ACADEMIC REGULATIONS

COURSE STRUCTURE

AND

DETAILED SYLLABUS

Electronics and Communication Engineering

B.TECH. FOUR YEAR DEGREE COURSE

(Applicable for the batches admitted from 2011-2012)

VNR VIGNANA JYOTHI
INSTITUTE OF ENGINEERING AND
TECHNOLOGY
(AFFILIATED TO JNTUH)
An Autonomous Institute under JNTUH

Bachupally, Nizampet (S.O),
Hyderabad – 500090
Andhra Pradesh, India

VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY

HYDERABAD

An Autonomous Institute under JNTUH

ACADEMIC REGULATIONS 2011 FOR B.TECH. DEGREE COURSE

(Applicable for Students admitted from the academic year 2011-2012)

1. Courses of study

The following courses of study are offered at present for specialization for the B. Tech. Course:

Branch Code	Branch
01	Civil Engineering.
02	Electrical and Electronics Engineering
03	Mechanical Engineering
04	Electronics and Communication Engineering
05	Computer Science and Engineering.
10	Electronics and Instrumentation Engineering
12	Information Technology
24	Automobile Engineering

1.1 Eligibility Criteria for Admission

The eligibility criteria for admission into engineering programmes shall be as mentioned below:

The candidate shall be an Indian National.

The candidate should have completed 16 years of age as on 31st December of the academic year for which the admissions are being conducted.

The Candidate should have passed the qualifying examination (10+2) or equivalent as on the date of admission.

Seats in each programme in the Institution are classified into **Category** A and **Category** B as per the G.Os.

1.1.1 Category – A Seats

These seats will be filled through counseling as per the rank at the Common Entrance Test (EAMCET) conducted by the State Government and State Government GOs as per other admission criteria laid down in the G.Os.

1.1.2 Category - B Seats

These seats will be filled by the institute as per the G.Os Issued by State Government from time to time.

1.1.3 Category: Lateral Entry

The candidate shall be admitted into the Third Semester, based on the rank secured by the candidate at Engineering Common Entrance Test (ECET(FDH)) by the Convener, ECET.

2. Distribution and Weightage of Marks

i. The performance of a student in each Semester shall be evaluated subject –wise with **a maximum of 100 marks for theory and 75 marks for practical subjects.** In addition, an Industry oriented mini-project, Seminar, Comprehensive viva-voce, and Project Work shall be evaluated for **50, 50, 50 and 200 marks** respectively.

ii. For theory subjects the distribution shall be **30 marks for Internal Evaluation** and **70 marks for the End-Examination**.

For theory subjects, Two mid examinations will be conducted in each Semester as per the academic calendar. Each mid examination is evaluated for 25 marks. First mid examination should be conducted for 1 – 2 ½ Units of syllabus and the second mid examination shall be conducted for 2 ½ - 5 Units of syllabus. The mid descriptive type exam paper consists of Section-A and Section-B.

Section-A [compulsory] consists of 5 short answer questions and each carries one mark.

Section-B consists of 5 questions out of which 4 are to be answered and each question carries 5 marks. The time duration of each mid examination is 90 minutes.

Two assignments are to be given to students covering the syllabus of first Mid and second Mid examinations and are evaluated for 5 marks each. .
The first assignment shall be submitted before first mid examinations and second Assignment should be submitted before second mid examination.

At the end of the Semester Internal Marks Maximum 30 for the respective subjects are allotted as follows:

(a) 25 marks for the better of the two mid term examinations
(b) 5 marks is the average of the two assignment marks

iii. For practical subjects there shall be a continuous evaluation during the Semester for **25 internal marks and 50 marks for end examination**. Out of the 25 marks for internal, **day-to-day work in the laboratory shall be evaluated for 10 marks**, and 10 marks for internal examination (two internal practical examinations will be conducted and the better of the two examinations will be taken into account) and 5 marks for laboratory record.

NOTE: A student who is absent for any assignment/Mid term examination for any reason what so ever shall be deemed to have secured 'zero' marks in the test/examination and no makeup test/examination shall be conducted.

iv For the subjects having design and / or drawing, (such as Engineering Graphics, Engineering Drawing, Machine Drawing, Production Drawing Practice, and Estimation etc., the distribution shall be 30 **marks for internal evaluation (15 marks for day-to-day work and 15 marks for internal tests (**the better of the two examinations will be taken into account**) and 70 marks for end examination.** There shall be **two internal tests** in a Semester.

iv. There shall be an **industry-oriented mini-Project**, in collaboration with an industry of their specialization, to be taken up during the vacation after III year II Semester examination. The **mini project shall be evaluated during the IV year I Semester.** The industry oriented mini project shall be submitted in report form and should be presented before a committee, which shall be evaluated for **50 marks.** The committee consists of Head of the Department, the supervisor of mini project and a senior faculty member of the department. There shall be **no internal assessment for industry oriented mini project.**

vi. There shall be a **Seminar presentation in IV year II Semester**. For the Seminar, the student shall collect the information on a specialized topic other than the project topic and prepare a technical report, showing his understanding of the topic, and submit to the department, which shall be evaluated by a Departmental committee consisting of the Head of the department, Seminar supervisor and a senior faculty member. The Seminar report shall be evaluated for **50 marks**. There shall be **no external examination for Seminar.**

vii. There shall be a **Comprehensive Viva-Voce in IV year II Semester**. The Comprehensive Viva-Voce will be conducted by a Committee consisting of the Head of the Department and three Senior Faculty members of the Department. The Comprehensive Viva-Voce is aimed to assess the student's understanding in various subjects studied during the B.Tech. course of study. The Comprehensive Viva-Voce is evaluated **for 50 marks** by the Committee. There will be **no internal assessment for the Comprehensive viva-voce.**

viii. The Project work shall be started by the student in the beginning of the IV year I Semester. Out of a total of **200 marks** for the project work, **60 marks shall be for Internal Evaluation** and **140 marks for the Semester end Examination**. The Semester end Examination (viva-voce) shall be conducted by a committee comprising of an external examiner, Head of the Department and the project supervisor. The evaluation of project work shall be conducted at the end of the IV year II Semester. **The Internal Evaluation shall be on the basis of three Seminars conducted during the IV year II Semester for 30 marks by the committee consisting of Head of the Department, project supervisor and senior faculty member of the Department and for 30 marks by the supervisor of the project.**

3. Semester end Examination

(a) Theory Courses

Each course is evaluated for 70 marks. Examination is of 3 hours duration.
Question paper contains two sections [Section-A and Section-B]

Section-A: Carries 30 marks [Five questions of one mark each, five questions of two marks each and another five questions of three marks each] which is compulsory.

Section-B: carries 40 marks consisting of six essay type questions out of which four questions are to be answered, each carrying 10 marks.

Drawing related subjects, question paper contains 8 questions (atleast one question from each unit), out of which the candidate has to answer any 5 questions, each carrying 14 marks.

(b) Practical Courses

Each lab course is evaluated for 50 marks. The examination shall be conducted by the laboratory teacher and another senior teacher concerned with the subject of the same/other department/Industry. The external examiner may be appointed by the Chief Superintendent in consultation with HOD as and when required.

(c) Supplementary Examinations

Supplementary examinations will be conducted along with regular Semester end examinations. (During even Semester regular examinations, supplementary examinations of odd Semester and during odd Semester regular examinations, supplementary examinations of even Semester will be conducted).

4. Attendance Requirements

i. A student shall be eligible to appear for the Semester end examinations if he acquires a **minimum of 75% of attendance in aggregate of all the subjects** for Semester / year.

ii. Condonation of shortage of attendance in aggregate **up to 10% (65% and above and below 75%)** in a Semester may be granted by **Institute Academic Committee.**

iii. A student will not be permitted to write the end examination and not promoted to the next Semester unless he satisfies the attendance requirement of the present Semester, as applicable. He may seek re-admission for that Semester when offered next.

iv. Shortage of Attendance **below 65% in aggregate** shall in **NO case be condoned.**

v. Students whose shortage of attendance is not condoned in any Semester are not eligible to take their end examination of that Semester.

vi. A stipulated fee shall be payable towards condonation of shortage of attendance.

5. Minimum Academic Requirements

The following academic requirements have to be satisfied in addition to the attendance requirements mentioned in item No.**4.**

i. A student shall be deemed to have satisfied the minimum academic requirements and earned the credits allotted to each theory or practical design or drawing subject or project, if he secures **not less than 35% (25 out of 70 marks)** of **marks in the end examination and a minimum of 40% of marks in the sum total of the internal evaluation and end examination taken together.**

ii. A student shall be **promoted from II to III year** only if he fulfils the academic requirement of **37 credits from Two regular and one supplementary examinations of I year I Semester and One Regular and One Supplementary exam of I year II Semester, and one regular examination of II year I Semester** irrespective of whether the candidate takes the examination or not.

iii. A student shall be **promoted from III year to IV year** only if he fulfils the academic requirements of total **62 credits from the following examinations,** whether the candidate takes the examinations or not.

- Three regular and Two supplementary examinations of I B Tech I Semester.
- Two regular and two Supplementary examinations for I B Tech II Semester
- Two regular and one supplementary examinations up to the end of II year I Semester.
- One regular and one supplementary examinations of II year II Semester.
- One regular examination of III year I Semester.

iv. A student shall register and put up minimum academic requirement in all 200 credits and earn the 200 credits. Marks obtained in all 200 credits shall be considered for the calculation of percentage of marks.

v. Students who fail to earn 200 credits as indicated in the course structure **within eight academic years** from the year of their admission shall **forfeit their seat** in B.Tech. course and their **admission shall get stands cancelled.**

6. Course pattern

i. The entire course of study is of four academic years. **All the I, II, III and IV years are of Semester pattern .**

ii. A student eligible to appear for the end examination in a subject, but absent or has failed in the end examination may reappear for that subject at the supplementary examination whenever conducted.

iii. When a student is detained due to shortage of attendance in any Semester, he may be re-admitted into that Semester when it is offered next, **with the academic regulations of the batch into which he gets readmitted.**

iv. When a student is detained due to lack of credits in any year, he may be eligible to be promoted or for promotion into the next year after fulfillment of the academic requirements, **with the academic regulations of the batch into which he gets admitted**

7. Award of B.Tech. Degree and Class

A student will be declared eligible for the award of the B. Tech. Degree if he/she fulfils the following academic regulations:

I. Pursued **a course of study for not less than four academic years and not more than eight academic years.**

ii. Registered for **200 credits** and secured **200 credits.**

NOTE: Students, who fail to fulfill all the academic requirements for the award of the degree within eight academic years from the year of their admission, shall forfeit their seat in B.Tech. Course.

Iii After a student has satisfied the requirements prescribed for the completion of the program and is eligible for the award of B. Tech. Degree he shall be placed in one of the following four classes:

Class Awarded	% of marks to be secured	
First Class with Distinction	70% and above	From the aggregate marks secured for the 200 Credits.
First Class	Below 70% but not less than 60%	
Second Class	Below 60% but not less than 50%	
Pass Class	Below 50% but not less than 40%	
Fail	Below 40%	

(The marks in internal evaluation and end examination shall be shown separately in the marks memorandum).

8. Withholding of Results

If the student has not paid dues to College, or if any case of indiscipline is pending against him, the result of the candidate may be withheld and he will not be allowed to go into the next higher Semester. The award or issue of the Degree may also be withheld in such cases.

9. Transitory Regulations

Students who have discontinued or have been detained for want of attendance or any other academic requirements, may be considered for readmission as and when they become eligible. They have to take up Equivalent subjects, as substitute subject in place of repetition of subjects as decided by the Institute Academic Committee.

10. Minimum Instruction Days

The minimum instruction days for each Semester shall be **90 clear instruction days.**

11. There shall be **no branch transfers** after the completion of admission process.

12. The decision of the Institute Academic Committee will be final in respect of equivalent subjects for those students who are transferred from other colleges. The procedure for permitting students to transfer from other colleges will be decided by the principal / Institute Academic Committee keeping the Government Rules concerned in view.

13. General

i. Where the words "he", "him", "his", occur in the regulations, they include "she", "her", "hers".

ii. The academic regulations should be read as a whole for the purpose of any interpretation.

iii. In the case of any doubt or ambiguity in the interpretation of the above rules, the decision of the Principal is final.

iv. In the case of any discrepancy/ambiguity/doubt arises in the above rules and regulations, the decision of the Principal shall be final.

v. The College may change or amend any or all of the academic regulations or syllabi at any time and the changes or amendments made shall be applicable to all the students concerned with effect from the dates notified by the College.

14. Academic Regulations for B.Tech. (Lateral Entry Scheme)

(Applicable for students admitted from the academic year 2012-2013)

(i) A student shall register for all 150 credits and earn all the 150 credits. Marks obtained in all 150 credits shall be considered for the calculation of the class.

(ii) A student who fails to earn 150 credits as indicated in the course structure within **six** academic years from the year of their admission shall forfeit their seat in B.Tech. programme and their admission stands cancelled.

(iii) The same attendance regulations are adopted as that of B.Tech. Four year degree course.

(iv) A student shall be promoted from third year to fourth year only on fulfilling the academic requirements of securing 37 credits from the following examinations.

a. Two regular and one supplementary examination of II year I Semester

b. One regular and one supplementary examination of II year II Semester

c. One regular examination of III year I Semester.

Irrespective of whether the candidate appears the Semester-End examination or not as per the normal course of study and in case of getting detained for want of credits the student may make up the credits through supplementary exams of the above exams before the date of commencement of class work for IV year I Semester.

(v) Award of B.Tech. Degree and Class

After a student has satisfied the requirements prescribed for the completion of the program and is eligible for the award of B. Tech. Degree he shall be placed in one of the following four classes:

Class Awarded	% of marks to be secured	
First Class with Distinction	70% and above	From the aggregate marks secured for the 150 Credits. (i.e., II year to IV year)
First Class	Below 70% but not less than 60%	
Second Class	Below 60% but not less than 50%	
Pass Class	Below 50% but not less than 40%	
Fail	Below 40%	

(The marks in internal evaluation and end examination shall be shown separately in the marks memorandum)

(vi) All other regulations as applicable to B.Tech. four year degree course will hold good for B.Tech. (Lateral Entry Scheme).

VNR Vignana Jyothi Institute of Engineering and Technology

B. TECH Electronics and Communication Engineering

I YEAR I SEMESTER **COURSE STRUCTURE**

Subject Code	Subject Name	Lectures	T/P/D	Credits
R11MTH1101	Mathematics - I	3	1	3
R11MTH1102	Mathematics- II	3	1	3
R11PHY1101	Engineering Physics-I	3	0	3
R11HAS1101	English	3	0	3
R11CSE1101	Computer Programming	3	0	3
R11MED1105	Engineering Drawing	3	3	4
R11HAS1201	English Language Communication Skills Lab - I	0	3	2
R11CSE1201	Computer Programming Lab	0	3	2
R11MED1202	Workshop Practice	0	3	2
Total		18	14	25

VNR Vignana Jyothi Institute of Engineering and Technology

B. TECH Electronics and Communication Engineering

I YEAR II SEMESTER **COURSE STRUCTURE**

Subject Code	Subject Name	Lectures	T/P/D	Credits
R11EEE1101	Circuit Theory	4	0	4
R11MTH1104	Numerical analysis and Linear Programming	3	1	3
R11PHY1102	Engineering Physics-II	3	0	3
R11CHE1101	Engineering Chemistry	3	0	3
R11CSE1102	Data Structures	3	0	3
R11CED1109	Environmental Studies	3	0	3
R11CSE1202	Data Structures Lab	0	3	2
R11EPC1201	Engineering Physics and Engineering Chemistry Lab	0	3	2
R11HAS1202	English Language Communication Skills Lab - II	0	3	2
Total		19	10	25

*** T/P/D: Tutorial/Practical/Drawing Practice**

VNR Vignana Jyothi Institute of Engineering and Technology

B. TECH Electronics and Communication Engineering

II YEAR I SEMESTER **COURSE STRUCTURE**

Subject Code	Subject Name	Lectures	T/P/D	Credits
R11MTH1105	Applied Mathematics	3	1	3
R11ECE1101	Probability Theory and Stochastic Processes	3	1	3
R11EIE1101	Signals and Systems	4	1	4
R11EEE1105	Principles of Electrical Engineering	3	1	3
R11ECE1102	Electronics Devices and Circuits	4	1	4
R11HAS1102	Business Economics and Financial Analysis	4	0	4
R11ECE1201	Basic Simulation Laboratory	0	3	2
R11ECE1202	Electronics Devices and Circuits Laboratory	0	3	2
Total		21	11	25

VNR Vignana Jyothi Institute of Engineering and Technology

B. TECH Electronics and Communication Engineering

II YEAR II SEMESTER COURSE STRUCTURE

Subject Code	Subject Name	Lectures	T/P/D	Credits
R11EEE1106	Control Systems	3	1	3
R11ECE1103	Switching Theory and Logic	4	0	4
R11ECE1104	Electromagnetic Theory and Transmission Lines	4	1	4
R11EIE1104	Pulse and Digital Circuits	3	1	3
R11EIE1105	Electronic Circuit Analysis	4	0	4
R11ECE1105	Analog Communications	3	1	3
R11EIE1202	PDC Laboratory	0	3	2
R11EEE1202	Electrical Engineering Laboratory	0	3	2
Total		21	10	25

*** T/P/D: Tutorial/Practical/Drawing Practice**

VNR Vignana Jyothi Institute of Engineering and Technology

B. TECH Electronics and Communication Engineering

III YEAR I SEMESTER **COURSE STRUCTURE**

Subject Code	Subject Name	Lectures	T/P/D	Credits
R11CSE1103	Computer Organization	4	0	4
R11EIE1106	Linear and Digital IC Applications	4	0	4
R11ECE1106	Digital Communications	4	1	4
R11ECE1107	Antennas and Wave Propagation	4	0	4
R11EIE1121	Electronic Measurement and Instrumentation	3	0	3
R11ECE1203	Analog Communications Laboratory	0	3	2
R11HAS1204	Advanced English Language Communication Skills Laboratory	0	3	2
R11EIE1203	Electronic Circuit Analysis Laboratory	0	3	2
Total		19	10	25

VNR Vignana Jyothi Institute of Engineering and Technology

B. TECH Electronics and Communication Engineering

III YEAR II SEMESTER **COURSE STRUCTURE**

Subject Code	Subject Name	Lectures	T/P/D	Credits
R11HAS1103	Management Science	4	0	4
R11ECE1108	Microprocessors and Microcontrollers	4	0	4
R11ECE1109	Digital Signal Processing	4	1	4
R11CSE1113	Computer Networks	3	1	3
R11ECE1110	VLSI Design	4	0	4
R11ECE1204	Microprocessor and Microcontrollers Laboratory	0	3	2
R11ECE1205	Digital Communications Laboratory	0	3	2
R11ECE1206	IC and E-CAD Laboratory	0	3	2
Total		19	11	25

* T/P/D: Tutorial/Practical/Drawing Practice

VNR Vignana Jyothi Institute of Engineering and Technology

B. TECH Electronics and Communication Engineering

IV YEAR I SEMESTER COURSE STRUCTURE

Subject Code	Subject Name	Lectures	T/P/D	Credits
R11ECE1111	Microwave Engineering	4	0	4
R11ECE1113 R11ECE1117 R11CSE1106	Elective - I Digital Image Processing Satellite Communications Operating Systems	3	1	3
R11ECE1114 R11ECE1115 R11ECE1116	Elective – II Optical Communications Digital Design through Verilog Speech Processing	4	0	4
R11ECE1119 R11ECE1123 R11CSE1114	Elective – III Advanced Digital Signal Processing RADAR Systems Object Oriented Programming	4	0	4
R11ECE1122 R11ECE1129 R11CSE1110	Elective – IV DSP Processors and Architecture Telecommunication Switching Systems Data Base Management Systems	4	0	4
R11ECE1207	Microwave Engineering Laboratory	0	3	2
R11ECE1208	Digital Signal Processing Laboratory	0	3	2
R11ECE1301	Industry Oriented mini – Project	0	8	2
Total		19	15	25

*Major Project initiated in I.Sem and Evaluated in II.Sem

* T/P/D: Tutorial/Practical/Drawing Practice

VNR Vignana Jyothi Institute of Engineering and Technology

B. TECH Electronics and Communication Engineering

IV YEAR II SEMESTER COURSE STRUCTURE

Subject Code	Subject Name	Lectures	T/P/D	Credits
R11ECE1120	Cellular and Mobile Communications	3	1	3
R11ECE1125 R11ECE1121 R11ECE1127	Elective – V Spread Spectrum Communications Network Security and Cryptography Embedded Real Time Operating Systems	3	1	3
R11ECE1128 R11EIE1107 R11ECE1126	Elective – VI TV Engineering Bio Medical Instrumentation CPLD and FPGA Architectures	3	1	3
R11ECE1302	Seminar	0	3	2
R11ECE1303	Comprehensive Viva	0	0	2
R11ECE1304	Project work	6	12	12
Total		15	18	25

* T/P/D: Tutorial/Practical/Drawing Practice

Note: All End Examinations (Theory and Practical/ Drawing) are of three hours duration.

I Year B.Tech ECE,EEE,EIE – I Sem	L	T/P/D	C
	3	1	3

(R11MTH1101) MATHEMATICS – I
(Advanced Calculus)

Pre-requisites: Calculus

Course Objectives

- Understand Taylor's theorem and its application to maxima and minima of f(x,y)
- Understand the process of curve sketching
- Understand multiple integrals and its applications
- Apply the integral theorems of vector calculus.

Course Outcomes

After going through this course the student will be able to

- Solve problems involving the maxima and minima of f(x,y).
- Apply the curve tracing concepts to find arc length of curves, surface area, volume of solids of revolution.
- Evaluate the multiple integrals using appropriate change of variables.
- Verify the integral theorems.

UNIT I
Elementary analysis

Sequences and series - convergence and divergence, ratio test, comparison test, integral test, Cauchy's root test, Raabe's test (statements only for the tests), and absolute and conditional convergence.

Mean value theorems (statements only) - Rolle's theorem, Lagrange's theorem, Cauchy's theorem, and generalized mean value theorem (Taylor's Theorem).

UNIT II
Functions of several variables

Partial differentiation; Functional dependence; Jacobian; Maxima and Minima of functions of two variables with constraints and without constraints.

Radius of curvature; Centre and circle of curvature – evolutes and envelopes.

UNIT III

Improper integrals and special functions

Improper Integrals; Beta, Gamma, and Error functions - Properties and simple applications.

UNIT IV

Curve tracing, applications of integration and multiple integrals

Curve tracing – Cartesian, polar, and parametric curves; Applications of integration to lengths, volumes and surface areas in cartesian and polar coordinates.

Multiple integrals - double and triple integrals, change of variables, and change of order of integration.

UNIT-V

Vector calculus

Introduction to vector and scalar functions; gradient, curl, divergence, and their related properties of sums and products; Laplacian and second order operators; Vector integration - line integral, work done, potential function; Area, surface, and volume integrals; Statements of Vector integral theorems and their verification (without proofs) - Green's theorem, Stoke's theorem, and Gauss divergence theorem.

TEXT BOOKS

1. Calculus and Analytic Geometry - Thomas and Finney, 9th edition, *Pearson Education*.

REFERENCES

1. Elementary Analysis: The Theory of Calculus - Kenneth Ross, *Springer.*
2. Principles of Mathematical Analysis - Walter Rudin, 3rd edition, *Paperbac,* 1976.
3. Advanced Engineering Mathematics - Erwin Kreyszig, 8th edition, *John Wiley*.
4. Calculus - Tom M. Apostol, Volume1 and Volume 2, 2nd edition, *John Wiley,* 2003.
5. Schaum's Outline of Vector Analysis - Murray R. Spiegel, 2nd edition, *Tata McGraw Hill* 2011.

I Year B.Tech ECE, EEE,EIE – I Sem	L	T/P/D	C
	3	1	3

(R11MTH1102) MATHEMATICS – II
(Linear Algebra and Ordinary Differential Equations)

Pre-requisites: Basic Algebra

Course Objectives

- Understand the Echolen form and Normal form of a matrix and its applications in solving linear system of equations.
- Understand the methods of solving first order differential equations and learn about its applications to L-R and R-C circuits.
- Apply the convolution theorem to evaluate Laplace Transform of the functions.
- Apply Z-Transforms in solving the difference equations.

Course Outcomes

After going through this course the student will be able to

- Find the rank using Echolen form and Normal form.
- Solve the problems in first order and second order differential equations.
- Learn Laplace Transform as a tool.
- Evaluate the Z-Transform of the given function.

LINEAR ALGEBRA

UNIT I

Solution of linear systems

Matrices and linear systems of equations - elementary row transformations, Rank Echelon form, and normal form; Solution of linear systems - direct methods - LU decomposition, LU decomposition from Gauss elimination, and solution of Tri-diagonal systems; Eigen values, eigen vectors, and their properties - Liner dependence and independence; Cayley-Hamilton theorem - inverse and powers of a matrix by Cayley-Hamilton theorem, diagonalization of a matrix, calculation of powers of a matrix; Modal and spectral matrices.

UNIT II

Linear transformations

Real matrices - symmetric, skew symmetric, and orthogonal linear transformation; Complex matrices - Hermitian, Skew-Hermitian and unitary matrices; Eigen values and eigen vectors of complex matrices and their properties; Quadratic forms - reduction of quadratic form to canonical form, rank, positive, negative definite, semi definite, index, signature, Sylvester law, and singular value decomposition.

ORDINARY DIFFERENTIAL EQUATIONS

UNIT III

Ordinary differential equations and their applications

Differential equations of first order and first degree - Linear, Bernoulli and exact differential equation; Applications of differential equations of first order and first degree - Newton's law of cooling, Law of natural growth and decay, Orthogonal trajectories, and basic circuits.

UNIT IV

Differential equations of higher order and their applications

Differential equations of higher order - homogeneous and non-homogenous type, differential equations of second order and higher order with constant coefficients with right hand side term of the type e^{ax}, sin (ax), cos (ax), polynomials in x, e^{ax} V(x), x V(x), and method of variation of parameters; Applications to bending of beams; Mechanical systems - Simple harmonic motion.

UNIT V

Linear differential equations and qualitative methods

Cauchy's linear differential equation; Legendre's differential equations; Simultaneous linear differential equations; The phase plane; Phase portraits and direction fields; Critical points and stability.

TEXT BOOKS

1. Advanced Engineering Mathematics - R.K Jain and S.R.K Iyengar, 3rd edition, Narosa Publications, 2011.
2. Differential Equations - Dennis G. Zill, Cengage learning, 2011.

REFERENCES

1. Advanced Engineering Mathematics - Erwin Kreyszig, 8th edition, *John Wiley*.
2. Advanced Engineering Mathematics - Peter V. O'Neil, 9th Edition, *Cengage Learning.*
3. Elementary Differential Equations and Boundary Value Problems - William E. Boyce and Richard C. Diprima ,*Wiley.*
4. Linear Algebra and its applications - David C Clay, *Pearson Education.*

5. Differential Equations, with Applications and Historical Notes - George F. Simmons and John S. Robertson, 2nd Edition, *Tata McGraw Hill,* 2008.

Advanced Engineering Mathematics - Dennis G. Zill, Warren S. Wright, and Michael R. Cullen, 4th edition, *Jones & Bartlett Learning*.

I Year B.Tech ECE,EEE,EIE – I Sem	L	T/P/D	C
	3	0	3

(R11PHY1101) ENGINEERING PHYSICS-I

Pre-requisites: Intermediate Physics

Course Objectives

- To learn essential concepts in Optics as light interacts with matter.
- To learn basic principles and working of LASERS and Double refracting crystals.
- To describe structural classification and bonding in crystals.
- To know various crystal defects and crystal analysis with X-rays.
- To understand surface phenomenon and size dependent properties of solids.

Course Outcomes

After going through this course the student will be able to

- Realize importance of diffraction in optical elements and interference of light in thin films.
- work with different wave plates to obtain desired polarization and to distinguish LASER light from ordinary light.
- Describe types of crystal systems and bonds in crystals.
- illustrate the importance of X-rays in crystal studies and identify various crystal defects.
- Identify importance of Nano-dimensional materials.

UNIT –I

INTERFERENCE AND DIFFRACTION: Superposition principle, resultant amplitude, coherence, methods to obtain coherent sources, interference, Young's double slit experiment, interference in thin films by reflection, Newton's rings Experiment, Distinguish between Fraunhofer and Fresnel diffraction, diffraction at single slit (Qualitative and Quantitative(Phasors approach)), double slit, circular aperture, and multiple slits (grating)(Qualitative Approach). Resolution of spectral lines, Rayleigh criterion, resolving power of grating and telescope.

UNIT - II

POLARIZATION: Polarization phenomenon, Brewster's Law and Malus law, examples, types of polarization, double refraction, Nicol prism, Quarter and Half wave plates

LASERS: Characteristics of Lasers – Spontaneous and Stimulated Emission of radiation, meta stable state, population inversion, lasing action, Einstein's coefficients and relation between them –– Ruby Laser – Helium-Neon Laser – Carbon dioxide laser - Semiconductor Laser – Applications of lasers.

UNIT - III

FIBER OPTICS: Principle of optical fiber – Acceptance angle and acceptance cone – Numerical aperture – - Types of fibers and refractive index profiles – Qualitative analysis of attenuation in optical fibers –Application of optical fibers.

CRYSTAL STRUCTURES: Space lattice – Unit cell – Lattice parameter – Crystal systems – Bravais lattices Atomic radius – Co-ordination number - Structures and Packing fractions of Simple Cubic – Body Centered Cubic – Face Centered Cubic crystals – Hexagonal closed packed crystals - Structures of diamond, NaCl.

UNIT - IV

DIRECTIONS, PLANES AND X-RD: Miller Indices for Crystal planes and directions – Inter planar spacing of orthogonal crystal systems –Diffraction of X-rays by crystal planes and Bragg's law– Laue method – Powder method – Applications of X-ray diffraction

BONDING IN SOLIDS: Force and energy between two approaching atoms, primary and secondary bonds, binding energy and cohesive energy, Madelung constant, cohesive energy and Madelung constant for NaCl crystal.

DEFECTS IN SOLIDS: Imperfections in crystals – Point defects (Vacancies, Interstitial and Impurities) Schottky and Frenkel defects – (with mathematical treatment)- Line imperfections – Edge and Screw dislocation – Burger vector – Surface defects and volume defects (Qualitative Treatment).

UNIT - V

SURFACE PHYSICS: Surface Electronic structure(work function, thermionic emission, surface states, tangential surface transport), Electron Microscope, Scanning Tunneling Microscope.

SCIENCE and TECHNOLOGY OF NANOMATERIALS:Origin of nanotechnology – (Basic principles of Nanoscience and Technology) surface to volume ratio, quantum confinement – Fabrication of nano materials Bottom up fabrication: sol-gel and

combustion methods – Top down fabrication: CVDand PVD methods– Characterization (XRD and TEM) - Applications of nanotechnology.

TEXT BOOKS:

(1) Introduction to Solid State Physics by Charles Kittel - John Wiley and Sons.
(2) Halliday, Resnick and Krane - Physics vol.2, John Wiley and Sons .
(3) Applied Physics - P.K.Mittal, IK International Publishing House (P) Ltd.
(4) Optics by Ghatak and Thyagarajan - Tata Mc Graw.

REFERENCE BOOKS:

(1) Engineering Physics - R.K.Gaur , S.L.Gupta; Dhanpat Rai and Sons.
(2) Solid State Physics - S.O.Pillai.
(3) Engineering Physics - M Chandra Shekar and P. Appala Naidu, VGS Book links.
(4) Solid State Physics - A.J.Dekker; Macmillan Publishers India Ltd.
(5) Solid State Physics - N.W.Ashcroft and N.David Merwin. Thomson Learning.
(6) Engineering Physics - G Sahashra Buddhe; University Press.
(7) Elements of Solid State Physics - J.P.Srivatsva, PHI Publishers.
(8) Introduction to Optical Communication - G. Keiser.
(9) Fundamentals of Molecular Spectroscopy - Banwell, Tata McGraw Hill.

VNR Vignana Jyothi Institute of Engineering and Technology

I Year B.Tech ECE,EEE,EIE – I Sem	L	T/P/D	C
	3	0	3

(R11HAS1101) ENGLISH

Introduction

This is the age of information and communication technologies. Engineers and technical professionals need to convey technical information in English for various purposes.

Besides learning general English as an international language, engineering students need to be equipped with adequate writing ability so that they can communicate technical information clearly on at least a basic level. A good English writing proficiency can be a contributing factor to professional recognition and career prospects. This course teaches those writing strategies that scientists, engineers, and others will need in order to write successfully on the job. It initiates the students into Technical Writing. The purposes of technical writing are to inform and persuade. This program aims to train students in writing clear, concise and effective English.

This Syllabus is therefore, a Pragmatic English Writing Program for engineering students with intermediate proficiency. The program covers a syllabus outline and instructional approaches on basic writing skills with particular reference to technical writing.

Pre-requisites: Intermediate English

Course Objectives:

- To equip the students with all the LSRW skills for academic writing and speaking.
- To equip the students with basic grammar, infrastructural patterns and grammatical constructions required in technical writing as well as oral communication.
- To acquaint the students with the writing process in preparation for academic and workplace writing.
- Equip the students with the concept of coherence and cohesion for meaningful and coherent communication.

Course Outcomes:

After going through this course the student will be able to

- Comprehend technical writing produced in the engineering profession

- Understand the writing process and create logical paragraphs
- Use infrastructural patterns in writing and speaking
- Communicate coherently orally and in writing

Methodology

A Task-based, process oriented methodology will be used by the teachers to give a practical orientation to the teaching of language. An inductive approach will be used to demonstrate the use of language in context. This should enable the students to internalize the language structures and vocabulary used in context. Students will be exposed to numerous examples and ample practice will be given in the contextual use of language structures.

Syllabus Outline

Unit I : Prose

1. Heaven's Gate by Pico Iyer
2. The Connoisseur by Nergis Dalal

Unit II : Basic Grammar

i) Common Errors
ii) Subject-Verb Agreement
iii) Adverbs
Vi)Transitional elements
v) Use of Articles and Prepositions
vi) Conjunctions
vii) pronoun reference

Unit III Reading and Writing Skills

i) Reading Comprehension
ii) Paragraph Writing
iii) Letter Writing
iv) Memo Writing
v) Words often Confused
vi) Synonyms and Antonyms
vii) One Word Substitutes
viii) Prefixes and Suffixes
ix) Idioms and Phrases

Unit IV : Prose

1. The Cuddalore Experience by Anu George
2. The Odds Against Us by Satyajit Ray

Unit V : Technical Writing Component

A. Definition of a Technical Term
B. Description of a Mechanism
C. Description of a Technical Process
D. Classification
E. Cause and Effect
F. Comparison and Contrast

G. Analogy

Prescribed Text Books

1. Ashraf Rizvi, ***Effective Technical Communication***
2. M. Raman and S. Sharma, ***Technical Communication : Principles and Practices*****,** OUP, 2004. *(Indian Edition)*

References

1. Technical Writing Process and Product - Gerson Sharon J. and Steven Gerson 3rd Edition, New Jersey: Prentice Hall 1999
2. Composition Practice - Blanton, L.L. Book 4 ,2nd Edition, Heinle and Heinle Publishers, pp. 54 , 1993.
3. A course in Analytical Writing for Science and Technology - Georges, T.M. 1996, http://www.mspiggy.etl.noaa.gov/write/
4. Oxford English for Electrical and Mechanical Engineering - Glendinning, E.H. and Glendinning, N Oxford University Press, pp.28,68,83 , 1995.
5. Summary Writing and Sentence Structure in the Advanced ESL Classroom - Greaney, G.L. 1997; Less is More, The Internet TESL Journal, Vol.III, No.9, http://iteslj.org/Techniques/Greaney-Writing.html
6. A Handbook for Technical Communication - Neufeld, J.K.;, Prentice-Hall, Inc. pp.20,65-68, 1987.
7. Principles of Course Design for Language Teaching - Yalden, J Cambridge University Press, 1987
8. Beer and David McMurrey - David F Guide to Writing as an Engineer, 2nd Edition, Wiley, , ISBN: 0471430749, 2004.
9. Applied Writing for Technicians - Dale Jungk, McGraw-Hill, , ISBN 0-07-828357-4, 2005
10. Pocket Style Manual - Diane Hacker, Bedford/St. Martin's, ISBN: 0312406843, 2003.

I Year B.Tech ECE,EEE,EIE – I Sem	L	T/P/D	C
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(R11CSE1101) COMPUTER PROGRAMMING

Pre-requisites: Basic computer Knowledge

Course Objectives

- Discuss the fundamentals concepts of C programming.
- Identify the appropriate decision making and branching statements to solve the problem.
- Understand different derived data types and the concepts of files
- Usage of different c concepts in problem solving.

Course Outcomes

After going through this course the student will be able to

- Understand the fundamentals of C programming.
- Choose the loops and decision making statements to solve the problem.
- Usage of different derived data types and the concepts of files

Implement different c concepts in problem solving

UNIT- I

Introduction to Computers – Computer Systems, Computing Environments (DOS/Linux*)*, Computer languages, Linux commands *,* creating and running programs, Software Development Methods, Algorithms, Pseudo code, flow charts, applying the software development method.

UNIT - II

Introduction to C Language – History, Simple C Programme, Identifiers, Basic data types, Variables, Constants, type qualifiers, Input / Output, Operators. Expressions, Precedence and Associativity, Expression Evaluation, Type conversions, Bit wise operators, Statements, Simple C Programming examples.

Selection Statements – if and switch statements, Repetition statements – while, for, do-while statements, Loop examples, other statements related to looping – break, continue, go to, C Programming examples.

UNIT - III

Designing Structured Programs, Functions- basics, user defined functions, inter function communication, Standard functions, Scope, Storage classes-auto, register, static, extern, scope rules, recursive functions, example C programs.

Arrays – Basic concepts, one-dimensional arrays, two – dimensional arrays, multidimensional arrays, arrays to functions, C program examples.

Strings – Basic concepts, String Input / Output functions, arrays of strings, string handling functions, strings to functions, C programme examples.

UNIT - IV

Derived types – Structures – Basic concepts, nested structures, arrays of structures, structures and functions, unions, typedef, bit fields, enumerated types, C programming examples.

Pointers – Basic concepts, pointers and functions, pointers and strings, pointers and arrays, pointers and structures, self referential structures , example C programs.

UNIT - V

File I/O – Basic concepts, text files and binary files, file input / output operations, file status functions (error handling), C program examples.

Preprocessor Directives, Dynamic Memory Allocation, Command-Line Arguments.

TEXT BOOKS:

1. C programming A Problem-Solving Approach by Behrouz A.Forouzan,E.V.Prasad,Richard F.Gilberg
2. The C Programming Language by Brian W. Kernighan, Dennis M. Ritchie

REFERENCES:

1. Let Us C Yashavant kanetkar BPB
2. C How to Program Paul Deitel and Harvey Deitel , PH
3. Absolute beginner's guide to C, Greg M. Perry, 2nd Edition,Publisher: Sams Publications, 1994

I Year B.Tech ECE,EEE,EIE – I Sem	L	T/P/D	C
	3	3	4

(R11MED1105) ENGINEERING DRAWING

Pre-requisites: Geometrical constructions

Course Objectives:

- Remember the conventions of Engineering Drawing and Auto Cad software commands
- Remember the importance of engineering curves
- Know the importance of orthographic projections for points, lines, planes and solids
- Know the various types of projections- orthographic to isometric and vice-versa

Course Outcomes:

After going through this course the student will be able to

- Interpret the concepts of curves and Solve the problems as per the drawing conventions in Auto Cad
- Solve the problems on Projections for points,lines, planes and solids in Auto Cad
- Apply the concepts of isometric projections and solve the problems in Auto CAD
- Apply the concepts of orthographic projections and solve the problems in Auto CAD

UNIT – I

Introduction to engineering graphics – construction of ellipse, parabola and hyperbola – cycloidal curves.

UNIT – II

Orthographic projections of points, lines and planes – axis inclined to one planes and inclined to both the planes.

UNIT – III

Orthographic projections of solids:

Cylinder, cone, prism, pyramid and sphere positions and axis inclined to both the planes.

UNIT – IV

Isomeric projections of lines, planes and simple solids.

UNIT – V

Conversion of orthographic views into isometric views and vice-versa.

TEXT BOOKS :

1. Engineering drawings By N.D.Bhatt.
2 Engineering graphics By K.L. Narayana and P.Kannayya.

REFERENCES:

1. Engineering drawing and graphics: Venugopal/ New age
2. Engineering drawing : Johle / TMH

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(R11HAS1201) ENGLISH LANGUAGE COMMUNICATION SKILLS LABORATORY-I

The English language Communication Skills Lab aims to provide practice in all the four skills of LSRW, and provide ample practice in listening and speaking skills.

Pre-requisites: Intermediate English, Intermediate level LSRW skills

Course Objectives

- Provide ample practice in LSRW skills and train the students in oral presentations, public speaking, role play and situational dialogue.
- Provide practice in vocabulary usage, grammatical construction, structural patterns, and improve comprehension abilities in the students.
- Train students to use neutral pronunciation through phonetic sounds, symbols, stress and intonation.
- Enable students to transfer information from verbal to graphic representation and vice versa

Course Outcomes

After going through this course the student will be able to

- Comprehend spoken and written discourse.
- Speak fluently with neutral pronunciation and exhibit interpersonal skills.
- Write accurately, coherently and lucidly making appropriate use of words depending on context and present data clearly.
- Introduce oneself to people and be able to speak extempore

Syllabus for Lab Sessions

Unit 1

Multimedia Lab

1. Phonetics
2. Listening Comprehension
3. Vocabulary Lesson 1

Oral Communication Skills Lab: Self Introduction ; E-mail

Unit 2

Multimedia Lab

1. Grammar ---Nouns and Pronouns; The Present Tense
2. Vocabulary Lesson 2
3. Listening Skills

Oral Communication Skills Lab: Role Play/ Situational Dialogues

Unit 3

Multimedia Lab

1. Telephoning Skills
2. Grammar --- Articles; The Past Tense
3. Vocabulary Lesson 3

Oral Communication Skills Lab: JAM/ Short Talk

Unit 4

Multimedia Lab

1. Grammar ---- Concord; The Future Tense
2. Vocabulary Lesson 4
3. Listening Comprehension

Oral Communication Skills Lab: Information Transfer

Unit 5

Multimedia Lab

1. Grammar --- Adjectives, adverbs, conjunctions
2. Vocabulary -- Lesson 5

Oral Communication Skills Lab : Presentation Skills

Multimedia Lab Requirements

The English Language Lab shall have two parts:

i) **The Computer aided Language Lab** for 60 students with 60 systems, one master console,
LAN facility and English language software for self- study by learners.

ii) **The Communication Skills Lab** with movable chairs and audio-visual aids with a P.A System,
a T. V., a digital stereo –audio and video system and camcorder etc.

System Requirement (Hardware component):

Computer network with Lan with minimum 60 multimedia systems with the following specifications:

iv) P – IV Processor

a) Speed – 2.8 GHZ
b) RAM – 512 MB Minimum
c) Hard Disk – 80 GB
v) Headphones of High quality

5. Suggested Software:

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

Suggested Software:

- **Clarity Pronunciation Power** – part II
- **Oxford Advanced Learner's Compass**, 7th Edition
- **DELTA's key to the Next Generation TOEFL Test: Advanced Skill Practice.**
- **Lingua TOEFL CBT Insider**, by Dreamtech
- **TOEFL and GRE** (KAPLAN, AARCO and BARRONS, USA, Cracking GRE by CLIFFS)

Multimedia Lab Requirements

Minimum Requirement:

The English Language Lab shall have two parts:

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Lingua TOEFL CBT Insider, by Dreamtech

TOEFL and GRE (KAPLAN, AARCO and BARRONS, USA, Cracking GRE by CLIFFS)

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(R11MED1202) WORKSHOP PRACTICE
(10 + 6 Weeks)

Pre-requisites: Basic Knowledge of Maths, English, Physics

CourseObjectives:

- To study/demonstrate the concepts of computer w.r.t. its hardware, operating system, assembling and disassembling.
- To conduct the experiments related to production engineering technology.
- To demonstrate the usage of power tools
- To get the knowledge of machine shop for different exercises

Course Outcomes

After going through this course the student will be able to

- To identify, assemble, dissemble, install and write commands for a given configuration of a computer.
- To create components using the techniques of Carpentry, Tin Smithy, Welding and Fitting etc. listed in trades for exercises.
- To evaluate the jobs prepared in different trades with the models prepared using various machine tools.
- To evaluate the performance of different Power Tools.

TRADES FOR EXCERCISES

At least two exercises from each trade:

1. Carpentry
2. Tin-Smithy
3. Fitting
4. Welding
5. Electrical Wiring

1. Computer Hardware: Identification of Parts, AsSembling and disasSembling Simple diagnostic exercises -

2. Installation of Operating System : Windows , Linux – Basic Commands Simple diagnostic exercises .

TEXT BOOKS

1. Work shop Manual - P.Kannaiah/ K.L.Narayana, Scitech Publishers.
2. Workshop Manual by Venkat Reddy.
3. Engineering Workshop Practice – V Ramesh Babu, VRB Publishers Pvt. Ltd.
4. IT Essentials PC Hardware and Software Companion Guide Third
5. Edition by Davis Anfinson and Ken Quamme – CISCO Press, Pearson Education.
6. PC Hardware and A+ Handbook – Kate J. Chase PHI (Microsoft)

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	0	3	2

(R11CSE1201) COMPUTER PROGRAMMING LABORATORY

Pre-requisites: Basic computer Knowledge

Course Objectives

- Discuss about different linux commands.
- Understand the basic structure of C Programming.
- List different decision making and branching statements, derived data types to solve the given problem
- Usage of different c concepts in problem solving.

Course Outcomes

After going through this course the student will be able to

- Able to write, compile and debug programs in C language using both Linux and windows environment
- Implement appropriate decision making statements and derived data types to solve a given problem.
- Implement different concept s of files to solve real world examples.
- Implement different c concepts in problem solving.

Week 1

1. WAP that reads three different integers from the keyboard and prints – sum, average, product, smallest, largest of the numbers.
2. WAP that reads two integers and prints – difference, quotient and remainder
3. WAP that reads two integers and determines whether the first is a multiple of the other

Week 2

1. Write a C program to find the sum of individual digits of a positive integer.

2. Write a program to generate Fibonacci sequence (1, 1 ,2, 3, 5, 8,…)

3. Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.

Week 3

1. Write a C program to calculate the following Sum: Sum=1-x2/2! +x4/4!-x6/6!+x8/8!-x10/10!
2. Write a C program to find the roots of a quadratic equation.

Week 4

1. Write a C program, which takes two integer operands and one operator from the user, performs the operation and then prints the result. (Consider the operators +,-,*, /, % and use Switch Statement)
2. Write a C program to generate Pascal's triangle.
3. Write a C program to construct a pyramids of numbers

Week 5

1 WAP to print a given number [0-1000] in words. For example, 123 as One Hundred and Twenty Three

2 WAP to check whether a given number is an Armstrong, Palindrome, Perfect, Prime, or a Fibonacci prime Number

3 Write a C program to find both the largest and smallest number in a list of integers

Week 6

1. Implementation of functions categories.
2. Write C programs that use both recursive and non-recursive functions
   i) To find the factorial of a given integer.
   ii) To find the GCD (greatest common divisor) of two given integers.

Week 7

1. Write a C program to calculate

i) Minimum and maximum of an 1-d array

ii) Sorting and Searching of 1-D array

iii) Addition and Multiplication of Two Matrices

Week 8

1. Programs on String handling functions-Copying, reverse, substring, concatenation.
2. Programs on structure and unions.

Week 9

Midterm exam

Week 10

Programs using pointers- pointer basic operations, pointers and functions

Week 11

Program on pointers and structures, Pointers and arrays, pointers and strings.

Week 12

Implementation of file operations and error handling.

Week 13

Implementation of Dynamic memory allocation

Week 14

Programs using command line arguments.

Week 15

Implementation of preprocessor directives

Week 16

Internal Lab Exam

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	4	0	4

(R11EEE1101) CIRCUIT THEORY

Pre-requisites: Mathematics, Physics

Course Objectives

- To analyze transient response of circuits with dc excitation
- To understand two port network parameters, filters and attenuators
- To know about performance of DC machines
- To understand the operation of transformers and AC machines

Course Outcomes

After going through this course the student will be able to

- Analyze transient response of circuits
- Evaluate two port parameters and design simple filters
- Appreciate the working of DC machines
- Understand the operation of transformers and AC machines

Objective:

This course introduces the basic concepts of circuit analysis which is the foundation for all subjects of the Electrical Engineering discipline. The emphasis of this course is laid on the basic analysis of circuits which includes Magnetic circuits, Single phase circuits, Resonance, Network topology and Theorems.

UNIT–I Introduction to Electrical Circuits

Circuit Concept – R-L-C parameters – Voltage and Current sources – Independent and dependent sources-Source transformation – Voltage – Current relationship for passive elements (for different input signals-square, ramp, saw tooth, triangular). Kirchhoff's laws – network reduction techniques – series, parallel, series parallel, star-to-delta or delta-to-star transformation.

UNIT–II Magnetic Circuits

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

UNIT–III Single Phase A.C Circuits

R.M.S and Average values and form factor for different periodic wave forms, Steady state analysis of R, L and C (in series, parallel and series parallel combinations) with sinusoidal excitation – Concept of Reactance, Impedance, Susceptance and Admittance – Phase and Phase difference – concept of power factor, Real and Reactive powers – J-notation, Complex and Polar forms of representation, Complex power.

UNIT-IV Locus diagrams and Resonance

Locus diagrams – series R-L, R-C, R-L-C and parallel combination with variation of various parameters – Resonance – series, parallel circuits, concept of band width and Q factor.

UNIT–V Network topology and Network theorems

Definitions – Graph – Tree, Basic cutset and Basic Tieset matrices for planar networks – Nodal analysis, Mesh analysis, Super Node and Super Mesh analysis of Networks with Independent and Dependent voltage and current sources - Duality and Dual networks.

Superposition, Reciprocity, Thevenin's, Norton's, Maximum Power Transfer, Tellegen's, Millman's and Compensation theorems for d.c. and a.c. excitations.

TEXT BOOKS:

1. Engineering circuit analysis - William Hayt and Jack E. Kemmerly, Mc Graw Hill Company, 6th Edition.
2. Network Analysis - A. Sudhakar, Shyammohan Palli, Mc Graw Hill Company,
3. Circuit Theory - A. Chakrabarti, Dhanipat Rai and Co., 6th Edition.

REFERENCES:

1. Network Analysis by M. E Van valkenburg, PHI.
2. Linear circuit analysis (time domain phasor, and Laplace transform approaches) by RAYMOND A.DECARLO and PEN-MIN-LIN, Oxford University Press. 2nd Edition 2004.
3. Network Theory: - N.C. Jagan and C.Lakshminarayana, B.S Publications.
4. Electrical Circuit theory by K. Rajeswaran, Pearson Education 2004.
5. Basic Circuit analysis by D.R, Cunningham and J.A Stuller, Jaico Publications.

I Year B.Tech ECE,EEE,EIE – II Sem	L	T/P/D	C
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(R11MTH1104) NUMERICAL ANALYSIS AND LINEAR PROGRAMMING

Pre-requisites: Integration, Differentiation

Course Objectives

- Understand the numerical methods for non linear systems, evaluating definite integrals and ordinary differential equations.
- Understand various methods of interpolation.
- Understand the simplex method and methods to solve the transportation problem.

Course Outcomes

After going through this course the student will be able to

- Apply the numerical methods to find a root of algebraic and transcendental equations.
- Apply the numerical methods to find the solutions of ordinary differential equations.
- Use simplex method procedure to optimize a linear function.
- Solve transportation problems.

NUMERICAL ANALYSIS

UNIT I

Solutions of non-linear systems

Introduction; Mathematical preliminaries; Solution of algebraic and transcendental equations – the bisection method, the method of false position, the iteration method, Newton - Raphson method, and order of convergence.

UNIT II

Interpolation

Introduction; Errors in polynomial interpolation; Finite differences; Forward differences; Backward differences; Central differences; Symbolic relations and separation of symbols; Differences of a polynomial; Newton's formulae for interpolation; Central difference interpolation formulae; Gauss's central difference formulae; Lagrange and Hermite interpolation formulae; Cubic spline interpolation.

UNIT III

Numerical differentiation and Integration

Introduction; Differentiation of equally and unequally spaced data, and finite difference approximations; Trapezoidal rule, Simpson's 1/3 rule, and Simpson's 3/8 rule.

Numerical solutions of ordinary differential equations

Solution of initial value problems by Taylor's series - Picard's method of successive approximations, Euler's method, and Runge - Kutta methods; Predictor Corrector methods – Adams-Bashforth-Moulton method.

UNIT IV

Numerical solutions of partial differential equations (PDE)

Introduction; Classification of second order PDE; finite difference approximations to derivatives; Solution of Laplace and Poisson equation - Jacobi's method, Gauss-Seidal method by Leibmann's Solution of parabolic equations (heat equation) by explicit and Crank Nicolson implicit scheme method; Solution of hyperbolic equations (wave equation).

LINEAR PROGRAMMING

UNIT V

Linear programming

Basic concepts; formulation of linear programming problem; constrained optimization-linear programming - simplex method, dual simplex method, and transportation problems.

TEXT BOOKS

1. Introduction to Numerical Analysis - S.S.Sastry*, PHI , 2010.*
2. Operations Research - Prem Kumar Gupta and D.S.Hira, *S.Chand,* 2003.

REFERENCES

1. Advanced Engineering Mathematics - Erwin Kreyszig, 8th Edition, *John Wiley and Sons.*
2. Advanced Engineering Mathematics - Peter V. O'Neil, 9th Edition, *Cengage Learning.*
3. Elementary Numerical Analysis – an algorithmic approach - Samuel D. Conte and Carl De Boor ,3rd edition,*Tata McGraw Hill,* 2006.
4. *Numerical Analysis - R.L Burden and J.D Faires, , 7th ediation, Thomson, 2007.*

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I Year B.Tech ECE,EEE,EIE – II Sem	**L**	**T/P/D**	**C**
	3	**0**	**3**

(R11PHY1102) ENGINEERING PHYSICS-II

Pre-requisites: Intermediate Physics

Course Objectives

- To learn basic concepts that lead to the development of Quantum Mechanics.
- To study behavior of electrons in metals.
- To describe the principles of conduction of charges in semiconductor.
- To learn the classification and behavior of magnetic materials and super conductors.
- To study dielectric properties of material.

Course Outcomes

After going through this course the student will be able to

- Distinguish fermions and bosons, recognize wave nature of particles and one dimensional behavior of a particle quantum mechanically.
- Illustrate periodic motion of electrons in solids that leads to classification of solids into conductors, semiconductors and non conductors.
- Estimate the concentration of charge carriers in semiconductors and realize the importance of principle of in P-n junction which is the fundamental for many semiconductor devices.
- Distinguish magnetic materials, especially ferrites and realize the importance of super conducting materials.
- Understand the dielectric behavior of materials under application of electric fields.

UNIT- I

ELEMENTS OF STATISTICAL MECHANICS: Maxwell-Boltzmann, Bose-Einstein and Fermi-Dirac statistics (non mathematical treatment) – Photon gas –Planck's law of black body radiation – Deduction of Wein's law and Rayleigh-Jeans law from Plank's law.

PRINCIPLES OF QUANTUM MECHANICS: Waves and particles – De Broglie hypothesis - Matter waves - Davisson and Germer experiment –Heisenberg's uncertainty principle - Schrodinger Wave Equation – Wave function and its Physical

Significance - Particle in one dimensional potential box(wave functions, probability densities and energy states).

UNIT - II

FREE ELECTRON FERMI GAS: Energy levels in one dimension, Effect of temperature on the Fermi-Dirac distribution, Free electron gas in three dimensions, electrical conductivity and Ohm's law, Electrical Resistivity of Metals (Qulitaitve), thermal conductivity of metals.

BAND THEORY OF SOLIDS: Electron in a periodic potential – Bloch Theorem - Kronig-Penney model (non mathematical treatment) – Origin of energy band formation in solids – Classification of materials into conductors, Semiconductors and Insulators - Concept of effective mass of an electron.

UNIT- III

SEMICONDUCTOR PHYSICS: Fermi level in Intrinsic and Extrinsic Semiconductors - Intrinsic Semiconductor and carrier concentration – Extrinsic Semiconductor and carrier concentration – Equation of continuity – Direct and indirect band gap Semiconductors - Hall effect.

PHYSICS OF SEMICONDUCTOR DEVICES: Formation of p-n junction – open circuit p-n junction – Energy diagram of diode – i/v characteristics of p-n junction diode – p-n diode as a rectifier – Diode equation – LED

UNIT- IV

MAGNETIC PROPERTIES :Permeability, Field intensity, magnetic field induction, Magnetization and Magnetic susceptibility – Origin of magnetic moment, Bohr magneton – Classification of magnetic materials (Dia, Para and Ferro)- Domain theory of ferromagnetism, Hysteresis curve – Soft and Hard magnetic materials – properties of Anti ferro and Ferri magnetic materials – Ferrites and their applications.

UNIT V

SUPERCONDUCTORS: Experimental survey and superconductivity phenomenon, – Meissner effect – Critical fields and Persistent currents, Type I and Type II superconductors - London equations- flux quantization, BCS theory, Josephson effect – High temperature Superconductors, Applications of Superconductors.

DIELECTRIC PROPERTIES:Electric dipole, Dipole moment, Dielectric constant, Electronic, Ionic and Orientation Polarization – Calculation of Polarizibilities – Internal fields – Claussius – Mossotti equation –Piezo and Ferro electricity

TEXT BOOKS:

(1) Introduction to Solid State Physics by Charles Kittel (Publishers: John Wiley and Sons) for units 2 to 5
(2) Concepts of Modern physics by Arthur Beiser, McGraw Hill Inc.
(3) Applied Physics by P.K.Mittal, IK International Publishing House (P) Ltd

References

1. Solid State Physics - S.O.Pillai, New Age Publishers
2. Solid State Physics - A.J.Dekker; Macmillan Publishers India Ltd.
3. Engineering Physics - Dr M Chandra Shekar and Dr P. Appala Naidu, VGS Book links.
4. Solid State Physics - N.W.Ashcroft and N.David Merwin. Thomson Learning
5. Engineering Physics - G Sahashra Buddhe; University Press
6. Elements of Solid State Physics - J.P.Srivatsva, PHI Publishers
7. Engineering Physics - M.R.Srinivasan, New Age Publishers

I Year B.Tech ECE,EEE,EIE – II Sem	L	T/P/D	C
	3	0	3

(R11CHE1101) ENGINEERING CHEMISTRY

Prerequisite: General Chemistry

Course Objectives

- Understand electrochemistry which deals with the utilization of electrical energy of an external source for bringing about a physical or chemical change.
- Knowledge of "Corrosion engineering education" and Usage of polymers in modern world as an integral part of every human's life.
- Knowledge of purification techniques and various applications of soft water in industries.
- Usage of nano-materials as emerging scientific components with amazing potential applications in various fields.

Course Outcomes

After going through this course the student will be able to

- Visualize the chemical applications of electricity.
- Prevention of corrosion of metals and applications of polymers from domestic articles to sophisticated scientific and medical instruments.
- Benefits of treated water as source in steam generation and other fields like production of steel, paper, textiles, atomic energy etc.
- The applicability and greater efficiency of using a material at nanoscale in different engineering fields

UNIT- I

Electrochemical cells and Batteries:

Cell representation, Galvanic cells, Single electrode potential, standard electrode potential, Electrochemical series, Nernst equation, Concentration cells. Reference electrodes – (Hydrogen, Calomel, Quinhydrone electrode), Ion Selective Electrodes (Glass Electrode and Flouride Electrode), Numerical problems.

Batteries: Primary and secondary cells, (lead-Acid cell, Ni-Cd cell, Lithium cells). Applications of batteries.Fuel cells – Hydrogen – Oxygen fuel cells, Advantages of fuel cells. Solar cells: working, principle and applications.

UNIT- II

Corrosion and its control:Introduction, causes and different types of corrosion and effects of corrosion. Theories of corrosion – Chemical, Electrochemical corrosion, corrosion reactions, factors affecting corrosion – Nature of metal – galvanic series, over voltage, purity of metal, nature of oxide film, nature of corrosion product. Nature of environment -effect of temperature, effect of pH, Humidity, effect of oxidant.

Corrosion control methods – cathodic protection, sacrificial anode, impressed current cathode. Surface coatings – methods of application on metals - hot dipping, galvanizing, tinning, cladding, electroplating -Organic surface coatings – paints constituents and functions.

UNIT- III

Polymers:

III a).Polymers: Introduction**,** Types of Polymerization, Plastics: Thermoplastic resins and Thermoset resins. Compounding and fabrication of plastics, preparation, properties, engineering applications of: polyethylene, PVC, PS, Teflon, Bakelite, Nylon.

III b).Rubber: Characteristics and uses Rubber –Natural rubber, vulcanization. Elastomers – Buna-s, Butyl rubber, Thiokol rubbers, Fibers – polyester, Fiber reinforced plastics (FRP), applications.

UNIT- IV

Water: Introduction, Hardness: Causes, expression of hardness – units – types of hardness, estimation of temporary and permanent hardness of water, numerical problems. Boiler troubles – Scale and sludge formation, caustic embrittlement, corrosion, priming and foaming Softening of water (Internal and external treatment- Lime soda, Zeolite, Ion exchange process and Numerical problems) Reverse osmosis, Electro dialysis.

UNIT- V

Nano-materials: Introduction, preparation and applications of nanomaterials with special reference to Carbon nano tubes.

Insulators: Classification of insulators, characteristics of thermal and electrical insulators and applications of Superconductors (Nb-Sn alloy, $YBa_2 Cu_3 O_{7-x}$).

TEXT BOOKS

1. Text book of Engineering Chemistry - Y.Bharathi Kumari, Jyotsna Cherukuri, VGS Book Links, Vijayawada.
2. Engineering Chemistry - P.C.Jain and Monica Jain, Dhanpatrai Publishing Company.

REFERENCES

1. Text book of Engineering Chemistry - S.S. Dhara and Mukkanti, S.Chand and Co. New Delhi.
2. Text book of Engineering Chemistry - C.P.Murthy, C.V.Agrawal, A.Naidu, B.S.Publications,Hyderabad.
3. Text book of Engineering Chemistry - R.Gopalan,D.Venkappayya,Sulochana Nagarajan, Vikas Publishers.

I Year B.Tech ECE,EEE,EIE – II Sem	L	T/P /D	C
	3	0	3

(R11CSE1102) DATA STRUCTURES

Prerequisites: 'C' Programming language

Course Objectives

- List various linear data structures and non linear data structures.
- Understand various operations of linear data structures and non linear data structures
- List the application of linear data structures.
- Identify basic and advanced sorting and searching techniques

Course Outcomes

After the completion of the course students will be able to

- Explore and analyze the working of linear data structures like list, stack and variations of queue in both static and dynamic implementation.
- Relate and demonstrate the application of linear data structures.
- Illustrate and Implement basic non linear data structures like trees, graphs and their operations.
- Identify and Implement basic and advanced comparison based sorting and searching techniques

UNIT-1

Data Structures – Introduction to Data Structures, abstract data types, Linear list – singly linked list implementation, insertion, deletion and searching operations on linear list, circular linked list implementation, Double linked list implementation, insertion, deletion and searching operations. Applications of linked lists.

UNIT – 2

Stacks-Operations, array and linked representations of stacks, stack application-infix to postfix conversion, postfix expression evaluation, recursion implementation.

UNIT-3

Queues-operations, array and linked representations. Circular Queue operations, Dequeues, applications of queue.

UNIT-4

Trees – Definitions, Binary tree representation, Binary search tree, binary tree traversals.

Graphs – Definitions, Graph representations, Graph traversals.

UNIT-5

Searching and Sorting – Big O Notation , Sorting- selection sort, bubble sort, insertion sort, quick sort, merge sort,

Searching-linear and binary search methods.

TEXT BOOKS:

1. C Programming and Data Structures - B.A.Forouzan and R.F. Gilberg, Third Edition, Cengage Learning.
2. Data Structures Using C (Paperback) - Aaron M. Tenenbaum

REFERENCES:

1. C and Data structures – P. Padmanabham, Third Edition, B.S. Publications.
2. Data Structures using C – A.M.Tanenbaum, Y.Langsam, and M.J. Augenstein, Pearson Education / PHI
3. C Programming and Data Structures, E. Balagurusamy, TMH.
4. C Programming and Data Structures - P. Dey, M Ghosh R Thereja, Oxford University Press
5. C and Data structures – E V Prasad and N B Venkateswarlu, S. ChandandCo.

I Year B.Tech ECE,EEE,EIE – II Sem	L	T/P/D	C
	3	0	3

(R11CED1109) ENVIRONMENTAL STUDIES

Pre-requisites:

Course Objectives:

- Develop an understanding of the necessity of protection of environment
- Develop an understanding of Natural resources
- Develop an understanding of Biodiversity
- Develop an understanding of Global Environmental problems and Environmental pollution

Course Outcomes:

After going through this course the student will be able to

- Acquire the knowledge on environment
- Acquire the knowledge of various Natural Resources
- Develop skills in understanding of various environmental problems
- Develop skills to protect the Environment

UNIT-I

Introduction, Definition, scope and Importance

Ecosystems: Introduction, types, Classification of Eco system, structure and functions of ecosystems.

Bio-diversity and its conservation, Value of bio-diversity Bio-geographical classification of India – India as a mega diversity habitat, Threats to bio-diversity –Hot-spots of Bio Diversity, Conservation of bio-diversity.

UNIT-II

Natural Resources: Classification of Resources, Land resources, Land degradation, Soil erosion and desertification, Food resources, Effects of modern agriculture, fertilizer pesticide problems, Food miles, organic farming, Forest resources, Use and over-

exploitation, Water resources, Dams –benefits, Conflicts over Water, Energy resources-sustainable Development, and Energy Audit

UNIT III

Environmental pollution and its control :Classification of pollution and pollutants, Air pollution, causes ,Effects ,Control measures, ambient air quality standards, water pollution causes , Effects ,Control measures, water and waste water treatment methods, water quality standards, Noise pollution causes ,Effects ,Control measures, land pollution causes ,Effects ,Control measures, solid waste disposal methods ,characteristics of e-waste and management

UNIT IV

Global Environmental problems and global Efforts: Nuclear hazards, Global warming, Acid rain, hurricanes, Hazardous Waste, Overpopulation , ozone layer depletion, Clean development mechanism , Green computing ,Green Building ,carbon credits, carbon trading

International conventions/protocols: Earth summit, Kyoto protocol and Montreal protocol, Stockholm Declaration

UNIT V

Environmental Impact Assessment and Environmental Management plan: Definition of impact, Classification of Impacts, Prediction of Impacts and Impact assessment Methodologies, Environmental Impact Statement, Environmental Management plan: Technological Solutions

TEXT BOOKS

1. Introduction to Environmental Science by Y.Anjaneyulu, BS Publications
2. Text book of Environmental studies by Deeksha dave, Cengage publishers
3. Text book of Environmental studies by M.Anji Reddy, BS Publications

REFERENCES

1. Text book of Environmental studies by Anuba Kaushik & C P Kaushik, Newage International Pvt.Limited
2. Text book of Environmental studies by S V S Rana, Rastogi Publications
3. Text book of Environmental studies by Dr. K Raghavan Nambiar, Scitech Publishers

I Year B.Tech ECE,EEE,EIE – II Sem	L	T/P/D	C
	0	3	2

(R11CSE1202) DATA STRUCTURES LABORATORY

Prerequisites: 'C' Programming language

Course Objectives

- Identify various linear Data structures.
- Demonstrate the applications of linear data structures.
- Able to write program for the implementation of non linear data structures.
- Examine various basic and advanced sorting and searching techniques and analyze their performances

Course Outcomes

After the completion of the course students will be able to

- Relate various basic concepts of data structures.
- Design and implement various linear and non linear data structures for a given application.
- Implement and analyze the performance of different searching and sorting techniques.
- Apply the appropriate data structures for the given application.

WEEK1:

1. Write a program for creation, Search and Traversal of Single Linked List
2. Write a program to perform insertion and deletion operations in Single Linked List
3. Write a program to merge two single linked lists

WEEK2:

1. Write a program for creation, Search and Traversal of Circular Linked List
2. Write a program to perform insertion and deletion operations in Circular Linked List

WEEK 3:

1. Write a program for creation, Search and Traversal of Double Linked List
2. Write a program to perform insertion and deletion operations in Double Linked List

WEEK 4:

1. Write a program to implement stack using Arrays
2. Write a program to implement stack using Linked List

WEEK 5:

1. Write a program to convert infix expression to postfix expression using stack
2. Write a program to evaluate postfix expression

WEEK 6:

1. Write a program to implement recursion
2. Write a program to convert infix expression to prefix expression using stack

WEEK 7:

1. Write a program to implement Linear queue using Array
2. Write a program to implement Linear queue using Linked List

WEEK 8:

1. Write a program to implement insertions and deletions in a circular Queue
2. Write a program to perform search and count operations in a circular queue

WEEK 9:

1. Write a program to implement insertions and deletions in a Dequeue
2. Write a program to perform search and count operations in Dequeue

WEEK 10: Midterm Exam

Week 11:

1. Write a program to implement Linear search
2. Write a program to implement Binary Search

Week 12:

1. Write a program to implement Selection sort
2. Write a program to implement Bubble sort
3. Write a program to implement Insertion sort

WEEK 13:

1. Write a program to implement Merge sort
2. Write a program to implement Quick sort

WEEK 14:

1. Implementation of a binary tree representation using Arrays
2. Write a program to search an element, to print right and left children of every node in a tree

Weeks 15:

1. Implementation of a Graph representation using Adjacency Matrix
2. Write a program to print all adjacent nodes of every node in a graph

WEEK 16: Final Internal Lab Exam

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I Year B.Tech ECE,EEE,EIE – II Sem	L	T/P/D	C
	0	3	2

(R11EPC1201) ENGINEERING PHYSICS LABORATORY

(R11EPC1201) ENGINEERING PHYSICS LABORATORY

Course Objectives

- To practically learn interaction of light with matter through physical phenomena like
  interference, diffraction and dispersion.
- To understand the periodic motion and formation of standing waves and to know the characteristics of the capacitors and resistors.
- To compare the experimental results with the class room learning.

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Course Outcomes

After the completion of the course students will be able to

- Demonstrate the optical phenomena with formation of Newton Rings, and formation of spectra with a grating and a prism.
- Illustrate periodic motion by measuring rigidity modulus of a material and formation of standing waves by Melde's apparatus and also discharging of a capacitor.
- Correlate the experimental results with the class room learning

Any Eight Experiments from the following:

1. Dispersive Power of the material of a Prism using Spectrometer
2. Diffraction Grating (both with Laser and non-laser source)
3. Single Slit with laser light
4. Newton's Rings
5. Finding thickness of a thin wire or sheet by forming a wedgeshaped film
6. Energy gap of a Semiconductor material
7. Torsional Pendulum Expt. to determine the rigidity modulus of material of a wire
8. Melde's experiment
9. Sonometer Experiment
10. Numerical Aperture and Acceptance angle of an optical fiber cable

11. Stewart Gee's experiment
12. Characteristics of LED.
13. Photo cell/ Solar Cell

Book: Essential Practical Lab Manual of Physics - P.Raghavendra Rao

ENGINEERING CHEMISTRY LABORATORY

Course Prerequisites: General Maths, General chemistry.

Course Objectives:

- Estimation of hardness of water is essential for drinking water and in industries to avoid boiler troubles.
- Knowledge of instrumentation in Colorimeter, Redwood viscometer, Conductivity meter and pH meter.
- Knowledge of preparation of soap.

Course Outcomes:

- Understand the extent of hardness range present in a water sample and its consequences if used for various industrial operations.
- Determination of strength of solutions, pH of various solutions, lubricants usage in machinery to prevent wear and tear.
- Understanding the composition of soap used for washings.

LIST OF EXPERIMENTS:

1. Titrimetry

a) Estimation of hardness of water by EDTA method.

2. Instrumental methods

(i) Conductometry

a) Conductometric titration of strong acid Vs Strong base

(ii) Colorimetry

a) Estimation of copper by colorimetric method

(iii) Potentiometry

a) Titration of strong acid Vs Strong base by potentiometry

3. Physical properties

a) Determination of viscosity of sample oil by Redwood viscometer.

4. Preparation of organic compounds

a) Preparation of aspirin or Thiokol rubber

TEXT BOOKS:

1. Laboratory Manual on Engineering Chemistry - S.K.Bhasin and Sudha Rani,Dhanpat Rai Publishing Company.
2. Laboratory Manual on Engineering Chemistry - Y.Bharathi Kumari, Jyotsna Cherukuri, VGS Book Links, Vijayawada.

I Year B.Tech ECE,EEE,EIE – II Sem	L	T/P/D	C
	0	3	2

(R11HAS1202) ENGLISH LANGUAGE COMMUNICATION SKILLS LABORATORY-II

In continuation with the first Year I Semester syllabus, this course offers further practice in Listening, Speaking, and Grammar in preparation for the advanced speaking and writing skills offered in the III Year .

Pre-requisites: Intermediate English, Intermediate level LSRW skills

Course Objectives

- Provide ample practice in LSRW skills and train the students in oral presentations, public speaking, role play and situational dialogue.
- Provide practice in vocabulary usage, grammatical construction, structural patterns, and improve comprehension abilities in the students.
- Train students to use neutral pronunciation through phonetic sounds, symbols, stress and intonation.
- Enable students to transfer information from verbal to graphic representation and vice versa

Course Outcomes

After the completion of the course students will be able to

- Comprehend spoken and written discourse.
- Speak fluently with neutral pronunciation and exhibit interpersonal skills.
- Write accurately, coherently and lucidly making appropriate use of words depending on context and present data clearly.
- Introduce oneself to people and be able to speak extempore

Unit I

Multimedia Lab :

1. Listening Comprehension
2. Grammar -- Voice
3. Vocabulary Lesson 6

Oral Communication Skills Lab : Self Introduction

Unit 2

Multimedia Lab :

1. Grammar - Conditionals and Prepositions
2. Listening Comprehension
3. Vocabulary Lesson 7

Oral Communication Skills Lab : 1. Description of Objects 2. Description of Processes

Unit 3

Multimedia Lab :

1. Grammar -- Use of Subordinate Clauses; Phrasal Verbs; Idioms
2. Vocabulary Lesson 8

Oral Communication Skills Lab : Presentation Skills

Unit 4

Multimedia Lab :

1. Grammar -- Use of Substitution, Reference and Ellipsis
2. Listening Comprehension
3. Vocabulary Lesson 9

Oral Communication Skills Lab : Debate

Unit 5

Multimedia Lab :

1. Grammar --- Parallelism, Repetition, Nominalization
2. Vocabulary Lesson 10

Oral Communication Skills Lab : Group Discussions

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II Year B.Tech ECE – I Sem	**L**	**T/P/D**	**C**
	3	**1**	**3**

(R11MTH1105) APPLIED MATHEMATICS
(SPECIAL FUNCTIONS AND COMPLEX ANALYSIS)

Pre-requisites: Calculus

Course Objectives

- Identify the difference of power series and Frobenius method and
- Obtain the solutions of Bessel and Legender equations.
- Distinguish Cauchy's integral theorem and Cauchy's integral formula.
- Apply Taylor's Series and Laurent series to expand the function.
- Understand the idea of a conformal mapping

Course Outcomes

After going through this course the student will be able to

- Solve Second order D.E's with variable coefficients.
- Use the Cauchy-Riemann equations to obtain the derivative of complex functions
- Use residues to evaluate contour integrals
- Calculate the image of the given curve under the given transformation

SPECIAL FUNCTIONS

UNIT I

Special functions

Series solutions of second order Ordinary Differential Equations , Regular point , Regular singular point, Frobineous Method ,Bessel functions properties. Recurrence relations, Orthogonality. Legendre polynomials , Properties, Rodrigue's formula, Recurrence relations and Orthogonal properties.

COMPLEX ANALYSIS

UNIT II

Functions of a complex variable

Functions of a complex variable Continuity,Differentiability, Analyticity, Properties, Cauchy-Riemann equations in Cartesian and polar coordinates. Harmonic and conjugate harmonic functions,Milne – Thompson method.

UNIT – III

Elementary functions and Integration of complex function

Exponential, trigonometric, hyperbolic functions and their properties. z^c and Logz, principal value. Line integral, evaluation along a path and by indefinite integration. Cauchy's integral theorem ,Cauchy's integral formula.

UNIT – IV

Power series and Residues

Radius of convergence , Expansion in Taylor's series, Maclaurin's series and Laurent series. Singular point, Isolated singular point, pole of order m , essential singularity. Residues – Evaluation of residue by formula and by Laurent Series, Residue theorem, Evaluation of integrals of the type (a) Improper real integrals (b) Integrals by indentation.

UNIT – V

Conformal mapping

Transformation of e^z , lnz, z^n, (n positive integer), Sin z, cos z, z + a/z. Translation, rotation, inversion. Bilinear transformation , fixed point , cross ratio , properties , invariance of circles , determination of bilinear transformation mapping three given points.

TEXT BOOKS:

1. Advanced Engineering Mathematics - R.K Jain and S.R.K Iyengar, 3rd edition, Narosa Publications, 2011.
2. Complex Analysis-Lars V.Ahlfors, International Edition, McGraw Hill, 1979.

REFERENCES

1. Advance Engineering Mathematics - Peter O'Neil, 5th Edition, Cengage Learning,2000.
2. Schaum's Outline of Complex Variables - Murray.R.Spiegel, 2nd Edition, Tata McGraw Hill, 2011.
3. Complex Variables and Its Applications- Churchill and Brown, International Edition, McGraw Hill,1996.

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II Year B.Tech ECE – I Sem	L	T/P/D	C
	3	1	3

(R11ECE1101) PROBABILITY THEORY AND STOCHASTIC PROCESSES

Pre-requisites: Basics of Mathematical and Probability Concepts

Course Objectives

- To describe and interpret the basic concepts of probability and stochastic processes.
- To Describe and interpret the discrete time and continuous time stochastic processes.
- To learn spectrum of Random process
- To learn noise sources and their characteristics

Course Outcomes

After going through this course the student will be able to

- Apply the concepts of probability to experiments that have Random outcomes and to recognize a random variable of single, multiple variables and its properties
- Apply the concepts of statistical estimations to the random variables
- Characterize the stochastic process and its response applying to linear systems
- Estimate and eliminate noise in communication systems

UNIT I

Overview of Probability Theory, Joint Probability, Conditional Probability, Baye's Theorem, Definition of Random Variable, classification of Random Variable, CDF and PDF of Random Variables and their properties(Single and Multiple Random Variables), Binomial, Poisson, Uniform, Gaussian, Exponential, Rayleigh, Rician Random Variables.

UNIT II

Operations on Single and Multiple Random Variables: Moments of Random Variables- About Origin , Central Moments , Joint Moments, Characteristic Function, Moment Generating Function, Transformation of Random Variables, Monotonic & Non-Monotonic transformation of Random Variables, Transformation of Multiple Random

Variables , Transformation of Gaussian Random Processes Jointly Gaussian Random Variables, Density of Sum of Random Variables, Central Limit Theorem.

UNIT III

Stochastic Processes: Concept of a Stochastic Process, Classification, Concept of Stationary Random Process, Time Averages, Ergodicity, Auto Correlation and Cross Correlation of Random Processes, Gaussian Random Processes and their properties.

UNIT IV

Power Spectrum-Properties, Relation between PSD and Autocorrelation function of a Random Process, Cross spectral Density and its relation with Cross Correlation, Transmission of a Random Process through an LTI system.

UNIT V

System Noise: Mathematical Modeling of Various system Noise sources, White Noise and colored noise, Narrow Band representation of Noise, Effective Noise Temperature, Noise Figure, Average Noise Figure of Cascaded networks.

TEXT BOOKS:

1. robability, Random Variables and Random Signal Principles - Peyton Z Peebles 4th Edidtion,TMH, 2001.
2. Probability, Random Variables and Stochastic Processes- Athanasios Papoulis and S. Unnikrishnan Pillai,4th Edition, TMH
3. Principles of Communication Systems – H.Taub, Donald L. Schiling, Goutham Saha, 3rd Edition,TMH,2007.

REFERENCES:

1. Theory of probability and stochastic Processes – pradip Kumar Gosh University press.
2. Probability and Random processes with application to signal processing – Henry Stark and John W, Woods, 3rd Edition, PE.
3. Probability Methods of Signal and System Analysis – George R.Cooper, Clave D.Mc Cillem, 3rd Edition,Oxford, 1999.
4. Statistical Theory of communication – S.P.Eugene Xavier, New age Publications, 1997.

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II Year B.Tech ECE – I Sem	L	T/P/D	C
	4	1	4

(R11EIE1101) SIGNALS AND SYSTEMS

Pre-requisites: Basics of mathematical concepts

Course Objectives

- To understand various fundamental characteristics of signals and systems.
- To study the importance of transform domain.
- To analyze and design various systems.
- To study the effects of sampling.

Course Outcomes

After going through this course the student will be able to

- Design solutions for complex input signals
- Analyze statistical parameters of a given signal.
- Apply the knowledge in modeling of LTI systems
- Create new systems

UNIT – I

Representation Of Signals: Continuous and discrete time signals: Classification of Signals – Periodic aperiodic even – odd – energy and power signals – Deterministic and random signals – complex exponential and sinusoidal signals – properties of discrete time complex exponential. Concepts of Impulse function, Unit step function, Signum function. Various Operations on Signals.

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,

Fourier Series Representation Of Periodic Signals : 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, Gibb's Phenomenon.

UNIT – II

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 transforms, Fourier transforms involving impulse function and Signum function. Introduction to Hilbert Transform.

Laplace Transforms : Review of Laplace transforms, , Concept of region of convergence (ROC) for Laplace transforms, constraints on ROC for various classes of signals, Properties of L.T's, Relation between L.T's, and F.T. of a signal. Inverse Laplace transform - Partial fraction expansion, Convolution method, Laplace transform of certain signals using waveform synthesis.

UNIT – III

Signal Transmission through Linear Systems : Linear system, impulse response, Response of a linear system, Linear time invariant (LTI) system, Linear time variant (LTV) system, Transfer function of a LTI system. Filter 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 – IV

Convolution and Correlation of Signals : Concept of convolution in time domain and frequency domain, Graphical representation of convolution, Convolution property of Fourier transform and Laplace transform. 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

Sampling Theorem: Representation of continuous time signals by its samples - Sampling theorem – Reconstruction of a Signal from its samples, aliasing – discrete time processing of continuous time signals, sampling of band pass signals

Z –Transforms: Basic principles of z-transform - z-transform definition – region of convergence – properties of ROC – Properties of z-transform – Poles and Zeros – inverse z-transform using Contour integration - Residue Theorem, Power Series expansion and Partial fraction expansion, Distinction among Fourier transform, Laplace Transform and Z - Transforms.

TEXT BOOKS

1. Signals, Systems and Communications - B.P. Lathi, BS Publications, 2009.
2. Signals and Systems –A.Rama Krishna Rao,TMH, 2008.

3. Signals and Systems – Alan V.Oppenheim, Alan S.Willsky and S.Hamid Nawab,2nd Edition, PHI.

REFERENCES

1. Signals and Systems -Simon Haykin and Barry Van Veen, 2nd Edition, John Wiley.
2. Signals and Systems- Cengage Learning, Narayana Iyer, 2011.
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,3rd Edition, Pearson, 2004 .
5. Signals and Systems Schaum's Outlines - HWEI P. HSU , Tata Mc Graw Hill, 2004.

II Year B.Tech ECE – I Sem	L	T/P/D	C
	3	1	3

(R11EEE1105) PRINCIPLES OF ELECTRICAL ENGINEERING

Pre-requisites: Circuit Theory, Mathematics

Course Objectives

- To analyze transient response of circuits with dc excitation
- To understand two port network parameters, filters and attenuators
- To know about performance of DC machines
- To understand the operation of transformers and AC machines

Course Outcomes

After going through this course the student will be able to

- Analyze transient response of circuits
- Evaluate two port parameters and design simple filters
- Appreciate the working of DC machines
- Understand the operation of transformers and AC machines

Unit – I

Transient Analysis (First and Second Order Circuits) : Transient Response of RL, RC and RLC Circuits for DC excitations, Initial Conditions, Solution using Differential Equations approach and Laplace Transform Method.

Unit – II

Two Port Networks : Impedance Parameters, Admittance Parameters, Hybrid Parameters, Transmission (ABCD) Parameters, Conversion of one Parameter to another, Conditions for Reciprocity and Symmetry, Interconnection of Two Port networks in Series, Parallel and Cascaded configurations, Image Parameters, Illustrative problems.

Unit – III

Filters and Symmetrical Attenuators : Classification of Filters, Classification of Pass band and Stop band, Characteristic Impedance in the Pass and Stop Bands, Constant-

k and m-derived filters-Low Pass Filter and High Pass Filters (both qualitative and quantitative treatment); Band Pass filter and Band Elimination filters (quantitative treatment only), Illustrative Problems. Symmetrical Attenuators – T-Type Attenuator, π-Type Attenuator, Bridged T-type Attenuator, Lattice Attenuator.

Unit – IV- DC Machines

DC Generators: Principle of Operation of DC Generator, construction, EMF equation, Types of Generators, Magnetization, Internal and external Characteristics of DC Generators.

DC Motors : Principle of Operation of DC Motors, Types of Dc Motors, Characteristics of Dc Motors, Losses and Efficiency, Swinburne's Test, Speed Control of Dc Shunt Motor- Flux and Armature Voltage control methods.

Unit – V Transformers and AC Machines

Transformers and Their Performance : Principle of Operation of Single Phase transformer, Types, Constructional Features, Phasor Diagram on No Load and Load, Equivalent Circuit, Losses, Efficiency and Regulation of Transformer, OC and SC Tests, Predetermination of Efficiency and Regulation, Simple Problems.

AC Machines

Three Phase Induction Motor : Principle of operation of three phase induction motors-Slip ring and Squirrel cage motors –Slip_Torque characteristics.

Alternators: Principle of operation –Types - EMF Equation- Predetermination of regulation by Synchronous Impedance Method- OC and SC tests.

TEXT BOOKS

1. Principles of Electrical Engineering- A.Sudhakar, Shyammohan S.Palli, TMH publications
2. Introduction to Electrical Engineering – M.S.Naidu and S. Kamakshaiah, TMH publications.
3. Network analysis and Synthesis- C L Wadhwa, New Age International Publishers.

REFERENCE BOOKS

1. Networks, Lines, and Fields – John.D.Ryder, PHI publications.
2. Engineering Circuit Analysis – W.H.Hayt and J.E Kemmerly and S.M.Durbin, TMH publications.
3. Circuit Theory by Chakrabarti, Dhanpat Rai and Co.
4. Network Analysis – N.C.Jagan and C.Lakshmi Narayana, BS publications.
5. Network Analysis – A.Sudhakar, Shyammohan S.Palli, TMH publications.

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(R11ECE1102) ELECTRONIC DEVICES AND CIRCUITS

Pre-requisites: Semiconductor physics

Course Objectives

- To learn principle of operation, construction and characteristics of various electronic devices.
- To study operation and characteristics of Rectifiers with filters.
- To understand the analysis of small signal low frequency amplifiers.
- To provide the concepts involved in design of electronic Circuits.

Course Outcomes

After going through this course the student will be able to

- Understand the operation and characteristics of various electronic devices.
- Develop few applications of devices.
- Understand the importance of biasing and stabilization.
- Analyze small signal model for BJTand FETamplifiers

UNIT I

p-n Junction Diode and Applications : Review of Semi Conductor Materials, Theory of p-n Junction, p-n Junction as a Diode, Diode Equation, Volt-Ampere Characteristics, Temperature dependence of V-I characteristic, Ideal versus Practical – Resistance levels (Static and Dynamic), Transition and Diffusion Capacitances, Diode Equivalent Circuits, Load Line Analysis.

The p-n Junction as a rectifier, Half wave Rectifier, Full wave rectifier, Bridge Rectifier, Harmonic components in a Rectifier Circuit, Inductor filters, Capacitor filters, L- Section Filters, Π- section filters, Comparison of Regulation Characteristics of different Filters, Breakdown Mechanisms in Semi Conductor Diodes, Zener Diode Characteristics, Shunt Voltage Regulation using Zener Diode. Principle of series voltage regulators.

UNIT II

Transistors, Biasing and Stabilization : The Junction Transistor, Transistor Current Components, Transistor as an Amplifier, Transistor Construction, BJT Operation,

Common Base, Common Emitter and Common Collector Configurations, Limits of Operation, BJT Specifications.

Quiescent operating Point, The DC and AC Load lines, Need for Biasing, Fixed Bias, Collector Feedback Bias, Emitter Feedback Bias, Collector-Emitter Feedback Bias, Voltage Divider Bias, Bias Stability, Stabilization Factors, Stabilization against variations in $V_{BE,}$ β_1 and I_{CO}. Bias Compensation using Diodes and Transistors, Thermal Runway, Thermal Stability.

UNIT III

Small signal low frequency BJT Amplifiers: Small signal low frequency transistor amplifier circuits: h-parameter representation of a transistor, Analysis of single stage transistor amplifiers CE, CC, CB configurations using h-parameters: voltage gain, current gain, Input impedance and Output impedance. Comparison of CB, CE, CC configurations in terms of A_I, R_i, A_V, R_O.

UNIT IV

FET, Biasing and Amplifiers : The Junction Field Effect Transistor (Construction, Principle of operation) – Pinch-off Voltage-Volt-Ampere characteristics, The JFET Small Signal Model, MOSFET (Construction, Principle of operation), MOSFET Characteristics in Enhancement and Depletion modes. FET Common Source Amplifier, Common Drain Amplifier, Generalized FET Amplifier, Biasing FET, FET as Voltage Variable Resistor. Comparison of BJT and FET amplifiers.

UNIT V

Special Purpose Electronic Devices : Principle of Operation and Characteristics of Tunnel Diode (with the help of Energy Band Diagram), Varactor Diode and schotky barrier diode. Principle of Operation and Characteristics of UJT, UJT Relaxation Oscillator. Principle of Operation of SCR, Diac and Triac. Principle of Operation of Semiconductor Photo Diode, PIN Diode ,Photo Transistor ,LED and LCD.

TEXT BOOKS

1. Electronic Devices and Circuits – J.Millman, C.C.Halkias, and Satyabratha Jit, Tata McGraw Hill, 2nd Edition, 2007.
2. Electronic Devices and Circuits – R.L. Boylestad and Louis Nashelsky, Pearson/Prentice Hall, 9th Edition, 2006.
3. Introduction to Electronic Devices and Circuits - Rober . T. Paynter, 7th Edition, PE, 2009.

REFERENCES

1. Integrated Electronics - J.Millman and Christos.C.Halkias, and Satyabratha, Jit Tata McGraw Hill, 2nd Edition, 2008.

2. Electronic Devices and Circuits – T.F. Bogart Jr., J.S.Beasley and G.Rico, Pearson Education, 6th Edition, 2004.

3. Electronic Devices and Circuits- S. S Salivahanan, N. Sursh Kumar, A. Vallava Raju,2nd Edition., TMH, 2010.

4. Electronic Devices and Circuits – Dr. K. Lal Kishore, B.S. Publications, 2nd Edition, 2005.

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	4	**0**	**4**

(R11HAS1102) BUSINESS ECONOMICS AND FINANCIAL ANALYSIS

Course Objectives

- To explain different forms of organizing private and public sector business enterprises and to analyze the significance of Business Economics in solving the problems of business enterprise. Also to define and analyze the concepts of Demand, Elasticity of Demand and Demand Forecasting Methods.
- To analyze the various types of costs and to determine the level of output at which there is neither profit nor loss. To estimate capital requirements and to describe various sources of mobilizing funds. Also to identify least cost combinations of inputs produce desired quantity of output.
- To describe the features of different market structure and pricing strategies.
- To explain the basic accounting concepts and conventions. To elaborate the importance of finance function for evaluating the economic status of a business unit.

Course Outcomes

After going through this course the student will be able to

- Select the suitable form of business organization which meets the requirement of selected business also perform decision – making function effectively in an uncertain frame work by applying concepts of Managerial Economics. Meet and manipulate the demand efficiently and plan the future course of action.
- Apply right kind cost to reduce cost by paying attention towards the costs which can be reduced. Take decision whether to buy or produce? Reduce the cost of capital by selecting best source of fund mobilization and select best investment opportunity which yields higher rate of return.
- Fix the right price which can best meets the predetermined objectives of the business firm under different market conditions. Able to select best combination of inputs to produce required quantity of output.

Prepare books of accounts and know over all financial position of the business enterprise which enables the concerned to take appropriate measures to improve the situation. Also interpret the financial position from difference angles and initiates the measures/ efforts in that direction.

UNIT I

Business and new economic environment

Characteristic features of business; Features and evaluation of sole proprietorship; Partnership; Joint stock company; Public enterprises and their types; Changing business environment in post- liberalization scenario.

UNIT II

Introduction to business economics, and demand analysis

Definition; Nature and scope of managerial economics - demand analysis determinants; Law of demand and its exceptions.

Elasticity of demand and demand forecasting

Definition; Types; Measurement and significance of elasticity of demand; Demand forecasting; Factors governing demand forecasting; Methods of demand forecasting - survey methods, statistical methods, expert opinion method, test marketing, controlled experiments, and judgmental approach to demand forecasting.

UNIT III

Cost analysis

Cost concepts - opportunity cost, fixed vs. variable costs, explicit costs vs. implicit costs, and out of pocket costs vs. imputed costs; Break-even analysis (BEA) - determination of break-even point (simple problems), managerial significance, and limitations of BEA.

Capital and capital budgeting

Capital and its significance; Types of capital; Estimation of fixed and working capital requirements; Methods and sources of raising finance.

Nature and scope of capital budgeting; Features of capital budgeting proposals; Methods of capital budgeting - payback method, accounting rate of return (ARR), and net present value method (simple problems)

UNIT IV

Theory of production

Production function - isoquants and isocosts, least cost combination of inputs, and laws of returns; Internal and external economics of scale.

Market structures

Types of competition; Features of perfect competition, monopoly, and monopolistic competition; Price-output determination in case of perfect competition and monopoly.

Pricing policies and methods

Cost plus pricing; Marginal cost pricing; Sealed bid pricing; Going rate pricing, Limit pricing, Market skimming pricing, Penetration pricing, Two-part pricing, Block pricing, Bundling pricing, Peak load pricing, Cross subsidization.

UNI T V

Introduction to financial accounting

Double-entry book keeping; Journal; Ledger; Trial balance; Final accounts - trading account, profit and loss account, and balance sheet with simple adjustments.

Financial analysis through ratios

Computation; Analysis and interpretation of liquidity ratios - current ratio, and quick ratio; Activity ratios - inventory turnover ratio, and debtor turnover ratio; Capital structure ratios – debt-equity ratio, and interest coverage ratio; Profitability ratios - gross profit ratio, net profit ratio, operating ratio, P/E ratio, and EPs.

TEXT BOOK

1. Managerial Economics and Financial Analysis *by* Aryasri, 2009; *Publisher: Tata McGraw Hill*.
2. Managerial Economics *by* Varshney & Maheswari, 2009; *Publisher: Sultan Chand*.

REFERENCES

1. Financial Accounting for Management: An analytical perspective *by* Ambrish Gupta, 2010; *Publisher: Pearson Education*.
2. Managerial Economics *by* H. Craig Peterson & W. Cris Lewis; *Publisher: Prentice Hall of India*.

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(R11ECE1201) Basic Simulation Laboratory

Pre-requisites: Basic concepts of Mathematics and Signal and systems

Course Objectives

- To learn basic Operations on Matrices
- To model generation of various signals
- To simulate operations on signals and systems.
- To simulate various random variables' generation and processes

Course Outcomes

After going through this course the student will be able to

- Apply signal generation in different areas.
- Apply the knowledge of random variables and processes in fields of communications.
- Analyze the systems for various properties.
- Create or design various systems and analyze sampling effects

List of Experiments:

1. Basic Operations on Matrices
2. Generation of various signals and sequences (Periodic and Aperiodic), such as unit Impulse step, Square,
   Saw tooth,Triangular, Sinusodial, Ramp, Sinc.
3. Operations on signals and sequences such as Addition, Multiplication, Scaling, Shifting, Folding,
   Computation of Energy and Average Power.
4. Finding the Even and Odd parts of Signal / Sequence and Real and imaginary parts of Signal.
5. Convolution between Signals and Sequences.
6. Auto Correlation and Cross Correlation between Signal of a given Sequences.
7. Verification of Linearity and Time Invariance Properties of a given Continuous / Discrete System.

8. Computation of Unit sample, Unit step and sinusoidal responses of the given LTI system and verifying its
   Physical realiazability and stability properties.
9. Gibbs Phenomenon.
10. Finding the Fourier Transform of a given signal and plotting its magnitude and phase spectrum.
11. Waveform Synthesis using Laplace Transform.
12. Locating the Zeros and Poles and Plotting the Pole-Zero maps in S plane and Z-Plane for the given transfer function.
13. Generation of Gaussian noise (Real and Complex), Computation of its mean, M.S. Value and its Skew, Kurtosis and PSD, Probability Distribution Function.
14. Sampling theorem Verification.
15. Removal of Periodic by Autocorrelation / Cross correlation.
16. Extraction of Periodic Signa, masked by noise using Correlation.
17. Verification of Weiner – Khinchine Relations.
18. Checking a Random Process for Stationarity in Wide sense.

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(R11ECE1202) ELECTRONIC DEVICES AND CIRCUITS LABORATORY

Pre-requisites: Semiconductor physics, Electronic Devices and Circuits Concepts

Course Objectives

- To identify various components and testing of active devices.
- To study and operation of multimeters, function generators ,regulated power supplies and CRO
- To know the characteristics of various active devices.
- To study frequency response Amplifier.

Course Outcomes

After going through this course the student will be able to

- Calculate various parameters of devices from characteristics.
- Use of devices in real time applications.
- Calculate h-parameters of BJT under various configurations.
- Compute frequency response of various amplifiers

Part A: (Only for viva-voce Examination)

ELECTRONIC WORKSHOP PRACTICE(in 3 lab sessions):

1. Identification, Specification, testing of R,L,C components (color codes), Potentiometers (SPDT, DPDT, and DIP),
   Coils, Gang Condensers, Relays, Bread Board, PCB's
1. Identification, Specification, testing of Active devices : Diodes, BJT, Low power JFET's, MOSFET's, Power Transistors, LED's, LCD's, SCR, UJT.
2. Study and operation of :
   - Multimeters (Analog and Digital)
   - Function Generator
   - Regulated Power Supplies
   - CRO

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

1. Forward and Reverse Bias V-I characteristics of PN junction Diode.
2. Zener diode V-I characteristics and Zener diode as voltage regulator.
3. Half Wave, Full wave and Bridge Rectifier with and without filters.
4. Characteristics of a BJT under CE configuration and calculation of h-parameters.
5. Characteristics of a BJT under CC configuration and calculation of h-parameters.
6. Characteristics of a BJT under CB configuration and calculation of h-parameters.
7. FET characteristics under CS configuration.
8. Frequency response of CE Amplifier.
9. Frequency response of CC Amplifier.
10. Frequency response of CS FET Amplifier.
11. SCR characteristics.
12. UJT characteristics and Relaxation Oscillator.

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(R11EEE1106) CONTROL SYSTEMS

Pre-requisites: Basic concepts of Mathematics and Signal concepts

Course Objectives

- To understand the different ways of system representations such as Transfer function representation and state space representations and should able to assess the system dynamic response
- To assess the system performance using time domain analysis and should know how to improve it
- To assess the system performance using frequency domain analysis and should know how to improve it
- To design various controllers and compensators to improve system performance

Course outcomes

After going through this course the student will be able to

- know how to improve the system performance by selecting a suitable controller and/or compensator for a specific application
- Apply various time domain and frequency domain techniques to assess the system performance
- Apply various control strategies to different applications (example: Power systems, electrical drives etc…)
- Test system Controllability and Observability using state space representation and applications of state space representation to various systems.

UNIT – I

INTRODUCTION

Concepts of Control Systems- Open Loop and closed loop control systems and their differences- Different examples of control systems- Classification of control systems, Feed-Back Characteristics, Effects of feedback.

Mathematical models – Differential equations, Impulse Response and transfer functions - Translational and Rotational mechanical systems

UNIT II

TRANSFER FUNCTION REPRESENTATION AND TIME RESPONSE ANALYSIS

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

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

UNIT –III

STABILITY ANALYSIS IN S-DOMAIN

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

Root Locus Technique:

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

UNIT – IV

FREQUENCY RESPONSE AND STABILITY ANALYSIS IN FREQUENCY DOMAIN

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

UNIT – V

CLASSICAL CONTROL DESIGN TECHNIQUES AND STATE SPACE ANALYSIS OF CONTINUOUS SYSTEMS

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

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

TEXT BOOKS

1. Automatic Control Systems 8th edition– by B. C. Kuo 2003– John wiley and son's.,
2. Control Systems Engineering – by I. J. Nagrath and M. Gopal, New Age International (P) Limited, Publishers, 2nd edition.

REFERENCES

1. Modern Control Engineering – by Katsuhiko Ogata – Prentice Hall of India Pvt. Ltd., 3rd edition, 1998.
2. Control Systems by N.K.Sinha, New Age International (P) Limited Publishers, 3rd Edition, 1998.
3. Control Systems Engg. by NISE 3rd Edition – John wiley
4. "Modelling and Control Of Dynamic Systems" by Narciso F. Macia George J. Thaler, Thomson Publishers.

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(R11ECE1103) SWITCHING THEORY AND LOGIC DESIGN

Pre-requisites: Basic Electronics

Course Objectives

- To understand the concepts of number systems, codes and design of various combinational and synchronous sequential circuits
- To learn various methods to minimize the Boolean expressions for reducing the number of gates and cost
- To realize logic networks, digital computers using PROM, PLA, PAL devices.
- To design state machines and ASM charts

Course Outcomes

After going through this course the student will be able to

- Use the concepts of Boolean Algebra for the analysis and various number systems for digital data representations
- Design combinational and sequential circuits
- Implement designs on PLDs
- Design ASM charts for digital systems

UNIT I

Number Systems And Codes: Philosophy of Number Systems Complement Representation of Negative Numbers , Binary Arithmetic, Binary Codes, Error Detecting and Error Correcting Codes, Hamming Code.

Boolean Algebra and Switching Functions: Fundamental Postulates of Boolean Algebra. Basic theorems and Properties , Switching Functions, Canonical and Standard forms , Algebra Simplification, Digital Logic Gates, Universal Gates, Multilevel NAND/NOR Realizations.

UNIT II

Minimization of Switching Functions: K-map method , Prime Implicants , Don't care Combinations , Minimal SOP and POS forms, Tabular Method ,Prime Implicant chart, Simplification rules.

Combinational Logic Design: Design using Conventional logic gates, Encoder, Decoder, Multiplexer, De- Multiplexer, Modular Design using IC Chips, Design of code converters, Parity bit generator, Hazards and Hazard free Realizations.

UNIT III

Sequential Circuits – I: Classification of Sequential circuits (Synchronous, Asynchronous, Plus mode, Level mode with examples), Basic Flip-Flops, Triggering and Excitation tables, Flip-Flop conversions, Steps in Synchronous Sequential circuit Design, shift registers and their applications, Design of counters, Serial Binary Adder, Sequence detector.

UNIT IV

Sequential Circuits – II : Finite State Machine-Capabilities And Limitations, Mealy and moore models, Minimization of Completely Specified and Incompletely specified Sequential Machines, Partition Techniques and Merger chart methods, Concept of Minimal cover table.

UNIT V

Programmable Logic Devices: Basic PLD's: ROM, PROM, PLA, PAL, Realization of Switching functions using PLD's.

Algorithmic State Machines : Salient features of the ASM chart, Simple examples, System Design using data path and control subsystems , Control Implementations, ASM charts for Flip-Flop's, Examples of Dice Game and Binary Multiplier.

TEXT BOOKS:

1 Switching and Finite Automata Theory- Zvi Kohavi, 2nd Edition, TMH.
2 Degital Design – Morris Mano, 3rd Edition, PHI, 2006.
3 Switching Theory and Logic Design – A. Anand Kumar, PHI , 2008

REFERENCES:

1. An Engineering Approach to Digital Design – Fletcher, PHI.
2. Fundamentals of Logic Design – Charles H, Roth, 5th Edition, Thomson Publications, 2004.
3. Digital Logic Applications and Design – John M. Yarbrough, Thomson Publications, 2006.
4.Mordern Digital Electronics – R.P.Jain, 4th Edition.

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II Year B.Tech ECE – II Sem	**L**	**T/P/D**	**C**
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(R11ECE1104) ELECTROMAGNETIC THEORY AND TRANSMISSION LINES

Pre-requisites: Vector Calculus, Electric and Magnetic fields concepts

Course Objectives

- To provide the basic concepts of Electric and Magnetic fields.
- To understand the Maxwell's equations and applying boundary conditions to the different material interfaces.
- To conceptualize the wave propagation characteristics for different media.
- To learn the basic parameters of Transmission lines.

Course Outcomes

After going through this course the student will be able to

- Apply the basic concepts of Electric and Magnetic fields in static and time varying conditions.
- Apply Maxwell's equations to solve equations of EM fields.
- Apply wave propagation characteristics and power calculations in applications like antennas.
- Design a lossless/distortion less transmission system.

UNIT I

Electrostatics: Coulomb's law, Electric filed intensity, fields due to different charge distributions, Electric flux density, Gauss law and applications, Electric potential, Relations between E and V, Maxwell's two equations for electro static fields, energy density, illustrative problems, Convection and Conduction currents, Dielectric Constant, Isotropic and Homogeneous Dielectrics , Continuity equation, Relaxation time, Poisson's and Laplace equations, Capacitance –parallel plate, coaxial, spherical capacitors, Illustrative problems.

UNIT II

Magneto Statics : Biot – Savart's law, Ampere's circuital law and applications, Magnetic flux density, Magnetic scalar and vector potentials, Forces due to Magnetic fields, Amperes Force law, Inductances and Magnetic energy, Illustrative problems

UNIT III

Maxwell"s Equations: Maxwell"s Equations (Time Varying Fields)Faraday's law and Transformer emf, Inconsistency of the Amperes law and displacement current density, Maxwell's equations in differential forms and word statements, conditions at a boundary surface: Dielectric - Dielectric and Dielectric conductor interfaces – Illustrative problems.

EM wave Characteristics – I: Wave equations for conducting and perfect dielectric media. Uniform plane waves – definitions, all relations between E and H sinusoidal variations, wave propagation in loss less and conducting media, conductors and Dielectrics characterization, wave propagation in good conductors and good dielectrics, polarization, Illustrative problems.

UNIT IV:

EM Waves characteristics – II : Reflection and refraction of plane waves – normal and Oblique incidences for both perfect conductor and perfect dielectrics, Brewster angle, Critical angle and Total internal reflection, Surface Impedance, poynting vector and poynting theorem – applications, power loss in a plane conductor, Illustrative problems.

UNIT V

Transmission Lines: Types, parameters, Transmission line equations, primary and secondary constants, Expressions for characteristic impedances, propagation constant, phase and group velocities, Infinite line concepts, Loss loss/ low loss characterization, Distortion – condition for distortionless and minimum attenuation, Loading, Types of loading, Illustrative problems.

Input impedance relations, sc and oc lines, reflection coefficient, VSWR, UHF lines as circuit, elements, $\lambda/4$, $\lambda/2$, $\lambda/8$ lines - impedance Transformations, Significant of Z_{min} and Z_{max}, smith chart, configuration and applications, single and double stub matching, Illustrative problems.

TEXT BOOKS

1. Elements of Electro magnetics – Matthew N.O.Sadiku, Oxford Univ.Press, 3rd Edition, 2001.
2. Electromagnetic Waves and Radiating Systems- E.C. Jordan and K.G.Balman,PHI, 2nd Edition, 2000.
3. Transmission Lines and Networks - Umesh Sinha, Satya Prakashan, Tech.India Publications, New Delhi, 2001.

REFERENCES

1. Engineering Electromagnetics - William H.Hayt jr.and John A. Buck,TMH, 7th Edition, 2006.
2. Electromagnetic Field Theory and Transmission Lines - G.S.N. Raju, Pearson Publication, 2005.
3 Networks Lines and Fields - John D Rider 2nd Edition, PHI, 1999.

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(R11EIE1104) PULSE and DIGITAL CIRCUITS

Pre-requisites: Electronic Devices and Circuits

Course Objectives

- To provide knowledge of Pulse and Wave shaping circuits.
- To analyze and design BJT switching circuits
- Analyze and Design the Sweep generators for various applications.
- To Analyze and Design of the logic gates and sampling gates using discrete components.

Course Outcomes

After going through this course the student will be able to

- Design linear and non-linear wave shaping circuits.
- Apply the fundamental concepts of wave shaping circuits for various switching and logic circuits
- Design the time base circuits for various applications
- Design the sampling gates for various applications

UNIT I

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

UNIT II

NON-LINEAR WAVE SHAPING : Diode clippers, Transistor clippers, clipping at two independent levels, Transfer characteristics of clippers, Emitter coupled clipper, Comparators, applications of voltage comparators, clamping operation, clamping circuits using diode with different inputs, Clamping circuit theorem, practical clamping circuits, effect of diode characteristics on clamping voltage, Transfer characteristics of clampers.

UNIT III

MULTIVIBRATORS : Design of transistor switch, Diode and Transistor-switching times. Analysis and Design of Bistable, Monostable, Astable Multivibrators and Schmitt trigger using transistors.

UNIT IV

TIME BASE GENERATORS : General features of a time base signal, methods of generating time base waveform, Miller and Bootstrap time base generators – basic principles, Transistor miller time base generator, Transistor Bootstrap time base generator, Current time base generators.

Synchronization and Frequency Division: Principles of Synchronization, Frequency division in sweep circuit, Astable relaxation circuits, Monostable relaxation circuits, Synchronization of a sweep circuit with symmetrical signals, Sine wave frequency division with a sweep circuit.

UNIT V

SAMPLING GATES : Basic operating principles of sampling gates, Unidirectional and Bi-directional sampling gates, Reduction of pedestal in gate circuits, Applications of sampling gates. Realization of Logic Gates Using Diodes and Transistors (Discrete Components): AND, OR and NOT gates using Diodes and Transistors, DCTL, RTL, DTL Logic Families and its comparison.

TEXT BOOKS

1. Pulse, Digital and Switching Waveforms J. Millman and H. Taub and Mothiki, S Prakash Rao 2nd Edition, TMH, 2008.
2. Pulse and Digital Circuits – A. Anand Kumar, PHI, 2005.

REFERENCES

1. Solid State Pulse circuits - David A. Bell, PHI, 4th Edition, 2002.
2. Wave Generation and Shaping L. Strauss.
3. Pulse, Digital Circuits and Computer Fundamentals - R.Venkataraman.

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II Year B.Tech ECE – II Sem	L	T/P/D	C
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(R11EIE1105) ELECTRONIC CIRCUIT ANALYSIS

Pre-requisites: Electronic Devices and Circuits

Course Objectives

- To explain the operation, design and Analysis of multistage amplifiers using BJT and MOSFET.
- Design high frequency BJT amplifiers and analysis of MOS amplifiers.
- Understand the concepts of feedback amplifiers and Oscillators
- Design large signal and tuned amplifiers.

Course Outcomes

After going through this course the student will be able to

- Apply the knowledge of BJTs and MOSFETs to design practical amplifier circuits.
- Design electronic sub systems such as feedback amplifiers, oscillators.
- Design various power amplifiers to meet the required specifications.
- Apply the knowledge of Tuned amplifiers to design practical amplifier circuits.

UNIT I

Multi Stage Amplifiers : Multi Stage Amplifiers Methods of Inter Stage Coupling, n – Stage Cascaded Amplifier, Equivalent Circuits, Miller's Theorem, Frequency Effects, Amplifier Analysis, Transistor Circuits. Cascade – Transistor Configuration, CE-CC Amplifiers (Darlington Pair), Two Stage RC Coupled JFET amplifier (in Common Source configuration), Difference Amplifier.

UNIT II

BJT High Frequency Model and Amplifiers : Logarithms, Decibels, General frequency considerations, Frequency response of BJT Amplifier, Analysis at Low and High frequencies, Effect of coupling and bypass Capacitors, the Hybrid-pi (π) – Common Emitter Transistor Model, CE Short Circuit Gain, Current Gain with Resistive Load, Single Stage CE Transistor Amplifier Response, Gain-Bandwidth Product, Emitter follower at higher frequencies.

UNIT III

Feedback Amplifiers and Oscillators : Concepts of Feedback, Classification of feedback amplifiers, general characteristics of Negative Feedback amplifiers, effect of Feedback on amplifier Characteristics, voltage series, voltage shunt, current series and current shunt feedback configurations, illustrative problems.

Classification of Oscillators, conditions for oscillations, RC Phase Shift and weinbridge Oscillator. Generalized analysis of LC oscillators – Hartley, and Colpitts Oscillators, Crystal Oscillators, Stability of Oscillators.

UNIT IV

Power Amplifiers: Classification, Class A Large signal Amplifiers, Transformer coupled Class-A Audio Power Amplifier, Efficiency of Class-A Amplifier , Class B Amplifier, efficiency of Class B Amplifier, Class-B Push-Pull Amplifier, Complementary-Symmetry Class B Push –Pull Amplifier, Distortion in Power Amplifiers, Thermal Stability and Heat Sinks, Design of Power Supplies.

UNIT V

Tuned Amplifiers : Introduction, Q-Factor, Small Signal Tuned Amplifiers, Effect of Cascading Single Tuned Amplifiers on Bandwidth, Effect of Cascading Double Tuned Amplifiers on Bandwidth, Stagger Tuned Amplifiers, wideband Amplifiers Stability of Tuned Amplifiers, Class-C tuned Amplifier.

TEXT BOOKS :

1. Integrated Electronics – J. Millman and C.C. Halkias, TMH, 2008.
2. Electronic Devices and Circuits- S. S Salivahanan, N. Sursh Kumar, A. Vallava Raju, 2nd Edition, TMH, 2010.
3. Design of Analog CMOS Integrated Circuits – Behzad Razavi , TMH, 2008.

REFERENCES :

1. Electronic Devices and Circuits Theory – Robert L. Boylestad and Louis Nashelsky, Pearson/Prentice Hall, 9th Edition, 2008.
2. Introduction to Electronic Devices and Circuits- Rober . T. Paynter, 7th Edition, PEI, 2009.
3. Electronic Circuit Analysis – K. Lal Kishore, BS Publications, 2004.
4. Electronic Devices and Circuits – David A. Bell , Oxford University Press, 5th Edition.

5 Micro Electronic Circuits – Sedra A.S. and K.C. Smith, 5th Edition, Oxford University Press,2009.

II Year B.Tech ECE – II Sem	L	T/P/D	C
	3	1	3

(R11ECE1105) ANALOG COMMUNICATIONS

Pre-requisites: Signals and Systems

Course Objectives

- To know the need for modulation in radio communication system.
- To understand the principles of various modulation and demodulation Techniques.
- To analyze various types of transmitters and receivers.
- To analyze the noise performance of Analog Modulation systems.

Course Outcomes

After going through this course the student will be able to

- Apply and relate the analog modulation techniques to real time applications like Radio Broadcasting,
  telecommunications, TV's etc.
- Compare different modulation Techniques
- Design transmitters and receivers for Analog Communication.
- Design various communication systems by including noise analysis

UNIT I

INTRODUCTION : Introduction to communication system, Need for modulation, Frequency Division Multiplexing , 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.

DSB MODULATION : Double side band suppressed carrier modulators, time domain and frequency domain description, Generation of DSBSC Waves, Balanced Modulators, Ring Modulator, Coherent detection of DSB-SC Modulated waves, COSTAS Loop.

SSB MODULATION : Frequency domain description, Frequency discrimination method for generation of AM SSB Modulated Wave, Time domain description, Phase discrimination method for generating AM SSB Modulated waves. Demodulation of SSB Waves, Vestigial side band modulation: Frequency description, Generation of VSB Modulated wave, Time domain description, Envelope detection of a VSB Wave pulse

Carrier, Comparison of AM Techniques, Applications of different AM Systems.

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 and Indirect FM, Detection of FM Waves: Balanced Frequency discriminator, Zero crossing detector, Phase locked loop, Comparison of FM and AM.

UNIT III

NOISE : Noise in Analog communication System, Noise in DSBand SSB System Noise in AM System, Noise in Angle Modulation System, Threshold effect in Angle Modulation System, Pre-emphasis and de-emphasis

UNIT IV

TRANSMITTERS : Radio Transmitter - Classification of Transmitter, AM Transmitter, Effect of feed back 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, Super-heterodyne receiver, RF section, Mixer (Down Converter) and Characteristics, Frequency Synthesizer , Frequency changing and tracking, Intermediate frequency, AGC, FM Receiver, Comparison with AM Receiver, Amplitude limiting.

UNIT V

PULSE MODULATION: Overview of sampling for Band pass and Band limited signals, Time Divison Multiplexing, Types of Pulse modulation, PAM (Single polarity, double polarity) PWM: Generation and demodulation of PWM, PPM, Generation and demodulation of PPM

TEXTBOOKS

1. Principles of Communication Systems – H Taub and D. Schilling, Gautam Sahe, 3rd Edition, TMH, 2007.

2. Modern analog and digital Communication Systems – B.P. Lathi and Zhi Ding, Oxford Publication,4/e, International Edition, 2010.

REFERENCES

1. Principles of Communication Systems - Simon Haykin, John Wiley, 2nd Edition.
2. Electronics and Communication System – George Kennedy and Bernard Davis, TMH, 2004.
3. Communication Systems – R.P. Singh, SP Sapre, 2nd Edition,TMH, 2007.
4. Fundamentals of Communication Systems - John G. Proakis, Masond, Salehi PEA, 2006.
5. Communication Systems –B.P Lathi, B.S.Publication, 2006.

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II Year B.Tech ECE – II Sem	**L**	**T/P/D**	**C**
	0	**3**	**2**

(R11EIE1202) PULSE and DIGITAL CIRCUITS LABORATORY

Pre-requisites: Electronic Devices and Circuits

Course Objectives

- To demonstrate the various wave shaping circuits.
- To demonstrate generation of various non-sinusoidal waveforms.
- To demonstrate functionality of various logic gates.
- To analyze dynamic response of electronic switch.

Course Outcomes

After going through this course the student will be able to

- Design linear and non linear wave shaping circuits .
- Generate various wave forms such as Square, Pulse and Sweep
- Design electronic switch.
- Design simple applications such as counters of flip-flops.

List of Experiments:

1. Linear wave shaping.
2. Non Linear wave shaping – Clippers.
3. Non Linear wave shaping – Clampers.
4. Transistor as a switch.
5. Study of Logic Gates and Some applications.
6. Study of Flip-Flops and some applications.
7. Sampling Gates.
8. Astable Multivibrator.
9. Monostable Multivibrator.
10. Bistable Multivibrator.
11. Schmitt Trigger.
12. UJT Relaxation Oscillator.
13. Bootstrap sweep circuit.

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II Year B.Tech ECE – II Sem	**L**	**T/P/D**	**C**
	0	**3**	**2**

(R11EEE1202) ELECTRICAL ENGINEERING LABORATORY

Pre-requisites: Circuit Theory, Principles of Electrical Engineering

Course Objectives

- The theoretical concepts of KVL and KCL are verified experimentally
- The transient behavior of RLC networks are studied practically
- The network theorems are verified experimentally
- The performance and efficiency / regulation of electrical machines are determined experimentally (under various operating conditions)

Course Outcomes

After going through this course the student will be able to

- Apply the network theorems in the domain applications
- Practically study the transient behavior of the RLC networks
- Find the applications of the electrical machines with the experimental determination of the performance of the machines.
- Find the difference between Generator and Motor performance characteristics

PART- A

1. Verification of KVL and KCL.
2. Series and Parallel Resonance – Timing, Resonant frequency, Bandwidth and Q-factor determination for RLC network.
3. Time response of first order RC/RL network for periodic non-sinusoidal inputs time constant and steady state error determination.
4. Two port network parameters –Z and Y-parameters
5. Two port network parameters – ABCD and h-parameters
6. Verification of Superposition and Reciprocity theorems.
7. Verification of maximum power transfer theorem. Verification on DC and AC Excitation with resistive and Reactive loads.
8. Experimental determination of Thevenin's and Norton's equivalent circuits and verification by direct test.
9. Constant –k Low Pass Filter and High Pass Filter- Design and Test.

PART- B

1. Magnetization characteristics of D.C Shunt generator, Determination of critical field resistance.
2. Swinburne's Test on Dc shunt machine. (Predetermination of efficiency of a given Dc Shunt machine working as motor and generator)
3. Brake test on DC shunt motor. Determination of performance characteristics.
4. OC and Sc tests on Single-phase transformer (Predetermination of efficiency and regulation at given power factors and determination of equivalent circuit).
5. Load Test on single Phase Transformer.
6. Speed Control of DC shunt Motor – flux and armature voltage control methods.

Note: Any 10 of the above experiments 5 from each part to be conducted.

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III Year B.Tech ECE – I Sem	**L**	**T/P/D**	**C**
	4	**0**	**4**

(R11CSE1103) COMPUTER ORGANIZATION

Pre-requisites: Digital fundamentals

Course Objectives

- Learn basic hardware and software of computer organization.
- Know the instructions codes, formats and addressing modes of a computer.
- Learn micro programmed control unit and memory organization of a computer.
- Understand computer arithmetic, IO organization and parallel processing.

Course Outcomes

After going through this course the student will be able to

- Analyze the concepts of computer organization for several engineering applications.
- Use the fundamentals of computer organization as a tool in digital systems.
- Identify, formulate, and solve hardware and software computer engineering problems.
- Analyze IO, memory, Stack organization and parallel processing of a computer

UNIT I

BASIC STRUCTURE OF COMPUTERS: Computer types, functional unit, basic operational concepts, bus structures, multi processors and multi computers, multi tasking.

Register Transfer Language and Micro operations: Register Transfer language, Regiser Transfer, Arithmetic Microoperations, Logic Microoperations, Shift Microoperations, Arithmetic logic shift unit.

UNIT II

BASIC COMPUTER ORGANIZATION AND DESIGN: Instruction Codes, Computer Registers, computer instructions – instruction Cycle, memory reference instructions, input-output and interrupt.

Central Processing Unit: Stack organization, instruction formats, addressing modes, data transfer and manipulation, program control, CISC and RISC.

UNIT III

Microprogrammed Control: Control memory, address sequencing, micro program example, design of control unit, hardwired control, microprogrammed control.

The Memory Organization: Memory hierarchy, Main Memory, Cache memory, performance considerations, virtual memory, secondary storage.

UNIT IV

Computer Arithmetic: Addition and subtraction, multiplication algorithms, Division algorithms, floating-point arithmetic operations, Decimal arithmetic unit, Decimal arithmetic operations.

Input-Output Organization: Peripheral devices, input-output interface, asynchronous data transfer, modes of transfer, priority interrupt, direct memory access.

UNIT V

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

TEXT BOOKS

1. Computer System Architecture – M. Morris Mano, III edition, Pearson/PHI
2. Computer organization – Carl Hamacher, Zvonks Vranesic, Safeazaky, V edition, Mc Graw Hill

REFERENCES

1. Computer Organization and Architecture – William Stallings Sixth edition Pearson/PHI
2. Fundamentals of Computer Organization and Design, Sivarama Dandamudi Springer Intl. edition
3. Computer Architecture, a Quantitative approach, John L. Hennessy and David A. Patterson, Fourth edition Elsevier.
4. Computer Architecture Fundamentals and Principles of Computer Design, Joseph D/ Dumas II, BS Publication

III Year B.Tech ECE – I Sem	L	T/P/D	C
	4	0	4

(R11EIE1106) LINEAR AND DIGITAL IC APPLICATIONS

Pre-requisites: Electronic circuits and Digital fundamentals

Course Objectives

- To study the characteristics and design concepts of operational amplifiers.
- To understand the functionality of specific ICs: 555 timer, 565, voltage regulators.
- To study the applications and design concepts of various ICs.
- To understand concepts of Digital circuits using digital ICs.

Course Outcomes

After going through this course the student will be able to

- Analyze electrical properties of Op-Amps and design various linear and nonlinear applications using Op-Amps.
- Design various applications of 555 timer, IC 565, voltage regulators.
- Understand and compare TTL and CMOS IC logic families.
- Design various combinational and sequential logic circuits using digital ICs.

UNIT I

INTEGRATED CIRCUITS : Classification, chip size and circuit complexity, basic information of Op-amp, ideal and practical Op-amp, internal circuits, Op-amp characteristics, DC and AC characteristics, 741 op-amp and its features, modes of operation-inverting, non-inverting, differential.

OP-AMP APPLICATIONS : Basic application of Op-amp, instrumentation amplifier, ac amplifier, V to I and I to V converters, sample and hold circuits, Instrumentation amplifier, Log and antilog amplifier, Precision rectifiers, Differentiators, Integrators, and comparators, sample and hold circuits..

UNIT II

ACTIVE FILTERS and OSCILLATORS : Introduction, 1st order LPF, HPF filters. Band pass, Band reject and all pass filters. Oscillator types and principle of operation – RC, Wien and quadrature type, waveform generators – triangular, sawtooth, square wave and VCO. Comparators.

UNIT III

SPECIAL ICs: Introduction to 555 timer, functional diagram, monostable and astable operations and applications, Schmitt Trigger. PLL - introduction, block schematic, principles and description of individual blocks of 565, introduction to voltage regulators, series voltage regulator , shunt voltage regulator and IC 723 Voltage Regulator.

D-A AND A- D CONVERTERS : Introduction, basic DAC techniques, weighted resistor DAC, R-2R ladder DAC, inverted R-2R DAC, and IC 1408 DAC, Different types of ADCs - parallel comparator type ADC, counter type ADC, successive approximation ADC and dual slope ADC. DAC and ADC specifications.

UNIT IV

LOGIC FAMILIES : Classification of Integrated circuits, standard TTL NAND Gate-Analysis and characteristics, TTL open collector O/Ps, Tristate TTL, MOS and CMOS open drain and tristate outputs, CMOS transmission gate, IC interfacing- TTL driving CMOS and CMOS driving TTL .

UNIT V

DIGITAL CIRCUIT DESIGN : Design using TTL-74XX and CMOS 40XX series, code converters, decoders, Demultiplexers, decoders and drives for LED and LCD display. Encoder, priority Encoder, multiplexers and their applications, priority generators/checker circuits. Digital arithmetic circuits-parallel binary adder/subtractor circuits using 2's-Complement system. Digital comparator circuits.

SEQUENTIAL CIRCUITS : Design of synchronous counters, Decade counter, shift registers and applications using TTL-74XX and CMOS 40XX series , familiarities with commonly available 74XX and CMOS 40XX series of IC counters.
Memories: ROM architecture, types and applications, RAM architecture, Static and Dynamic RAMs, synchronous DRAMs.

TEXT BOOKS

1. Linear Integrated Circuits –D. Roy Chowdhury, New Age International (p) Ltd, 2nd Edition, 2008.
2. Op-Amps and Linear ICs – Ramakanth A. Gayakwad, PHI, 1987.
3.Digital Fundamentals – Floyd and Jain, Pearson Education,8th Edition, 2005.

REFERENCES:

1.Operational Amplifiers and Linear Integrated Circuits – R.F. Coughlin and Fredrick F. Driscoll, PHI, 1977.
2.Operational Amplifiers and Linear Integrated Circuits: Theory and Applications – Denton J. Daibey, TMH.
3.Design with Operational Amplifiers and Analog Integrated Circuits - Sergio Franco, McGraw Hill, 3rd Edition, 2002.
4. Op Amps and Linear Integrated Circuits: Concepts and Applications, Fiore,Cengage Publications.
5. Operational Amplifiers and Linear Integrated Circuits by K.Lal Kishore- Pearson education,2008.

III Year B.Tech ECE – I Sem	L	T/P/D	C
	4	1	4

(R11ECE1106) DIGITAL COMMUNICATIONS

Pre-requisites: Analog Communications, Probability theory

Course Objectives

- Understand various modulation techniques.
- Study the concepts of base band transmissions.
- Knowledge of information theory.
- Importance of coding theory.

Course Outcomes

After going through this course the student will be able to

- Analyze pulse digital modulation techniques.
- Compare power spectral densities of various encoding formats and know the Importance of pulse shaping.
- Apply modulation techniques to design a digital system.
- Understand source and channel coding schemes

UNIT I

PULSE DIGITAL MODULATION: Elements of digital communication systems, advantages of digital communication systems, elements of PCM: sampling, quantization and coding, quantization error, companding in PCM systems. Differential PCM systems (DPCM).

DELTA MODULATION: Delta modulation, its drawbacks, adaptive Delta modulation, comparision of PCM and DM systems, noise in PCM and DM systems.

UNIT II

BASE BAND TRANSMISSION: Requirements of a line encoding format, various line encoding formats- Unipolar, Polar, Bipolar, Scrambling techniques-B8ZS,HDB3. Computation of power spectral densities of various line encoding formats.

M-ARY PULSE MODULATION: Inter symbol interference, pulse shaping to reduce ISI, Nyquist's criterion, Raised cosine filter, Equalization, Correlative level coding, Duo-binary encoding, Modified Duo-binary encoding.

UNIT III

DIGITAL MODULATION TECHNIQUES: Introduction, Modulation and Demodulation of ASK, FSK, PSK, DPSK, DEPSK, QPSK, M-ary PSK, ASK, FSK.

DATA TRANSMISSION: base band signal receiver, probability of error, optimum filter, matched filter, probability of error using matched filter, probability of error for various line encoding formats, correlator receiver.

Coherent reception, non-coherent detection of ASK, FSK, BPSK, QPSK and calculation of their error probabilities using matched filter approach and Correlator receiver approach.

UNIT IV

INFORMATION THEORY: Information and Entropy conditional entropy, Mutual Information, channel Capacity, Various Mathematical Modeling of Communication Channels and their Capacities, Hartley Shannon Law, Trade off between bandwidth and S/N ratio Source Coding. Fixed Length and Variable Length Source Coding Schemes.

UNIT V

LINEAR BLOCK CODES: Introduction to error control coding, Matrix description of linear block codes, error detection and error correction capabilities of linear block codes, hamming code, binary cyclic codes, algebraic structure, encoding, syndrome calculation and error correction.

CONVOLUTIONAL CODES: Introduction, encoding of convolutional codes, time domain approach, transform domain approach. General approach: state, tree and trellis diagram, decoding using viterbi algorithm, burst error correction, block interleaving and Convolutional interleaving.

TEXT BOOKS

1. Digital Communications – Simon Haykin, John Wiley, 2005.
2. Digital and Analog Communication Systems – Sam Shanmugam, John Wiley, 2005

3. Principles of Communication Systems – H. Taub and D. Schilling, Goutam Saha, 3rd Edition, McGraw-Hill, 2008.

REFERENCES

1. Digital Communications – John Proakis, TMH, 1983.
2. Communication Systems Analog and Digital – Singh and Sapre, TMH, 2004.
3. Modern Analog and Digital Communications – B.P. Lathi and Zhi Ding, International 4th Edition, Oxford University Press.

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III Year B.Tech ECE – I Sem	**L**	**T/P/D**	**C**
	4	**0**	**4**

(R11ECE1107) ANTENNAS AND WAVE PROPPAGATION

Pre-requisites: Electro Magnetic Theory concepts

Course Objectives

- To know about the fundamentals to design various types of Antennas.
- To analyze the fields associated with various types of antennas along with emphasis on their applications
- To know the measurement techniques involved in measuring antenna parameters
- To understand the concepts of radio wave propagation in the atmosphere.

Course Outcomes

After going through this course the student will be able to

- Apply the fundamentals to design various types antennas
- Quantify the fields radiated by various types of antennas
- Analyze antenna parameters measurement to assess antenna's performance
- Analyze the intricacies involved in propagation of waves in free space

UNIT I

ANTENNA FUNDAMENTALS: Introduction, Radiation Mechanism – single wire, 2 wire, dipoles, Current Distribution on a thin wire antenna . Antenna Parameters - Radiation Patterns, Patterns in Principal Planes, Main Lobe and Side Lobes, Beamwidths, Polarization, Beam Area, Radiation Intensity, Beam Efficiency, Directivity, Gain and Resolution, Antenna Apertures, Aperture Efficiency, Effective Height, illustrated Problems.

UNIT II

THIN LINEAR WIRE ANTENNAS: Retarded Potentials, Radiation from Small Electric Dipole, Quarterwave Monopole and Halfwave Dipole – Current Distributions, Evaluation of Field Components, Power Radiated, Radiation Resistance, Beamwidths, Directivity, Effective Area and Effective Hight. Natural current distributions, fields and patterns of Thin Linear Center-fed Antennas of different lengths, Radiation Resistance at a point which is not current maximum. Antenna Theorems – Applicability and Proofs for equivalence of directional characteristics, Loop Antennas : Small Loops - Field

Components, Comparison of far fields of small loop and short dipole, Concept of short magnetic dipole, D and R_r relations for small loops.

UNIT III

ANTENNA ARRAYS : 2 element arrays – different cases, Principle of Pattern Multiplication, N element Uniform Linear Arrays – Broadside, Endfire Arrays, EFA with Increased Directivity, Derivation of their characteristics and comparison; Concept of Scanning Arrays. Directivity Relations (no derivations). Related Problems. Binomial Arrays, Effects of Uniform and Non-uniform Amplitude Distributions, Design Relations. Arrays with Parasitic Elements, Yagi - Uda Arrays, Folded Dipoles and their characteristics.

NON-RESONANT RADIATORS : Introduction, Traveling wave radiators – basic concepts, Longwire antennas – field strength calculations and patterns, Microstrip Antennas-Introduction, Features, Advantages and Limitations, Rectangular Patch Antennas –Geometry and Parameters, Impact of different parameters on characteristics. Broadband Antennas: Helical Antennas – Significance, Geometry, basic properties; Design considerations for monofilar helical antennas in Axial Mode and Normal Modes (Qualitative Treatment).

UNIT IV

VHF, UHF AND MICROWAVE ANTENNAS - I : Reflector Antennas : Flat Sheet and Corner Reflectors. Paraboloidal Reflectors – Geometry, characteristics, types of feeds, F/D Ratio, Spill Over, Back Lobes, Aperture Blocking, Off-set Feeds, Cassegrainian Feeds.

Horn Antennas – Types, Optimum Horns, Design Characteristics of Pyramidal Horns; Lens Antennas – Geometry, Features, Dielectric Lenses and Zoning, Applications, Antenna Measurements – Patterns Required, Set Up, Distance Criterion, Directivity and Gain Measurements (Comparison, Absolute and 3-Antenna Methods).

UNIT V

WAVE PROPAGATION : Concepts of Propagation – frequency ranges and types of propagations. Ground Wave Propagation–Characteristics, Parameters, Wave Tilt, Flat and Spherical Earth Considerations. Sky Wave Propagation – Formation of Ionospheric Layers and their Characteristics, Mechanism of Reflection and Refraction, Critical Frequency, MUF and Skip Distance – Calculations for flat and spherical earth cases, Optimum Frequency, LUHF, Virtual Height, Ionospheric Abnormalities, Ionospheric Absorption.

Fundamental Equation for Free-Space Propagation, Basic Transmission Loss Calculations. Space Wave Propagation – Mechanism, LOS and Radio Horizon. Tropospheric Wave Propagation – Radius of Curvature of path, Effective Earth's

Radius, Effect of Earth's Curvature, Field Strength Calculations, M-curves and Duct Propagation, Tropospheric Scattering.

TEXT BOOKS

1. Antennas for All Applications – John D. Kraus and Ronald J. Marhefka, 3rd Edition, TMH, 2003.
2. Electromagnetic Waves and Radiating Systems – E.C. Jordan and K.G. Balmain, PHI, 2nd Edition, 2000.

REFERENCES

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

III Year B.Tech ECE – II Sem	L	T/P/D	C
	3	0	3

(R11EIE1121) ELECTRONIC MEASUREMENTS AND INSTRUMENTATION

Pre-requisites: Operational Amplifier Concepts

Course Objectives

- Develop an awareness to various electronic measurement Concepts
- Explain the operation and design of different electronic instruments
- Compare different ADC and DAC techniques and explain various circuits for conversion.
- Explain the operations of frequency and time measuring instruments and transducers.

Course Outcomes

After going through this course the student will be able to

- Apply measurement and instrumentation systems for electrical and electronics engineering.
- Design signal conditioning circuits corresponding to the measurement purposes.
- Learn different types of CRO's and bridges to measure resistance, capacitance and inductance.
- Design real time applications using transducers

UNIT I

Performance characteristics of instruments, static characteristics, Accuracy, Resolution, Precision, Expected value, Errors, Sensitivity. Errors in measurements , Dynamic Characteristics , DC volt meters. D'Arsonvan Movement, DC Current meters, AC volt meters and Current Meters, Range Extension /solid state and Differential voltmeters ,AC voltmeters, Multirange extension , Thermocouple type RF ammeter , ohmmeter series type , shunt type , Specifications and design consideration of different types of Digital Volt meters (DVMs) - Staircase Ramp- type DVM, Dual Slope integrating type DVM, Successive Approximation Type DVM.

UNIT II

Signal generators-Fixed and variable , AF oscillators , Standard and AF sine and square wave signal generators , Function Generators ,Square , pulse generator , Signal

Analyzer, Logic Analyzer, Network Analyzer, Random noise generator, sweep generator , arbitrary waveform generator Wave analyzers , harmonic distortion wave analyzer , spectrum analyzers Frequency counter , time and period measurement.

UNIT III

Oscilloscopes- CRT Features, vertical amplifiers, Horizontal deflection system, sweep, trigger pulse, delay line, sync selector circuits ,simple CRO, Trigger sweep CRO, dual beam CRO , Dual trace oscilloscope, sampling oscilloscope ,storage oscilloscope, digital read out oscilloscope, measurement of amplitude and frequency, probes for CRO-active and passive , CRO Specifications, High Frequency CRO's.

UNITIV

DC bridges- Wheatstone's bridge, Kelvin bridge, AC bridges-measurement of inductance-Maxwell's bridge, Hay's bridge, measurement of capacitance, schearing bridge, wien bridge, errors and precautions in using bridges, Q-meter,different connections in Q- meter.

UNITV

Transducers-active and passive transducers-Resistance transducers , Capacitance transducers, inductance transducers, Strain gauges transducers, LVDT transducers, Piezo electric transducers, Resistance thermometers, Thermocouples, Measurement of physical parameters- flow measurement, Liquid level measurement , measurement of humidity and moisture, Velocity, Force , pressure -- high preasure, Vacuum level measurements, data acquisition systems.

TEXTBOOKS

1. Electronic Measurements and Instrumentation - K.Lal Kishore, Pearson Education, 2005

2. Electronic Instrumentation, - H.S.Kalsi, 2nd Edition ,Tata McGraw Hill, 2004.

3. Modern Electronic Instrumentation and Measurement Techniques- A.D.Helfric and W.D. Cooper, 5th Edition ,PHI, 2002.

REFERENCES:

1. Transducers and display systems - B.S.Sonde

2. Electronic measurements and Instrumentation – B. M. Oliver and J.M. Cage, TMH, 2009.

3. Electrical and Electronic measurements - Shawney, Khanna Publications.

4. Introduction to Instrumentation and measurements - Robert Northrop (CRC press)

III Year B.Tech ECE – I Sem	L	T/P/D	C
	0	3	2

(R11ECE1203) ANALOG COMMUNICATION LABORATORY

Pre-requisites: signals and systems

Course Objectives

- To analyze various modulation techniques in communications.
- To analyze various spectrums using spectrum analyzer.
- To analyze receiver characteristics.
- To understand the importance of AGC and VCO

Course Outcomes

After going through this course the student will be able to

- Simulate all the experiments using any simulation software
- Design transmitter and receiver in analog communication system
- Perform various experiments using Teena software and ASL Kit
- Understand and Analyze various problems when implemented on DSP

The experiments are to be software simulated and implemented through Hardware.

1. Amplitude modulation and demodulation.
2. Diode detector characteristics.
3. Frequency Modulation and Demodulation.
4. Balanced Modulator.
5. Pre-emphasis and de-emphasis.
6. Characteristics of mixer.
7. Digital phase detector.
8. Phase locked loop.
9. Synchronous detector.
10. SSB system.
11. Spectral analysis of AM and FM signals using spectrum analyzer.
12. Squelch Circuit.
13. Frequency Synthesizer.
14. AGC Characteristics.
15. Receiver Measurements

III Year B.Tech ECE– I Sem	L	T/P/D	C
	0	3	2

(R11HAS1204) ADVANCED ENGLISH COMMUNICATION SKILLS LABORATORY

Introduction

This course aims to offer students a practical approach to Technical Writing, and provide a relevant, contemporary and authoritative introduction to the dynamic field of technical communication that prepares them for Workplace Communication. Each unit in the syllabus is devised so as to include a writing component as well as an oral component.

Prerequisites: English Language Communication Skills laboratory

Course objectives:

- enable the students to create clear, accurate, and succinct content to write business letters, resume, SOP, Proposals and Technical Reports for academics as well as for workplace
- enable students to adjust technical content to meet the needs of a specific target audience
- groom students to speak accurately and fluently and prepare them for real world activities through behavioral skills.
- train students in soft skills through role play and group discussion to improve their EQ.

Course Outcomes:

Students will be able to:

- summarize and synthesize information and produce technical writing that is required in academics as well as in the engineering profession
- write covering letters, resume, SOP, Project Proposals and Technical Reports
- speak fluently and address a large group of audience and participate in debates and discussions.
- negotiate terms, manage complex situations through interpersonal skills, persuade people and make quick decisions

Methodology

Writing Component

A Process- Genre methodology will be used in teaching the technical genres. This method would enable students to understand the use of particular lexico-grammatical patterns required of in the context of technical writing. They would learn to use language to express the particular communicative intent that is required of in the context of writing these genres.

Oral Communication Component

The objective of including Oral Communication is to impart behavioral skills and prepare students to speak to a large group or team, keeping in mind the audience, context and purpose of communication. This Oral Communication component must enable students to speak in an organized and mature way, without any inhibitions. They will be groomed to relate their speech to their audience.

Objectives of Oral Communication Component

i) equip students with Behavioral skills
ii) prepare them for Oral presentations, and Group Discussions
iii) equip them with Interview skills

Syllabus Outline

Unit I

1. Applications and Covering letters

2. Resume Writing
3. Oral Communication :Self Introduction

Unit II

1. Introduction to Technical Writing

- Defining Technical Writing
- Distinguishing it from other types of writing
- Determining audience, purpose and context

2. Summarizing and Synthesizing Information

3. Behavioral Skills and Personality Development

a) Building a Positive Attitude, Building a Positive Personality, Motivation, Goal Setting & Values & Vision

b) Problem Solving and Decision Making; Negotiation Skills through Role Play

c) Team Building and Leadership Abilities

Unit III

1. Verbal Ability : Language, Reasoning Skills, Analytical Ability, Reading and Listening Skills
2. Oral Communication: Presentation Skills (Oral and Visual)

Unit IV

1. Writing Research Abstracts
2. Oral Communication: Group Discussions

Unit V.

1. Writing Project Proposals
2. Writing Project Reports
3. Oral Communication: Interview Skills

REQUIRED TEXT BOOKS AND MATERIALS

1. Technical Writing: Process and Product *by* Sharon J. Gerson and Steven M. Gerson (1999); *Publisher: Prentice Hall.*
2. Effective Technical Communication *by* Ashraf Rizvi, M., (2005); Publisher: *Tata Mc Graw Hill*.
3. Anderson, Paul V. (2003). Reports. In Paul V. Anderson's Technical Communication: A Reader-Centered Approach (5th ed.) (pp. 457-473). Boston: Heinle.

REFERENCES

1. Technical Communication *by* Rebecca E. Burnett, 5th edition (2001); *Publisher: Thomson/Wadsworth*
2. Technical Communication: A Practical Approach (7th ed.) *by* William S. Pfeiffer; *Publisher: Person education*
3. Technical Communication: Situations and Strategies *by* Mike Markel (2006-2007); *Publisher: Bedford/ St. Martins*.
4. Anderson, Paul V. (2003). Three Types of Special Reports. In Paul V. Anderson's Technical Communication: A Reader-Centered Approach (5th ed..) ((pp. 474-513). Boston:Heinle.
5. Bolter, Jay David (2001), "The Late Age of Print" in Robert P. Yagelski's Literacies and Technologies: A Reader for Contemporary Writers (135-145); *Publisher: Longman*.
6. Brandt, Deborah. (1998) Sponsors of literacy. College Composition and Communication 49.2, 165-185.
7. Burnett, Rebecca, E. (2001) "Locating and Recording Information" in Rebecca E. Burnett's Technical Communication (pp. 164-195).
8. Johnson-Sheehan, Richard (2007). "Starting Your Career" in Richard Johnson-Sheehan's Technical Communication Today (2nd ed.) (pp. 388-402). New York: Longman.
9. Business Correspondence and Report Writing by R. C. Sharma and K. Mohan, Third Edition (2002); *Publisher: Tata McGraw Hill*.
10. Technical Communication: Principles and Practices by M. Raman and S. Sharma (Indian edition; 2004); *Publisher: Oxford University Press*.

III Year B.Tech ECE – I Sem	L	T/P/D	C
	0	3	2

(R11EIE1203)ELECTRONIC CIRCUIT ANALYSIS LABORATORY

Pre-requisites: Electronic Devices and Circuits

Course Objectives

- Design and simulate various BJT and FET amplifiers.
- Design and simulate various BJT Feedback amplifiers.
- Design and simulate various BJT Oscillators.
- Design and simulate various power amplifiers and tuned amplifiers.

Course Outcomes

After going through this course the student will be able to

- Apply the concepts of amplifiers in the design of Public Addressing System
- Generate Sinusoidal wave forms
- Design stable system using feedback concepts.
- Design Class C tuned amplifier.

Design and simulation of the following circuits using simulation software and implementation through hardware.

1. Common Emitter Amplifier with and without emitter bypass capacitor.
2. Common source Amplifier.
3. Two stage RC coupled BJT Amplifier.
4. Darlington pair.
5. Current shunt and voltage series feedback amplifier.
6. Cascade amplifier.
7. RC phase shift Oscillator using Transistor.
8. Hartley Oscillator using BJT.
9. Crystal controlled Oscillator using BJT.
10. Class A power Amplifier.
11. Complementary Symmetry Class B Push-Pull Amplifier.
12. Class C Tuned Amplifier.
13. Common Source MOSFET Amplifier.
14. Frequency Response Common Emitter Amplifier.

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III Year B.Tech ECE – II Sem	**L**	**T/P/D**	**C**
	4	**0**	**4**

(R11HAS1103) MANAGEMENT SCIENCE

Pre-requisite: Knowledge on Business Economics & Financial Analysis

Course Objectives

- Understand the principles, functions, theories and practices of different management areas and to provide them with practical exposure to cases of success/failure in business.
- Exposure with a systematic and critical understanding of organizational theory, structures and design.
- Comprehend conceptual models of strategic management and to familiarize with the tools of operations and project management.
- Gain Knowledge on the role of human relations in the management of operations and to provide basic insights into contemporary management practices.

Course Outcomes

After going through this course the student will be able to

- Function effectively in multidisciplinary teams to accomplish a common goal of organizations.
- Apply theories to improve the practice of management.
- Appreciate the management challenges associated with high levels of change in the organizations.
- Develop global vision and management skills at both a strategic level and interpersonal level.

UNIT I

Introduction to management

Concepts of management - nature, importance, and functions of management; Taylor's scientific management theory; Fayol's principles of management; Mayo's Hawthorne experiments; Maslow's theory of human needs; Douglas McGregor's theory X and

theory Y; Herzberg's two-factor theory of motivation; System and contingency approach to management; Planning – meaning, significance, and types of plans; Decision making and steps in decision making process; Leadership styles; Social responsibilities of management.

Organizing - Meaning, and features; Process of organization; Principles of organization; Elements of organization; Organization chart; Span of control - Graicunas formulae; Centralisation and decentralization; Types of mechanistic and organic structures of organisation - line organization, line and staff organization, functional organization, committee organization, matrix organization, virtual organisation, cellular organisation, team structure, boundaryless organization, inverted pyramid structure, and lean and flat organization structure; Their merits, demerits and suitability.

UNIT II

Human resources management

Concepts of HRM;

Basic functions of HR manager - human resource planning (definition; objectives; process), recruitment (definition; sources; techniques), selection (definition; process), induction and orientation, training and development (definition; need; methods), employee exit process, employee relations management, employee compensation and benefits administration, job evaluation (objectives; process; methods), and performance appraisals (objectives; process; methods).

UNIT III

Strategic management

Mission; Goals; Objectives; Policy; Strategy; Programmes; Elements of corporate planning process - environmental scanning; value chain analysis, BCG matrix, generic strategy alternatives, SWOT analysis, and steps in strategy formulation and implementation; Balance score card; Capability maturity model (CMM)/ People capability maturity model (PCMM).

UNIT IV

Operations management

Plant location; Types of plant layout; Methods of production – job, batch, and mass production; Work study-basic procedure involved in method study and work measurement.

Materials management

Objectives; Need for inventory control; EOQ, ABC Analysis; Purchase procedure; Value analysis; JIT, Six sigma; TQM; Supply chain management; Stores management and stores records.

Marketing

Functions of marketing; Marketing mix, and marketing strategies based on product life cycle; Channels of distribution.

UNIT V

Project management – network analysis

Network analysis; Programme evaluation review technique - PERT (probability of completing the project within given time); Critical path method - CPM (Identifying critical path); Project cost analysis; Project crashing; Simple problems.

TEXT BOOK

1. Management Science *by* Aryasri; *Publisher: Tata McGraw Hill, 2009.*
2. Management *by* James Arthur, Finch Stoner, R. Edward Freeman, and Daniel R. Gilbert 6th Ed; *Publisher: Pearson Education/Prentice Hall.*
3. Principles and Practice of Management - L.M. Prasad; *Publisher: Sultan Chand Publications, New Delhi.*

REFERENCES

1. Principles of Marketing: A South Asian Perspective *by* Kotler Philip, Gary Armstrong, Prafulla Y. Agnihotri, and Eshan ul Haque , 2010, 13th Edition, *Publisher: Pearson Education/ Prentice Hall of India*.
2. A Handbook of Human Resource Management Practice *by* Michael Armstrong, 2010; *Publisher: Kogan Page Publishers*.
3. Quantitative Techniques in Management *by* N.D. Vohra, 4th edition, 2010; *Publisher: Tata McGraw Hill*.
4. Operations Management: Theory and Practice *by* B. Mahadevan, 2010; *Publisher: Pearson Education*.
5. Strategic Management *by* V.S.P. Rao and V. Hari Krishna, 2010; *Publisher: Excel Books*.

III Year B.Tech ECE – II Sem	L	T/P/D	C
	4	0	4

(R11ECE1108) MICROPROCESSORS AND MICROCONTROLLERS

Pre-requisites: Digital fundamentals, Computer Organization

Course Objectives

- To understand characteristics and architectures of various microprocessors and microcontrollers.
- Understand basic programming concepts and software tools
- Learn various interfacing circuits necessary for various applications
- To learn various interfacing concepts.

Course Outcomes

After going through this course the student will be able to

- Demonstrate the ability to design a system, component or a process as per needs and specifications
- Select the proper architecture for the implementation of digital designs
- Write various assembly language programs for a given task using 8086, 8051 and ARM processors.
- Design and implement microprocessor and microcontroller based systems.

UNIT I

Introduction to 8085 Microprocessor, Architecture of 8086 Microprocessor, Addressing modes of 8086, Instruction set of 8086, Assembler directives, simple assembly language programs, procedures, and macros. Pin diagram of 8086-Minimum mode and maximum mode of operation. Memory and I/O organization of 8086.

UNIT II

8255 PPI – various modes of operation and interfacing to 8086. Interfacing Keyboard and Displays, D/A and A/D converter to 8086 using 8255, memory interfacing to 8086, Interfacing 8257 DMA Controller to 8086.

UNIT III

Serial Communication standards, serial data transfer schemes, 8251 USART architecture and interfacing, RS-232, IEEE 488 standards. Interrupt structure of 8086, Interrupt Vector Table. Need for 8259 Programmable Interrupt Controller.

UNIT IV

Introduction to Microcontrollers, 8051 Microcontroller Architecture, I/O ports, memory organization, counters and Timers, Serial data Input/Output, Interrupts. Addressing modes, Instruction set of 8051, Simple programs.

Timer, serial port and Interrupts programming: Programming 8051 timers/counters, 8051 serial port programming, programming timer interrupts, programming External hardware interrupts, programming serial communication interrupts.

UNIT V

The AVR RISC microcontroller architecture: Introduction, AVR family architecture, Register File, The ALU, Memory access and Instruction execution, I/O memory, EEPROM, I/O ports, Timers, UART, Interrupt structure.

TEXT BOOKS

1. Microprocessors and interfacing – Douglas V. Hall, TMH, 2nd Edition, 1999.
2. 8051 Microcontroller – Kenneth J. Ayala, Penram International/ Thomson, 3rd Edition.
3. The 8051 microcontrollers and Embedded systems- Mazidi and mazidi, PHI, 2000.

REFERENCES

1. Micro computer systems, The 8086/8088 Family Architecture, Programming and Design – Y.Liu and G.A. Gibson, PHI, 2nd edition.
2. Advanced microprocessors and Peripherals – A.K.Ray and K.M.Bhurchandi, TMH, 2000.
3. Micro Computer System 8086/8088 Family Architecture Programming and Design – By Liu and GA Gibson PHI, 2nd Edition
4. Microcontrollers and Applications, Ajay . V. Deshmukh, TMGH,2005.
5. The 8085 Microprocessor : Architecture Programming and Interfacing – K.Uday Kumar, B.S Umashankar, Pearson , 2008.

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III Year B.Tech ECE – II Sem	L	T/P/D	C
	4	1	4

(R11ECE1109) DIGITAL SIGNAL PROCESSING

Pre-requisites: Signals and systems

Course Objectives

- To understand characteristics of discrete time signals and systems
- To analyze and process signals using various transform techniques
- To understand various factors involved in design of digital filters and role of Multi rate Signal Processing.
- To understand the effects of finite word length implementation.

Course Outcomes

After going through this course the student will be able to

- Analyze and process signals in the discrete domain and their transformation
- Design filters to suit specific applications
- Design multi rate signal processing of signals through systems.
- Analyze binary fixed point and floating-point representation of numbers and arithmetic operations.

UNIT I

Introduction: Introduction to Digital Signal Processing: Discrete time signals and sequences, linear shift invariant systems, stability, and causality. Applications of Z-Transforms Solution of Linear constant coefficient difference equations, Block diagram representation of LCCD equations. System function, Frequency domain representation of discrete time signals and systems.

Discrete Fourier series: Properties of discrete Fourier series, DFS representation of periodic sequences, Relation between Z-transform and DFS.

UNIT II

Discrete Fourier Transforms: Properties of DFT, linear convolution of sequences using DFT, Computation of DFT.

Fast Fourier Transforms: Fast Fourier transforms (FFT) – Radix-2 decimation in time and decimation in frequency FFT Algorithms, Inverse FFT, and FFT for composite N.

UNIT III

IIR Digital Filters: Analog filter approximations- Butterworth and Chebyshev, Design of IIR Digital filters from analog filters, Step and Impulse invariance transformation techniques, Bilinear transformation method. Spectral transformations(Analog to Analog).

Realization of IIR Filters: Direct, Canonic, Cascade, Parallel and Ladder forms.

UNIT IV

FIR Digital Filters : Introduction to characteristics of linear phase FIR filters, Frequency response, Design of FIR filters : Fourier Method, windowing methods: Rectangular window, Hanning window, Hamming window, Generalized Hamming window, Bartlett triangular window, Frequency Sampling method, Comparison of IIR and FIR filters.

Realization of FIR Filters: Direct form, cascade realization and Linear phase Realization.

UNIT V

Multirate Digital Signal Processing: Introduction, Down sampling, Decimation, Up sampling, Interpolation, sampling rate conversion, Implementation of sampling rate conversion, Applications of Multirate Signal Processing.

Finite Word Length Effects: Limit cycles, Overflow oscillations, Round-off noise in IIR digital filters , Computational output round off noise, Methods to prevent overflow, Trade off between round off and overflow noise, Measurement of coefficient quantization effects through pole-zero movement, Dead band effects.

TEXT BOOKS

1. Digital Signal Processing : Principles, Algorithms and Applications – John G.Proakis,, D.G.Manolakis, 3rd Edition, Perason/PHI, 2007.
2. Discrete Time Signal Processing – A.V.Oppenheim and R.W. Schaffer, PHI, 2009
3. Digital Signal Processing – A Pratical Approach – Emmanuel C.Ifeacher, Barrie. W. Jervis, 2nd Edition., Pearson Education, 2009.

REFERENCES

1. Digital Signal Processing- Fundamentals and Applications – Li Tan, Elsevier , 2008.
2. Fundamentals of Digital signal Processing using MatLab- Robert J.Schilling, Sandra L.Harris, Thomson , 2007.
3. Digital Signal Processing – S.Salivahanan, A.Vallavaraj, C.Gnanapriya,TMH ,

2009.
4. Fundamentals of Digital Signal Processing - Loney Ludeman, John Wiley ,2009.
5. Discrete Systems and Digital Signal Processing with MatLab -Taan S. ElAli, CRC Press ,2009.

III Year B.Tech ECE – II Sem	L	T/P/D	C
	3	1	3

(R11CSE1113) COMPUTER NETWORKS

Pre-requisites: Digital communications

Course Objectives

- Understand fundamental concepts of computer networking.
- Familiarize the protocol and IEEE standards of various networks.
- Understand different routing protocols.
- Understand the concepts of Integrated and differentiated services.

Course Outcomes

After going through this course the student will be able to

- Understand the Layered Architecture of Computer Networks.
- Learn various datalink protocols and algorithms
- Learn various routing protocols and algorithms.
- Apply TCP and UDP in real time applications

UNIT – I

Introduction to networks, internet, protocols and standards, the OSI Model, Layers in OSI model, TCP/IP suite, Addressing, Analog and Digital signals.
Physical layer : Digital transmission, multiplexing, transmission media, circuit switched networks, Datagram networks, virtual circuit networks, switch and Telephone networks.

UNIT – II

Data link layer : Introduction, Block coding, cyclic codes, checksum, framing, flow and error control, Noiseless channels, noisy channels, HDLC, point to point protocols.
Medium Access sub layer: Random access, controlled access, channelization.

UNIT – III

IEEE standards, Ethernet, Fast Ethernet, Giga-Bit Ethernet, wireless LANS. Connecting LANS , backbone networks and virtual LANS, Wireless WANS, SONET, Frame relay and ATM.

UNIT – IV

Network layer: Logical addressing, internetworking, tunneling, address mapping, ICMP, IGMP, forwarding, Uni-cast routing protocols, multicast routing protocols.

UNIT – V

Transport Layer: Process to process delivery, UDP and TCP protocols, SCTP, Data traffic, congestion, congestion control, Qos, integrated services, differentiated services,QoS in switched networks.

Application Layer: Domain name space, DNS in internet, electronic mail, FTP, WWW, HTTP, SNMP, multi-media, network security.

TEXT BOOKS:

1. Data Communications and Networking – Behrouz A. Forouzan, Fourth Edition TMH,2006.
2. Computer Networks — Andrew S Tanenbaum, 4th Edition. Pearson Education/PHI.

REFERENCES :

1. Data communications and computer Networks, P.C .Gupta, PHI.
2. An Engineering Approach to Computer Networks-S.Keshav, 2nd Edition, Pearson Education.
3. Understanding communications and Networks, 3rd Edition, W.A. Shay, Cengage Learning.
4. *Computer Networking: A Top-Down Approach Featuring the Internet*. *James F. Kurose* and *Keith W. Ross*,3rd Edition, Pearson Education.

III Year B.Tech ECE – II Sem	L	T/P/D	C
	4	0	4

(R11ECE1110) VLSI DESIGN

Pre-requisites: Electronic Devices and circuits, Digital IC Concepts

Course Objectives

- To learn the various fabrication steps of IC and come across basic electrical properties of MOSFET.
- To study the concepts of stick diagrams and layouts with the knowledge of MOS layers through design rules.
- To study gate level design of subsystems, integrated circuits
- To learn concepts of PLD's ,design capture tools and CMOS testing.

Course Outcomes

After going through this course the student will be able to

- Learn IC Fabrication process steps required for PMOS, NMOS,CMOS, BiCMOS and I_{ds}- V_{ds} relationship.
- Understand VLSI Design flow for fabrication of a chip , layout design rules , stick diagrams and scaling of MOS transistor.
- Learn the time delays, driving large capacitive loads, wiring capacitance, and design of different subsystems.
- Understand concepts of PLD's, CMOS testing, Design Strategies, verification, and CMOS Testing.

UNIT I

INTRODUCTION: Introduction to MOS Technology – MOS, PMOS, NMOS, CMOS and BiCMOS technologies- Oxidation, Lithography, Diffusion, Ion implantation, Metallization, Encapsulation , Packing

BASIC ELECTRICAL PROPERTIES : Basic Electrical Properties of MOS ,CMOS and BiCMOS Circuits: Ids-Vds relationships, MOS transistor threshold Voltage, gm, gds, figure of merit w_o, Pass transistor, NMOS inverter, Various pull ups, Determination of pull-up to pull-down ratio(Z_{pu} / Z_{pd}) , CMOS Inverter analysis and design, BiCMOS inverters, Latch-up in CMOS circuits.

UNIT II

VLSI CIRCUIT DESIGN PROCESSES : VLSI Design Flow, MOS Layers, Stick Diagrams, Design Rules and Layouts, Lambda based design rules, Contact cuts , CMOS Lambda based design rules, Layout Diagrams for logic gates, Transistor structures ,wires and vias,

Scaling of MOS circuits- Scaling models, scaling factors, scaling factors for device parameters, Limitations of Scaling.

UNIT III

GATE LEVEL DESIGN AND LAYOUT: Architectural issues, Switch logic networks: Implementation of AND,OR and Multiplexer , Gate logic , Other forms of CMOS logic-Pseudo-NMOS , Dynamic CMOS logic. Basic circuit concepts, Sheet Resistance R_S and its concept to MOS, Area Capacitance Units, Calculations, The delay unit T, Inverter Delays, Driving large Capacitive Loads, Wiring Capacitances, Fan-in and fan-out, Choice of layers.

UNIT IV

SUBSYSTEM DESIGN Process: Subsystem Design, Shifters, Adders, ALUs, Multipliers, Parity generator, Comparators, Zero/One Detectors, Counters, Memory elements.

SEMICONDUCTOR INTEGRATED CIRCUIT DESIGN: PLDs, FPGAs, CPLDs, Standard Cells, Programmable Array Logic, Design Approach.

UNIT V

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

CMOS TESTING : CMOS Testing, Need for testing, Test Principles, Design Strategies for test, Over view of Chip level Test Techniques and System-level Test Techniques, Layout Design for Improved Testability.

TEXTBOOKS

1. Essentials of VLSI circuits and systems – Kamran Eshraghian, Eshraghian Dougles and A. Pucknell, PHI, Edition, 2005.
2. VLSI DESIGN – K.Lal Kishore , VSV Prabhakar – I.K..International ,2009
3. CMOS VLSI Design – A circuits and systems perspective, Neil H.E Weste , David Harris , Ayan Banerjee, pearson ,2009.

REFERENCES

1. CMOS logic circuit Design – John P. Uyemura , Springer , 2007
2. Moderan VLSI Design –Wayne Wolf, Pearson Education , 3rd Edition, 1997.
3. VLSI Design – A.Albert Raj, Latha PHI, 2008.
4. .Introduction to VLSI Design- Mead and Convey , BS Publcations, 2010.
5. VLSI Design – M. Michal Vai, CRC Press, 2009.

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III Year B.Tech ECE – II Sem	L	T/P/D	C
	0	3	2

(R11ECE1204) MICROPROCESSORS AND MICROCONTROLLERS LABORATORY

Pre-requisites: Programming concepts, Instruction sets

Course Objectives

- Introducing assembly language and the required tools for programming microprocessors and microcontrollers .
- Provide knowledge required to interface various peripherals to microprocessors and microcontrollers
- Design and develop both the hardware and software for microprocessor /microcontroller based systems.

Course Outcomes

After going through this course the student will be able to

- Develop the basic skills on choosing the suitable CPU and the required peripherals for a given application
- learnt and apply various software development tools for programming the microprocessors and microcontrollers
- design and develop microprocessor based general purpose computer systems
- design and develop special purpose systems used in various engineering disciplines based on microcontrollers.

I. Microprocessor 8086 and Interfacing:

1. Introduction to MASM/TASM.

2. Arithmetic operation – Multi byte Addition and Subtraction, Multiplication and Division – Signed and unsigned Arithmetic operation, ASCII – arithmetic operation.

3. Logic operations – Shift and rotate – Converting packed BCD to unpacked BCD, BCD to ASCII conversion.

4. By using string operation and Instruction prefix: Move Block, Reverse string, Sorting, Inserting, Deleting, Length of the string, String comparison.

5. 8255 : Interface keyboard

6. 8255 : Interface Display

7.Serial communication between 8086 processors and PC through 8251.

II. Microcontroller 8051 and Interfacing:

1. Programming using arithmetic, logical and Bit manipulation instructions of 8051
2. Reading and Writing on a parallel port.
3. Timer in different modes
4. Serial communication between 8051 and PC
5. Interrupt programming
6. LCD Interfacing
7. Keyboard Interfacing
8. ADC Interfacing
9. DAC Interfacing
10. stepper motor Interfacing
11. DC motor Interfacing
12. Sensor Interfacing and signal conditioning

(At least 5 interfacing experiments must be completed in addition to programming experiments from part-II)

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	0	3	2

(R11ECE1205) DIGITAL COMMUNICATIONS LABORATORY

Pre-requisites: Digital communications

Course Objectives

- To analyze various modulation techniques.
- To verify the sampling theorem.
- To study the spectral characteristics of PAM and QAM
- Develop various algorithms

Course Outcomes

After going through this course the student will be able to

- Develop any real time application using digital modulation techniques.
- Knowledge of time division multiplexing and its importance in real time applications.
- Create various algorithms.
- Evaluate the performance of various modulations

The Experiments should be software simulated and implemented through Hardware.

1. Pulse Amplitude Modulation and demodulation.
2. Pulse Width Modulation and demodulation.
3. Pulse Position Modulation and demodulation.
4. Sampling Theorem – verification.
5. Time division multiplexing.
6. Pulse code modulation.
7. Differential pulse code modulation.
8. Delta modulation.
9. Frequency shift keying.
10. Phase shift keying.
11. Differential phase shift keying.

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	0	3	2

(R11ECE1206) IC and ECAD LABORATORY

Pre-requisites: Linear and Digital IC Applications

Course Objectives

- To demonstrate the characteristics and applications of Op-Amps
- To verify the functionality of specific ICs: 555 timer, IC 565, Voltage regulators
- To study and build applications with ASLKV2010 Starter Kit
- To learn hardware description language and modeling of combinational circuits.
- To learn hardware description language and modeling of sequential circuits

Course Outcomes

After going through this course the student will be able to

- To demonstrate the characteristics and applications of Op-Amps
- To verify the functionality of specific ICs: 555 timer, IC 565, Voltage regulators
- Apply switching theory to the solution of logic design problems
- Understand the logical properties of flip-flops and design counters, adders, sequence detectors using HDL .

List of Experiments:

IC Lab:

1. Applications of 741 Op-Amp.-Adder, Subtractor, Integrator, Differentiator, Comparator.
2. Function Generator ,Full wave rectifier ,D/A Converter, A/D Converter using OP amp.
3. IC 555 Timer– Monostable Operation, Astable Operation.
4. Voltage Regulator using IC 723
5. Study of Logic Gates and Flip-Flops using Ics.,Half Adder, Full Adder and Subtractor.
6. Encoders and Decoders, Counters and Shift Registers
7. BCD to 7 Segment decoder using IC 7447, Multiplexer and De-multiplexer.

ECAD Lab:

Simulate the following using VHDL / VERILOG and verify the Functionality

1.Combinational Logic Circuits

2.Sequential Logic Circuits- Flip-Flops, Shift Registers and Counters

3. Memory

4.State Machines

5.Arithmetic Operations-Addition, Multiplication

VLSI Programs:

6. Introduction to layout Design rules

7. Layout, Physical Verification for Basic logic gates.
   CMOS invrter, CMOS NOR/NAND gates.

IV Year B.Tech ECE – I Sem	L	T/P/D	C
	4	0	4

(R11ECE1111) MICROWAVE ENGINEERING

Pre-requisites: Electro Magnetic theory and Transmission lines

Course Objectives

- To present a cohesive overview of the required fundamentals on Transmission lines and Wave Propagation Theory in the case of Wave guides.
- To understand various coupling techniques in waveguides and the basic properties of Polarization in Ferrite based materials in the case of waveguide components.
- To introduce the multiport junction concept for splitting the microwave energy in a desired direction.
- To get exposure on Microwave components in building a Microwave test bench setup for measurements.

Course Outcomes

After going through this course the student will be able to

- Understand the basics of wave propagation inside waveguides
- Analyze the ferrite based microwave components
- Apply the scattering parameters calculation in characterizing microwave junctions
- Analyze various types of Microwave measurements using a Microwave test bench

UNIT I

Microwave Transmission Lines : Introduction, Microwave Spectrum and Bands, Applications of Microwaves. Rectangular Waveguides-TE/TM mode Analysis, Dominant and Degenerate Modes, Filter characteristics, Power Transmission and Power Losses in Rectangular Waveguides. Microstrip Lines- Introduction, Z_0 Relations, Effective Dielectric Constant, Q Factor and Losses

UNIT II

Microwave Components – I: Coupling Mechanisms – Probe, Loop, Aperture types. Waveguide Discontinuities – Waveguide Windows, Tuning Screws and Posts, Matched Loads.

Cavity Resonators- Introduction, Rectangular Cavity Resonators.

Ferrites –Composition and Characteristics, Faraday Rotation, Ferrite Components - Isolator, Circulator, Gyrator.

UNIT III

Microwave Components-II: Waveguide Multiport Junctions – E plane and H plane Tees, Magic Tee, Hybrid Ring; Directional Couplers- 2 Hole, Bethe Hole types, Applications. Scattering Matrix and its Properties, Scattering Matrix of E Plane and H plane Tees, Magic Tee, Directional coupler, Circulator and Isolator. Waveguide Attenuators –Resistive Card, Rotary Vane types; Waveguide Phase Shifters- Dielectric, Rotary Vane types.

UNIT IV

Microwave Tubes: Limitations of Conventional tubes at Microwave frequencies, Microwave Tubes- Classifications, 2 cavity Klystrons –Structure, Velocity Modulation process and Applegate diagram, Bunching process, Power output and efficiency. Reflex Klystrons-Structure, Velocity Modulation, Applegate diagram and Principle of Working, Mode Characteristics, Power Output and Efficiency, Oscillating Modes and output characteristics. Traveling Wave tubes-Amplification Process, Microwave crossed field tubes: Cylindrical Magnetron-Structure and characteristics.

UNIT V

Microwave Solid State Devices: Transferred Electronic Devices – Introduction, Gunn Diode-Principle, Characteristics, Basic modes of operation. Introduction to Avalanche transit time devices –IMPATTs and TRAPATTs.

Microwave Measurements

Description of Microwave Bench – Different Blocks and their Features, Microwave power measurement- Bolometer Method, Measurement of Attenuation, Frequency, VSWR, Cavity Q and Impedance Measurements.

TEXT BOOKS

1. Microwave Devices and Circuits – by Samuel Y. Liao, Pearson,3rd Edition,2003
2. Microwave Principles – Herbert J. Reich, J.G. Skalnik, P.F. Ordung and H.L. Krauss, CBS Publishers and Distributors, New Delhi, 2004.
3. Foundations for Microwave Engineering – R.E. Collin, IEEE Press, John Wiley, 2nd Edition, 2002.

REFERENCES

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

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IV Year B.Tech ECE – I Sem	**L**	**T/P/D**	**C**
Elective - I	**3**	**1**	**3**

(R11ECE1113) DIGITAL IMAGE PROCESSING

Pre-requisites: Digital Signal processing

Course Objectives

- To introduce fundamentals of digital image processing and study image transforms
- To demonstrate digital image processing techniques in spatial and frequency domains
- To study and compare various image compression algorithms
- To study advanced image analysis methods: image segmentation, morphological image processing, & image restoration

Course Outcomes

After going through this course the student will be able to

- Understand the basic principles of digital image processing and perform image transforms
- Understand and perform basic image processing methods such as Image filtering operations, Image enhancement
- Analyze and compare various image compression techniques and their applications
- Design and implement various algorithms for image analysis

UNIT I

Fundamentals of Image Processing and Image Transforms: Digital Image Fundamentals, Basic steps of Image Processing System, Sampling and Quantization of an image, relationship between pixels, Imaging Geometry.

Image Transforms: 2 D- Discrete Fourier Transform, Discrete Cosine Transform (DCT), Haar Transform, Hadmard Transform, Hotelling Transform and slant transform.

UNIT II

Image Enhancement: Spatial domain methods: Histogram processing, Fundamentals of Spatial filtering, Smoothing
spatial filters, Sharpening spatial filters.

Frequency domain methods: Basics of filtering in frequency domain, image smoothing, image sharpening, Selective filtering.

UNIT III

Image Segmentation: Segmentation concepts, Point, Line and Edge Detection, Edge Linking using Hough Transform, Thresholding, Region Based segmentation.

Wavelet based Image Processing: Introduction to wavelet Transform, Continuous wavelet Transform, Discrete wavelet Transform, Filter banks, Wavelet based image compression

UNIT IV

Image Compression: Image compression fundamentals - Coding Redundancy, Spatial and Temporal redundancy, Compression models: Lossy and Lossless, Huffman coding, Arithmetic coding, LZW coding, Run length coding, Bit plane coding, Transform coding, Predictive coding, JPEG Standards.

UNIT V

Image Restoration: Image Restoration Degradation model, Algebraic approach to restoration, Inverse Filtering, Least Mean square filters, Constrained Least squares Restoration, Interactive restoration. Overview of Digital Image Watermarking Methods

TEXT BOOKS:

1. Digital Image Processing- Rafael C. Gonzalez and Richard E.Woods, 3rd Edition, Pearson, 2008.
2. Digital Image Processing- S.Jayaraman, S Esakkirajan, T Veerakumar, TMH, 2010.
3. Fundamentals of Digital Image Processing-A.K.Jain, PHI, 1989.

REFERENCES:

1. Digital Image Processing-William K.Pratt, 3rd Edition, John Willey, 2004.
2. Digital Image Processing and Computer Vision – Somka, Hlavac, Boyl, Cengage Learning, 2008.
3. Digital Image Processing using MATLAB - Rafael C. Gonzalez, Richard E.Woods and Steven L.Edding 2nd , TMH. 2010.
4. Introductory Computer Vision Imaging Techniques and Solutions – Adrian Low,2nd Edition, 2008.
5. Introduction to image Processing and Analysis – John C. Russ, J. Christian Russ, CRC Press, 2010

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IV Year B.Tech ECE – I Sem	**L**	**T/P/D**	**C**
Elective-I	**3**	**1**	**3**

(R11ECE1117) SATELLITE COMMUNICATIONS

Pre-requisites: Antennas, Microwave and Communication Concepts

Course Objectives

- Know, design understand the construction and principles of Satellites used for communications
- Know the tracking techniques of satellites
- Learn about various multiple accessing techniques
- Know about the application of satellites in GPS and other applications

Course Outcomes

After going through this course the student will be able to

- Understand the communication satellite mechanics and know about the satellite internal sub systems for communication applications
- Design the power budget for satellite links
- Know about the principles of GPS
- Understand various constellations of satellite and their applications

UNIT I

Introduction: Origin of Satellite Communications, Historical Back-ground, Basic Concepts of Satellite Communications, Frequency allocations for Satellite Services, Applications, Future Trends of Satellite Communications.

Orbital Mechanics and Launchers: Orbital Mechanics, Look Angle determination, Orbital perturbations, Orbital determination, Launches and Launch vehicles, Orbital effects in communication systems performance.

UNIT II

Satellite Subsystems: Attitude and Orbit control system, Telemetry, Tracking, Commanding and Monitoring, Power Systems, Communication Subsystems, Satellite

antennas, Equipment reliability and Space qualification.

UNIT III

Multiple Access: Frequency Division Multiple Access (FDMA), Intermodulation, calculation of C/N. Time Division Multiple Access (TDMA), Frame structure, Examples. Satellite Switched TDMA Onboard processing, DAMA, Code Division Multiple Access (CDMA), Spread Spectrum Transmission and Reception.

UNIT IV

Satellite Link Design: Basic transmission theory, system noise temperature and G/T ratio, Design of down links, Uplink design, Design of satellite links for specified C/N, System design examples.

Earth Station Technology: Introduction, Transmitters, Receivers, Antennas, Tracking systems, Terrestrial Interface, Primary Power test methods.

UNIT V

Low Earth Orbit and Geo-Stationary Satellite Systems: Orbit considerations, Coverage and Frequency Consideration, Delay and Throughput considerations, Systems considerations, Operational NGSO Constellation Designs.

Satellite Navigation and Global Positioning System: Radio and Satellite Navigation, GPS Position Location principles, GPS Receivers and Codes, Satellite Signal Acquisition, GPS Navigation Message, GPS Signal Levels, GPS Receiver Operation, GPS C/A code accuracy, Differential GPS.

TEXT BOOKS

1. Satellite Communications- Timothy Pratt, Charles Bostian and Jeremy Allnutt, WSE, Wiley Publications, 2nd Edition, 2003.

2. Satellite Communications Engineering- Wilbur L.Pritchard, Robert A Nelson and Henri G.Suyderhoud, 2nd Edition, Pearson Publications, 2003.

REFERENCE

1. Satellite Communications: Design Principles- M. Richharia, B S publications, 2nd Edition, 2003.

2. Satellite Communication- D.C Agarwal, Khanna Publications, 5th Edition.

3. Fundamentals of Satellite Communications- K.N. Raja Rao, PHI, 2004

4. Satellite Communications- Dennis Roddy, McGraw Hill, 4th Edition, 2009

IV Year B.Tech ECE – I Sem	L	T/P/D	C
Elective-I	3	1	3

(R11CSE1108) OPERATING SYSTEMS

Pre-requisites:

Course Objectives:

- Analyze the tradeoffs inherent in operating system design.
- Summarize the various approaches in solving the problem of mutual exclusion in an operating system.
- Evaluate the trade-offs in terms of memory size (main memory, cache memory, secondary memory) and processor speed.
- Demonstrate disk storage strategies, file strategies and analyze the system protection and security.

Course Outcomes:

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

- Identify the System calls, interrupts and process scheduling of any GOS.
- Write application keeping Concurrency and synchronization Semaphores/monitors, shared memory in mind
- Design new deadlock free and efficient memory management schemes for a GOS.
- Explain RAID, file systems facilities and protection and securityof any GOS.

UNIT-I

Computer System and Operating System Overview : Overview of Computer System hardware . Operating System Objectives and functions, Evaluation of operating System, Example Systems. Operating System Services , System Calls , System Programs, Process Management- Process Description ,Process Control, Process States, Cooperating Processes , Inter-process Communication.

UNIT –II

CPU Scheduling: Basic Concepts, Scheduling Criteria, Scheduling Algorithms and evaluation.

Threads Overview, Threading issues.

Concurrency : Principles of Concurrency, Mutual Exclusion, Software and hardware approaches , Semaphores , Monitors , Message Passing , Classic problems of synchronization.

UNIT-III

Principles of deadlock: System Model, Deadlock Characterization , Methods for handling Deadlocks, Deadlock Prevention, Deadlock avoidance ,Deadlock detection ,Recovery from Deadlocks, Dining philosophers problem .

UNIT-IV

Memory Management: Basic concepts, Swapping, Contiguous memory allocation, Paging, Segmentation, Virtual memory, Demand paging, Page-replacement algorithms, Thrashing.

Secondary storage structure: Disk structure, Disk scheduling, Disk management, Swap-space Management, RAID structure, Stable-storage Implementation, Tertiary-Storage Structure

I/O systems- I/O hardware, Application I/O interface, Kernel I/O subsystem, Transforming I/O request to hardware operations, STREAMS

UNIT-V

File Management: File system-File concepts, Access methods, Directory structure, File system mounting, File sharing and Protection. Implementing file systems-File system structure and implementation, Directory implementation, Allocation methods, Free-space management, Efficiency and performance

Security: Security threats, Protection, Intruders, Viruses, Trusted System.

TEXT BOOKS

1. Operating System Concepts- Abraham Silberchatz, Peter B. Galvin, Greg Gagne 7th Edition, John Wiley.
2. Operating Systems - Internal and Design Principles William Stallings, Fifth Edition-2005, Pearson education/PHI

REFERENCES

1. Operating System A Design Approach-Crowley,TMH.
2. Modern Operating Systems, Andrew S Tanenbaum 2nd edition Pearson/PHI.
3. Pramod Chandra P. Bhatt – "An Introduction to Operating Systems, Concepts and Practice", PHI, 2003.
4. Operating Systems – A Concept based Approach – D.M.Dhamdhere, 2nd Edition, TMH.

IV Year B.Tech ECE – I Sem	L	T/P/D	C
Elective - II	4	0	4

(R11ECE1114) OPTICAL COMMUNICATIONS

Pre-requisites: Optical Physics, Communications Concepts

Course Objectives

- To learn about the basic elements of optical fiber transmission link, fiber modes, configurations, structures and losses associated
- To know the working principles of various optical sources and photo detectors
- To analyze and design a fiber optic link for a given budget requirement
- To understand the parameters effecting the systems performance

Course Outcomes

After going through this course the student will be able to

- Demonstrate an understanding of the propagation of light in optical fiber.
- Analyze the principles governing optical sources and detectors used in optical communications.
- Design an optical communication system for a particular application.
- Analyze optical systems for performance and utility.

UNIT I

Overview of optical fiber communication: Historical development, The general system, advantages of optical fiber communications. Optical fiber wave guides- Introduction, Ray theory transmission, Total Internal Reflection, Acceptance angle, Numerical Aperture, Skew rays. Cylindrical fibers- Modes, Vnumber, Mode coupling, Step Index fibers, Graded Index fibers.

Single mode fibers- Cut off wavelength, Mode Field Diameter, Effective Refractive Index. Fiber materials — Glass, Halide, Active glass, Chalgenide glass, Plastic optical fibers. Signal distortion in optical fibers- Attenuation, Absorption, Scattering and Bending losses, Core and Cladding losses.

UNIT II

Information capacity determination, Group delay, Types of Dispersion : Material dispersion, Wave-guide dispersion, Polarization mode dispersion, Intermodal dispersion. Pulse broadening. Optical fiber Connectors- Connector types, Single mode

fiber connectors, Connector return loss. Fiber Splicing- Splicing techniques, Splicing single mode fibers. Fiber alignment and joint loss- Multimode fiber joints, single mode fiber joints.

UNIT III

Optical sources: LEDs, Structures, Materials, Quantum efficiency, Power, Modulation, Power bandwidth product. Injection Laser Diodes- Modes, Threshold conditions, External quantum efficiency,Laser diode rate equations,Resonant frequencies. Reliability of LEDandILD.

Source to fiber power launching - Output patterns, Power coupling, Power launching, Equilibrium Numerical Aperture, Laser diode to fiber coupling.

UNIT IV

Optical detectors: Physical principles of PIN and APD, Detector response time, Temperature effect on Avalanche gain, Comparison of Photodetectors. Optical receiver operation- Fundamental receiver operation, Digital signal transmission, error sources, Receiver configuration, Digital receiver performance, Probability of error, Quantum limit, Analog receivers.

UNIT V

Optical system design: Considerations, Component choice, Multiplexing. Point-to-point links, System considerations, Link power budget with examples, Overall fiber dispersion in Multi mode and Single mode fibers, Rise time budget with examples.

Transmission distance, Line coding in Optical links, WDM, Necessity, Principles, Types of WDM, Measurement of Attenuation and Dispersion, Eye pattern.

TEXT BOOKS :

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

RERFERENCES :

1. Fiber Optic Communications – D.K. Mynbaev , S.C. Gupta and Lowell L. Scheiner, Pearson Education, 2005.
2. Text Book on Optical Fibre Communication and its Applications – S.C.Gupta, PHI, 2005.

3. Fiber Optic Communication Systems – Govind P. Agarwal , John Wiley, 3rd Ediition, 2004.
4. Introduction to Fiber Optics by Donald J.Sterling Jr. – Cengage learning ,2004.
5. Fiber Optic Communications – John Gowar, 2nd Edition, PHI, 2001.

IV Year B.Tech ECE – I Sem	L	T/P/D	C
Elective – II	4	0	4

(R11ECE1115) DIGITAL DESIGN THROUGH VERILOG

Pre-requisites: Digital Logic Design, Programming Knowledge

Course Objectives

- To model, simulate and synthesize the digital designs using Verilog HDL
- To describe and realize the functionality of the digital design by using ASM charts
- To know architectural features and implementation of digital designs in CPLDs
- To know architectural features and building blocks of Altera's FPGAs.

Course Outcomes

After completing this course the student will be able to

- Develop HDL code for digital system designs.
- Describe ASM charts for synchronous sequential systems
- Acquire knowledge to Implement and test designs on the target CPLDs & FPGAs.
- Develop different digital solutions ranging from signal processing, data manipulation, electronic instrumentation control, telecommunications to consumer electronics.

UNIT I

INTRODUCTION TO VERILOG: Verilog as HDL, Levels of Design Description, Concurrency, Simulation and Synthesis, Functional Verification, System Tasks, Programming Language Interface (PLI), Module, Test Benches.

LANGUAGE CONSTRUCTS AND CONVENTIONS : Introduction, Keywords, Identifiers, White Space Characters, Comments, Numbers, Strings, Logic Values, Strengths, Data Types, Scalars and Vectors, Parameters, Memory, Operators, System Tasks.

UNIT II

GATE LEVEL MODELING : Introduction, AND Gate Primitive, Module Structure, Other Gate Primitives, Illustrative Examples, Tri-State Gates, Array of Instances of Primitives, Additional Examples, Design of Flip-flops with Gate Primitives, Delays, Strengths and Contention Resolution, Net Types, Design of Basic Circuits, Exercises.

BEHAVIORAL MODELING : Introduction, Operations and Assignments, Functional Bifurcation, Initial Construct, Always Construct, Examples, Assignments with Delays, Wait construct, Multiple Always Blocks, Designs at Behavioral Level, Blocking and Non blocking Assignments, The case statement, Simulation Flow. if and if-else constructs, assign-deassign construct, repeat construct, for loop, the disable construct, while loop, forever loop, parallel blocks, force-release construct, Event.

UNIT III

MODELING AT DATA FLOW LEVEL: Introduction, Continuous Assignment Structures, Delays and Continuous Assignments, Assignment to Vectors, Operators.

SWITCH LEVEL MODELING: Introduction, Basic Transistor Switches, CMOS Switch, Bi-directional Gates, Time Delays with Switch Primitives, Instantiations with Strengths and Delays, Strength Contention with Trireg Nets

UNIT IV

SYSTEM TASKS, FUNCTIONS, AND COMPILER DIRECTIVES: Introduction, Parameters, Path Delays, Module Parameters, System Tasks and Functions, File-Based Tasks and Functions, Compiler Directives, Hierarchical Access, General Observations, Exercises,

FUNCTIONS, TASKS, AND USER-DEFINED PRIMITIVES: Introduction, Function, Tasks, User- Defined Primitives (UDP), FSM Design (Moore and Mealy Machines)

UNIT V

DIGITAL DESIGN WITH SM CHARTS : State Machine Charts, Derivation of SM Charts, Realization of SM Charts, Implementation of the Dice Game, Alternative realizations for SM Charts using Microprogramming, Linked State Machines.

DESIGNING WITH PROGRAMMABLE GATE ARRAYS AND COMPLEX PROGRAMMABLE LOGIC DEVICES : Xilinx 3000 Series FPGAs, Altera FLEX 10K Series CPLDs.

VERILOG MODEL: Design of Microcontroller CPU,Interfacing Memory to a Microprocessor Bus.

TEXT BOOKS

1. Design through Verilog HDL – T.R. Padmanabhan and B. Bala Tripura Sundari, WSE, IEEE Press, 2004.
2. A Verilog Primier – J. Bhaskar, BSP, 2003.

REFERENCES

1. Fundamentals of Logic Design with Verilog – Stephen. Brown and Zvonko Vranesic, TMH, 2005.
2. Digital Systems Design using VHDL – Charles H Roth, Jr. Thomson Publications, 2004.
3. Advanced Digital Design with Verilog HDL – Michael D. Ciletti, PHI, 2005.
4. HDL Programming Fundamentals VHDL and VERILOG, Botros, Thomson Publications.

IV Year B.Tech ECE – I Sem	L	T/P/D	C
Elective-II	4	0	4

(R11ECE1116) SPEECH PROCESSING

Pre-requisites: Signal Processing

Course Objectives

- To learn the fundamentals of Speech Production and Perception and modeling
- To Comprehensively learn the Signal Processing techniques applied for Speech,
- To Understand building blocks of Speech Processing for Speaker Recognition
- To learn various Speech Technologies related to Accent and Emotion Recognition.

Course Outcomes

After going through this course the student will be able to

- Study the concatenated tube models of Speech Production and represent Vocal tract as a filter and its transfer function determination .
- Find the fundamental frequency (pitch) and formant estimation using signal processing methods like average zero crossing rate, auto correlation function
- Understand the Linear prediction analysis and coding techniques.
- Know the working of Speech technological applications

UNIT I

Production and Classification of Speech Sounds: Anatomy and physiology of Speech production, Lossless tube Digital Models for Speech Signals, Categorization of speech sounds, Sound structure of language, Acoustic theory of speech production, Lossless tube Digital models for speech signal.

UNIT II

Time Domain models and short time Fourier analysis: Short-time energy and Average magnitude , Short-time energy and average zero crossing Rate, Pitch period Estimation, Implementation of Filter Bank summation methods using FFT, Pitch detection, Analysis –by-synthesis systems.

UNIT III

Digital representation of Speech waveform : Sampling speech signals, Statistical model for speech, Instantaneous Quantization, Adaptive Quantization, General theory of differential Quantization, Delta Modulation, Differential PCM, Comparison of Systems.

UNIT IV

Homomorphic Signal Processing and Linear Predictive Coding of speech : Complex cepstrum approach, Pitch detection, Formant detection, Homomorphic Vocoder, Principles of linear predictive analyses, solution of LPC Equation, prediction error signal , frequency domain representation of LPC analysis, Relation between the various speech parameters, Synthesis of speech from LP parameters.

UNIT V

Man-machine communication: Speech Transformations, Computer music synthesis, Speaker recognition system, Speech recognition system, Emotion Detection, Concepts of Computational Auditory Scene Analysis.

TEXT BOOKS

1. L.R.Rabiner and R.W.Schafer : Digital Processing of Speech Signals, Pearson Educationn, 2002
2. Dellar andProakis, Digital Speech processing.
3. Speech and Audio Signal Processing : Ben Gold, Nelson Morgan, John Wiley and Sons ,2002

REFERENCE BOOKS

1. Thomas F Quateri, Discrete time Speech Signal Processing Principles and Practice, Pearson Education,2002
2. Natural Language understanding : James Allen.
3. Speech Communications By Shaugnassey.

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IV Year B.Tech ECE – I Sem	**L**	**T/P/D**	**C**
Elective-III	**4**	**0**	**4**

(R11ECE1119) ADVANCED DIGITAL SIGNAL PROCESSING

Pre-requisites: Knowledge of Transformations ,Digital filter design techniques, Digital signal processing techniques

Course Objectives

- To provide in-depth knowledge on methods and techniques in digital filter design, Multi-rate digital signal processing, Applications of Multirate Signal Processing
- To introduce spectrum estimation methods, Power spectrum estimation
- To enhance the awareness of different nonparametric and parametric methods
- To enhance the knowledge of sources of errors and its significance

Course Outcomes

After going through this course the student will be able to

- Apply fundamental principles of multi rate concepts for sampling rate alterations and design multirate DSP systems.
- Apply concepts of linear prediction theory for various problems encountered in Signal estimation and Analyze and design optimum filters for better system performance
- Understand methodologies and techniques of parametric and non-parametric methods for spectral estimation
- Analyze various limitations in implementation of DSPs

UNIT I

Review of DFT, FFT, IIR Filters, FIR Filters,

Multirate Signal Processing: Introduction, Decimation by a factor D, Interpolation by a factor I,

Sampling rate conversion by a rational factor I/D, Multistage Implementation of Sampling Rate

Conversion, Filter design and Implementation for sampling rate conversion, Applications of Multirate Signal Processing

UNIT II

Linear Prediction : Forward and Backward Linear Prediction – Forward Linear Prediction, Backward Linear Prediction, Optimum reflection coefficients for the Lattice Forward and Backward Predictors. Solution of the Normal Equations: Levinson Durbin Algorithm, Schur Algorithm. Properties of Linear Prediction Filters

UNIT III

Non-Parametric methods of Power Spectral Estimation: Estimation of spectra from finite duration observation of signals, Non-parametric Methods: Bartlett, Welch and Blackman and Tukey methods, Comparison of all Non-Parametric methods.

UNIT –IV

Parametric Methods of Power Spectrum Estimation: Autocorrelation and Its Properties, Relation between auto correlation and model parameters, AR Models - Yule-Waker and Burg Methods, MA and ARMA models for power spectrum estimation.

UNIT V

Finite Word Length Effects: Analysis of finite word length effects in Fixed-point DSP systems – Fixed, Floating Point Arithmetic – ADC quantization noise and signal quality – Finite word length effect in IIR digital Filters – Finite word-length effects in FFT algorithms.

TEXTBOOKS

1. Digital Signal Processing: Principles, Algorithms and Applications - J.G.Proakis and D.G.Manolokis, 4th Edition, Pearson Education/PHI. 2007
2. Discrete Time signal processing - Alan V Oppenheim and Ronald W Schaffer, PHI. 2009

3. DSP – A Pratical Approach – Emmanuel C.Ifeacher, Barrie. W. Jervis, 2 ed., Pearson Education. 2009

REFERENCES

1. Modern spectral Estimation : Theory and Application – S. M .Kay, PHI,1988.

2. Multirate Systems and Filter Banks – P.P.Vaidyanathan – Pearson Education

3. Digital Signal Processing – S.Salivahanan, A.Vallavaraj, C.Gnanapriya,TMH, 2009.

4. Modern Digital Signal Processing, Roberto Crist, Thomson Brooks,2004.

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IV Year B.Tech ECE – I Sem	L	T/P/D	C
Elective-III	4	0	4

(R11ECE1123) RADAR SYSTEMS

Pre-requisites: Communication Fundamentals
Course Objectives

- Understanding of the components of a radar system and their relationship to overall system performance, the radar operating environment and techniques used to confront it, and top level measures of performance.
- Understanding basic detection theory as applies to radar.
- Understanding the concepts of the matched filter, ambiguity functions, and other aspects of waveform with noise.
- Understanding radar measurements, associated quality, and the fundamentals of radar tracking.

Course Outcomes
After going through this course the student will be able to

- Describe radars and demonstrate the factors affecting the radar performance using radar range equation
- Analyze different types of radar systems to assess their performance
- Explain the processing of radar signals and analyze the performance of simple tracking radar systems.
- Analyze different types of radar receivers, effects of the noise interference on radar systems and understand the configuration of electronic

UNIT I

Basic of Radar: Introduction, Maximum Unambiguous Range, Simple form of Radar Equation, Radar block diagram and operation , Radar frequencies and Applications. Prediction of Range Performance, Minimum detectable Signal, Receiver Noise, Modified Radar Range Equation, Illustrative Problems.

Radar Equation : SNR, Envelope Detector-False Alarm Time and Probability, Integration of Radar Pulses, Radar Cross Section of Targets (simple targets – sphere , cone – sphere), Transmitter Power , PRF and Range Ambiguities. Systems Losses (qualitative treatment) Illustrative Problems.

UNIT II

CW and Frequency Modulated Radar: Doppler Effect, CW Radar – Block Diagram , Isolation between Transmitter and receiver , Non zero IF Receiver , Receiver Bandwidth Requirements, Applications of CW Radar. Illustrative Problems.

FM-CW Radar, Range and Doppler Measurement, Block Diagram and Characteristics (Approaching/ Receding Targets), FM-CW altimeter, Multiple Frequency CW Radar.

UNIT III

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

Tracking Radar: Tracking with Radar, Sequential Lobing, Conical Scan, Monopulse Tracking Radar – Amplitude Comparison Monopulse (one- and two- coordinates), Phase Comparison Monopulse. Tracking in Range, Acquisition and Scanning Patterns. Comparison of Trackers.

UNIT V

Detection of Radar Signals in Noise: Introduction, Matched Filter Receiver – Response Characteristics and Derivation, Correlation Function and Cross-correlation Receiver, Efficiency of Non-matched Filters, Matched Filter with Non-white Noise.

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

TEXT BOOKS

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

REFERENCES

1. Introduction to Radar Systems – Merrill I. Skolnik, 3rd ed., TMH, 2001.
2. Radar : Principles, Technology, Aplications – Byron Edde, Pearson Education, 2004.
3. Radar Principles – Peebles, Jr., P.Z., Wiley, New York, 1998.

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IV Year B.Tech ECE – I Sem	**L**	**T/P/D**	**C**
Elective-III	**4**	**0**	**4**

(R11CSE1114) OBJECT ORIENTED PROGRAMMING

Pre-requisites: 'C ' Programming language, Data structures

Course Learning Objectives

- Understand Object Oriented Programming concepts
- Write efficient and effective applications in Java
- Design and implement a Java Applet.
- Appraise how object-oriented design principles were used to extend Java's GUI capabilities.
- Recite the use of JDBC API in Java Applications

Course Outcomes

After going through this course the student will be able to

- Understand the concept and underlying principles of Object-Oriented Programming
- Discuss how object-oriented concepts are incorporated into the Java programming
- Develop problem-solving and programming skills using Java concepts such as multi threading, io and lang packages and exceptional handling
- Design and develop UI applications using AWT and to understand the event-based GUI handling principles
- Relate JDBC APIs to Java applications for operations on database

UNIT – I

Fundamentals of Object Oriented programming: Object Oriented paradigm - Basic concepts of Object Oriented Programming - Benefits of OOP - Applications of OOP **Java Evolution:** Java Features - How Java differs from C and C++ - Java and Internet - Java and World Wide Web - Web Browsers - Hardware and Software Requirements - Java Environment. Overview of Java Language: Simple Java Program - Java Program Structure - Java Tokens- Java Statements - Implementing a Java Program - Java Virtual Machine - Constants - Variables - Data types - Scope of Variables-Symbolic Constants-Type Casting and type promotions – Operators, Operator Precedence and

Associativity - Control Statements – break - continue- Arrays-Multi dimensional arrays, Wrapper Classes - Simple examples.

UNIT – II

Classes - Objects - Constructors – methods - this keyword – garbage collection- finalize - Overloading methods and constructors - Access Control- Static members – nested and inner classes – command line arguments - variable length arguments.
Inheritance – forms of inheritance – specialization, specification, construction, extension, limitation, combination, benefits and costs of inheritance. Super uses- final - polymorphism, method overriding - dynamic method dispatch –abstract classes – exploring string class.

UNIT – III

Packages and Interfaces: Defining and accessing a package – understanding CLASSPATH – access protection importing packages – Interfaces - Defining and implementing an interface, Applying interfaces, Variables in interfaces and extended interfaces. Exploring java.lang and java.util packages.
Exception Handling-Fundamentals, usage of try, catch, multiple catch clauses, throw, throws and finally. Java Built in Exceptions and creating own exception subclasses.

UNIT – IV

Multithreaded Programming: Java Thread life cycle model – Thread creation - Thread Exceptions - Thread Priority – Synchronization - Messaging - Runnable Interface - Interthread Communication - Deadlock - Suspending, Resuming and stopping threads.
I/O Streams: File – Streams – Advantages - The stream classes – Byte streams – Character streams.
Networks basics: Socket Programming - Proxy Servers - TCP/IP Sockets - Net Address - URL - Datagram's

UNIT – V

Applet Programming: How Applets differ from Applications - Applet Life Cycle - Creating an Applet - Running the Applet- Designing a Webpage - Applet Tag - Adding Applet to HTML file - More about Applet Tag - Passing parameters to Applets - Aligning the display.
Event handling- basics of event handling, Event classes, Event Listeners, delegation event model, handling mouse and keyboard events, adapter classes, AWT Class

hierarchy - AWT Controls - Layout Managers and Menus, limitations of AWT, Swing, MVC architecture, components, containers, exploring swing.

TEXT BOOKS

1 The Complete Reference Java J2SE, Herbert Schildt, 5th Edition, , TMH.
2. Gary Cornell - Core Java 2 Volume I Fundamentals, Cay S.Horstmann, 5th Edition. PHI,2000.

REFERENCES

1. The Java Programming Language, K. Arnold and J. Gosling, Second Edition, Addison Wesley, 1996.
2. Java Programming and Objected Oriented Application Development, Richard A. Johnson INDIA Edition CENGAGE Learning.
3. Object Oriented Programming with Java, R.Buyya, S.T.Selvi, X.Chu, TMH.
4. An Introduction to Java Programming, Y.Daniel Liang, Pearson Education.

IV Year B.Tech ECE – I Sem	L	T/P/D	C
Elective-IV	4	0	4

(R11ECE1122) DSP PROCESSORS AND ARCHITECTURES

Pre-requisites: Digital Signal Processing

Course Objectives

- To study the Architectural details of TMS320C54xx DSPs and the concepts involved in execution control and pipelining
- To analyze the importance of numeric formats and sources of errors in DSP implementation
- To understand the concepts of Memory & I/O interfacing
- Develop various algorithms

Course Outcomes

After going through this course the student will be able to

- Compare various architectures
- Design systems and role sampling rate
- Interface different devices to the processor.
- Design and implement real time signal processing algorithms and applications based on DSP processors.

UNIT I

Introduction to DSP Processors: Differences between DSP and other general purpose processor architectures, their comparison and need for special ASPs, RISC and CISC CPUs.

Implementation considerations: Data representations and arithmetic, finite word length effects, real time implementation considerations. Hardware looping, Interrupts, Stacks, Relative Branch support, Pipelining and Performance, Pipeline Depth, Interlocking, Branch effects, Interrupt effects, Pipeline Programming models.

UNIT II

Typical real-time DSP systems: Analog - to – digital conversion process, Sampling-lowpass and bandpass signals, Uniform and non-uniform quantization and encoding, Oversampling in A/D conversion, Digital to analog conversion process: signal recovery,

The DAC, Anti-imaging filtering, Oversampling in D/A conversion, Analog I/O interface for real-time DSP systems, sources of errors in DSP implementation.

UNIT III

Architecture of TMS 320C 5X, C54X Processors, addressing modes, Memory space of TMS320C54XX Processors, Program Control, TMS320C54XX instructions and Programming, On-Chip Peripherals, Interrupts of TMS320C54XX processors, Pipeline operation of TMS320C54XX Processors, speed issues.

UNIT IV

Memory space organization, External bus interfacing signals, Memory interface, Parallel I/O interface, Programmed I/O, Interrupts and I/O, Direct memory access (DMA). Hardware interfacing. A Multichannel buffered serial port (McBSP), McBSP Programming, a CODEC interface circuit.

UNIT V

The Q-notation, FIR Filters, IIR Filters, Interpolation Filters, Decimation Filters, PID Controller, Adaptive Filters, 2-D Signal Processing.

An FFT Algorithm for DFT Computation, A Butterfly Computation, Overflow and scaling, Bit-Reversed index generation, An 8-Point FFT implementation on the TMS320C54XX.

TEXT BOOKS

1. Digital Signal Processing – Avtar Singh and S. Srinivasan, Thomson Publications, 2004.

2. DSP Processor Fundamentals, Architectures and Features – Lapsley , S. Chand, 2000.

3. Digital Signal Processing A Practical approach, Second Edition, Emmanuel C. Ifeachor,Barrie W Jervis, Pearson Publications. 2002.

REFERENCES

1. Digital Signal processors Architectures, implementations and Applications-Sen M.Kuo, Woon-Seng S.Gan, Pearson Publications, 2009.

2 .Digital Signal Processors, Architecture, Programming and Applications – B. Venkata Ramani and M. Bhaskar,TMH, 2004.

3. Digital Signal Processing – Jonatham Stein, John Wiley, 2005.

4. A Simple Approach to Digital Signal Processing, C. Marren and G. Ewess, WILEY Inter-science, 1996, K. Shin, “DSP Applications with TMS 320 Family”, Prentice Hall, 1987.

IV Year B.Tech ECE – I Sem	L	T/P/D	C
Elective-IV	4	0	4

(R11ECE1129) TELECOMMUNICATION SWITCHING SYSTEMS

Pre-requisites: Analog and Digital Communications

Course Objectives

- To study about the basic concepts of telephony switching.
- To learn about the telecommunication networks.
- To learn about the telecommunication signaling.
- To learn about the packet switching and high speed networks.

Course Outcomes

After going through this course the student will be able to

- Design a telecommunication switching system.
- Analyze the performance of telecommunication network.
- Implement the signaling techniques in communication networks
- Analyze the different routing protocols and high speed networks

UNIT I

Switching Systems: Evolution of Telecommunications; Basics, functions, types and design parameters of switching system. 100/1000/10,000 Line exchange. Principles of Crossbar switching; A general trunking; Electronic and digital switching systems.

UNIT II

Telecommunications Traffic: Introduction; Unit of traffic; congestion; Traffic measurement; Mathematical model; Lost call systems-Theory; Traffic performance; Loss systems in Tandem; Use of traffic tables;Queing systems-the second Erlang distribution ; Probability of delay; Finite queue capacity; some other useful results; Systems with a single server; queues in tandem; Delay tables; Applications of delay formulae.

Switching Networks: Introduction; Single stage networks; Grading Principles; Design of progressive grading; other forms of gradings; Traffic capacity of Grading; Applications of grading; Link systems-grading; Two, Three and four stage networks; Grades of service of link systems.

Unit III

Time Division switching: Basics of time division space switching; basics of time division time switching; Time multiplexed space switch; Time multiplexed time switch; Combination switching; Three stage Combination switching.
Control of switching systems; call processing functions; sequence of operations; signal exchanges; State transition diagrams; common control; reliability; availability and security ; Stored program control.

Unit IV

Signaling: Introduction;Customer Line signaling; Audio frequency Junction and trunk circuits; FDM carrier systems-Outband signaling; Inband (VF) signaling; PCM signaling; Inter Register signaling; Common channel signaling principles- General signaling networks; CCITT signaling system number 6; CCITT signaling system number 7; High level data link control; Signal units; The signaling information field.

Unit V

Packet Switching: Introduction; Statistical multiplexing; Local and wide Area networks-network topologies and their comparison; Optical fiber Networks; Large scale networks-General; Datagrams and virtual circuits; Routing; Flow control; Standards; Frame relay; Broadband networks-general; Asynchronous Transfer mode; ATM switches; ISDN; Cellular radio networks; private networks; charging; Routing-general, automatic, Alternative routing.

TEXT BOOKS

1. Telecommunication Switching and Traffic Networks, J.E Flood, Pearson Eduction, 2006.
2. Telecommunication Switching system and Networks, Tyagarajan Viswanathan Prentice hall of India Pvt Ltd., 2006

REFERENCES

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

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IV Year B.Tech ECE – I Sem	L	T/P/D	C
Elective-IV	4	0	4

(R11CSE1110) DATA BASE MANAGEMENT SYSTEMS

Pre-requisites: Basic Computing Knowledge

Course Objectives

- Introduction of Data Base Management concepts and to give the description of structure of Data Base systems.
- Understand concepts of ER model and model the data base for the given scenarios including banking enterprise.
- Know the features of various models of data and representation of query model in SQL, relational algebra and calculus.
- Identify various anomalies in the database and refinement of the database schema through normalization process.
- Introduce the concepts and protocols related to transaction management and understand the concepts of data storage

Course Outcomes

After going through this course the student will be able to

- Understand, appreciate and effectively explain the underlying concepts of database system architecture and technologies
- Design and illustrate the database schema for a given scenario in an Entity-Relationship(ER) model.
- Analyse the features of Relational Data Model features in SQL and formulate the queries in Relational Algebra, Calculus and SQL.
- Define the concepts of Normalization and apply them for the design of the database.
- Summarize the concepts of transaction management and the data storage.

UNIT-I

Introduction to Databases and Database Management System - Database system Applications - Advantages of DBMS over File System - Data Models – Instances and

schema - View of Data - Database Languages -DDL-DML - Database Users and Administrator - Database System Structure.

UNIT-II

Database Design and ER diagrams – Attributes and Entity Sets – Relationships and Relationship Sets – Constraints - Keys - Design Issues - Entity-Relationship Diagram- Weak Entity Sets - Extended E-R Features - Database Design with ER model - Database Design for Banking Enterprise

UNIT – III

Introduction to the Relational Model – Structure of RDBMS - Integrity Constraints over Relations – Enforcing Integrity Constraints – Querying Relational Data - Relational Algebra and Calculus.

Introduction to SQL- Data Definition commands, Data Manipulation Commands, Basic Structure, Set operations Aggregate Operations - Join operations - Sub queries and correlated queries, SQL functions , views ,Triggers, Embedded SQL.

UNIT – IV

Functional Dependencies– Introduction , Basic Definitions, Trivial and Non trivial dependencies, closure of a set of dependencies, closure of attributes, irreducible set of dependencies- Schema Refinement in Database Design- Problems Caused by Redundancy – Decompositions – Problem Related to Decomposition –- Lossless Join Decomposition – Dependency Preserving Decomposition - FIRST, SECOND, THIRD Normal Forms – BCNF –— Multivalued Dependencies – Fourth Normal Form.

UNIT-V

Transaction concept- Transaction state- Implementation of atomicity and Durability- Concurrent executions – Serializability, Recoverability

Lock Based Protocols, Timestamp Based Protocols, Validation Based Protocols, Multiple Granularity, Dead Lock Handling – Failure Classification – Storage Structure - Recovery and Atomicity- Log Based recovery – Recovery with concurrent transactions – Checkpoints .

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

TEXT BOOKS.

1. Database System Concepts, Silberschatz, Korth , Fifth Edition, McGraw hill (1,2,3 and 5 Units)
2. Introduction to Database Systems, C.J.Date, Pearson Education (4th Unit)

REFERENCES:

1. Fundamentals of Database Systems, Elmasri Navrate Pearson Education
2. Database Management Systems, Raghuramakrishnan, Johannes Gehrke, TATA Mc Graw Hill(1,2,3 and 5 Units)
3. Data base Systems design, Implementation, and Management, Peter Rob and Carlos Coronel 7th Edition.
4. Data Base Systems using Oracle : A simplified guide to SQL and PL /SQL, Shah, PHI

IV Year B.Tech ECE – I Sem	L	T/P/D	C
	0	3	2

(R11ECE1207) MICROWAVE ENGINEERING LABORATORY

Pre-requisites: Microwave Concepts

Course Objectives

- To study the performance of microwave oscillators
- To measure the characteristic parameters of Microwave components
- To calculate scattering parameters of microwave junctions
- To analyze various parameters of Microwave components

Course Outcomes

After going through this course the student will be able to

- Characterize microwave oscillator sources.
- Measure and analyze performance characteristics of microwave components
- Analyze the scattering parameters of microwave junctions
- Design a microwave communication link

1. Reflex Klystron Characteristics.

2. Gunn Diode Characteristics.

3. Attenuation Measurement.

4. Directional Coupler Characteristics.

5. VSWR Measurement.

6. Impedance and Frequency Measurement.

7. Waveguide parameters measurement.

8. Scattering parameters of Circulator.

9. Scattering parameters of Magic Tee.

10. Radiation Pattern Measurement.

11. Scattering parameters of E-Plane Tee.

12. Scattering parameters of H-Plane Tee.

13. Characteristics of Isolator.

IV Year B.Tech ECE – I Sem	L	T/P/D	C
	0	3	2

(R11ECE1208) DIGITAL SIGNAL PROCESSING LABORATORY

Pre-requisites: Digital Signal Processing concepts

Course Objectives

Simulation and implementation on DSP processor

- To verify properties of a discrete system.
- To learn various transforms on digital signals.
- To understand the design of digital filters.
- To verify basic properties of multi rate systems.

Course Outcomes

After going through this course the student will be able to

- To apply knowledge of digital filter design for various applications.
- To analyze various signals in transform domain
- To apply multirate concepts in different areas
- To perform real time experiments on processors such as audio and speech processing.

The following experiments are to be performed using MATLAB

1) Circular Convolution
2) Correlation of signals and sequences
3) Discrete Fourier Transform
4) Power Density Spectrum
5) Filter Design
6) Implementation of Decimation and Interpolation processes, I/D sampling Rate Converters.
7) To find the Impulse Response/frequency response of given system in Transfer Function/Difference Equation Form

Getting familiarity with SimuLink:

i. Features of DSP Processor Kit (DSK)
ii. Installation Procedure for DSK
iii. Introduction To Code Composer Studio
iv. Procedure to Work On CCS

The following Experiments are to be performed using DSP Processor Kit.

1. To Verify Linear Convolution (Assembly Language program Using 67XX Instructions).
2. To Verify Circular Convolution.
3. Design FIR (Low Pass/High Pass) using Windowing Technique.
    i. Using Rectangular Window
    ii. Using Triangular Window
    iii. Using Kaiser Window
4. To Design IIR Filter (Low Pass and High pass).
5. To Find The FFT Of given 1-D Signal And Plot
6. To Compute Power Density Spectrum Of a Sequence

IV Year B.Tech ECE – II Sem	L	T/P/D	C
	3	1	3

(R11ECE1120) CELLULAR AND MOBILE COMMUNICATIONS

Pre-requisites: Analog and Digital Communication Fundamentals

Course Objectives

- To understand concepts of cellular and mobile radio systems
- To design cellular radio system and the required antennas.
- To learn various types of interferences and mobile propagation.
- To learn about digital cellular networks

Course Outcomes

After going through this course the student will be able to

- Design and analyze Basic Cellular System.
- Understand of frequency reuse and Co-channel Interference and different methods of cell splitting and sectoring.
- Measure the real time Co-Channel Interference.
- Apply the different methods of Handoff mechanisms

UNIT I

CELLULAR MOBILE RADIO SYSTEMS: Introduction to Cellular Mobile System, Performance criteria, uniqueness of mobile radio environment, operation of cellular systems, Hexagonal shaped cells, Analog and Digital Cellular systems.

ELEMENTS OF CELLULAR RADIO SYSTEM DESIGN : General description of the problem, concept of frequency channels, Co-channel Interference Reduction Factor, desired C/I from a normal case in a omni directional Antenna system, Cell splitting, consideration of the components of Cellular system.

UNIT II

INTERFERENCE : Introduction to Co-Channel Interference, real time Co-Channel interference, Co-Channel measurement, design of Antenna system, Antenna parameters and their effects, diversity receiver, non-co-channel interference-different types.

CELL COVERAGE FOR SIGNAL AND TRAFFIC : Signal reflections in flat and hilly terrain, effect of human made structures, phase difference between direct and reflected paths, constant standard deviation, straight line path loss slope, general formula for mobile propagation over water and flat open area, near and long distance propagation antenna height gain, form of a point to point model.

UNIT III

CELL SITE AND MOBILE ANTENNAS : Sum and difference patterns and their synthesis, omni directional antennas, directional antennas for interference reduction, space diversity antennas, umbrella pattern antennas, minimum separation of cell site antennas, high gain antennas.

FREQUENCY MANAGEMENT AND CHANNEL ASSIGNMENT: Numbering and grouping, setup access and paging channels channel assignments to cell sites and mobile units, channel sharing and borrowing, sectorization, overlaid cells, non fixed channel assignment.

UNIT IV

Handoff, dropped calls and cell splitting, types of handoff, handoff invitation, delaying handoff, forced handoff, mobile assigned handoff. Intersystem handoff, cell splitting, micro cells, vehicle locating methods, dropped call rates and their evaluation.

UNIT V

DIGITAL CELLULAR NETWORKS: GSM architecture, GSM channels, multiplex access scheme , TDMA, CDMA.

TEXTBOOKS

1. Mobile Cellular Telecommunications – W.C.Y. Lee, Tata McGraw Hill, 2nd Edition,2006.
2. Principles of Mobile Communications – Gordon L. Stuber, Springer International 2nd Edition, 2007.

REFERENCES

1. Wireless Communications - Theodore. S. Rapport, Pearson education, 2nd Edition, 2002.

2. Wireless and Mobile Communications – Lee McGraw Hills, 3rd Edition, 2006.
3. Wireless Communication and Networking – Jon W. Mark and Weihua Zhqung, PHI, 2005.
4. Wireless Communication Technology – R. Blake, Thompson Asia Pvt. Ltd., 2004.

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IV Year B.Tech ECE – II Sem	**L**	**T/P/D**	**C**
Elective-V	**3**	**1**	**3**

(R11ECE1125) SPREAD SPECTRUM COMMUNICATIONS

Pre-requisites: Digital and Analog Communication Concepts

Course Objectives

- Understand the concepts of spread spectrum communication techniques, code tracking loops and synchronization of the receivers in wireless systems.
- Describe the principles of CDMA, detection schemes and interference cancellation techniques of CDMA.
- Analyze the performance of the spread spectrum communication systems.
- Understand the fundamental concepts of Software Defined Radio and develop SDR based end-to-end Communication.

Course Outcomes

After completing this course the student will be able to

- Apply fundamental knowledge of spread spectrum communication to provide initial synchronization of a receiver with spreading codes.
- Based on knowledge of CDMA, analyze the performance of detection schemes and interference cancellation techniques.
- Analyze the performance of spread spectrums in jamming environments.
- Apply the fundamental knowledge of Software Defined Radio, design SDR and establish SDR based end-to-end communication.

UNIT I

Introduction to spread spectrum system: Fundamental concepts of spread spectrum systems. Pseudo noise sequences, direct sequence spread spectrum, frequency hop spread spectrum, Hybrid direct sequence frequency hop spread spectrum, code division multiple access

Binary shift register sequences for spread spectrum systems: Introduction. Definitions, Mathematical back ground and sequence generator fundamentals, maximal length sequences, Gold codes.

UNIT II

Code tracking Loops: Introduction, Optimum tracking of wideband signals, Base band delay-lock tracking loop, Tau-dither non-coherent tracking loop, Double dither non-coherent tracking loop.

Initial synchronization of the receiver spreading code: Introduction, Problem definition and the optimum synchronizer, serial search synchronization techniques, synchronization using matched filter, synchronization by estimated the received

spreading code.

UNIT III

Cellular code division multiple access CDMA Principles: Introduction, Wide band mobile channel, The cellular CDMA System, Single user receiver in a multi user channel, CDMA System capacity.

Multi-User detection in CDMA Cellular radio: Optimal multi-user detection, Linear suboptimal detectors, Interference combat detection schemes, Interference Cancellation techniques.

UNIT IV

Performance of spread spectrum systems in Jamming environments: Spread Spectrum Communication system model, Performance of spread spectrum systems without coding, Performance of spread spectrum systems with forward error correction: Elementary block coding concepts, Optimum decoding rule, Calculation of error probability. Elementary convolution coding concepts, viterbi algorithm, Decoding and bit-error rate.

UNIT V

Software Defined Radio

Introduction to SDR: SDR concepts and history, Characteristics and Benefits of SDR, SDR Forum, Design principles of Soft ware Radio, Ideal SDR architecture, SDR Based End-to-End Communication.

TEXT BOOKS

1. Introduction to spread spectrum communication - Rodger Eziemer, Roger L.Peterson and David E Borth– Pearson, 1st Edition,1995
2. Introduction to CDMA wireless Communications- Mosa Ali Abu, Rgheff, Elsevier Publications, 2008.
3. A Modern Approach to Radio Engineering - Software Radio - Jeffrey H. Reed, Prentice Hall PTR, May 2002

REFERENCES

1. Modern Communication and Spread Spectrum - George R. Cooper, Clare D. Mc Gillem, McGraw Hill, 1986.
2. CDMA; Principles of Spread Spectrum Communication - Andrew J. viterbi, Pearson Education, 1st Edition, 1995.
3. Wireless Digital Communications - Kamilo Feher, PHI, 2009.
4. WCDMA Design Handbook -Andrew Richardson, Cambridge University Press, 2005.
5. Software Defined Radio, Architectures, Systems and Functions - Dillinger, Madani, Alonistioti(Eds.), Wiley, 2003.

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IV Year B.Tech ECE – II Sem	**L**	**T/P/D**	**C**
Elective-V	**3**	**1**	**3**

(R11ECE1121) NETWORK SECURITY AND CRYPTOGRAPHY

Pre-requisites: Computer Networks

Course Objectives

- Understand security concepts, Ethics in Network Security.Analyze the tradeoffs inherent in security, Understand the basic categories of threats to computers and networks and Comprehend security services and mechanisms in the network protocol stack
- Discuss issues for creating security policy for a large organization, Defend the need for protection and security, and the role of ethical considerations in computer use
- Describe efficient basic number-theoretic algorithms, including greatest common divisor, multiplicative inverse mod n, and raising to powers mod n.
- Describe at least one public-key cryptosystem, including a necessary complexity-theoretic assumption for its security.
- Create simple extensions of cryptographic protocols, using known protocols and cryptographic primitives.
- Comprehend and apply authentication services and mechanisms, Describe the enhancements made to IPv4 by IPSec, Understand Intrusions and intrusion detection
- Generate and distribute a PGP key pair and use the PGP package to send an encrypted e-mail message.
- Understand security threats, and the security services and mechanisms to counter them, Comprehend and apply relevant protocol like SSL, SSH etc, Comprehend and apply email security services and mechanisms.

Course Outcomes

After completing this course the student will be able to

- Design a security solution for a given application.
- Analyse a given system with respect to security of the system.
- Should be able to identify network security threats and determine efforts to counter them
- Should be able to write code for relevant cryptographic algorithms, Should be able to write a secure access client for access to a server

- Should be able to send and receive secure mails, Should be able to determine firewall requirements, and configure a firewall.

UNIT I

Security Attacks (Interruption, Interception, Modification and Fabrication), Security Services (Confidentiality, Authentication, Integrity, Non-repudiation, access control and availability) and Mechanisms, A Model for Internetwork Security, Internet Standards and RFCs, Buffer overflow and format string vulnerabilities, TCP session hijacking, ARP attacks, route table modification, UDP hijacking, and man-in-the-middle attacks. Classical Encryption techniques, Block Ciphersand The Data Encryption Standard.

UNIT II

Conventional Encryption Principles, Conventional encryption algorithms, cipher block modes of operation, location of encryption devices, key distribution Approaches of Message Authentication, Secure Hash Functions and HMAC.

Public key cryptography principles, public key cryptography algorithms, digital signatures, digital certificates, certificate Authority and key management Kerberos, X.509 Directory Authentication service.

UNIT III

Email privacy: Pretty Good Privacy (PGP), S/MIME.

IP Security Overview, IP Security Architecture, Authentication Header, Encapsulating Security Payload, Combining Security Associations, and Key Management.

UNIT IV

Web Security requirements, secure sockets layer (SSL) and Transport layer security (TLS), Secure Electronic Transaction (SET).

UNIT V

Basic concepts of SNMP, SNMPv1 Community facility and SNMPv3.

Intruders, Viruses and related threats. Firewalls Design Principles, Trusted Systems.

TEXT BOOKS

1. Network Security Essentials (Applications and Standards) by William Stallings Pearson Education.
2. Hack Proofing your network by Ryan Russell, Dan Kaminsky, Rain Forst Puppy, Joe Grand , David Ahmad, Hal Flynn Ido Dubrawsky, Steve W. Manzuik and Ryan Permeh, Wiley Dreamtech.
3. Network Security and Cryptography: Bernard Manezes, CENGAGE Learning.

REFERENCES

1. Network Security – Private Communication in a public Word by Charlie Kaufman , Radia Perlman and Mike Speciner, Pearson /PHI.
2. Cryptography and Network Security, Third edition, Stallings, PHI/Pearson.
3. Principle of Information Security, Whitman, Cengage Learning.
4. Cryptography and Network Security, B.A Forouzan, D.Mukhopadhyay, 2nd Edition TMH.
5. Network Security: The Complete Reference, Robert Bragg, Mark Rhodes, TMH.

IV Year B.Tech ECE – II Sem	L	T/P/D	C
Elective - V	3	1	3

(R11ECE1127) EMBEDDED AND REAL TIME OPERATING SYSTEMS

Pre-requisites: Microprocessor and Microcontrollers Concepts

Course Objectives

- Learn the general embedded system concepts
- Understand design of embedded hardware and software development tools
- Learn the basics of OS and RTOS
- Describe key issues such as CPU scheduling, memory management, task synchronization, and file system in the context of real-time embedded systems.

Course Outcomes

After completing this course the student will be able to

- Understand and design real time and non real time embedded systems
- Define the unique design challenges of real-time systems and program them.
- Understand unique characteristics of RTOS and use RTOS to build an embedded real-time system
- Gain knowledge and skills necessary to design and develop embedded applications based on real-time operating systems.

UNIT 1:

Introduction to Embedded systems: Examples of Embedded systems, Typical hardware, Hardware fundamentals: Terminology, gates,Timing diagrams, memory, Microprocessors, Buses, Direct memory access, Interrupts.

UNIT 2:

Software Architectures: Round Robin, Round Robin with Interrupts, Function queue Scheduling Architecture, Real time operating System Architecture, Selecting an Architecture.

UNIT 3:

Introduction to Real time operating Systems: Tasks and Task states, Tasks and Data, Semaphores and shared data, Message queues Mailboxes and Pipes, Timer functions, events, Memory management, Interrupt routines in an RTOS environment.

UNIT 4:

Basic Design Using a Real Time Operating System: Principle, Example, encapsulating Semaphores and queues, Hard real time scheduling considerations, saving memory space, saving power.

UNIT 5:

Embedded software Development tools and Debugging techniques: Host and Target machines, Linkers/Locators for embedded software, getting embedded software into the target system, Testing on host machine.

TEXT BOOKS

1. An Embedded Software Primer – David E. Simon, Pearson Edition, 2005.

REFERENCES

1. Introduction to Embedded Systems – Raj Kamal, TMS, 2002
2. Real time Systems", J. W. S. Liu, Pearson
3. The 8051 Microcontroller and Embedded Systems using Assembly and C by Ayala and Gadre, Cengage Publications.

IV Year B.Tech ECE – II Sem	L	T/P/D	C
Elective-VI	3	1	3

(R11ECE1128) TELEVISION ENGINEERING

Pre-requisites: Communication Fundamentals

Course Objectives

- To learn the fundamentals of Television Picture formation, transmission, reception.
- To Understand the Television broadcast and receiver fundamentals
- Know the principles of color video transmission and VCR technologies.
- To understand digital television technologies and high definition Television.

Course Outcomes

After going through this course the student will be able to

- Understand the issues related to propagation of TV signals, antennas.
- Know the working of TV Receiver and design principles.
- Understand the various video systems like VCR, Video disc systems CCTV
- Know the principles involved in the working of Latest Technologies like HDTV

UNIT-I

TELEVISION FUNDAMENTALS :TV Transmitter, Receiver, Synchronization

Television Pictures : Geometric form and aspect ratio, Image Continuity, Picture resolution, Interlaced Scanning , Scanning sequence

Video Signal Generation : Video signal dimension, Composite video signal, Horizontal and Vertical sync Signals

Colour Signal generation : Perception of brightness and colors, additive colour mixing ,video signals for colour, Formation of Chrominance signal, Encoding.

UNIT-II

TELEVISION BROADCASTING:

Picture signal Transmission: Positive and negative modulation, VSB transmission, sound signal Transmission, Standard channel Bandwidth, TV signal propagation

TV Transmitter: TV broadcast channels, TV transmitter, TV transmission Antennas

TV Standards: NTSC color System, PAL Colour system.

TV Cameras: Camera tube types, Silicon diode Array Vidicon, CCD Image scanners, Colour Camera

UNIT-III

RECEIVER FUNCTIONS AND SUBSYSTEMS: Monochrome Receiver: RF Tuner, IF subsystem, AGC, Video amplifier, , FM Sound Detectors, sound section, sync separation and processing, Noise in sinc pulses, Saperation of frame and line Sinc pluses, AFC, deflection circuits, Deflection Drive ICs scanning circuits, PAL –D Colour receiver: Electronic Tuners, Digital tuning techniques, IF subsystem, Y-signal channel , chroma decoder, video and intercarrier sound signal detection, raster circuits,

UNIT-IV

RECEIVER CIRCUITS AND TV APPLICATIONS:

Colour TV display Tubes: Delta-gun , Precision-in-line and Trinitron Color Picture tubes

Flat panel Display TV receivers: LCD TV, LED TV, Plasma TV, and OLED TV

TV Applications: CCTV, Cable TV , Video games, Tele-Text broadcast receiver, Sterio sound in TV, Remote control of receiver functions, Receiver Antennas

UNIT-V

ADVANCED TELEVISION SYSTEMS

Satellite TV Technology , Difital Television, HDTV, 3D TV, Direct To Home Television, Digital equipments for TV studios, IP TV.

TEXT BOOKS:

1. Monochrome Television Practice, Principles,Technologyand Servicing - RR.Gulati, New Age International Publishers, 2004.
2. Television and Video Engineering - AM Dhake 2nd Edition, TMH, 2003

REFERENCES

1. R.R.Gulati, " Monocrome and Colour Television" New Age International Publishers, 2003.
2. Colour Television, Theory and Practice - SP Bali.

IV Year B.Tech ECE – II Sem	L	T/P/D	C
Elective-V	3	1	3

(R11EIE1107) BIO MEDICAL INSTRUMENTATION

Pre-requisites: Electronic Measurements and Instrumentation

Course Objectives

- Identify and obtain biological parameters and relationship between them.
- Identify mathematical models and principles for the design of biomedical instrumentation systems.
- Understand the principles involved in acquiring different bio-signals.
- Represent these principles in form of mathematical equations.

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Course Outcomes

After going through this course the student will be able to

- Apply fundamental knowledge of sciences to analyze the relationship among different bio signals
- Apply fundamental knowledge of mathematics coupled with electronics and use it for designing bio amplifiers for different applications.
- Understand or become aware of artifacts caused by an incorrect diagnosis of the symptoms through sample data.
- Apply these equations to analyze real time problems by making good assumptions and learn systematic engineering method design robust amplifiers.

UNIT I

Components of Medical Instrumentation System. Bio signals and their characteristics, Bio amplifier. Characteristics of medical instruments. Problems encountered with measurements from human beings.

Organization of cell. Nernst equation for membrane. Resting and Action Potential.

UNIT II

Bio Electrodes – Bio potential Electrodes and their classifications-External electrodes, Internal Electrodes-Biochemical Electrodes.

UNIT III

The Heart and Cardiovascular system- Heart Sounds- Mechanical function, Electrical Conduction system of the heart. Cardiac cycle. Relation between electrical and mechanical activities of the heart. Interpretation of ECG waveform with respect to electro mechanical activity of the heart.

UNIT IV

Cardiac Instrumentation: Blood pressure and Blood flow measurement. Specification of ECG machine. Einthoven triangle, Standard 12-lead configurations, EEG and EMG-Neuro-Muscular Instrumentation: Specification of EEG and EMG machines. Electrode placement for EEG and EMG recording. Interpretation of EEG and EMG.

UNIT V

Therapeutic equipment.: Pacemaker, Defibrillator, Shortwave diathermy. Hemodialysis machine.

Respiratory Instrumentation: Mechanism of respiration, Spirometry, Pnemuotachograph Ventilators.

TEXT BOOKS:

1. Biomedical Instrumentation and Measurements – Leslie Cromwell, F.J. Weibell, E.A. Pfeiffer, PHI.
2. Medical Instrumentation, Application and Design – John G. Webster, John Wiley.
3. Biomedical Instrumentation - Chatterjee,Cengage,Publications

REFERENCES:

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

IV Year B.Tech ECE – II Sem	L	T/P/D	C
Elective-VI	3	1	3

(R11ECE1126) CPLD AND FPGA ARCHITECTURES

Pre-requisites: Digital Logic Design

Course Objectives

- To Learn architectures and technologies of various PLD's , CPLDs and FPGAs
- To introduce the student to state machines for sequential circuit design and petrinets for parallel controllers.
- To describe partitioning techniques and Placement & Routing algorithms for FPGAs.
- To gain knowledge about EDA Tools for FPGAs & ASICs and case studies

Course Outcomes

After going through this course the student will be able to

- Understand the various architectures of PLD's ,CPLDs and FPGAs
- Design real time applications using state machines and petrinets.
- Analyze placement and routing algorithms.
- Verify the digital design, placement and routing of the designs using CAD tools.

UNIT I

Programmable logic : Combinational logic - PLD'S- ROM, PLA, PAL , PGA – Synchronous sequential logic- Analysis of clocked sequential circuits ,State reduction and assignment, Flip-Flop excitation tables , Sequence Generator, Sequence Detector.

UNIT II

Features, programming and applications using complex programmable logic devices Altera series – Max 5000/7000 series and Altera FLEX logic- 10000 series CPLD, AMD's- CPLD (Mach 1to 5), Cypress FLASH 370 Device technology, Lattice PLSi's architectures – Speed performance and in system programmability. Implementation tools: Simulation and synthesis, Programming technologies.

UNIT III

FPGAs: Field Programmable gate arrays- Logic blocks, routing architecture, design flow technology mapping for FPGAs, Case studies Xilinx XC4000 and ALTERA's FLEX 8000/10000 FPGAs: AT andT ORCA's (Optimized Reconfigurable Cell Array): ACTEL's ACT-1,2,3 and their speed performance

UNIT IV

Digital design with SM Charts- State machine Charts, Derivation of SM chart , Realization and implementation of Dice game example, Alternative realization for state machine chart using microprogramming, linked state machine, one – hot state machine, Petri nets for state machines-basic concepts, properties, extended Petri nets for parallel controllers.

UNIT V

Digital front end digital design tools for FPGAsand ASICs: Using mentor graphics EDA tool– Design flow using FPGAs.

TEXT BOOKS

1. Field Programmable Gate Array Technology - S Trimberger, Edr, Kluwer Academic Publications,1994.
2. Field Programmable Gate Arrays, John V.Oldfield, Richard C Dore, Wiley Publications.
3. Digital System Design Using VHDL – Charles H Roth, Jr. Thomson, 1998.

REFERENCES

1. Digital Design Using Field Programmable Gate Array, P.K.Chan and S. Mourad, Prentice Hall, 1994,
2. Application – Specific Integrated Circuits – Michael John Sebastian Smith, Addison Wesley Professional ,1997.
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IV Year B.Tech ECE – II Sem	**L**	**T/P/D**	**C**
	0	**3**	**2**

(R11ECE1302) COMPREHENSIVE VIVA-VOCE

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IV Year B.Tech ECE – II Sem	**L**	**T/P/D**	**C**
	0	**0**	**2**

(R1ECE1303) COMPREHENSIVE VIVA-VOCE

VNR Vignana Jyothi Institute of Engineering and Technology

IV Year B.Tech ECE – II Sem	**L**	**T/P/D**	**C**
	6	**12**	**12**

(R11ECE1304) PROJECT WORK