.
4. Make a distinction between Lap, Butt and T – joints in welding processes.
5. Perform markings, cutting, and filing on steel specimens by fitting tools.

MEP 01:Workshop Practice	P01	**PO2**	**PO3**	**PO4**	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	**3**	**2**	**2**	**2**										
CO2														
CO3														
CO4														
CO5														

III Semester

S.V. UNIVERSITY COLLEGE OF ENGINEERING: TIRUPATI – 517502

4-Year B.Tech Degree Programme

ENGINEERING MATHEMATICS - III

(Common to All Branches)

Lecture :	***3hrs/ week***	***Internal Assessment:***	***20+20=40 Marks***
Tutorial :	***2hrs/ week***	***Semester End Examination:***	***60 Marks***
Semester :	***III***	***Credits:***	***4***

Course Educational Objectives :

1. Extending their skills in elementary calculus to the complex plane.
2. Finding Taylor's and Laurent series for complex functions.
3. Applying complex residue theory to integration of real valued functions over the real line.

UNIT I

Complex analysis - I: Analytical functions - Cauchy-Reimann equations – Construction of Analytic functions- Complex integration - Cauchy's theorem - Integral formula - Evaluation of integrals.

UNIT II

Complex analysis - II**:** Taylor's and Laurents' series- Transformations- Conformal mapping - Bilinear transformations - Transformation of 1/z, z^2, sin z and cos z.

UNIT III

Complex anaylasis –III: Singularities - Poles - Residues - Residue theorem – Contour integration- Evaluation of real integrals

UNIT IV

Partial differential equations - I : Formation of differential equations - Classification - First order linear partial differential equations – Legranges' linear equation - Method of multipliers - first order non-linear partial differential equations - Charpits method.

UNIT V

Partial differential equations - II: Method of separation of variables - One dimensional wave equation - Heat equation – Laplace's equation.

Text Books:

1. Grewal B S, Higher Engineering Mathematics, 40th Edition, Khanna Publications, 2007.
2. Venkataraman M K, Engineering Mathematics, Vol. I & II, National Publishing Company, 1993.
3. Venkataraman M K, Engineering Mathematics, National Publishing Company, 1995.

4. Grewal B S, Engineering Mathematics, 13th Edition, Khanna Publications.
5. Kreyszig E, Advanced Engineering Mathematics, 8th edition, Wiley, 1998.

MAT 03:Engineering Mathematics –III	P01	**PO2**	**PO3**	**PO4**	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3		3	2		2	1	1	2	2	1	1		
CO2	3		3	2		2	1	1	2	1	1	1		
CO3	3		3	2		2	1	1	2	1	1	1		
CO4	3		3	2		2	1	1	2	1	1	1		
CO5	3		3	2		2	1	1	2	1	1	1		
CO6	3		3	2		2	1	1	2	1	1	1		
CO7	3		3	2		2	1	1	1	1	1	1		
CO8	3		3	2		2	1	1	1	1	1	1		
CO9	3		3	2		2	1	1	1	1	1	1		
CO10	3		3	2		2	1	1	1	1	1	1		

S.V. UNIVERSITY COLLEGE OF ENGINEERING: TIRUPATI – 517502

4-Year B.Tech Degree Programme

EET03 NETWORK ANALYSIS

Lecture :	***3hrs/ week***	***Internal Assessment:***	***20+20=40 Marks***
Tutorial :	***2hrs/ week***	***Semester End Examination:***	***60 Marks***
Semester :	***III***	***Credits:***	***4***

Course Objectives:

1.To Understand basics electrical circuits with nodal and mesh analysis.

2. To Appreciate electrical network theorems.

3. To Apply Laplace Transform for steady state and transient analysis.

4. To Determine different network functions.

5. To Appreciate the frequency domain techniques

UNIT-I

Network Topology: graph,tree,incidencematrix,tie-set and cut-set matrices, formulation of equilibrium equations based on graph theory, duality, and dual circuits.

UNIT-II

Transient Analysis:Dc transients, Transient response of RL, RC, and RLC circuits for dc and sinusoidal excitations – Determination of initial conditions – Concept of time constant – Transform circuit analysis – Laplace transforms of signals and periodic functions and initial and final value theorems – Applications for transient response of RL, RC, and RLC circuits.

UNIT-III

Network Functions: One-port and Two-port networks – Driving point and transfer functions of networks – Properties of driving point and transfer functions – Concept of complex frequency, poles and zeros – Time domain response from pole-zero diagram – Restrictions on pole-zero locations.

UNIT-IV

Two-port Network Parameters : Open circuit impedance and short circuit admittance parameters – Hybrid and inverse-hybrid parameters – Transmission and inverse transmission parameters – Inter relationships between parameter sets – Series, Parallel, and Cascade connection of two-ports – Conditions for reciprocity and symmetry of two-port networks. Terminated two-port networks – Image parameters.

UNIT-V

Elementary Ideas of Network Synthesis: Conditions for**realizability**– Hurwitz polynomials – Positive real functions – Properties and realization of RL, RC, and LC immitance functions by Foster and Cauer methods.

Text Books:

1. Van Valkenburg, Network Analysis, Pearson Education
2. Sudhakar and Shyammohan, Network analysis and synthesis, Tata McGraw-Hill
3. Ravish R. Singh, Electrical Networks, Tata Mc. Graw Hill, 2009.
4. Roy Choudary, Network Analysis, New Age International
5. Electrical circuits by A.Chakrabarty, Dhanpath Rai & Co.

Course Outcomes: At the end of this course students will demonstrate the ability to

1. Understand basics electrical circuits with nodal and mesh analysis.

2. Appreciate electrical network theorems.

3. Apply Laplace Transform for steady state and transient analysis.

4. Determine different network functions.

5. Appreciate the frequency domain techniques

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

S.V. UNIVERSITY COLLEGE OF ENGINEERING: TIRUPATI – 517502
4-Year B.Tech Degree Programme

ECT 02 ELECTRONIC DEVICES

Instruction : 4 hr / week *Credits : 4* *Assessment : 20 + 20 + 60*

COURSE Objectives:

1.To understand PN Junction diodes, Zener diode, Tunnel diode, UJT.

2. To know the principle of operation of Rectifiers, Bipolar Junction Transistors, Field Effect Transistors and optoelectronic Devices

UNIT-I

Junction Diodes: Band structure of PN junction. Current components. Volt ampere characteristics and its temperature dependence. Diode resistance and capacitance. Zener diode,Tunnel diode,UJT.

UNIT-II

Rectifiers: Diode equivalent circuits, Analysis of diode circuits, Characteristics and comparison of Half-wave, Full-wave and Bridge rectifiers, Analysis of filters (C, L, LC, and CLC) used with Full-wave rectifier.

UNIT-III

Bipolar Junction Transistors: Transistor action. PNP and NPN transistors. CB, CE, and CC configurations and their characteristics. Analytical expressions for transistor characteristics. Typical junction voltages and maximum ratings. Determination of h-parameters from BJT characteristics.

UNIT-IV

Bipolar Junction Transistor Biasing : Operatingpoint, stabilization, thermal runaway.

Field Effect Transistors: Characteristics and parameters of JFET. Depletion and Enhancement type of MOSFETs. Pinch off and saturation. Metal Semiconductor FET,FET biasing schemes.

UNIT-V

Optoelectronic Devices: LED. LCD. Principle of operation and characteristics of Photoconductor, Photodiode, Phototransistor, and Photovoltaic cell.

Text Books:

1. Jacob Millman and Christos C.Halkias, "Integrated Electronics", Tata Mc Graw-Hill Pub. Co. Ltd.
2. Allen Mottershed, "Electronic Devices and Circuits", Prentice-Hall of India Pvt. Ltd.
3. Ben G.Steetman and Sanjay Banerjee, "SolidState Electronic Devices", Pearson Education (Singapore) Pvt. Ltd.

COURSE OUTCOMES

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

CO1 Develop a basic understanding of semiconductor physics, PN Junction diodes, Zener diode, Tunnel diode, UJT.

CO2 Understand and analyze the operation of Rectifiers.

CO3 Understand and analyze the operation of Bipolar Junction Transistors

CO4 Understand and analyze the operation of Bipolar Junction Transistors & Field Effect Transistors

CO5 Understand and analyze the operation of optoelectronic Devices

Mapping of course outcomes with program outcomes:

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

S.V. UNIVERSITY COLLEGE OF ENGINEERING: TIRUPATI – 517502
4-Year B.Tech Degree Programme

ECT03 SIGNALS AND SYSTEMS

Lecture :	***3 hrs/ week***	***Internal Assessment:***	***20+20=40 Marks***
Tutorial :	***1hrs/ week***	***Semester End Examination:***	***60 Marks***
Semester :	***III***	***Credits:***	***4***

Course Educational Objectives :

1. To create a foundation in signals and systems which will facilitate better understanding of higher level subjects like signal processing, control systems, communication systems etc.
2. To intrude signals and their representation in various domain and understand classification of signals.
3. To understand the transmission of signals through linear time invariant (LTI) system and introduce the types of convolution filters and their responses.
4. To introduce the concept of correlation and their properties.
5. To discuss the importance and application of Laplace transform.
6. To discuss the significance of Z-transform and its properties.

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 and Signal Transmission Through Linear Systems

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 Impulse function and Signum function, Introduction to Hilbert Transform.

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

Course Outcomes:

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

CO1: To identify different classes of signals and methods of representing the signals

CO2: To know the basic functions like unit step, ramp etc. and their properties

CO3: To find the response of LTI system

CO4: To find the filter characteristics of LTI system

CO5: To know the condition of causality and stability

CO6: To know the definition of convolution and apply the same for some specific examples

CO7: To know the definition of correlation and apply the same for some specific examples

CO8: To find the Laplace transforms and inverse Laplace transforms of certain circuits

CO9: To evaluate the region of convergence (ROC) and constraints on ROC

CO10: To know the Z- transform and find Z-transform for selected example

CO11: To find the system response to standard signals

Learning Resources

Text Books:

1. Signals, Systems & Communications - B.P. Lathi, BS Publications, 2003.
2. Signals and Systems - A.V. Oppenheim, A.S. Willsky and S.H. Nawab, PHI, 2nd Edn.

Reference Books:

1. Signals & Systems - Simon Haykin and Van Veen, Wiley, 2nd Edition.
2. Network Analysis - M.E. Van Valkenburg, PHI Publications, 3rd Edn., 2000.
3. Fundamentals of Signals and Systems Michel J. Robert, MGH International Edition, 2008.
4. Signals, Systems and Transforms - C. L. Philips, J.M.Parr and Eve A.Riskin, Pearson education.3rd Edition, 2004

Mappingofcourseoutcomeswithprogramoutcomes:

POCO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	-	-	-	-	-	-	-	-	-	-	3
CO2	-	1	-	-	-	2	-	-	-	-	-	-
CO3	-	2	2	-	-	-	-	-	-	-	2	2
CO4	-	2	-	-	-	-	-	-	-	-	-	2
CO5	2	-	-	-	-	-	-	-	-	-	-	2
CO6	2	-	-	-	-	-	-	-	-	-	-	3
CO7	-	1	-	-	-	2	-	-	-	-	-	-
CO8	-	2	2	-	-	-	-	-	-	-	2	2
CO9	-	2	-	-	-	-	-	-	-	-	-	2
CO10	2	-	-	-	-	-	-	-	-	-	-	2
CO11	2	-	-	-	-	-	-	-	-	-	-	3

S.V. UNIVERSITY COLLEGE OF ENGINEERING: TIRUPATI – 517502

4-Year B.Tech Degree Programme

ECT04 ELECTROMAGNETIC FIELDS AND WAVES

Lecture :	***3 hrs/ week***	***Internal Assessment:***	***20+20=40 Marks***
Tutorial :	***1 hrs/ week***	***Semester End Examination:***	***60 Marks***
Semester :	***III***	***Credits:***	***4***

Course Educational Objectives :

1. To evaluate static electric fields.
2. To evaluate static magnetic fields.
3. To evaluate EM waves in different domains.
4. To understand how materials affect electric and magnetic fields.
5. To evaluate reflection of EM waves by different materials.

UNIT – I

Electrostatic Fields: Coulomb's law. Electric field intensity. Electric flux density and Gauss's law. Gauss's law in point form. Electrostatic potential. Potential gradient. Energy stored in electric field, Boundary conditions, capacitance.

UNIT – II

Magnetostatic fields: Ampere's force law. Biot-Savart law. Lorentz force law. Ampere's circuital law. Ampere's circuital law in point form. Magnetic vector tail. Boundary conditions.

UNIT – III

Maxwell's Equations: Summary of field equations. Displacement current. Maxwell's equations in differential and integral forms. Wave equation for free space conditions. Uniform plane wave propagation. Phasor notation for fields. Maxwell's equations in frequency domain.

UNIT – IV

EM waves in a homogeneous medium: solutions for free space-conditions, uniform plane wave, wave equations for a conducting medium, conductors and dielectrics, depth of penetration, polarization.

UNIT – V

Reflection by perfect conductor- normal incidence, oblique incidence, reflection by perfect dielectric-normal incidence, oblique incidence, breswer angle, surface impedance.

Course Outcomes: At the end of the course the student will be able to

CO1: analyze Electrostatic fields and its applications in ECG,EEG etc.

CO2: find energy stored in electric field and find resistance and capacitance.

CO3: analyze Electromagnetic fields & its applications in motors, transformers, microphones, memory stores etc.

CO4: find energy stored in magnetic field and find Inductance.

CO5: solve EM fields in both Time and Frequency Domains.

CO6: understand polarization in Dielectrics.

CO7: analyze propagation of EM waves in different medium.

CO8: study and analyze parallel and perpendicular polarizations.

CO9: understand reflection of plane waves by normal and oblique incidence.

CO10: find Brewster angle in different polarizations.

CO11:apply EM fields in Transmission lines, Waveguides and Antennas.

CO12find applications of EM waves in Microwaves

Learning Resources

Text Books:

1. Mathew N.O.Sadiku, "Elements of Electromagnetics", Oxford University Press.
2. Edward C.Jordan and Keith G.Balmain, "Electromagnetic Waves and Radiating Systems", Prentice-Hall of India Pvt.Ltd.

ECPCT303Electromagnetic Waves	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1	-	2	-	-	2	-	-	-	-	-	-	-	-
CO2	-	2	-	1	-	2	-	-	-	-	-	-	-	-
CO3	-	2	2	1	-	2	-	-	-	-	-	-	-	-
CO4	-	2	2	1	-	2	-	-	-	-	-	-	-	-
CO5	1	-	2	-	-	2	-	-	-	-	-	-	-	-
CO6	-	2	-	1	-	2	-	-	-	-	-	-	-	-

CO7	-	2	2	1	-	2	-	-	-	-	-	-	-	-
CO8	-	2	2	1	-	2	-	-	-	-	-	-	-	-
CO9	1	-	2	-	-	2	-	-	-	-	-	-	-	-
CO10	-	2	-	1	-	2	-	-	-	-	-	-	-	-
CO11	1	-	2	-	-	2	-	-	-	-	-	-	-	-
CO12	-	2	-	1	-	2	-	-	-	-	-	-	-	-

S.V. UNIVERSITY COLLEGE OF ENGINEERING: TIRUPATI – 517502

4-Year B.Tech Degree Programme

EET 41 ELECTRICAL TECHNOLOGY

Lecture :	3*hrs/ week*	*Internal Assessment:*	*20+20=40 Marks*
Tutorial :	*1 hrs/ week*	*Semester End Examination:*	*60 Marks*
Semester :	*III*	*Credits:*	*4*

Course Educational Objectives :

1. To understand operation of DC machines & motors.
2. To understand operation of transformer & to analyze performance of transformers.
3. To analyze operation of single phase & three phase induction motors.
4. To understand functioning of alternators & various Electrical instruments

UNIT – I

DC Machines: Principle of operation of dc generator, emf equation, types of generators, magnetization and load characteristics, principle of operation of dc motor, torque equation, Speed control, efficiency calculations by Swinburne's test and direct load test

UNIT – II

Transformers: Single phase transformer, principle of operation, types, constructional features, emf equation, phasor diagram on no load and load, equivalent circuit, losses and efficiency, predetermination of efficiency and regulation from OC and SC tests.

UNIT – III

Three phase induction motors: constructional features, principle of torque production, torque equation, slip torque characteristics, efficiency calculation, starting methods

Single phase induction motor: principle of operation, starting methods, types of single phase induction motors.

UNIT – IV

Synchronous Machines: Constructional features, types of synchronous machines, Synchronousgenerators**:** emf equation, coil span factor, estimation of regulation by synchronous impedance method.

Stepper motors: Principle of operation and applications.

UNIT – V

Electrical Measurements: Permanent Magnet moving coil meter (PMMC), Moving iron meter (MI), Principles of volt meter and energy meter, extension of range of meters. Whetstone's bridge, Maxwell's bridge, Wien's bridge.

Course Outcomes: At the end of the course the student will be able to

CO1: explain the operation & Characteristic of DC machines.

CO2: explain the operation & performance of transformer.

CO3: calculate efficiency of various Induction motors.

CO4: determine regulation by synchronous impedance method (OC test & SC test).

Learning Resources

Text Books:

1. H. Cotton, "Electrical Technology".
2. A K Sawhney, "Electrical Measurements and Instrumentation".
3. Edword Hughes, "Electrical Technology"

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

S.V. UNIVERSITY COLLEGE OF ENGINEERING: TIRUPATI – 517502

4-Year B.Tech Degree Programme

EEP 41 ELECTRICAL CIRCUITS AND MACHINES LAB

L+T:	*-*	*Internal Assessment:*	*20+20=40 Marks*
Practical :	*3 hrs/ week*	*Semester End Examination:*	*60 Marks*
Semester :	*III*	*Credits:*	*2*

Course Educational Objectives:

1.Provide students with practical knowledgeofbasic laws i.e. ohms law, Kirchhoff's law and measure resistance and inductanceofacoil.

2. Provide students with practical knowledgeof how to verify theorems in DC network.

3. Provide students with practical knowledgeofhow to verify resonance in ac circuit & current locus diagrams.

4. Tobriefthestudentsaboutnetwork parameters of T and ∏ circuit.

To familiarizestudents with the transient response characteristics ofdifferent circuits

ListofExperiments:

. To verify Kirchoffs Laws.
. To measure the resistanceandinductance of a coil.
. To verify superposition and reciprocity theorems.
. To verify thevenin's and Norton's theorems.
. Toverify Maximum power transfer theorem.
. To conduct series resonance on ac circuit.
. To measure network parameters of T and π circuit.
. To draw the current locus diagrams of RL load with R varying and L is varying.
. To obtain the transient response characteristics of RL, RC, RLC networks with PSIM software.

Course Outcomes:

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

CO1:verifyvariouslawsusingelectricalinstruments
CO2: measure the coil parameters like R, L, X, Z.
CO3: verify various theorems in DC circuits.
CO4:getfamiliarwith series resonance in ac circuit.
CO5: know about different parameters of DC circuit.
CO6:getfamiliarwith current locus diagrams with one element fixed while other varying.
CO7: know about transient response characteristics ofdifferent circuits with PSIM software.
CO8:perform goodinviva-voceexams
CO9: know about the latest practical trends in electrical fields.
CO10: know about different software's which are used for simulation of electrical networks.
CO11: know about applications of different theorems.

Learning Resources

Text Books:

PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12

CO											
CO1	2	2	3	2	-	-	-	-	-	-	-	2
CO2	2	2	2	2	-	-	-	-	-	-	-	2
CO3	2	2	3	2	-	-	-	-	-	-	-	2
CO4	2	2	2	2	-	-	-	-	-	-	-	2
CO5	2	2	3	2	-	-	-	-	-	-	-	2
CO6	2	2	2	2	-	-	-	-	-	-	-	2
CO7	2	2	3	2	-	-	-	-	-	-	-	2
CO8	2	2	3	2	-	-	-	-	-	-	-	2
CO9	2	2	2	2	-	-	-	-	-	-	-	2
CO10	2	2	3	2	-	-	-	-	-	-	-	2
CO11	2	2	3	2	-	-	-	-	-	-	-	2

S.V. UNIVERSITY COLLEGE OF ENGINEERING: TIRUPATI – 517502

4-Year B.Tech Degree Programme

ECP01 MATLAB AND SIMULATION LAB

L+T:	***-***	***Internal Assessment:***	***20+20=40 Marks***
Practical :	***2hrs/ week***	***Semester End Examination:***	***60 Marks***
Semester	***III***	***Credits:***	***1***

Course Educational Objectives :

1. To make aware the students about MATLAB working environment
2. To knowabout main features of the MATLAB integrated design environment and its user interfaces
3. To practice MATLAB commands and emphasis on creating and accessing data in variables
4. To perform mathematical and statistical calculations with vectors and creating basics visualizations
5. To introduce UNIX operating system working environment
6. To create and edit files, and observing the output in UNIX shells

List of Programs Using MATLAB:

1. To make aware the students about MATLAB working environment
2. To become familiar with the main features of the MATLAB integrated design environment and its user interfaces
3. To practice MATLAB commands and emphasis on creating and accessing data in variables
4. To perform mathematical and statistical calculations with vectors and creating basics visualizations
5. To introduce UNIX operating system working environment
6. To create and edit files, and observing the output in UNIX shells

List of Programs Using UNIX:

1. (a) Matrix operations (b) Computing Values of functions
2. (a) Solving Linear equations, (b) Factorial of a given number
3. To find the largest & Smallest of given numbers
4. (a) Program to draw a circle, (b) Different types of plots
5. Convolution of two signals
6. (a) Integral of a polynomial (b) Derivative of a polynomial

Course Outcomes:

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

CO1: Perform basic matrix operations and evaluate the function

CO2: Solve polynomial, linear equations

CO3: Sketch desired waveforms and shapes

CO4: Compute the signal processing techniques, such as convolution, correlation etc.,

CO5: Determine the calculus functions such as differentiation, integration etc.,

CO6: Analyse the statistics of the data by computing mean, median, mode etc.,

CO7: To display the system time in UNIX

CO8: Compute some basic mathematical operation such as factorial etc., in UNIX

CO9: Check given year is a leap year or not, check to given number is prime or not in UNIX

CO10: Search the files or a word in UNIX

CO11: Categorize the statistical data according to the different ranges

Learning Resources

Textbooks:

ECP 01:MAT LAB &Simulation Lab	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	2	-	-	-	-	-	-	-	-	-	-	-
CO2	-	1	-	-	-	-	-	-	-	-	-	-	-	-
CO3	-	-	2	-	-	-	-	-	-	-	-	-	-	-
CO4	2	2	2	-	-	-	-	-	-	-	-	-	-	-
CO5	2	2	2	-	-	-	-	-	-	-	-	-	-	-
CO6	-	1	-	-	-	-	-	-	-	-	-	-	-	-
CO7	-	-	2	-	-	-	-	-	-	-	-	-	-	-
CO8	2	2	2	-	-	-	-	-	-	-	-	-	-	-
CO9	2	2	2	-	-	-	-	-	-	-	-	-	-	-
CO10	-	1	-	-	-	-	-	-	-	-	-	-	-	-
CO11	-	-	2	-	-	-	-	-	-	-	-	-	-	-

IV Semester

S.V. UNIVERSITY COLLEGE OF ENGINEERING: TIRUPATI – 517502

4-Year B.Tech Degree Programme

ECT05 ***ELECTRONIC CIRCUITS ANALYSIS***

Lecture :	***3hrs/ week***	***Internal Assessment:***	***20+20=40 Marks***
Tutorial :	***2 hrs/week***	***Semester End Examination:***	***60 Marks***
Semester :	***IV***	***Credits:***	***4***

Course Educational Objectives :

1. To provide proficient in basic analysis, design and measurement of linear analog electronics systems important across engineering disciplines.
2. To gain the knowledge in low frequency and high frequency amplifier analysis.
3. To develop knowledge on operating principles, design methodologies, analyzing techniques of analog electronic circuits
4. To provide students with the basic concepts behind the design and operation of single and multi-stage amplifiers.
5. To acquire sound knowledge in power amplifiers and tuned voltage amplifiers.
6. To understand concept of oscillator circuits

UNIT – I

General Amplifiers: Concept of Amplifier, Voltage gain, Current gain, Power gain, Input and Output resistances, Conversion efficiency, Frequency response, Bandwidth, Distortion, CE, CB and CC amplifiers, Approximate model analysis, Effects of coupling and bypass capacitors on low frequency response, Hybrid-Π model at high frequencies.

UNIT – II

FET Amplifiers: Small signal model, Analysis of CS, CD and CG amplifiers.

Multistage Amplifiers: Types of coupling, Choice of amplifier configuration, overall voltage gain and Bandwidth of n-stage amplifier, Darlington and Bootstrap circuits.

UNIT – III

Power Amplifiers: Class-A large signal amplifiers, Transformer coupled audio power amplifiers, Push-pull amplifiers, Class-B amplifiers, Class-AB operation.

UNIT – IV

Feedback amplifiers: Feedback concept, Classification, Effects of negative feedback on gain, Stability, Noise, Distortion, Bandwidth.

Sinusoidal oscillators: Barkhausen criterion, RC phase shift, Wien bridge, Hartley and Colpitts oscillators, Crystal oscillator

UNIT – V

Tuned amplifiers: Single tuned amplifier, tuned primary amplifier, tuned secondary amplifier, double tuned transformer amplifier.

Course Outcomes: At the end of the course the student will be able to

CO1: analyze, design, simulate and build amplifier circuits, and measure their properties.

CO2: Design and produce small signal amplifier circuits for various practical applications to meet a given specification.

CO3: Understand the operating principles of major electronic amplifiers, circuit models.

CO4: Able to analyze single stage and multi stage amplifiers analytically.

CO5: An ability to analyze linear electronic circuits at both low and high frequencies.

CO6: Understand the concepts of both positive and negative feedback in electronic circuits.

CO7: Learn how negative feedback is used to stabilize the gain of amplifier and how positive feedback can be used to design an oscillator.

CO8: Acquire experience in building and trouble-shooting simple electronic analog circuits

Learning Resources

Text Books:

1. Millman and Halkias, "Integrated Electronics", McGraw-Hill Co
2. .Mottershed, "Electronic devices and circuits", PHI

Reference Books:

1. Salivahanan, "Electronic Devices and circuits", TMH.
2. David A. Bell, "Electronic Devices and circuits", PHI

ECT05 Electronic Circuits Analysis	Po 1	Po 2	Po 3	Po 4	Po 5	Po 6	Po 7	Po 8	Po 9	Po10	Po11	Po 12	Pso1	Pso2
CO1	2	2	2	-	-	-	-	-	-	-	-	-	-	-
CO2	-	1	-	-	-	-	-	-	-	-	-	-	-	-
CO3	-	-	2	-	-	-	-	-	-	-	-	-	-	-
CO4	2	2	2	-	-	-	-	-	-	-	-	-	-	-
CO5	2	2	2	-	-	-	-	-	-	-	-	-	-	-
CO6	-	1	-	-	-	-	-	-	-	-	-	-	-	-
CO7	-	-	2	-	-	-	-	-	-	-	-	-	-	-

CO8	2	2	2	-	-	-	-	-	-	-	-	-	-	-

S.V. UNIVERSITY COLLEGE OF ENGINEERING: TIRUPATI – 517502

4-Year B.Tech Degree Programme

ECT06 PULSE & DIGITAL CIRCUITS

Lecture :	*2 hrs/ week*	*Internal Assessment:*	*20+20=40 Marks*
Tutorial :	*2 hrs/ week*	*Semester End Examination:*	*60 Marks*
Semester :	*IV*	*Credits:*	*3*

Course Educational Objectives :

1. To understand basic principles involved in generation and processing of pulse waveforms.
2. To understand basic principles & design of diode clippers and clampers circuits.
3. To design different multivibrators using BJT's, JFET's, MOSFET's and CMOS.
4. To design time base generators for different frequencies & also methods to improve their sweep linearity.
5. To understand & design of Monostable and Astablemultivibrators using 555 IC timer.
6. To understand different IC families and their advantages and to understand interfacing them.

UNIT – I

Wave shaping circuits: Types of waveform, characteristics of pulse waveforms, RC low pass and high pass circuits, rise time, tilt, square wave testing of amplifiers, Diode as a switch, Diode clipper and clamper circuits.

UNIT – II

Multivibrators : BJT switch and switching times, Inverter, JFET switch, MOSFET and CMOS switches, BJT Schmitt trigger, Bistable, Monostable and Astablemultivibrators using BJT & triggering methods.

UNIT – III

Time Base circuits : General features of Time-base signal, Methods of generating time base wave form, Exponential sweep circuit, sweep circuit using UJT, sweep circuit using a transistor switch, a transistor constant-current sweep, Miller and Bootstrap time-base generators-basic principles, transistor Miller time-base generator, bootstrap time-base generator.

UNIT – IV

IC Timers and Multivibrators: CMOS multivibrators, integrated circuit TTL multivibrators, 555 timer, Astable and monostable modes, dual timer and its applications.

UNIT – V

Digital Integrated circuits: Evaluation of ICs, Advantages and classification of ICs. Digital IC characteristics, Digital IC families. DTL, HTL, TTL, ECL, MOS, CMOS, I^2L and their comparison, Totempole, open collector and Tristate outputs, interfacing different logic types.

Course Outcomes: At the end of the course the student will be able to

CO1: learn the operating principles of linear wave shaping circuits like RC low pass and highpass circuits.

CO2: design RC low pass and high pass circuits for different RC time constants.

CO3: understand the operating principles and design of non-linear wave shaping circuits likediode clippers and clampers.

CO4: understand electronic switches using transistors.

CO5: design different multivibrators using transistors.

CO6: design different triggering mechanisms.

CO7: understand the different applications of the multivibrators.

CO8: design UJT sweep circuits.

CO9: design different sweep circuits with improved sweep linearity.

CO10: design monostable and astablemultivibrators using IC 555 timer.

CO11: understand the usage of single and dual timers in different applications.

Co12: understand different IC families and their comparision

Learning Resources

Text Books:

1. Pulse, Digital &Switching Waveforms- J.Millman, Herbert Taub and M.S.PrakashRao, TMH. 2nd
Edn, 2007.
3. Solid state pulse circuits- David a. Bell, PHI, 4thEdn, 2002.

Reference Books:

1. Pulse and Digital Circuits – A. Anand Kumar, PHI 2ndEdn, 2009.
2. Introduction to system design using ICs – B.S.Sode, Wiley Eastern.

ECT 06:Pulse and Digital Circuits	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PO11	PO 12	PSO 1	PSO2

CO1	2	2	2	-	-	-	-	-	-	-	-	-	-	-
CO2	-	1	-	-	-	-	-	-	-	-	-	-	-	-
CO3	-	-	2	-	-	-	-	-	-	-	-	-	-	-
CO4	2	2	2	-	-	-	-	-	-	-	-	-	-	-
CO5	2	2	2	-	-	-	-	-	-	-	-	-	-	-
CO6	-	1	-	-	-	-	-	-	-	-	-	-	-	-
CO7	-	-	2	-	-	-	-	-	-	-	-	-	-	-
CO8	2	2	2	-	-	-	-	-	-	-	-	-	-	-
CO9	2	2	2	-	-	-	-	-	-	-	-	-	-	-
CO10	-	1	-	-	-	-	-	-	-	-	-	-	-	-
CO11	-	-	2	-	-	-	-	-	-	-	-	-	-	-
CO12	2	2	2	-	-	-	-	-	-	-	-	-	-	-

S.V. UNIVERSITY COLLEGE OF ENGINEERING: TIRUPATI – 517502

4-Year B.Tech Degree Programme

ECT07 SWITCHING THEORY AND LOGIC DESIGN

Lecture :	*2 hrs/ week*	*Internal Assessment:*	*20+20=40 Marks*
Tutorial :	*2 hrs/ week*	*Semester End Examination:*	*60 Marks*
Semester :	*IV*	*Credits:*	*3*

Course Educational Objectives :

1. Provides introduction to logic designs and the basic building blocks used in digital systems.
2. To understand the number systems and codes, Boolean algebra, and logic gates.
3. To minimize the logical functions using Boolean algebra, K-maps, tabular method, and also to understand combinational circuits.
4. To understand different sequential circuits.
5. To understand different Arithmetic circuits.
6. To understand different programmable circuits

UNIT – I

Number Systems and Codes: Review of binary, octal, decimal and hexadecimal number systems and their interconversion. BCD, Grey, ASCII, Parity bit.

Boolean algebra and Logic Gates: NOT, OR, AND operations. Boolean theorems, De Morgan's theorem, Symbols and truth tables of logic gates (NOT, OR, AND, NAND, NOR, XOR, XNOR), Universal gates.

UNIT – II

Combinational logic circuits: Standard forms of logical functions, Minterm and Maxterm specifications, Simplification by K-maps, Incompletely specified functions, Tabular method, Realization of logical functions using gates, Decoders and encoders, Multiplexers and demultiplexers, Digital magnitude comparator.

UNIT – III

Sequential circuits: Latches, Clocked flip-flops, SR, JK, D and T flip flops, Timing problems and master-slave flip-flops, Shift registers, Asynchronous and synchronous counters, Ring and Johnson counters, Application of counters.

UNIT – IV

Arithmetic circuits: Signed binary numbers, Binary arithmetic, Binary adders and subtractors, Serial and parallel adders, Integrated-circuit parallel adder and its applications, Binary multipliers, ALU.

UNIT – V

Programmable Logic Devices: Read-only Memory (ROM), ROM organization, Combinational circuit implementation, Types of ROMs, Combinational programmable logic devices, Programmable Array Logic (PAL), Programmable Logic Array (PLA), Programmable ROM

Course Outcomes:

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

CO1: To apply principles of Boolean algebra to manipulate and minimize logic expression

CO2: To use K-maps and tabular method to minimize logic functions

CO3: To design logic functions with logic gates

CO4: To design combinational circuits

CO5: To learn operation of latches, flip-flops, counters and registers

CO6: To analyze the operation of sequential circuits

CO7: To learn different arithmetic circuits

CO8: To learn building blocks of digital systems

CO9: To learn about ROM, RAM and its implementation

CO10: learn the operation of state of art components to design and build digital systems such as PLA, PALs and PLDs

CO11:To articulate how modern microelectronics has impacted society

CO12: To identify paper related to the applications of digital system in society, read and summarize the Paper

Learning Resources

Text Books:

1. Ronald J.Tocci, Neal S.Widmer, "Digital systems – Principles and applications". 8th edition, Pearson Education Asia, 2001.
2. Morris Mano, "Digital Design", PHI, 3rd Edition, 2006.

Reference Books:

1. Taub and Schilling, "Digital Integrated Electronics". Mc-Graw Hill International Edition.
2. Anand Kumar, "Switching Theory and Logic Design" PHI, EEE, 2nd Edition, 2009

ECT07 Switching Theory and Logic Design	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PO11	PO 12	PSO 1	PSO2
CO1	1	-	2	-	-	2	-	-	-	-	-	-	-	-
CO2	-	2	-	1	-	2	-	-	-	-	-	-	-	-
CO3	-	2	2	1	-	2	-	-	-	-	-	-	-	-
CO4	-	2	2	1	-	2	-	-	-	-	-	-	-	-
CO5	1	-	2	-	-	2	-	-	-	-	-	-	-	-

CO6	-	2	-	1	-	2	-	-	-	-	-	-	-	-
CO7	-	2	2	1	-	2	-	-	-	-	-	-	-	-
CO8	-	2	2	1	-	2	-	-	-	-	-	-	-	-
CO9	1	-	2	-	-	2	-	-	-	-	-	-	-	-
CO10	-	2	-	1	-	2	-	-	-	-	-	-	-	-
CO11	-	2	2	1	-	2	-	-	-	-	-	-	-	-
CO12	-	2	2	1	-	2	-	-	-	-	-	-	-	-

S.V. UNIVERSITY COLLEGE OF ENGINEERING: TIRUPATI – 517502
4-Year B.Tech Degree Programme

ECT08 RANDOM SIGNALS AND STOCHASTIC PROCESSES

Lecture :	***3hrs/ week***	***Internal Assessment:***	***20+20=40 Marks***
Tutorial :	***2 hrs/ week***	***Semester End Examination:***	***60 Marks***
Semester :	***IV***	***Credits:***	***4***

Course Educational Objectives :

1. To find Distribution function, Density function, Characteristic and moment generating functions for different Random variables.
2. To find Joint distribution / Density functions – Conditional density / Distribution functions on

multiple Random variables

3. To study properties of Random Processes.
4. To study different Linear Systems with Random Inputs
5. To evaluate Optimum Linear Systems.

UNIT – I

Probability : Probability introduced through Sets and Relative Frequency: Experiments and Sample Spaces, Discrete and Continuous Sample Spaces, Events, Probability Definitions and Axioms, Mathematical Model of Experiments, Probability as a Relative Frequency, Joint Probability, Conditional Probability, Total Probability, Bays' Theorem, Independent Events:

The Random Variable : Definition of a Random Variable, Conditions for a Function to be a Random Variable, Discrete and Continuous, Mixed Random Variable, Distribution and Density functions, Properties, Binomial, Poisson, Uniform, Gaussian, Exponential, Raleigh, Conditional Distribution, Methods of defining Conditioning Event, Conditional Density, Properties.

UNIT – II

Multiple Random Variables : Vector Random Variables, Joint Distribution Function, Properties of Joint Distribution, Marginal Distribution Functions, Conditional Distribution and Density – Point Conditioning, Conditional Distribution and Density – Interval conditioning, Statistical Independence, Sum of Two Random Variables, Sum of Several Random Variables, Central Limit Theorem, (Proof not expected). Unequal Distribution, Equal Distributions.

Operations on Multiple Random Variables: Expected Value of a Function of Random Variables, Joint Moments about the Origin, Joint Central Moments, Joint Characteristic Functions and Joint Gaussian Random Variables: Two Random Variables case, N Random Variable case, Properties, Transformations of Multiple Random Variables, Linear Transformations of Gaussian Random Variables.

UNIT – III

Random Processes – Temporal Characteristics: The Random Process Concept, Classification of Processes, Deterministic and Nondeterministic Processes, Distribution and Density Functions, concept of Stationarity and Statistical Independence. First-Order Stationery Processes, Second- Order and Wide-Sense Stationarity, (N-Order) and Strict-Sense Stationarity, Time Averages and Ergodicity, Mean-Ergodic Processes, Correlation-Ergodic Processes, Autocorrelation Function & Its Properties, Cross-Correlation Function & its Properties, Covariance Functions, Gaussian Random Processes, Poisson Random Process.

UNIT – IV

Random Processes – Spectral Characteristics: The Power Spectrum: Properties, Relationship between Power Spectrum and Autocorrelation Function, The Cross-Power Density Spectrum, Properties, Relationship between Cross-Power Spectrum and Cross-Correlation Function.

UNIT – V

Linear Systems with Random Inputs:Random Signal Response of Linear Systems: System Response – Convolution, Mean and Mean-squared Value of System Response, autocorrelation Function of Response, Cross-Correlation Functions of Input and Output, Spectral Characteristics of System Response: Power Density Spectrum of Response, Cross-Power Density Spectrums of Input and Output, Band pass, Band-Limited and Narrowband Processes, Properties.

Course	At the end of the course the student will be able to
Outcomes:	CO1: Able to evaluate probability for different experiments

CO2: obtain Distribution function, Density functions, and Conditional density functions for different Random variables.

CO3: Able to obtain Expected value of function of random variables by applying different operations.

CO4: Able to evaluate Transformations of multiple random variables.

CO5: apply Concept of Stationarity, Independence, Time averages, Ergodicity for Random processes

CO6: Able to obtain Power spectrum for discrete time processes and sequences.

CO7: Able to obtain Random signal response of linear system

CO8: Able to calculate Noise bandwidth for Band-pass, Band-limited, and Narrow-band processes

CO9: Able to Model of different Noise Sources.

CO10: Able to analyze matched filter and Wiener filter.

CO11: apply the concept of Random variables to find noise in AM and FM communicationsystems.

CO12: Able to apply the concept of Random variables for RADAR detection.

Learning Resources

Text Books:

1. Probability, Random Variables & Random Signal Principles - Peyton Z. Peebles, TMH, 4th Edition, 2001.
2. Probability, Random Variables and Stochastic Processes – Athanasios Papoulis and S. Unnikrishna Pillai, PHI, 4th Edition, 2002

Reference Books:

1. Communication Systems Analog & Digital – R.P. Singh and S.D. Sapre, TMH, 1995.
2. Probability and Random Processes with Application to Signal Processing – Henry Stark and John W.Woods, Pearson Education, 3rd Edition.
3. Probability Methods of Signal and System Analysis. George R. Cooper, Clave D. MC Gillem, Oxford,3rd Edition, 1999.
4. Statistical Theory of Communication - S.P. Eugene Xavier, New Age Publications, 2003.
5. Signals, Systems & Communications - B.P. Lathi, B.S. Publications, 2003.

ECT08 Random Signals and Stochastic processes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	1	2	_	_	3	_	_	_	_	_	_	_	_
CO2	1	2	2	2	_	2	_	_	_	_	_	_	_	_
CO3	_	2	2	1	_	2	_	_	_	_	_	_	_	_
CO4	_	2	2	1	_	2	_	_	_	_	_	_	_	_
CO5	3	1	2	_	_	3	_	_	_	_	_	_	_	_

CO6	1	2	2	2	_	2	_	_	_	_	_	_	_	_
CO7	_	2	2	1	_	2	_	_	_	_	_	_	_	_
CO8	_	2	2	1	_	2	_	_	_	_	_	_	_	_
CO9	3	1	2	_	_	3	_	_	_	_	_	_	_	_
CO10	1	2	2	2	_	2	_	_	_	_	_	_	_	_
CO11	_	2	2	1	_	2	_	_	_	_	_	_	_	_
CO12	_	2	2	1	_	2	_	_	_	_	_	_	_	_

S.V. UNIVERSITY COLLEGE OF ENGINEERING: TIRUPATI – 517502
4-Year B.Tech Degree Programme

ECT09 *ANALOG COMMUNICATIONS*

Lecture :	*3hrs/ week*	*Internal Assessment:*	*20+20=40 Marks*
Tutorial :	*----*	*Semester End Examination:*	*60 Marks*
Semester :	*IV*	*Credits:*	*3*

Course Educational Objectives :

1. Understand concept of modulation and design of major building blocks of communication system.
2. Modulation techniques will be analyzed both in time and frequency domains.
3. To understand the communication systems. Signal modulation techniques will be emphasized.
4. Able to understand Signal Modulation (amplitude, frequency, and phase) and transmission techniques (base band, band pass) will be emphasized.
5. To develop a clear insight into the relations between the input and output ac signals in various stages of a transmitter and a receiver of AM & FM systems.

UNIT – I

Introduction : Introduction to communication system, Need for modulation, Amplitude Modulation, Definition, Time domain and frequency domain description, 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, DSBSC and SSB generation and detection methods – VSB – Frequency translation –Frequency Division Multiplexing.

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, Zero crossing detector, Phase locked loop, Comparison of FM & AM.

UNIT – III

Sampling Theory And Pulse Modulation: Sampling theorem – Nyquest rate – Aliasing effect – Sampling of Band pass signals –Time Division Multiplexing, Types of Pulse modulation, PAM, PWM and PPM – Generation and detection – comparison of Modulation methods

UNIT – IV

Noise: Noise in Analog communication System, Noise in DSB& SSB System Noise in AM System, Noise in Angle Modulation System, Threshold effect in Angle Modulation System, Pre-emphasis & de-emphasis.

UNIT – V

Transmitters : Radio Transmitter - Classification of Transmitter, AM Transmitter, Effect of feedback on performance of AM Transmitter, FM Transmitter – Variable reactance type and phase modulated FM Transmitter, frequency stability in FM Transmitter.

Receivers : Radio Receiver - Receiver Types - Tuned radio frequency receiver, Superheterodyne receiver, RF section and Characteristics - Frequency changing and tracking, Intermediate frequency, AGC, FM Receiver, Comparison with AM Receiver, Amplitude limiting.

Course Outcomes:	At the end of the course the student will be CO1: Able to demonstrate about various blocks in analog communication system. CO2: Able to analyze and design the analog modulator and demodulator circuits. CO3: Able to calculate the effect of noise in analog modulations. CO4:Able to demonstrate about various blocks in Transmitters and Receivers CO5: Able to know about AM Radio Broadcasting Frequency CO6: Able to know FM Radio Broadcasting Frequency CO7: Able to know the quality difference between AM and FM stations. CO8: Able to know the community services of Radio stations. CO9: Able to know the Complex Mathematics in AM and FM signals. CO10: Able to know how to sample the analog signal to discrete signal. CO11: Able to know the types of noises that effect the modulation schemes. CO12: Able to know different multiplexing techniques possible in time and frequency

Learning Resources

Text Books:

1. Principles of Communication Systems – H Taub& D. Schilling, GautamSahe, TMH, 2007 3rd Edition.
2. Communication Systems – B.P. Lathi, BS Publication, 2006.
3. Communication Systems (Analog and Digital)- Sanjay Sharma, Katsons books.
4. Electronics & Communication System – George Kennedy and Bernard Davis, TMH 2004.
5. "Communication Systems Engineering" John g Proakis, MasoudSalebi.
6. Principles of Communication Systems - Simon Haykin, John Wiley, 2nd Ed

ANALOG COMMUNICATIONS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	1	2	_	_	3	_	_	_	_	_	_	_	_
CO2	1	2	2	2	_	2	_	_	_	_	_	_	_	_
CO3	_	2	2	1	_	2	_	_	_	_	_	_	_	_
CO4	_	2	2	1	_	2	_	_	_	_	_	_	_	_
CO5	3	1	2	_	_	3	_	_	_	_	_	_	_	_
CO6	1	2	2	2	_	2	_	_	_	_	_	_	_	_
CO7	_	2	2	1	_	2	_	_	_	_	_	_	_	_
CO8	_	2	2	1	_	2	_	_	_	_	_	_	_	_
CO9	3	1	2	_	_	3	_	_	_	_	_	_	_	_
CO10	1	2	2	2	_	2	_	_	_	_	_	_	_	_
CO11	_	2	2	1	_	2	_	_	_	_	_	_	_	_
CO12	_	2	2	1	_	2	_	_	_	_	_	_	_	_

S.V. UNIVERSITY COLLEGE OF ENGINEERING: TIRUPATI – 517502

4-Year B.Tech Degree Programme

ECT10 TRANSMISSION LINES AND WAVEGUIDES

Lecture : *2 hrs/ week*

Tutorial : *2 hrs/ week*

Semester : *IV*

Course Educational Objectives :

1. To study the fundamental concepts of transmission lines at higher frequencies
2. Understand and analyze power flow in transmission line
3. Ability to analyze and design impedance matching methods
4. Ability to Understand Wave Propagation between parallel planes
5. Exposé the learner to waveguides their types and modes of transmissions

UNIT – I

Transmission Lines: Primary constants of the line. Distributed parameter equivalent circuit. Transmission line equations and solutions. Propagation constant. Characteristic impedance. Distortion less line.

UNIT – II

Power flow in transmission line: Input impedance of transmission line, Reflection coefficient. Standing waves open circuit and short circuited lines, VSWR, relation between reflection coefficient and VSWR.

UNIT – III

Impedance Matching: Methods of impedance matching, Quarter wave transformer, Smith chart. Features of smith chart, Impedance matching Using Smith chart – Single stub tuner. Double stub matching.

UNIT – IV

Waves between parallel planes : TE waves TM waves, TEM waves, Velocity of propagation, Attenuation in parallel plane guides, wave impedance

UNIT – V

Rectangular waveguides: TM waves and TE waves in waveguides, Impossibility of TEM wave, circular waveguides, wave impedance and characteristic impedance, Attenuation and Q of waveguides

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

CO1: Understand Primary ,Secondary Constants and equivalent circuit of Transmission line

CO2: Derive Transmission line equations and also Propagation constant Characteristics implements

CO3: Compute Input impedance of Transmission line O.C & S.C lines.

CO4: The relation between VSWR & reflection coefficient.

CO5: Understand the Impedance Matching methods.

CO6: Understand the application and properties of smith chart.

CO7: Understand TE, TM and TEM Waves based on Helmholtz equation and boundaryconditions .

CO8: Analyze velocity of propagation, attenuation and wave impedance.

CO9: Understand TE, TM waves in rectangular waveguides.

CO10: Understand TE,TM waves in circular waveguides.

CO11: Calculate wave and characteristic impedance, Attenuation and Q of waveguides.

Learning Resources

1. Edward C.Jordan and Keith G.Balmain, “Electromagnetic Waves and Radiating Systems”, Prentice-Hall of India Pvt.Ltd.
2. Mathew N.O.Sadiku, "Elements of Electromagnetics", Oxford University Press.
3. S.Y.Liao, "Microwave Devices and Circuits", Prentice-Hall of India Pvt.Ltd.

ECT10:Transmission Lines& Wave Guides	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	1	2	–	–	3	–	–	–	–	–	–	–	–

CO2	1	2	2	2	_	2	_	_	_	_	_	_	_	_
CO3	_	2	2	1	_	2	_	_	_	_	_	_	_	_
CO4	_	2	2	1	_	2	_	_	_	_	_	_	_	_
CO5	3	1	2	_	_	3	_	_	_	_	_	_	_	_
CO6	1	2	2	2	_	2	_	_	_	_	_	_	_	_
CO7	_	2	2	1	_	2	_	_	_	_	_	_	_	_
CO8	_	2	2	1	_	2	_	_	_	_	_	_	_	_
CO9	3	1	2	_	_	3	_	_	_	_	_	_	_	_
CO10	1	2	2	2	_	2	_	_	_	_	_	_	_	_
CO11	_	2	2	1	_	2	_	_	_	_	_	_	_	_

S.V. UNIVERSITY COLLEGE OF ENGINEERING: TIRUPATI – 517502

4-Year B.Tech Degree Programme

EET42 ***CONTROL SYSTEMS***

Lecture :	***3 hrs/ week***	***Internal Assessment:***	***20+20=40 Marks***
Tutorial :	***----***	***Semester End Examination:***	***60 Marks***
Semester :	***IV***	***Credits:***	***3***

Course Educational Objectives :

1. To study different Mathematical modeling of physical systems.
2. To explain the Time domain analysis.
3. To learn Stability of control systems.
4. To learn the Frequency domain analysis.

UNIT – I

Introduction to classical control systems: Open loop and closed loop control systems- Transfer functions- Block diagrams and their reduction - Signal flow graphs - Mason’s gain formula

UNIT – II

Mathematical modeling of physical systems: Mathematical modeling and transfer functions of electrical, mechanical and electro-mechanical elements. - DC servo motors- two-phase a.c. servo motors – synchros.

UNIT – III

Time domain analysis: Standard test signals, step response of first and second order systems – Time response specifications – steady state error – static error and generalized error coefficients – response with proportional, derivative and integral controllers

UNIT – IV

Stability of control systems: concept – characteristic equation – location of roots in the s-plane for stability – Routh Hurwitz criterion – Nyquist stability criterion – Gain margin and Phase margin – Root locus – rules for the construction of root loci

UNIT – V

Frequency domain analysis: Introduction - Polar plots - Bode plots - M&N circles – Nicholas charts – Need for compensators - Lag and lead compensators design in frequency domain

Course Outcomes: At the end of the course the student will be able to

CO1: apply knowledge of linear control systems.

CO2: know the classification of control systems, block diagrams and their reductions.

CO3: learn signal flow graphs and mason's gain formula.

CO4: Understand the transfer function of electrical, mechanical and electro – mechanical elements through mathematical modeling.

CO5: Understand the derivations of both ac & dc servo motors.

CO6: know the test signals and response of first & second order systems.

CO7: Understand the time domain analysis, derivate and integral controllers.

CO8: Understand the Stability of control systems - Routh Hurwitz criterion.

CO9: learn Root locus – rules for the construction of root loci

CO10: Understand the Frequency domain analysis - correlation between time and frequency response – frequency response plots.

CO11: design and construct – polar plots – Bode plots - Gain margin and Phase margin.

Learning Resources

Text Books:

1. "Automatic Control systems"- by B.C.Kuo, PHI.
2. "Discrete Time Control Systems": by K.Ogata, Pearson Education. .
3. "Control system Engg" :I.J.Nagrath and M.Gopal, Wiley Eastern Ltd.
4. "Control system Engineering" by NISE, Wiley, 2000.

EET 42:Control Systems	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	1	2	_	_	3	_	_	_	_	_	_	_	_
CO2	1	2	2	2	_	2	_	_	_	_	_	_	_	_
CO3	_	2	2	1	_	2	_	_	_	_	_	_	_	_
CO4	_	2	2	1	_	2	_	_	_	_	_	_	_	_
CO5	3	1	2	_	_	3	_	_	_	_	_	_	_	_
CO6	1	2	2	2	_	2	_	_	_	_	_	_	_	_

CO7	_	2	2	1	_	2	_	_	_	_	_	_	_	_
CO8	_	2	2	1	_	2	_	_	_	_	_	_	_	_
CO9	3	1	2	_	_	3	_	_	_	_	_	_	_	_
CO10	1	2	2	2	_	2	_	_	_	_	_	_	_	_
CO11	_	2	2	1	_	2	_	_	_	_	_	_	_	_

S.V. UNIVERSITY COLLEGE OF ENGINEERING: TIRUPATI – 517502

4-Year B.Tech Degree Programme

ECP02 ELECTRONIC CIRCUITS ANALYSIS LAB

Internal Assessment: ***20+20=40 Marks***

Semester End Examination: ***60 Marks***

Credits: ***2***

1. To analyze and design the single stage amplifiers, multi stage amplifiers
2. To understand the calculation of efficiency for different types of power amplifiers

3. This course provides fundamental concept of various electronics circuits.
4. To understand more focuses of amplifiers
5. It also provides the knowledge of electronic circuits on switched power supplies like transistor series, transistor shunt and zener shunt voltage regulators

List Of Experiments:

1. PN Diode
2. BJT under CE- Configuration
3. BJT under CB-Configuration
4. Junction Field Effect Transistor
5. Photo Diode and Light Dependent Resistor
6. Solar Panel
7. Half Wave Rectifier and Full Wave Rectifier
8. Common Emitter Amplifier
9. RC Phase Shift Oscillator
10. Two Stage Amplifier

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

CO1: Should be able to design and analyze the voltage amplifiers

CO2: Should be able to calculate the efficiency of class – A power amplifiers

CO3: Should be able to determine the load regulation and line regulation for the voltage regulators

ECP02 Electronic Circuits Analysis lab	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	1	2	_	_	3	_	_	_	_	_	_	_	_
CO2	1	2	2	2	_	2	_	_	_	_	_	_	_	_
CO3	_	2	2	1	_	2	_	_	_	_	_	_	_	_

S.V. UNIVERSITY COLLEGE OF ENGINEERING:
TIRUPATI – 517502
4-Year B.Tech Degree Programme

ECP03 ANALOG COMMUNICATION LAB

L+T : ***-*** ***Internal Assessment:*** ***20+20=40 Marks***

Practical : ***3 hrs/*** ***Semester End*** ***60 Marks***

	week	***Examination:***	
Semester :	***IV***	***Credits:***	***2***

Course Educational Objectives :	1. To Understand the modulation , demodulation techniques used in communication system 2. To develop the modulation techniques used in both time and frequency domains. 3. To develop the knowledge of pre-emphasis and de-emphasis circuits used in analog communication. 4. To analyse the Signal modulation i.e. amplitude, frequency and pulse modulation techniques. 5. Effect of noise on various Analog Systems.

List of Experiments:

1) Amplitude Modulation and Demodulation
2) Frequency Modulation and Demodulation
3) Balanced Modulator
4) PWM & PPM
5) Pulse Amplitude Modulation
6) BpskModulaiton and Demodulation
7) Pre-Emphasis and De-Emphasis
8) Time Division Multiplexing
9) Sample and Hold Circuit
10) Effect of Noise on Various Analog Systems

Course Outcomes:	At the end of the course the student will be able to CO1: Study amplitude modulation and demodulation CO2: Study FM generator and observe its output waveform CO3: Generate pulse amplitude modulated wave and demodulate the same CO4: Generate DSBSC wave using balanced modulator CO5:Generate pulse width modulated wave and demodulate the same CO6: Generate pulse position modulated wave and demodulate the same CO7: Study the carrier modulation technique by Binary phase shift keying modulation & demodulation CO8: Study the behavior of pre-emphasis and de-emphasis circuits CO9: Study 3 channel time division multiplex generator CO10: Study sample and hold circuit CO11: Effect of noise on various analog systems and also calculate signal-to-noise ratio

Learning Resources

Text books:

ECT09 ANALOG COMMUNICATIONS Analog Communications	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	1	2	_	_	3	_	_	_	_	_	_	_	_
CO2	1	2	2	2	_	2	_	_	_	_	_	_	_	_
CO3	_	2	2	1	_	2	_	_	_	_	_	_	_	_
CO4	_	2	2	1	_	2	_	_	_	_	_	_	_	_
CO5	3	1	2	_	_	3	_	_	_	_	_	_	_	_
CO6	1	2	2	2	_	2	_	_	_	_	_	_	_	_
CO7	_	2	2	1	_	2	_	_	_	_	_	_	_	_
CO8	_	2	2	1	_	2	_	_	_	_	_	_	_	_
CO9	3	1	2	_	_	3	_	_	_	_	_	_	_	_
CO10	1	2	2	2	_	2	_	_	_	_	_	_	_	_
CO11	_	2	2	1	_	2	_	_	_	_	_	_	_	_

V Semester

S.V. UNIVERSITY COLLEGE OF ENGINEERING: TIRUPATI – 517502

4-Year B.Tech Degree Programme

EOT01 ECONOMICS

Lecture :	*2 hrs/ week*	*Internal Assessment:*	*20+20=40 Marks*
Tutorial :	*-*	*Semester End Examination:*	*60 Marks*
Semester :	*V*	*Credits:*	*2*

Course Educational Objectives :

1. To introduce to managerial Economics, Cost Analysis Production and Supply Analysis
2. To gain Knowledge in Price and Output Decisions Under Different Market Structures

And Profit Management

UNIT – I

Introduction - Nature and Scope of Managerial Economics, Economic Theory and Managerial Economics, Managerial **Economist:** Role and Responsibilities. Demand Analysis and Forecasting – Demand Determinants, Demand Distinctions, Demand Forecasting: General Considerations, Methods of Demand Forecasting

UNIT – II

Cost Analysis – Cost Concepts, Classifications and Determinants; Cost-Output Relationship, Economies and Diseconomies of Scale, Cost Control and Cost Reduction.

Production and Supply Analysis – Production Functions, Supply Analysis.

UNIT – III

Price and Output Decisions Under Different Market Structures – Perfect ompetition, Monopoly and Monopsony; Price Discrimination, Monopolistic Competition, Oligopoly and Oligopsony

UNIT – IV

Pricing Policies and Practices – Pricing Policies, Pricing Methods, Specific Pricing Policies, Price Discounts and Differentials; Product-line Coverage and Pricing; Price Forecasting.

UNIT – V

Profit Management – Nature of Profit, Measuring Accounting Profit, Profit Policies, Profit Planning and Forecasting. Capital Management - Capital Budgeting, Cost of Capital, Appraising Project Profitability, Risk, Probability and Investment Decisions

Course Outcomes: At the end of this course, students will demonstrate the ability to

1. To gain introduction to managerial economics and demand analysis
2. To estimate Cost Analysis Production and Supply Analysis
3. To understand Price and Output Decisions Under Different Market Structures
4. To be able to analyze Profit Management

Learning Resources

Text Books:

1. Varshney R L and Maheshwari K L, Managerial Economics, 19th Edition, Sultan Chand and Sons, 2009.

2. Froeb L M, and McCann B T, Managerial Economics*:* A Problem Solving Approach, Cengage Learning, 2008.

EOT01 ECONOMICS	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	3		3	2	1	1	2	2	2	3	3	3		3
CO2	3		3	2	1	1	2	2	2	3	3	3		3
CO3	3		3	2	1	1	3	2	2	3	3	3		3
CO4	3		3	3	1	1	3	2	2	3	3	3		3

S.V. UNIVERSITY COLLEGE OF ENGINEERING: TIRUPATI – 517502
4-Year B.Tech Degree Programme

AOT01 ACCOUNTANCY

Lecture :	***2 hrs/ week***	***Internal Assessment:***	***20+20=40 Marks***
Tutorial :	***-***	***Semester End Examination:***	***60 Marks***
Semester :	***V***	***Credits:***	***2***

Course Educational Objectives :

UNIT – I
Management Accounting – Definition, Objectives, Scope and Functions. Financial Accounting – Introduction, Process, Principles and Concepts. Financial Statements – Trading Account, Balancing Process, Profit & Loss Account and Balance Sheet

UNIT – II
Financial Statement Analyses – Trend Percentage Analysis, Ratio Analysis, Fund Flow Statement Analysis, Cash Flow Statement Analysis.

UNIT – III
Methods of Depreciation – Straight line, Depletion, Machine Hour Rate, Diminishing Balance, Sum of Digits, Sinking Fund and Insurance Policy Methods. Inventory Valuation Methods – FIFO, LIFO, Average Weighted Average, Base Stock and HIFO Methods.

UNIT – IV
Capital Budgeting – Pay Back Period, ARR, NPV, PI and IRR Methods. Unit Costing – Introduction, Direct Cost Classification and Indirect Cost Classification. Introduction to Process Costing, Job Costing and Activity Based Costing

UNIT – V
Marginal Costing – Introduction, Definition, Meaning and BEP Analysis and BEP in units. Standard Costing – Introduction, Variance Analysis Material Cost Variance, Material Price Variance, Labor Variance, and Sales Variance. Budgetary Control – Introduction and Classification of Budgets, Production, Material / Purchase, Sales, Sales Overhead, Cash and Factory Overheads Budgets. Flexible Budget
.

Course Outcomes: At the end of the course the student will be able to

Learning Resources

Text Books: Pandikumar M P, Management Accounting: Theory and Practice, 1st Edition, Excel Books, 2007.

AOT01 ACCOUNTANCY	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PO11	PO 12	PSO 1	PSO2

CO1	3		3	2	1	1	2	2	2	3	3	3		3
CO2	3		3	2	1	1	2	2	2	3	3	3		3
CO3	3		3	2	1	1	3	2	2	3	3	3		3
CO4	3		3	3	1	1	3	2	2	3	3	3		3

4-Year B.Tech Degree Programme

ECT11 ANALOG IC APPLICATIONS

Lecture :	***3 hrs/ week***	***Internal Assessment:***	***20+20=40 Marks***
Tutorial :	***---***	***Semester End Examination:***	***60 Marks***
Semester :	***V***	***Credits:***	***3***

Course Educational Objectives :

1. This course focuses on the characteristics and applications of various analog integrated circuits using operational amplifiers
2. To learn basics of the design and analysis of selected analog circuits including some specialized linear integrated circuits.
3.To understand various modes of operation of an operational amplifier
4. To understand AC and DC characteristics of operational amplifiers.
5. To understand the linear and non-linear applications of operational amplifiers
6. To learn about comparator and different waveform generator circuits using operational amplifiers.
7. To know about basics and applications of Phase locked loops
8. To understand design concepts of voltage regulators and active filters using operational amplifiers

UNIT – I

Operational Amplifier : Ideal op-amp characteristics, internal circuit, differential amplifier and its transfer characteristic,examples of IC op-amps, DC and AC characteristics, Inverting and non-inverting modes of operation, voltage follower.

UNIT – II

Op-Amp Applications: Summer, Integrator, Differentiator, Analog computation, DC and AC amplifiers. Instrumentation amplifier, V to I and I to V converters, Precision rectifiers, Log and Antilog amplifiers, multiplier

UNIT – III

Comparators and waveform generators: Comparator, Regenerative comparator, Astable and monostablemultivibratorsusing op-amp, Triangular wave generator, Sine wave generators using op-amp. IC waveform generator (8038).

UNIT – IV

Phase Locked Loops: PLL- introduction, block schematic, principles and description individual blocks, Voltage controlled oscillator (566), IC PLL (565), PLL applications- Frequency multiplication, Frequency translation, FM & FSK demodulation.

UNIT – V

Voltage regulators: Series op-amp regulator, IC voltage regulators, 723 regulator, Switching regulators.

Active Filters: Introduction, Butter worth filters- 1st order, 2ndorder, Low pass, and High pass filters, Band pass, band reject andall pass filters, State variable filter.

Course Outcomes:

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

CO1: Understand the operation of analog electronic circuit systems and their components.

CO2:demonstrate the use of analog circuit analysis techniques to analyze the operation and behavior of various analog integrated circuits.

CO3: design differential amplifier using operational amplifier

CO4: analyze stability of operational design differential amplifier using operational amplifier amplifiers

CO5: apply frequency compensation techniques for amplifiers

CO6: design the different waveform generators using operational amplifiers.

CO7: design linear applications circuits such as summer, integrator, and differentiator etc using op-amplifiers.

CO8: design circuits such as log, comparator and multiplier etc using operational amplifiers.

CO9: analyze basic operation of PLL.

CO10: implement various applications of PLL

CO11: design and realize voltage regulators

CO12: realize analog filter circuits

Learning Resources

Text Books:

1. D.Roy Choudary, ShailB.Jain, “Linear Integrated circuits”, New Age International publishers, 2003.
2. RamakantA.Gayakward, “Op-amps and linear Integrated circuits”, LPE, 4th edition, Pearson Education.

Reference Books:

1. S.Salivahanan, V.S.KanchanaBhaaskaran “Linear Integrated circuits”, TMH, 2008.
2. David A. Bell, “Operational amplifiers and Linear ICs”, PHI, EEE, 1997

ECT11 Analog IC Applications	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	-	1	-	-	-	-	-	-	-	-	-	-
CO2	-	3	-	-	-	-	-	-	-	-	-	-	-	-
CO3	-	-	3	1	-	-	-	-	-	-	-	-	-	-
CO4	2	2	3	-	-	-	-	-	-	-	-	-	-	-
CO5	3	3	-	1	-	-	-	-	-	-	-	-	-	-
CO6	-	3	-	-	-	-	-	-	-	-	-	-	-	-
CO7	-	-	3	1	-	-	-	-	-	-	-	-	-	-
CO8	2	2	3	-	-	-	-	-	-	-	-	-	-	-
CO9	3	3	-	1	-	-	-	-	-	-	-	-	-	-
CO10	-	3	-	-	-	-	-	-	-	-	-	-	-	-
CO11	-	-	3	1	-	-	-	-	-	-	-	-	-	-
CO12	2	2	3	-	-	-	-	-	-	-	-	-	-	-

S.V. UNIVERSITY COLLEGE OF ENGINEERING: TIRUPATI – 517502

4-Year B.Tech Degree Programme

ECT12 ANTENNAS AND WAVE PROPAGATION

Lecture :	***3 hrs/ week***	***Internal Assessment:***	***20+20=40 Marks***
Tutorial :	***2 hrs/ week***	***Semester End Examination:***	***60 Marks***
Semester :	***V***	***Credits:***	***4***

Course Educational Objectives :

1. To strengthen the concepts of electromagnetic and create mathematical and analytical basis in the area of antennas and propagation
2. To develop the insight into radiation fundamentals and discuss the antenna performance parameters
3. To discuss current distribution along linear wire antennas and introduce concept of linear arrays and their patterns
4. To study the analysis of Traveling wave antennas
5. To discuss the mathematical models of surface wave and space wave propagation
6. To discuss the layers in ionosphere and mode of sky wave propagation

UNIT – I

Radiation Fundamentals: Definition of an antenna. Retarded potential. Relation between potentials and time varying fields. Far-field approximation. Radiation from a current element. Antenna parameters – Radiation pattern, Radiation intensity, Directivity, Gain, HPBW, Effective aperture, relation between directivity and maximum effective aperture

UNIT – II

Linear wire Antennas and Arrays: Current distribution on thin linear wire antennas. Half-wave dipole and quarter-wave monopole. Array of two point sources. Principle of pattern multiplication. Uniform linear arrays – Broad side and end fire cases.

UNIT – III

Traveling wave antennas – Long wire, V and Rhombic antennas, Folded dipole, Yagi-Uda array. Log-periodic dipole array. Helical antenna.

UNIT – IV

Surface wave and space wave propagation: Friis transmission formula. Salient features of Sommerfeld’s theory. Ground wave field strength calculation. Antennas located over a flat earth. Effect of curvature of earth. Refraction of radio waves in troposphere. Effective radius of earth. Radio horizon and maximum radio range.

UNIT – V

Sky wave propagation: Structure of ionosphere. Mechanism of wave reflection in ionosphere. Critical frequency. MUF. Virtual height. Skip distance. Effect of earth’s magnetic field. Faraday rotation

Course Outcomes:

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

CO1: To demonstrate basic understanding of the radiation of electromagnetic waves by antennas.

CO2: To develop expressions for antenna parameters and make practical calculations

CO3: To calculate the radiation resistance for quarter wave monopole and half wave dipole

CO4: To demonstrate the principle of pattern multiplication

CO5: To design broad side and end-fire arrays and sketch the patterns for sample cases

CO6: To design folded dipole and apply the same in the construction of yagi-uda array

CO7: To design V and Rhombic antennas and make sample calculations

CO8: To derive Friis transmission formula and solve some numerical examples

CO9: To apply the corrections to the propagation model taking the effect of earth curvature

CO10: To drive expressions for critical frequency and maximum usable frequency & make sample Calculations

Learning Resources

Text Books:

1. C.A.Balanis, “Antenna Theory”, John Wiley & sons publishers. (Ito III)
2. J.Griffiths, “Radio wave propagation and Antennas”, Prentice-Hall International. (IV and V).

ECT12 Antennas and Wave Propagation	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2
CO1	3	3		2								2		
CO 2	3	3	2	2								2		
CO 3	3	3										2		
CO4	3	3		2								2		
CO5	3	3	-	1	-	-	-	-	-	-	-	-	-	-
CO6	-	3	-	-	-	-	-	-	-	-	-	-	-	-
CO7	-	-	3	1	-	-	-	-	-	-	-	-	-	-
CO8	2	2	3	-	-	-	-	-	-	-	-	-	-	-
CO9	3	3	-	1	-	-	-	-	-	-	-	-	-	-
CO10	-	3	-	-	-	-	-	-	-	-	-	-	-	-

S.V. UNIVERSITY COLLEGE OF ENGINEERING: TIRUPATI – 517502

4-Year B.Tech Degree Programme

ECT13 ELECTRONIC MEASUREMENTS AND INSTRUMENTATION

Lecture :	***3hrs/ week***	***Internal Assessment:***	***20+20=40 Marks***
Tutorial :	***-***	***Semester End Examination:***	***60 Marks***
Semester :	***V***	***Credits:***	***3***

Course Educational Objectives:

1. To understand the different types of errors in the measurement process.
2. To understand the operating principles and design of DC ammeters, voltmeters and ohm meters.
3. To understand the internal diagrams of different types AC voltmeters.
4. To understand the internal diagrams of CRO.
5. To design the electrostatic deflection systems.
6. To understand working of special purpose oscilloscopes.
7. To design various instruments like electronic voltmeters, Q-meters and Multimeters.
8. To design different devices like DC and AC bridges, wave analyzers and spectrum analyzers.
9. To understand &design of various digital devices like digital volt meters, universal counters, etc.
10. To understand the selection of a transducer for measurement of physical parameters like displacement, pressure, temperature, strain etc.

UNIT – I

Measurement and Error: Definitions, accuracy and precision, types of errors. DC Ammeters, DC Voltmeters, Series type ohmmeter, Shunt type ohmmeter. AC Voltmeter using rectifiers, True RMS responding voltmeter.

UNIT – II

Cathode Ray Oscilloscopes : Motion of electron in electric field and in magnetic field – Block diagram of CRO, CRT, Electrostatic deflection sensitivity – Vertical and Horizontal deflection systems – Principle of operation of dual beam, dual trace, sampling and storage CROs - Measurements with CRO (voltage, current, time, frequency, phase angle, lissajous figures).

UNIT – III

Analog Instruments – Transistor voltmeter, micro voltmeter (chopper type) - DC differential voltmeter - AC voltmeters - Multimeter - Q meter and measurement methods.

Bridges: Wheatstone, Maxwell, Hay and Schering bridges.

Wave analyzers(AF & RF) - Harmonic distortion analyzers – Spectrum analyzer.

UNIT – IV

Digital instruments – Digital voltmeters(Ramp, Dual slope, stair case, successive approximation types) Digital multimeter, universal counter, Digital tachometer, Digital phase meter IEEE 488 Bus.

UNIT – V

Transducers – Classification and selection of transducers – strain gauges – Temperature measurement (resistance thermometer, thermo couples and thermistors) LVDT – Peizo electric transducer.

Course Outcomes: At the end of the course the student will be

CO1: demonstrate the importance of various errors in the measurement process.
CO2: design of various devices like DC Ammeter and DC voltmeters using PMMC, ohmmeters.
CO3: demonstrate internal structure, working and design of various electronic devices like true RMS responding voltmeters, AC voltmeters.
CO4: demonstrate internal structure, working and design of various subsystems in CRO.
CO5: design electrostatic deflection systems.
CO6: understand the working principles of special purpose oscilloscopes.
CO7: design different electronic devices like Multimeters and Q-meters, etc.
CO8: design DC and AC bridges.
CO9: understand audio & radio frequency wave analyzers and spectrum analyzers.
CO10: understand the working of different Digital voltmeters.
CO11: understand the working of different digital instruments like universal counter, tachometers etc.
CO12:select a transducer for measurement of various physical parameters like displacement, pressure,
temperature, strain etc.

Learning Resources

Text Books:

1.H.S.Kalsi, “Electronic Instrumentation” TMH, 1995.
2. Helfric and Cooper, “Modern Electronic Instrumentation and measurement techniques”, PHI, 1995.
3. A.K.Sawhney , " Electrical and electronic measurements and instrumentation", Danapa Rai& Co.,18thedition., 2007.

ECT13 Electronic measurements and instrumentation	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO8	P O 9	PO 10	PO 11	PO1 2	PS O1	PS O2
CO1	2	2	2	1	1	1	1	2	1	1	1	2		
CO2	2	2	2	2	1	1			1	1	1	2		
CO3	2	1	1	1		1			1	1	2	2		
CO4	2	2	2	1		1			1	1	2	2		
CO5	3	3	-	1	-	-	-	-	-	-	-	-	-	-
CO6	-	3	-	-	-	-	-	-	-	-	-	-	-	-
CO7	-	-	3	1	-	-	-	-	-	-	-	-	-	-
CO8	2	2	3	-	-	-	-	-	-	-	-	-	-	-

CO9	3	3	-	1	-	-	-	-	-	-	-	-	-	-
CO10	-	**3**	-	-	-	-	-	-	-	-	-	-	-	-
CO11	**2**	**2**	**3**	-	-	-	-	-	-	-	-	-	-	-
CO12	3	3	-	1	-	-	-	-	-	-	-	-	-	-

S.V. UNIVERSITY COLLEGE OF ENGINEERING: TIRUPATI – 517502

4-Year B.Tech Degree Programme

ECT14 DIGITAL COMMUNICATIONS

Lecture :	*3hrs/ week*	*Internal Assessment:*	*20+20=40 Marks*
Tutorial :	*2 hrs/ week*	*Semester End Examination:*	*60 Marks*
Semester :	*V*	*Credits:*	*4*

Course Educational Objectives :

1. To develop the theoretical aspects of DCS, is essential to understand today's multi disciplinary applications.
2. To present the essential digital communication concepts by understanding the elements of DCS, fundamental concepts of sampling theorem and coding.
3. To discuss the different types of digital pulse and band pass signaling techniques.
4. To emphasize the analysis of performance of DCS in the presence of noise, by calculating the probability of error for matched filter Rx and various digital modulation techniques.
5. To understand the inform capacity of a channel by studying the concept of inform theory.
6. To know the efficient representation sources, by providing source coding techniques.
7. To provide knowledge about error detection and correction, different types of channel coding techniques such as linear block codes cyclic code, and convolution codes are to be discussed.

UNIT – I

Pulse Digital Modulation: Elements of digital communication systems, advantages of digital communication systems, Elements of PCM: Sampling, Quantization & Coding, Quantization error, Comparing in PCM systems. Differential PCM systems (DPCM).Delta modulation, its draw backs, adaptive delta modulation, comparison of PCM and DM systems, noise in PCM and DM systems.

UNIT – II

Digital Modulation Techniques: Introduction, ASK, FSK, PSK, DPSK, DEPSK, QPSK, M-ary PSK, ASK, FSK, similarity of BFSK and BPSK.

UNIT – III

Data Transmission : Digital PAM signals, Base band signal receiver, probability of error, the optimum filter, matched filter, probability of error using matched filter, coherent reception, non-coherent detection of FSK, calculation of error probability of ASK, BPSK, BFSK,QPSK

UNIT – IV

Information Theory: Discrete messages, concept of amount of information and its properties. Average information, Entropy and its properties. Information rate, Mutual information and its properties.Source Coding: Introductions, Advantages, Shannon's theorem, Shanon-Fanocoding, Huffman coding, efficiency calculations, channel capacity of discrete and analog Channels, capacity of a Gaussian channel, bandwidth –S/N trade off.

UNIT – V

Spread Spectrum Modulation: Pseudo-noise Sequences, Generation and characteristics, Direct Sequence Spread Spectrum Modulation, Frequency Hopping Spread Spectrum Modulation, Comparison of Spread Spectrum Modulation, Applications.

Course Outcomes: At the end of the course the student will be able to

CO1: Understand the theoretical aspects of digital communication system, useful for today'smultidisciplinary applications.

CO2: Learn the elements of digital communications systems, fundamental concepts of sampling theorem, quantization and coding.

CO3: Understand the different types of digital pulse and band pass modulation techniques.

CO4: Able to calculate probability of error for method filter Rx and various digital modulationtechniques to analyze the performance of DCS in the pressure of noise.

CO5: Able to do the source coding problems and understand the compact description of sources.

CO6: Able to solve the various channel coding problems and analyze the performance of vicariouscoding techniques.

Learning Resources

Text Books:

1. Taub-Schilling and GoutamSaha, "Principles of Communication Systems", 3rd Edition, TATA McGraw-Hill.
2. "R.P.Singh&S.D.Sapre" – Communication systems, Analog & Digital, Tata McGraw Hill.
3. J.S.Chitode, " Digital Communication*", Technical* Publications.
4. "Simon Haykin" - Digital communications, John Wiley, 2005.

ECT14 DIGITAL COMMUNICATIONS	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	PO9	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	2	2	2	1	1	1	1	2	1	1	1	2		
CO2	2	2	2	2	1	1			1	1	1	2		
CO3	2	1	1	1		1			1	1	2	2		
CO4	2	2	2	1		1			1	1	2	2		
CO5	3	3	-	1	-	-	-	-	-	-	-	-	-	-
CO6	-	**3**	-	-	-	-	-	-	-	-	-	-	-	-

S.V. UNIVERSITY COLLEGE OF ENGINEERING: TIRUPATI – 517502

4-Year B.Tech Degree Programme

ECT15 COMPUTER ORGANISATION

Lecture :	***3 hrs/ week***	***Internal Assessment:***	***20+20=40 Marks***
Tutorial :	***-***	***Semester End Examination:***	***60 Marks***
Semester:	***V***	***Credits:***	***3***

Course Educational Objectives :

1. To understand the basic structure and fundamentals of computer.
2. To get the basic idea on RTL, Micro operations and micro programmed control.
3. To understand the flow of computer arithmetic operations.
4. To understand the concepts of pipeline, vector processing and multiprocessing

UNIT – I

Basic Structure of Computers: Computer types, Functional units, basic operational concepts, Bus structures, Data types, software: Languages and Translators, Loaders, Linkers, Operating systems.

Addressing Methods and Machine Program Sequencing: Memory locations – addresses and encoding of information – main memory operations – Instruction formats and instruction sequences – Addressing modes and instructions – Simple input programming – pushdown stacks – subroutines.

UNIT – II

Register Transfer and Micro Operations: Register transfer Language, Register transfer, Bus and Memory Transfers, Arithmetic Micro operations, Logic Micro operations, shift Micro operations, Arithmetic Logic Shift Unit.

Central Processing Unit: Stack organization, instruction formats, Addressing modes, Data transfer and manipulation, Execution of a complete instruction, Sequencing of control signals, Program Control.

UNIT – III

Micro-Programmed Control: Control Memory, address Sequencing, Micro Programme Example, Design of Control Unit.

Computer Arithmetic: Addition and Subtraction, Multiplication Algorithms, Division Algorithms, Floating Point Arithmetic Operations, Decimal Arithmetic Unit, Decimal Arithmetic Operation

UNIT – IV

Input-Output Organization: Peripheral Devices, Input-Output Interface, Asynchronous Data Transfer, Modes of Transfer, Priority Interrupt, Direct Memory Access (DMA), Input-Output Processor (IOP), Serial Communication.

Memory Organization: Memory hierarchy, main memory, auxiliary memory, Associative memory, Cache memory, Virtual memory, Memory management hardware**.**

UNIT – V

Pipeline and Vector Processing: Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline, RISC Pipeline Vector Processing, Array Processors.

Multi-Processors: Characteristics of Multiprocessors, Interconnection Structures, Interprocessor Arbitration, Interprocessor Communication and Synchronization, Cache Coherence.

Course Outcomes: At the end of the course the student will be able to

CO1: Able to describe the basic structure and fundamentals of computer.

CO2: Able to develop the RTL, Micro operations and micro programmed control.
CO3: Design the computer arithmetic logic units to perform different operations

Learning Resources

Text Books:

1. Computer Organization by V.C. Hemacher, ZvonksG.Vranesic and SafatG.Zaky, Tata McGraw Hill (TMH) 2002.
2. Computer system Architecture by M. Morris Mano, Prentice Hall of India (PHI), Third edition.
3. Computer organization and programming by William Stallings Prentice Hall of India(PHI) Seventh Edition, Pearson Education(PE) Third edition, 2006.

ECT15 COMPUTER ORGANISATION	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	PO9	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	3	2	1	1	1				1			2		
CO2	3	3	2	2	1				1			2		
CO3	2	2	2	2	1				1			2		

S.V. UNIVERSITY COLLEGE OF ENGINEERING: TIRUPATI – 517502
4-Year B.Tech Degree Programme
ECP04 DIGITAL CIRCUITS LAB

Practical :	***3 hrs/ week***	***Internal Assessment:***	***20+20=40 Marks***
Tutorial :	***-***	***Semester End Examination:***	***60 Marks***
Semester:	***V***	***Credits:***	***2***

Course Educational Objectives :
1. To understand the linear and non-linear wave shaping
2. To design the logic gates and flip-flops using Transistors and Diodes
3. To Design the Pulse Generators
4. To understand the relaxation oscillators and sweep circuits

List Of Experiments:
1. Logic Gates And Simulation Of Gates Using Universal Gates
2. Flip – Flops
3. Counters
4. Four Channel Data Selector
5. Binary Adders And Subtractors
6. Diode Clipper Circuits
7. Schmitt Trigger
8. AstableMultivibrator Using BJT
9. UJT Sweep Generator
10. Monostable And AstableMultivibrator Using 555 Timer

Course Outcomes: At the end of the course the student will be able to
CO1: Able to differentiate liner and non-linear wave shaping
CO2: Able to design logic gates and flip-flops
CO3: Able to design Actable, Monostable and BistableMultivibrators.
CO4: Able to design Schmitt trigger, UJT Relaxation Oscillators and Sweep circuits

Learning Resources

Text books:

ECP04 DIGITAL	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	PO	**PO1**	**PO1**	**PO1**	**PSO**	**PSO**

CIRCUITS LAB									9	0	1	2	1	2
CO1	2	2	3	3	3	_	_	_	3	_	_	_	3	3
CO2	3		2	2	3	_	_	_	2	_	_	_	3	3
CO3	2	2	3	3	3	_	_	_	2	_	_	_	2	3
CO4	2	2	3	3	3	_	_	_	2	_	_	_	2	3

S.V. UNIVERSITY COLLEGE OF ENGINEERING: TIRUPATI – 517502

4-Year B.Tech Degree Programme

ECP05 DIGITAL COMMUNICATION LAB

Practical :	***3hrs/ week***	***Internal Assessment:***	***20+20=40 Marks***
Tutorial :	***--***	***Semester End Examination:***	***60 Marks***
Semester :	***V***	***Credits:***	***2***

.

Course Educational Objectives :

List of Experiments:

1. Error Control Coding Techniques
2. A) Study Of Framer In Time Division Multiplexing
   B) Study Of Marker In Time Division Multiplexing
3. A) Delta Modulation And Demodulation
   B) Slope Overload And Increased Integration Gain
4. A) Quadrature Phase Shift Keying Modulation Techniques
   B) Differential Quadrature Phase Shift Keying Modulation Techniques
   C) Constellation Diagram & Study Of Bandwidth Efficiency Of QPSK
5. A) Pulse Amplitude Modulation Of Digital Data For Base Band Transmission
   B) Calculation Of Noise Margin And Timing Jitter
   C) Bit Error Rate
6. A) Adaptive Delta Modulation & CVSD
   B) Sigma Delta Modulation And Demodulation
7. Direct Sequence Spread Spectrum
8. Continuous Phase Frequency Shift Keying
9. Frequency Hop Spread Spectrum
10. Study On Message Scramblers And Unscramblers

Course Outcomes:

At the end of this course students will have the ability to

1. Understand the Digital communication System and able to analyse the different Digital modulation techniques.
2. Understand the concepts of baseband digital modulation schemes and Inter Symbol Interference.
3. Analyze Signal space concepts, probability of error performance of various digital binary modulation systems and are able to design digital communication systems.
4. Design a system with Error correcting codes by learning Block Codes, Cyclic Codes and Convolutional Codes

Learning Resources

Text books:

ECP05 DIGITAL COMMUNICATION LAB	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	PO9	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	-	-	3	2	1	-	-	-	-	-	1	-	3	-
CO2	-	-	3	2	1	-	-	-	-	-	1	-	3	-
CO3	-	-	3	2	2	-	-	-	-	-	1	-	3	-
CO4	-	-	3	2	2	-	-	-	-	-	1	-	3	-

S.V. UNIVERSITY COLLEGE OF ENGINEERING: TIRUPATI – 517502
4-Year B.Tech Degree Programme

ECP06 ***ELETRONIC MEASUREMENTS LAB***

Lecture :	***2hrs/ week***	***Internal Assessment:***	***20+20=40 Marks***
Tutorial :		***Semester End Examination:***	***60 Marks***
Semester:	***V***	***Credits:***	***1***

Course Educational Objectives:	1. To understand the definitions, characteristics of instrumentation and measurements. 2. To calibrate different types of meters. 3. To understand the function of bridges. 4. To study the characteristics of transducers and its functions. 5. To get acquitted with the usage of special purpose instruments.

List of Experiment:

1. Determination of inductance using Anderson's bridge.
2. Calculation of unknown Resistance using Kelvin's double bridge.
3. Measurements of inductance using Maxwell's bridge.
4. Measurements of capacitance using Schering Bridge.
5. Study the characteristics of instrumentation Amplifiers.
6. Characteristics of photovoltaic cell.
7. Characteristics of thermocouple.
8. Characteristics of LVDT.
9. Measurements of pressure.
10. Characteristics of load cell.
11. Strain measurements.

12. Characteristics of Torque measurements.

Course Outcomes: At the end of the course the student will be able to

CO1: The features of Electronics instrumentation are familiarized.

CO2: Different types of meters for calculation of unknown parameters like inductances, Resistances and Capacitance are studied.

CO3: Understand the characteristics of transducers and instrumentation Amplifiers.

CO4: To acquire skills on using different measuring devices.

Learning Resources

Text books

ECP06 ELETRONIC MEASUREMENTS LAB	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	PO9	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	3	3	2	1	3	-	3	-	1	3	2	3	3	2
CO2	3	3	1	3	3	2	2	-	3	2	1	3	3	1
CO3	2	1	1	-	3	2		3	3	2	3	2	1	1
CO4	1	1	1	-	1	2	3	3	3	1	3	1	1	1

VI Semester

S.V. UNIVERSITY COLLEGE OF ENGINEERING: TIRUPATI – 517502
4-Year B.Tech Degree Programme

MET43 MANAGEMENT SCIENCE

Lecture :	***3hrs/ week***	***Internal Assessment:***	***20+20=40 Marks***
Tutorial :	***---***	***Semester End Examination:***	***60 Marks***
Semester :	***VI***	***Credits:***	***3***

Course Educational Objectives :

1. Understand the concepts of management, administration and organization.
2. To apply the concept of work study in the day to day life.
3. To understand the concepts of corporate planning.
4. To understand the importance of Human Resources, Marketing and Production managements
5. To understand the concepts the strategic planning and the techniques.

UNIT – I

Concept of Management – Administration, Organization – Functions of Management, evolution of management thought – Organization, principles of organization – Types – Organization charts – Managerial objectives and social responsibilities.

UNIT – II

Corporate planning – Mission, Objectives, and programs, SWOT analysis – Strategy formulation and implementation – Plant location and Plant layout concepts – Production control.

UNIT – III

Human resources management – Manpower planning – Personnel management – Basic functions of personnel management job evaluation and merit rating – Incentive plans- Marketing, Functions of marketing.

UNIT – IV

Productivity - Batch and mass production – Work study – Basic procedure involved in method study - work measurement – Elements of cost – Methods of calculation of overhead charges – Depreciation

UNIT – V

Network Analysis to project management – PERT/CPM – Application of network techniques to engineering problems. – Cost Analysis – Project crashing.

Course Outcomes: At the end of the course the student will be able to

CO1: Able to work more creatively.

CO2: Able to work in groups

CO3: Presenting ideas more effectively and efficiently in formal and informal ways.

CO4: Development of fundamental rethinking and radical redesign in the organizations.

CO5: Applying the ideas of the course to identifying and solving real world problems.

CO6: Development of Group Dynamic Skills

Learning Resources

Text Books:

1. Principles of management by Koontz and O Donnel.
2. Industrial Engineering and Management by O.P.Khanna.
3. Marketing by Philips Kother
4. PERT/CPM by L.S.Srinath
5. Business policy by Gluck (TMH)

MET43 MANAGEMENT SCIENCE	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3		3	2	1	1	2	2	2	3	3	3		3
CO2	3		3	2	1	1	2	2	2	3	3	3		3
CO3	3		3	2	1	1	3	2	2	3	3	3		3
CO4	3		3	3	1	1	3	2	2	3	3	3		3
CO5	3	3	-	1	-	-	-	-	-	-	-	-	-	-
CO6	-	3	-	-	-	-	-	-	-	-	-	-	-	-

S.V. UNIVERSITY COLLEGE OF ENGINEERING: TIRUPATI – 517502
4-Year B.Tech Degree Programme

ECT16 DIGITAL IC DESIGN APPLICATIONS

Lecture :	***3 hrs/ week***	***Internal Assessment:***	***20+20=40 Marks***
Tutorial :	***---***	***Semester End Examination:***	***60 Marks***
Semester :	***VI***	***Credits:***	***3***

Course Educational Objectives :

1. To introduce the VHDL language fundamentals and prepare the students to write code for low-level to high-level circuits.
2. To discuss the types of electronic data converters.
3. To study the steps in VHDL design flow.
4. To develop the code for some combinational circuits.
5. To develop the code for some sequential circuits.
6. To study the design aspects of ROMs and RAMs and their applications

UNIT – I

Electronic data converters: D/A converters, characteristic parameters – DAC designs, DAC ICs – Conversion errors – performance measurements.

A/D converters – characteristic parameters – ADC design ADC ICs – conversion errors – ADC testing.

UNIT – II

The VHDL Hardware Description Language: Design flow, program structure, types and constants, functions and procedures, libraries and packages.

The VHDL design elements: Structural design elements, behavioral design elements, time dimension and simulation synthesis.

UNIT – III

Combinational Logic Design: Decoders, encoders, three state devices, multiplexers and demultiplexers, Code Converters, EX-OR gates and parity circuits, comparators, adders &subtractors, ALUs, Combinational multipliers, VHDL models for the above ICs.

UNIT – IV

Design Examples (using VHDL): Barrel shifter, comparators, floating-point encoder, and dual parity encoder.

Sequential logic Design: Latches & flip flops, PLDs, counters, shift register and their VHDL models, Synchronous design methodology.

UNIT – V

ROMs: Internal Structure, 2D – decoding commercial types, timing and applications.

Static RAMs: Internal Structure, timing and standard SRAMs, Synchronous SRAMs.

Dynamic RAMs: Internal Structure, timing and standard DRAMs, Synchronous DRAMs.

Course Outcomes: At the end of the course the student will be able to

CO1: design R-2R and Weighted resistors with some numerical problems

CO2: design comparator type, successive approximation type etc. A/D converters and study their performance

CO3: get familiarized with structural and behavioral description styles along with some examples

CO4: get familiarized with basic declarations like entity, process etc. with some examples

CO5: write the code for lower and higher order MUX/DEMUX

CO6: write the code for encoders/decoders and code converters

CO7: write the code for sequential circuits like FFs, converters and shift registers

CO8: design ROMs for given specifications

CO9: design SRAMS and DRAMS for given specifications

CO10: write the code for barrel shifter and floating point encodes

CO11: get familiarized with timing and synchronization aspects in the design of ROMs and RAMs.

Learning Resources

Text Books:

1. Linear Integrated Circuits, D. Roy Choudary – Wiley eastern publications (1994).
2. Digital Design Principles & Practices - John F. Wakerly, Pearson Education, 3rd Edition,2005
3. VHDL Primer - J. Bhaskar, Pearson education, 3rd Edition.

ECT16 DIGITAL IC DESIGN APPLICATIONS	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PO11	PO 12	PSO 1	PSO2
CO1	1	2	-	-	-	-	-	-	-	-	-	-	-	-
CO2	-	-	2	1	-	-	-	-	-	-	-	-	-	-
CO3	-	-	-	2	-	1	-	-	-	-	-	-	-	-
CO4	-	-	-	2	-	-	-	-	-	1	-	-	-	-
CO5	3	3	-	1	-	-	-	-	-	-	-	-	-	-
CO6	-	3	-	-	-	-	-	-	-	-	-	-	-	-
CO7	-	-	3	1	-	-	-	-	-	-	-	-	-	-
CO8	2	2	3	-	-	-	-	-	-	-	-	-	-	-
CO9	3	3	-	1	-	-	-	-	-	-	-	-	-	-
CO10	-	3	-	-	-	-	-	-	-	-	-	-	-	-
CO11	-	-	3	1	-	-	-	-	-	-	-	-	-	-

S.V. UNIVERSITY COLLEGE OF ENGINEERING: TIRUPATI – 517502
4-Year B.Tech Degree Programme

ECT17 VLSI DESIGN

Lecture : 3 hrs/ week — ***Internal Assessment: 20+20=40 Marks***
Tutorial : --- — ***Semester End Examination: 60 Marks***
Semester : VI — ***Credits: 3***

Course Educational Objectives :

1. To provide the basic fundamentals of fabrication technology, generations of IC and speed, power consumptions of various fabrication technologies.
2. To understand the knowledge of electrical properties of MOS circuits.
3. To learn the design concepts of stick diagrams, layouts for various MOS technologies.
4. To understand the concepts of design rules, scaling, subsystem design semiconductor IC design.
5. To understand the synthesis, simulation design verification tools, CMOS testing

UNIT – I

Introduction: Brief Introduction to IC technology – MOS, PMOS, NMOS, CMOS &BiCMOS technologies – Oxidation, Lithography, Diffusion, Ion implantation, Metallization, Encapsulation, Probe testing, Integrated Resistors and Capacitors.

Basic Electrical Properties of MOS and BiCMOSCircuits:I_{ds} – V_{ds} relationships, MOS transistor threshold Voltage, g_m, g_{ds}, figure of merit ω_0; Pass transistor, NMOS Inverter, Various pull ups, CMOS Inverter analysis and design, Bi-CMOS Inverters.

UNIT – II

Basic Circuit Concepts: Sheet Resistance R_s and its concepts to MOS, Area Capacitance calculations, Inverter Delays, Driving large Capacitive Loads, Wiring Capacitances, Fain-in and fan-out.

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

UNIT – III

Gate level Design: Logic gates and other complex gates, Switch logic, Alternate gate circuits.

Physical Design: Floor-Planning, Placement, routing, Power delay estimation, Clock and Power routing.

UNIT – IV

Subsystem Design: Shifters, Adders, ALUs, Multipliers, Parity generators, Comparators, Counters, High Density Memory Elements.

VLSI Design styles: Full-custom, Standard Cells, Gate-arrays, FPGAs, CPLDs and Design Approach for Full-custom and Semi-custom devices.

UNIT – V

VHDL Synthesis: VHDL Synthesis, Circuit Design Flow, Circuit Synthesis, Simulation, Layout, Design capture tools, Design Verification Tools.

Test and Testability: Fault-modeling and simulation, test generation, design for testability, Built-in-self-test.

Course Outcomes: At the end of the course the student will be able to

CO1: History and perspective on IC development. And an ability to explain the chip technology scaling process

CO2:use mathematical methods and circuit analysis models in analysis of CMOS digital electronic circuits, including logic components and their interconnect

CO3: calculate electrical properties of MOS circuits

CO4: apply CMOS technology-specific layout rules in the placement and routing of transistors and interconnect, & to verify the functionality, timing, power, and parasitic effects.

CO5: apply design rules.

CO6: design various gates, adders, Multipliers, Memories, using stick diagrams, layouts.

CO7: analyze the characteristics of CMOS circuit in comparing CMOS 2.5 micron process and emerging nanometer-scale electronic circuit technologies and processes.

CO8: demonstrate semiconductor IC design such as PLA's, FPGAs and CPLDs.

CO9: Be capable of designing and implementing combinational and sequential CMOS digital circuits and optimize them with respect to different constraints, such as area, delay, power, or reliability.

CO10: design, simulate, and develop fabrication specs for CMOS VLSI digital circuits.

CO11: Be capable of implementing a complete design verification process using computer automated tools for layout, extraction, simulation, and timing analysis.

CO12: complete a significant VLSI design project having a set of objective criteria and design constraints

Learning Resources

Text

1. Essentials of VLSI circuits and systems – Kamran Eshraghian, Eshraghian Douglas and A. Pucknell, PHI, 2005 Editi

Books:

2. Principles of CMOS VLSI Design – Weste and Eshraghian, Pearson Education, 1999.
3. Modern VLSI Design – Wayne Wolf, Pearson Education, 3rd Edition, 1997.
4. Chip Design for Submicron VLSI: CMOS layout and Simulation, - John P. Uyemura, Thomson Learning.
5. Introduction to VLSI Circuits and Systems – John P. Uyemura, John wiley, 2003.
6. Digital Integrated Circuits – John M. Rabaey, PHI, EEE, 1997.

ECT17 VLSI DESIGN	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	2	2	–	–	–	–	–	–	–	–	–	–	-	-
CO2	–	2	2	–	–	–	–	–	–	–	–	–	-	-
CO3	–	–	2	1	1	–	–	–	–	–	–	–	-	-
CO4	–	–	–	–	–	–	–	–	1	1	–	–	-	-
CO5	3	3	-	1	-	-	-	-	-	-	-	-	-	-
CO6	-	**3**	-	-	-	-	-	-	-	-	-	-	-	-
CO7	-	-	**3**	**1**	-	-	-	-	-	-	-	-	-	-
CO8	**2**	**2**	**3**	-	-	-	-	-	-	-	-	-	-	-
CO9	3	3	-	1	-	-	-	-	-	-	-	-	-	-
CO10	-	**3**	-	-	-	-	-	-	-	-	-	-	-	-
CO11	-	-	**3**	**1**	-	-	-	-	-	-	-	-	-	-
CO12	**2**	**2**	**3**	-	-	-	-	-	-	-	-	-	-	-

S.V. UNIVERSITY COLLEGE OF ENGINEERING: TIRUPATI – 517502

4-Year B.Tech Degree Programme

ECT18 MICROPROCESSOR AND INTERFACING

Lecture :	*3 hrs/ week*	*Internal Assessment:*	*20+20=40 Marks*
Tutorial :	*2 hrs/ week*	*Semester End Examination:*	*60 Marks*
Semester:	*VI*	*Credits:*	*4*

Course Educational Objectives :

1. To understand the basic microprocessors architecture and its functionality
2. To design and implement Microprocessor based systems
3. To make the communication in between different processors and other peripherals
4. To design and analyze the date of flow in between basic microprocessor and microcontroller components

UNIT – I

Development of microprocessors, 8086 microprocessor – Architecture, Instruction set, Addressing modes, Interrupt system. Minimum mode 8086 system and timings, Maximum mode 8086 system and timings.

UNIT – II

Assembler directives, Assembly language programs (8086) with Assembler directives for addition, subtraction, multiplication, division etc., sorting and searching, bit manipulation, Programs using look–up tables, Delay subroutine. Stages of software development.

UNIT – III

Data transfer schemes – Synchronous, Asynchronous, Interrupt driven and DMA type schemes, Programmable interrupt controller (8259) and its interfacing, Programmable DMA controller(8257) and its interfacing, Programmable Interval Timer (8253) and its interfacing, Programmable communication Interface (8251 USART) and its interfacing.

UNIT – IV

Memory interfacing to 8086 – Interfacing various types of RAM and ROM chips, 8255 PPI and its interfacing, ADC and DAC Interfacing, Data acquisition, Waveform generation, Traffic light controller, Stepper motor control, temperature measurement and control.

UNIT – V

8051 Microcontroller – Architecture, Register set, Instruction set, Interrupt structure, timer and serial port operations, Memory and I/O interfacing, Simple Assembly language programs.

Course Outcomes: At the end of the course the student will be able to

CO1: Understand the basic microprocessors architecture and its functionality

CO2: design and implement microprocessor based digital systems.

CO3: make communication in between microprocessor based systems and peripherals.

CO4:Develop the digital systems to perform real time applications by using microcontrollers

Learning Resources

Text Books:

1. A.K. Ray and K.M. Bhurchandi, “Advanced Microprocessors and Peripherals”, TMH.
2. Douglas V. Hall, “Microprocessors and interfacing: Programming and hardware”, TMH, 2nd Edition.
3. Kenneth J Ayala, “The 8051 Micro Controller Architecture, Programming and Applications”, Pernam International /

Thomson Publishers, 2nd Edition, 2005.

4. Ajay V. Deshmukh, “Microcontrollers – theory applications”, Tata McGraw-Hill Company

ECT18 MICROPROCESSOR AND INTERFACING	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	1	–	2	–	–	2	–	–	–	–	–	–	–	–
CO2	–	2	–	1	–	2	–	–	–	–	–	–	–	–
CO3	–	2	2	1	–	2	–	–	–	–	–	–	–	–
CO4	–	2	2	1	–	2	–	–	–	–	–	–	–	–

S.V. UNIVERSITY COLLEGE OF ENGINEERING: TIRUPATI – 517502
4-Year B.Tech Degree Programme

ECT19 MICROWAVE TECHNIQUES

Lecture :	***3hrs/ week***	***Internal Assessment:***	***20+20=40 Marks***
Tutorial :	***---***	***Semester End Examination:***	***60 Marks***
Semester :	***VI***	***Credits:***	***3***

Course Educational Objectives :

1. To study special purpose microwave Tube devises and its applications in transmitters and receivers.
2. To understand different semiconductor Microwave device characteristics , construction and applications.
3. To study different types of microwave components and their applications
4. To study different parameters and their measurements at MW frequencies
5. To study about Mw Integrated circuits and antennas used at MW frequencies.

UNIT – I

Tubes : Klystron amplifier, Reflex klystron oscillator, Traveling wave tube amplifier and magnetron oscillator

UNIT – II

Semiconductor devices: Tunnel diode, GUNN diode, IMPATT diode, PIN diode, Crystal diode, Schottky Barrier diode, Varactor diode and parametric amplifier, MASER, microwave transistors and FET's.

UNIT – III

Components: Cavity resonators, attenuators, Tees, bends, corners, windows. Coupling probes and loops, phase shifters, rotary joints, Directional couplers, matching elements, Isolators and circulators, S-parameters of networks

UNIT – IV

Measurements: Measurement of frequency, power, VSWR, Impedance, Reflection coefficient, Attenuation constant and dielectric constant, S-parameters and Q of a cavity.

UNIT – V

MIC's and Antennas: Advantages of MIC's, Hybrid MIC's, Strip lines and microstrip lines, Monolithic MIC's. Parabolic reflector antennas, passive reflector, Horn and lens antennas.

Course Outcomes: At the end of the course the student will be able to

CO1: apply knowledge of microwave engineering.

CO2: design and construct experiments as well as to analyze and interpret the data of microwave experiments

CO3: design mw transmitter And receiver system to meet desired needs within constraints such as economic, environmental, social, political, ethical and safety.

CO4: function on multi- disciplinary teams.

CO5: identify, formulate, and solve Mw engineering related problems.

CO6: understanding of professional and ethical responsibility.

CO7: communicate effectively

CO8: the broad idea of microwave engineering to understand the impact of it in social context

CO9: a recognition of the need for and an ability to engage in life long learning

CO10: a knowledge of contemporary issues

CO11: an ability to use the techniques, skills, and modernize mw engineering tools necessary for practice

Learning Resources

Text Books:

1. Samuel Y.Liao, “Microwave devices and circuits”, Prentice-Hall, 1999.
2. M.Kulkarni, “Microwave and Radar Engineering”, Umesh publications, 1998.
3. Annapurna Das and SisirK.Das, “Microwave Engineering” Tata McGraw-Hill, 2000.

ECT19 MICROWAVE TECHNIQUES	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1	–	2	–	–	2	–	–	–	–	–	–	–	–
CO2	–	2	–	1	–	2	–	–	–	–	–	–	–	–
CO3	–	2	2	1	–	2	–	–	–	–	–	–	–	–
CO4	–	2	2	1	–	2	–	–	–	–	–	–	–	–
CO5	3	3	-	1	-	-	-	-	-	-	-	-	-	-
CO6	-	**3**	-	-	-	-	-	-	-	-	-	-	-	-
CO7	-	-	**3**	**1**	-	-	-	-	-	-	-	-	-	-
CO8	**2**	**2**	**3**	-	-	-	-	-	-	-	-	-	-	-
CO9	3	3	-	1	-	-	-	-	-	-	-	-	-	-
CO10	-	**3**	-	-	-	-	-	-	-	-	-	-	-	-
CO11	-	-	**3**	**1**	-	-	-	-	-	-	-	-	-	-

S.V. UNIVERSITY COLLEGE OF ENGINEERING: TIRUPATI – 517502

4-Year B.Tech Degree Programme

ECT20 DIGITAL SIGNAL PROCESSING

Lecture :	***3 hrs/ week***	***Internal Assessment:***	***20+20=40 Marks***
Tutorial :	***2 hrs/ week***	***Semester End Examination:***	***60 Marks***
Semester :	***VI***	***Credits:***	***4***

Course Educational Objectives:

1. The objective of this course is to provide fundamental knowledge of Digital signal processing techniques and applications.
2. To study DFT and implementation of DFTs using Fast Fourier Transform.
3. To understand the various realizations of filters, algorithms for calculating transform.
4. Provide a thorough understanding and working knowledge of design, implementation, analysis and comparison of digital filters for processing of discrete time signals.
5. To understand concepts of sampling rate conversion and its applications.

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 and Signal Transmission Through Linear Systems

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 Impulse function and Signum function, Introduction to Hilbert Transform.

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

UNIT – III

Sampling: Representation of a Continuous-Time Signal by Its Samples - Sampling Theorem, Reconstruction of a Signal from Its Samples Using Interpolation. Effect of under sampling, Aliasing.
Introduction to Discrete Time Signals & Systems: Linear shift invariant systems, Stability and Causality , Linear Constant Coefficient Difference Equations, DTFT, Properties of DTFT, Analysis of Discrete systems using DTFT**.**

UNIT – IV

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.

UNIT – V

Laplace Transforms and Z-Transforms

Laplace Transforms: Review of Laplace Transforms (L.T), Partial fraction expansion, Inverse Laplace Transform, Concept of Region of Convergence (ROC) for Laplace Transforms, Constraints on ROC for various classes of signals, Properties of L.T, Relation between L.T and F.T of a signal, Laplace Transform of certain signals using waveform synthesis.

Z–Transforms: Fundamental difference between Continuous and Discrete time signals, Discrete time signal representation using Complex exponential and Sinusoidal components, Periodicity of Discrete time signal using complex exponential signal, Concept of Z- Transform of a Discrete Sequence, Distinction between Laplace,Fourier and Z Transforms, Region of Convergence in Z-Transform, Constraints on ROC for various classes of signals, Inverse Z-transform, Properties of Z-transforms.

Course Outcomes:	At the end of the course the student will be able to
	CO1: Analyze and process signals in the discrete domain
	CO2: Design filters to suit specific requirements for specific applications
	CO3: calculate discrete Fourier series, discrete Fourier transform
	CO4:apply properties of Fourier series, Fourier transform and FFT algorithms
	CO5: design various digital filters
	CO6: demonstrate on the concepts of multi rate signal processing and its applications.
	CO7: address the real time applications

CO8: choose the best filter structure for implementation

CO9: Understand the digital signal processing approach and digital filter with a computer based approach

Learning Resources

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 Signals – 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.

ECT20 DIGITAL SIGNAL PROCESSING	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	3	–	3	2	–	–	–	–	–	–	2	3	–	–
CO2	–	3	3	–	–	–	–	–	–	–	3	2	–	–
CO3	2	–	2	2	–	–	–	–	–	–	2	–	–	–
CO4	2	–	2	2	–	3	2	2	–	–	3	–	–	–
CO5	3	3	-	1	-	-	-	-	-	-	-	-	-	-
CO6	-	**3**	-	-	-	-	-	-	-	-	-	-	-	-
CO7	-	-	**3**	**1**	-	-	-	-	-	-	-	-	-	-
CO8	**2**	**2**	**3**	-	-	-	-	-	-	-	-	-	-	-
CO9	3	3	-	1	-	-	-	-	-	-	-	-	-	-

S.V. UNIVERSITY COLLEGE OF ENGINEERING: TIRUPATI – 517502

4-Year B.Tech Degree Programme

ECP07 IC APPLICATIONS LAB

Practical :	***3hrs/ week***	***Internal Assessment:***	***20+20 =40 Marks***
Tutorial :	***-***	***Semester End Examination:***	***60 Marks***
Semester	***VI***	***Credits:***	***2***

Course Educational Objectives :

1. To study the applications of IC 741 as Scalar, Voltage follower, Adder and Comparator
2. To study the applications of IC 741 as AC coupled amplifier, integrator and differentiator c
3. To study the rectifier circuits using operational amplifiers and precision diodes.
4. To study R-2R Ladder and Weighted resistor type DAC.
5. To study the astable operation using operational amplifier
6. To generate triangular and square waveforms using 741 IC and IC 8038
7. To study the voltage regulator using IC 723
8. To study an operational amplifier as LPF and BPF

List of Experiments :

1. OP-AMP (Operational Amplifiers) APPLICATIONS-I: Scalar, Voltage follower ,Adder and Comparator Circuits using IC 741
2. OP-AMP APPLICATIONS-II: AC coupled amplifier, Integrator and Differentiator Circuits using IC 741
3. Precision Rectifiers Circuits using IC 741
4. R-2R Ladder And Weighted Resistor Type DAC
5. AstableMultivibrator Using Operational amplifier
6. Wave Form Generation Using Operational amplifier

7. Voltage Regulator using IC 723
8. Wave Form Generation using IC 8038
9. Active Filters: I and II order Low Pass Filters
10. Active Filters: Band Pass Filters

Course Outcomes : At the end of the course the student will be

CO1: Able to design analog circuits such as Scalar, Adder, Comparator,and AC coupled amplifiers integrator and differentiator circuits using IC741.

CO2: Able to design precision rectifiers, compare precision half wave and full wave rectifiers.

CO3: Able to design and implement R-2R and weighted type DAC

CO4: Able to analyze and design Astablemultivibrator using op-amp , low voltage variable regulator and waveforms generator IC 8038

CO5: Able to design active I & II order low pass filters , Band pass filters and High pass filters

ECP07 IC APPLICATIONS LAB	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	2	2	3	3	3	-	-	-	3	-	-	-	3	3
CO2	3		2	2	3	-	-	-	1	-	-	-	3	3
CO3	2	2	3	3	3	-	-	-	2	-	-	-	2	3
CO4	2	2	3	3	3	-	-	-	2	-	-	-	2	2
CO5	3	3	-	1	-	-	-	-	-	-	-	-	-	-

S.V. UNIVERSITY COLLEGE OF ENGINEERING: TIRUPATI – 517502
4-Year B.Tech Degree Programme

ECP08 VLSI LAB

Practical :	***2 hrs/ week***	***Internal Assessment:***	***20+20=40***
Tutorial :	***-***	***Semester End Examination:***	***60 Marks***
Semester :	***VI***	***Credits:***	***1***

Course Education Objectives :

LIST OF EXPERIMENTS:

1.1. Logic Gates (Data Flow Model)
1.2. Logic Gates (Behavioral Model)
1.3. Nand Logic Gate (Structural Model)
1.4. Nor Logic Gate (Structural Model)
1.5. XNor Logic Gate (Structural Model)
2. Design of 2-to-4 decoder
3. Design of 8-to-3 encoder
3.1. Without priority
4. Design of 8-to-1 multiplexer

5. Design of 4 bit binary to gray converter

ECP08 VLSI LAB	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	2	3	1	2	2	-	-	-	-	3	-	3	3	2
CO2	2	3	2	2	3	-	-	-	-	3	-	3	3	2
CO3	2	3	2	3	3	-	-	-	-	3	-	3	3	2
CO4	2	3	3	3	3	-	-	-	-	3	-	3	3	2

VII Semester

S.V. UNIVERSITY COLLEGE OF ENGINEERING: TIRUPATI – 517502
4-Year B.Tech Degree Programme

ECT21 RADAR ENGINEERING

Lecture :	***3 hrs/ week***	***Internal Assessment:***	***20+20=40 Marks***
Tutorial :	***-***	***Semester End Examination:***	***60 Marks***
Semester :	***VII***	***Credits:***	***3***

Course Educational Objectives :

1. To acquire knowledge on principle and working of various radar systems.
2. To understand the applications of various electronic equipments in the functioning of the radar system.
3. To analyse the functioning of various radar systems in real life.
4. To gain the knowledge of various blocks required for designing a radar system
5. To acquire the knowledge of Navigational systems for ships and aeroplanes.
6. To gain the knowledge of distance measuring equipment in navigation systems.

UNIT – I

Nature of Radar and Radar equation – Simple form of Radar equation – Radar block diagram and operation, Radar frequencies, Applications of Radar.

Minimum Detectable signal – Receiver noise, Probability – Density functions, signal – to – noise ratio, Radar cross section of targets, cross-section fluctuations system losses.

UNIT – II

Radar components : RF amplifier, TWT, CFA, Modulators, mixers – Conversion loss, Noise figure, Balanced mixer, Image recovery mixer, Duplexers – Branch type, Balanced type and solid state duplexers, limiters, Displays – CRT displays, A,B,C,D – scopes PPI and RHI.

UNIT – III

Radar systems:CW radar, frequency-modulates CW radar, multiple - Frequency CW radar. MTI radar – Delay line cancellers, Pulse repetition frequencies, Range-gated Doppler filters tracking radar – Range and angle tracking sequential lobing and conical scanning.

UNIT – IV

Radio direction finding and radio ranges, the loop antenna, the goniometer, errors in direction finding the LF/MF four-course radio range, VHF-VOR, VOR receiving equipment.

UNIT – V

Hyperbolic systems of navigation & DME: TACAN : Loran-A, Loran-C, The decca navigation system, decca receivers. **DMA-operation**, TACAN STACAN equipment.

Course Outcomes: At the end of the course the student will be able to

CO1: Should have the knowledge on principles and working of various radar systems and should be able to analyze various electronic equipments required for designing a radar depending upon the requirement.

CO2: Expected to analyse the functioning of the radar system in reallife.

CO3: Should be able to avoid difficulties arising due to various conditions while detecting a target.

CO4: Should demonstrate the knowledge of how to track a particular target

CO5: Able to know how radar detects Doppler Frequency hence velocity of target

CO6: Should be in position how the position of target(distance and angle)is determined.

CO7: Able to know how the tracking of target is performed using radar.

CO8: Able to know different components of radar system.

CO9: Gains the knowledge of different direction finding techniques.

CO10: Gains the Knowledge of errors in direction finding equipment.

CO11: Able to know different equipment used navigational purpose at airports and in aeroplanes.

Learning Resources

Text Books:

1. Introduction to radar systems – "M.I.Skolmik", 2nd edition – TMH 1980.
2. Elements on electronic navigation – "N.S.Nagaraja", 2nd edition - TMH 1996.
3. Modern electronic communication – "G.M.Miller", 6th edition - Prentice Hall, 1999.
4. Electronic communication systems– "Kennedy & Davis" , 4th edition – McGraw Hill, 1993

ECT21 RADAR ENGINEERING	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO1 1	PO 12	PSO 1	PS O2

CO1	2	3	2	3	2	1						2		
CO2	2	2	1	1	3	2					1	2		
CO3	1	2	3	2	3		1			1	1	3		
CO4		2	1	2	1	1				1	2	3		
CO5	3	3	-	1	-	-	-	-	-	-	-	-	-	-
CO6	-	3	-	-	-	-	-	-	-	-	-	-	-	-
CO7	-	-	3	1	-	-	-	-	-	-	-	-	-	-
CO8	2	2	3	-	-	-	-	-	-	-	-	-	-	-
CO9	3	3	-	1	-	-	-	-	-	-	-	-	-	-
CO10	-	3	-	-	-	-	-	-	-	-	-	-	-	-
CO11	-	-	3	1	-	-	-	-	-	-	-	-	-	-

S.V. UNIVERSITY COLLEGE OF ENGINEERING: TIRUPATI – 517502

4-Year B.Tech Degree Programme

ECT22 OPTICAL COMMUNICATIONS

Lecture :	***3 hrs/ week***	***Internal Assessment:***	***20+20=40 Marks***
Tutorial :	***---***	***Semester End Examination:***	***60 Marks***
Semester:	***VII***	***Credits:***	***3***

Course Educational Objectives :

1. To learn the basic elements of optical fiber transmission link, fiber modes configurations and structures.
2. To understand the different kind of losses, signal distortion in optical wave guides and other signal degradation factors. Design optimization of SM fibers, RI profile and cut-off wave length.
3. To learn the various optical source materials, LED structures, quantum efficiency, Laser diodes and different fiber amplifiers.
4. To learn the fiber optical receivers such as PIN APD diodes, noise performance in photo detector, receiver operation and configuration.
5. To learn the designing of analog and digital system with power budget analysis, and a brief discussion of applications of Optical Communications

UNIT – I

Introduction to Optical Fibers: Evolution of fiber optic system- Element of an Optical Fiber Transmission link- Ray Optics-Optical Fiber Modes and Configurations –Mode theory of Circular Wave guides- Overview of Modes-Key Modal concepts-Linearly Polarized Modes –Single Mode Fibers-Graded Index fiber structure.

UNIT – II

Signal Degradation Optical Fibers: Attenuation – Absorption losses, Scattering losses, Bending Losses, Core and Cladding losses, Signal Distortion in Optical Wave guides - Information Capacity determination –Group Delay- Material Dispersion, Wave guide Dispersion, Signal distortion in SM fibers-Polarization Mode dispersion, Intermodal dispersion, Pulse Broadening in GI fibers-Mode Coupling –Design Optimization of SM fibers-RI profile and cut-off wavelength.

UNIT – III

Fiber Optical Sources and Coupling : Direct and indirect Band gap materials-LED structures –Light source materials –Quantum efficiency and LED power, Modulation of a LED, lasers Diodes-Modes and Threshold condition –Rate equations –External Quantum efficiency –Resonant frequencies –Temperature effects, Introduction to Quantum laser, source-to-fiber Power Launching, Lensing schemes, Fibre –to- Fibre joints, Fibre splicing.

UNIT – IV

Fiber Optical Receivers : PIN and APD diodes –Photo detector noise, SNR, Detector Response time, Avalanche Multiplication Noise –Comparison of Photo detectors –Fundamental Receiver Operation – preamplifiers, Error Sources – Receiver Configuration –Probability of Error – Quantum Limit.

UNIT – V

System Design and Applications : Design of Analog Systems: system specification, power budget, bandwidth budget

Design of Digital Systems: system specification, rise time budget, power budget, Receiver sensitivity.

Applications: Telephony, Telemetry, video distribution, military applications, passive and active sensing.

Course Outcomes: At the end of the course the student will be able to

CO1:Define basic optical laws and definitions.

CO2: Classify fibers as single-mode, multimode step index and multi-mode graded index.

CO3: Describe modes in multimode fibers and mode field parameter in single-mode fibers.

CO4: Classify fiber optic cables and connectors.

CO5: Explain the basis of signal degradation in optical fibers.

CO6: Discuss the properties of light emitting diodes (LED) and laser diodes.

CO7: Analyze power launching and coupling techniques for optical fibers.

CO8: Describe the properties of PIN and Avalanche photodiodes.

CO9: Analyze point-to-point fiber optic links.

CO10: Explain different concepts and components of wave division multiplexing (WDM).

CO11: List and explain the different applications of Optical Communications & design the power budget with the given specifications.

ECT21 RADAR ENGINEERING	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	3	2	3	2	1						2
CO2	2	2	1	1	3	2					1	2
CO3	1	2	3	2	3		1			1	1	3
CO4		2	1	2	1	1				1	2	3
CO5	3	3	-	1	-	-	-	-	-	-	-	-
CO6	-	**3**	-	-	-	-	-	-	-	-	-	-
CO7	-	-	**3**	**1**	-	-	-	-	-	-	-	-
CO8	**2**	**2**	**3**	-	-	-	-	-	-	-	-	-
CO9	3	3	-	1	-	-	-	-	-	-	-	-
CO10	-	**3**	-	-	-	-	-	-	-	-	-	-
CO11	-	-	**3**	**1**	-	-	-	-	-	-	-	-

Learning Resources

Text Books:

1. Gerd Keiser, "Optical Fiber Communication" McGraw –Hill International, Singapore, 3rd ed., 2000

Reference Books:

1. J.Senior, "Optical Communication, Principles and Practice", Prentice Hall of India, 1994.
2. Joseph Palais, "Fiber optic communication", Pearson edition, 2008.

S.V. UNIVERSITY COLLEGE OF ENGINEERING: TIRUPATI – 517502

4-Year B.Tech Degree Programme

ECT23 MOBILE COMMUNICATIONS

Lecture :	***3 hrs/ week***	***Internal Assessment:***	***20+20=40 Marks***
Tutorial :	***---***	***Semester End Examination:***	***60 Marks***
Semester:	***VII***	***Credits:***	***3***

Course Educational Objectives :

1. To provide an introduction to wireless communication, trends in wireless communications and cellular concept.
2. To make students to get familiarized mobile radio propagation models, parameters of mobile multipath propagation and fading.
3. Understand the Concepts of different modulation techniques and equalization.
4. To provide different coding and multiple access techniques for mobile communications.

5. To make the students to get familiarized with Mobile satellite systems and standards

UNIT – I

Cellular Concept and System Design Fundamentals: Introduction to wireless communication: Evolution of mobile communications, mobile radio systems- Examples, trends in cellular radio and personal communications. **Cellular Concept:** Frequency reuse, channel assignment, hand off, Interference and system capacity, trucking and grade of service Improving Coverage and capacity in Cellular systems.

UNIT – II

Mobile Radio Propagation: Free space propagation model, reflection, diffraction, scattering, link budget design, Outdoor Propagation models, Indoor propagation models, Small scale Multipath propagation, Impulse model, Small scale Multipath measurements, parameters of Mobile multipath channels, types of small scale fading, statistical models for multipath fading channels.

UNIT – III

Modulation Techniques and Equalization: Modulation Techniques: Minimum Shift Keying, Gauss ion MSK, M-ary QAM, M-ary FSK, Orthogonal Frequency Division Multiplexing, Performance of Digital Modulation in Slow-Flat Fading Channels and Frequency Selective Mobile Channels. Equalization: Survey of Equalization Techniques, Linear Equalization, Non-linear Equalization, Algorithms for Adaptive Equalization. Diversity Techniques, RAKEreceiver

UNIT – IV

Coding And Multiple Access Techniques : Coding: Vocoders, Linear Predictive Coders, Selection of Speech Coders for Mobile Communication, GSM Codec, RS codes for CDPD. Multiple Access Techniques: FDMA, TDMA, CDMA, SDMA, Capacity of Cellular CDMA and SDMA.

UNIT – V

Mobile Satellite Systems and Standards : LEO satellite systems - Iridium, Globalstar, ICO and Teledesic systems, comparison, GSM - reference architecture, radio and security aspects, DECT-radio and network aspects,IMT-2000 – radio and network aspects

Course	At the end of the course the student will be able to
Outcomes:	CO1: Independently understand concept of wireless communication.
	CO2: Understand and explain cellular concept.
	CO3: Understand the concept of mobile radio propagation.
	CO4: Identify the different types of propagation models for wireless communication.
	CO5: Explore the different modulation techniques.
	CO6: Design an equalizer for wireless communications.
	CO7: Design of speech encoders for mobile applications.
	CO8: Have a detailed knowledge of the mobile satellite systems and standards.
	CO9: Design wireless communication system
	CO10: To address the real time applications.

Learning Resources

Text Books: 1. T.S.Rappaport, "Wireless Communications: Principles and Practice, Second Edition, Pearson Education/ Prentice Hall of India, Third Indian Reprint 2003.

2. Raj Pandya, “Mobile and personal communication systems and services”, PHI edition, 2003.

Reference Books: 1. R.Blake,“WirelessCommunication Technology", Thomson Delmar, 2003.

2. W.C.Y.Lee, "Mobile Communications Engineering: Theory and applications, Second Edition, McGraw-Hill International, 1998.

ECT23 MOBILE COMMUNICATIONS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	1	2	1	3	2	3	1	1	1	3		
CO2	1	2	1	2	3	1	2	1						
CO3	1	2	2											
CO4		1	2	2	3									
CO5	3	3	-	1	-	-	-	-	-	-	-	-	-	-
CO6	-	3	-	-	-	-	-	-	-	-	-	-	-	-
CO7	-	-	3	1	-	-	-	-	-	-	-	-	-	-
CO8	2	2	3	-	-	-	-	-	-	-	-	-	-	-
CO9	3	3	-	1	-	-	-	-	-	-	-	-	-	-
CO10	-	3	-	-	-	-	-	-	-	-	-	-	-	-

S.V. UNIVERSITY COLLEGE OF ENGINEERING: TIRUPATI – 517502

4-Year B.Tech Degree Programme

ECT24 COMMUNICATION NETWORKS

Lecture :	***3 hrs/ week***	***Internal Assessment:***	***20+20=40 Marks***
Tutorial :	***2 hrs/week***	***Semester End Examination:***	***60 Marks***
Semester :	***VII***	***Credits:***	***4***

-

Course Educational Objectives : 1. To provide an introduction to networking technologies and understand fundamentals underlying the principles of computer networking and functionality of layered network architecture.

2. To make students to get familiarized with different topologies, transmission media, protocols and network components.
3. Understand the Concepts of Routing and Congestion Control Algorithms.
4. Acquire knowledge of the functions of different layers in OSI, TCP/IP Model In addition to explaining concepts, the course uses a multitude of real world examples of networking issues.
5. Understand how the packets are passed around the Internet and how the traffic and errors are controlled and to describe application and application protocols.

UNIT – I

Theoretical basis for communication, Maximum data rate of channel, communications media, Network goals, Application of networks, protocol hierarchies, OSI reference model, Design issues for the layers in the model, Modulation and keying alternatives, multiplexing, modems, parallel and serial data transmission, handshake procedures, RS 232C, V.14/V.28, RS 449 interfaces, X.21, IEEE protocols, Link switching techniques.

UNIT – II

Local Area Networks: Local communication alternatives, static and dynamic channel allocation in LANs, the ALOHA protocols, LAN protocols, IEEE logical link control, Ethernet, Token bus and Token ring protocols.

Data link layer: Design issues, Error detection and correction, sliding window protocols, Wide area network standards, SDLC, HDLC, X.25 protocols

UNIT – III

Network layer Design issues, Routing algorithms, congestion control algorithms, Internetworking, Transport layer design issues, connection management, Transport protocol X.25, session layer design issues, Remote procedure cell.

UNIT – IV

Presentation layer: Abstract syntax notation, Data compression techniques, Cryptography, Application such as file transfer, Electronic mail and virtual terminals, X.400 protocol for electrical messaging, overview of ARPANET, MAP, TOP, Novell Netware, PC/NOS, unix support for networking.

UNIT – V

World wide web: web browsers, web servers, uniform resource locator, Home pages, Basics of HTML, creating links, Anatomy of URL and kinds of URLs, HTML assignments, Editors and converters, New features of HTML, creating tables, Using images, Using external media, writing and designing web pages, Introduction to CGI scripts.

Course Outcomes: At the end of the course the student will be able to

CO1: OSI model and TCP/IP and explain the function(s) of each Layer.

CO2: Understand and explain Data Communications System and its components.

CO3: Identify the different types of network topologies and protocols.

CO4: Identify the different types of network devices and their functions within a network.

CO5: Understand and building the skills of subnetting and routing mechanisms.

CO6: Familiarity with the basic protocols of computer networks, and how they can be used to assist in

network design and implementation.

CO7: be familiar with several common programming interfaces for network communication;

CO8: have a such as Broadcasting, Multicasting

CO9: understand the key protocols that support the Internet

CO10: develop a basic understanding of technologies and protocols used on the Internet, and how to efectively use Internet tools technologies including current web-based applications,e-mail, and social networking tools; developing searching strategies.

CO11: Analyse the security requirements of a networked programming environment and identify the issues to be solved, assess security aspects in networking programs, come up with conceptua solutions to those issues;

1.

ECT24 COMMUNICATION NETWORKS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	–	1	1									
CO2	2	2	–	1	1									
CO3	2	2	1	1	1									
CO4	2	2	1	1	1									
CO5	3	3	-	1	-	-	-	-	-	-	-	-	-	-
CO6	-	3	-	-	-	-	-	-	-	-	-	-	-	-
CO7	-	-	3	1	-	-	-	-	-	-	-	-	-	-
CO8	2	2	3	-	-	-	-	-	-	-	-	-	-	-
CO9	3	3	-	1	-	-	-	-	-	-	-	-	-	-
CO10	-	3	-	-	-	-	-	-	-	-	-	-	-	-
CO11	-	-	3	1	-	-	-	-	-	-	-	-	-	-

Learning Resources

Text Books:

1. Andrew S Tenenbaum, Computer Networks, 3rd edition, PHI, 1997.
2. Laura Lemay, web publishing with HTML 3.0, 2nd edition, PHI, 1996

S.V. UNIVERSITY COLLEGE OF ENGINEERING: TIRUPATI – 517502

4-Year B.Tech Degree Programme

ECP09 MICROPROCESSORS AND MICROCONTROLLERS LAB

Practical :	*3 hrs/ week*	*Internal Assessment:*	*20+20=40 Marks*
Tutorial :	*-*	*Semester End Examination:*	*60 Marks*
Semester :	*VII*	*Credits:*	*2*

Course Educational Objectives :	1. To develop the microprocessor based programs for various applications. 2. To make the interfacing in between microprocessor and various peripherals. 3. To develop DOS / BIOS programs. 4. To develop the microcontroller based programs for various applications

List of the Experiments:

MICRO PROCESSOR

1. Addition of n Numbers.
2. Temperature Conversion.
3. Sum of cubes of n Numbers.
4. Display message using keyboard monitor subroutines.
5. Number of logical 1s in a given word or Quad word.

MICRO CONTROLLERS

1. DAC Interface.
2. Simulation of Stepper Motor.
3. Seven Segment Message Display.
4. Simulation of Elevator.
5. Simulation of Traffic Light Controller.

Product of two 16 bit numbers using 8051 macro assembler.

Course Outcomes:	At the end of the course the student will be able to CO1: Design and implement microprocessor, microcontroller based systems for various real time applications. CO2: interface microprocessor with various peripherals. CO3: design microcontroller based systems.

ECP09 MICROPROCESSORS AND MICROCONTROLLERS LAB	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1	_	2	_	_	2	1	_	2	_	_	2		
CO2	_	2	_	1	_	2	_	2	_	1	_	2		
CO3	_	2	2	1	_	2	_	2	2	1	_	2		

S.V. UNIVERSITY COLLEGE OF ENGINEERING: TIRUPATI – 517502

4-Year B.Tech Degree Programme

ECP10 MICROWAVE AND OPTICAL COMMUNICATIONS LAB

Practical :	***2 hrs/ week***	***Internal Assessment:***	***20+20=40 Marks***
Tutorial :	***-***	***Semester End Examination:***	***60 Marks***
Semester :	***VII***	***Credits:***	***1***

Course Educational Objectives :

1. To experiment with klystron oscillators and Gunn oscillators.
2. To study characteristics of waveguides.
3. To know that waveguide wavelength is different from free space wavelength.
4. To have the knowledge of radiation pattern of antennas.
5. To couple, attenuate and adjust the microwave power using different microwave components.
6. To design and simulate the dipole antenna.

LIST OF EXPERIMENTS:

1) Reflex Klystron Characteristics – I
2) Reflex Klystron Characteristics – Ii
3) Waveguide Parameters (F and A) Measurements
4) VSWR Measurements
5) Directional Couplers
6) Attenuation Measurement
7) Impedance Measurement
8) Gunn Diode Oscillator
9) Dipole Antenna Simulation Using IE3D Software
10) Antenna Measurements

Course Outcomes: At the end of the course the student will be able to

CO1&2: know the klystron oscillator and Gunn diode oscillation characteristics

CO3: have the knowledge of probe, loop slotted line etc.,

CO4: know the relationship between Guide wavelength, free space wavelength and cut-off wavelength.

CO5: Will be able to know tuning methods, both mechanical and electronic tuning practically.

CO6: Have the knowledge of power coupling methods.

CO7: know components like attenuator, isolators, short, matched termination etc., functioning.

CO8: know different types of antennas, Horn antenna, microstrip antenna etc.

CO9: the frequency meter functioning at microwave frequencies.

CO10: know the knowledge in operation of VSWR meter.

CO11: know the knowledge of spectrum analyzer.

ECP10 MICROWAVE AND OPTICAL COMMUNICATIONS LAB	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	2	2	2	-	-	-	3	-	-	-		
CO2	3	2	2	3	2	-	2	-	2	-	-	-		
CO3	3	2	3	-	3	-	-	-	3	-	-	-		
Co4	2	2	3	3	3	-	-	-	2	-	-	-		
CO5	3	3	-	1	-	-	-	-	-	-	-	-	-	-

CO6	-	**3**	-	-	-	-	-	-	-	-	-	-	-	-
CO7	-	-	**3**	**1**	-	-	-	-	-	-	-	-	-	-
CO8	**2**	**2**	**3**	-	-	-	-	-	-	-	-	-	-	-
CO9	3	3	-	1	-	-	-	-	-	-	-	-	-	-
CO10	-	**3**	-	-	-	-	-	-	-	-	-	-	-	-
CO11	-	-	**3**	**1**	-	-	-	-	-	-	-	-	-	-

S.V. UNIVERSITY COLLEGE OF ENGINEERING: TIRUPATI – 517502
4-Year B.Tech Degree Programme

ECP11 DIGITAL SIGNAL PROCESSING LAB

Practical :	***2hrs/ week***	***Internal Assessment:***	***20+20=40 Marks***
Tutorial :	***-***	***Semester End Examination:***	***60 Marks***
Semester :	***VII***	***Credits:***	***2***

Course Education Objectives :

1. To understand the convolution and its application in system analysis
2. To design IIR filter and FIR filter
3. To understand DFT of given sequence using FFT algorithm
4. To understand relationship between correlation and power spectral density

List Of Experiments:

PART A

1. (a) Generation of different waveforms (b) Generation of different discrete time sequence.
2. Compare Linear and Circular Convolutions.
3. DFT and IDFT
4. Frequency response of different analog filters.
5. Design FIR Filters (Low Pass, High Pass and Band Pass).
6. Design FIR Low Pass Filter using different Window Techniques.
7. Design Butterworth Filter (Low Pass and High Pass).
8. Design Chebyshev type I and type II Filters.
9. Conversion of Analog Filters into Digital Filters using
   (a) Impulse Invariant Transformations. (b) Bilinear Transformations.
10. Interpolation and Decimation of Sequence.
11. Power Spectral Density.

PART B (CC Studio)

1. Linear Convolution
2. Circular Convolution
3. DFT
4. FFT Algorithms

Density Spectrum of 1D Signal.

Course Outcomes:	At the end of the course the student will be able to CO1: Should able to find the convolution of sequence CO2: Able to design IIR and FIR filter CO3: Able to interrelate correlation and power spectral density

ECP11 DIGITAL SIGNAL PROCESSING LAB	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	-	-	3	2	1	-	-	-	-	-	1	-	3	
CO2	-	-	3	2	1	-	-	-	-	-	1	-	3	
CO3	-	-	3	2	2	-	-	-	-	-	1	-	3	

VIII Semester

ECP13 PROJECT WORK

Practical :		***Internal Assessment:***	***20+20=40 Marks***
Tutorial :		***Semester End Examination:***	***60 Marks***
Semester :	***VIII***	***Credits:***	***8***

Course Education Objectives :

1. To prepare the graduate to analyze a problem, identify and define the computing requirements appropriate to its solutions.
2. To provide knowledge of various functionalities so that they can perform effectively on teams.
3. To provide knowledge of design and development principles in the construction of software systems of arying complexity.
4. To provide the knowledge of preparing rich documentation for the software system design and develop.
5. To provide professional careers including computer programmer, software engineer, application developer, project lead, system analyst and tester.
6. To prepare with the knowledge and skills to do advanced studies and research in Electronics and Communication Engineering discipline

Project work

Course Outcomes: At the end of the course the student will be able to

CO1: analyze a problem, identify and define the computing requirements appropriate to its solutions

CO2: Shall be able to function effectively on teams to accomplish a common goal

CO3: Shall be able to use current techniques, skill and tools necessary for computing practices

CO4: to design and development principles in the construction of software systems of varying complexity

CO5: Ability to communicate effectively

CO6: understand the impact of engineering solutions in a global, economic, environment and social context.

CO7: Knowledge of contemporary issues

CO8: Ability to use the techniques ,skills and modern engineering tools necessary for engineering practice

CO9: Ability to identify, formulate and solve engineering problems

CO10: Understanding of professional and ethical responsibility

CO11: Ability to function on multi-disciplinary teams

CO12: Ability to design a system, component, or process to meet desired needs.

Learning Resources

Text Books:

ECP13 PROJECT WORK	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO1 1	PO 12	PSO 1	PS O2
CO1	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**
CO2	**2**	**3**	**3**	**3**	**3**	**2**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**2**
CO3	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**1**	**2**
CO4	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**
CO5	**3**	**2**	**3**	**3**	**3**	**2**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**2**
CO6	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**1**	**2**
CO7	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**
CO8	**3**	**2**	**3**	**3**	**3**	**2**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**2**
CO9	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**1**	**2**
CO10	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**
CO11	**3**	**2**	**3**	**3**	**3**	**2**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**2**
CO12	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**1**	**2**