Academic Regulations
Programme Structure
&
Detailed Syllabus

Bachelor of Technology
(B. Tech)
(Four Year Regular Programme)
(Applicable for Batches admitted from 2017-18)

Department of

Electronics and Communication Engineering

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY
Bachupally, Kukatpally, Hyderabad, Telangana, India
500 090

Academic Regulations

GOKARAJU RANGARAJU

INSTITUTE OF ENGINEERING AND TECHNOLOGY, HYDERABAD

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING (B. Tech)

GR17 REGULATIONS

Gokaraju Rangaraju Institute of Engineering and Technology 2017 Regulations (GR17 Regulations) are given hereunder. These regulations govern the programmes offered by the Department of Elecctrical and Electronics Engineering with effect from the students admitted to the programmes in 2017-18 academic year.

1. **Programme Offered:** The programme offered by the Department is B.Tech in Elecctrical and Electronics Engineering, a four-year regular programme.
2. **Medium of Instruction:** The medium of instruction (including examinations and reports) is English.
3. **Admissions:** Admission to the B.Tech in Elecctrical and Electronics Engineering Programme shall be made subject to the eligibility, qualifications and specialization prescribed by the State Government/University from time to time. Admissions shall be made either on the basis of the merit rank obtained by the student in the common entrance examination conducted by the Government/Universityor on the basis of any other order of merit approved by the Government/University, subject to reservations as prescribed by the Government/University from time to time.

4. **Programme Pattern:**

a) Each Academic year of study is divided into two semesters.

b) Minimum number of instruction days in each semester is 90.

c) Student is introduced to "Choice Based Credit System (CBCS)"

d) Grade points, based on percentage of marks awarded for each course will form the basis for calculation of SGPA (Semester Grade Point Average) and CGPA (Cumulative Grade Point Average).

e) The total credits for the Programme is 192. Typically each semester has 24 credits.

f) A student has a choice of registering for credits from the courses offered in the programme ensuring the total credits in a semester are between 20 and 28.

g) All the registered credits will be considered for the calculation of final CGPA.

h) Each semester has - 'Continuous Internal Evaluation (CIE)' and 'Semester End Examination (SEE)'. Choice Based Credit System (CBCS) and Credit Based Semester System (CBSS) as indicated by UGC and course structure as suggested by AICTE are followed.

i) Subject Course Classification All subjects/ courses offered for the under graduate programme in E&T (B.Tech. degree programmes) are broadly classified as follows.

S. No.	Broad Course Classification	Course Group/ Category	Course Description
1	Foundation Courses (FnC)	BS – Basic Sciences	Includes mathematics, physics and chemistry subjects
2		ES - Engineering Sciences	Includes fundamental Engineering subjects
3		HS – Humanities and Social sciences	Includes subjects related to humanities, social sciences and management
4	Core Courses (CoC)	PC – Professional Core	Includes core subjects related to the parent discipline/ department/ branch of Engineering.
5	Elective Courses (EℓC)	PE – Professional Electives	Includes elective subjects related to the parent discipline/ department/ branch of Engineering.
6		OE – Open Electives	Elective subjects which include interdisciplinary subjects or subjects in an area outside the parent discipline/ department/ branch of Engineering.
7		Project Work	B.Tech. project or UG project or UG major project

8	Core Courses	Industrial training/ Mini-project	Industrial training/ Internship/ UG Mini-project/ Mini-project
9		Seminar	Seminar/ Colloquium based on core contents related to parent discipline/ department/ branch of Engineering.
10	Minor courses	-	1 or 2 Credit courses (subset of HS)
11	Mandatory Courses (MC)	-	Mandatory courses Credits/Marks are not counted for grading/pass percentage

5. Award of B.Tech Degree: A student will be declared eligible for the award of B. Tech Degree if he/she fulfills the following academic requirements:

a) He/She pursues the course of study and completes it successfully in not less than four academic years and not more than eight academic years.

b) A student has to register for all the 192 credits and secure all credits.

c) A student, who fails to fulfill all the academic requirements for the award of the degree within eight academic years from the date of admission, shall forfeit his/her seat in B.Tech course.

d) The Degree of B.Tech in Elecctrical and Electronics Engineering shall be conferred by Jawaharlal Nehru Technological University Hyderabad (JNTUH), Hyderabad, on the students who are admitted to the programme and fulfill all the requirements for the award of the degree.

6. Attendance Requirements

a) A student shall be eligible to appear for the semester-end examinations if he/she puts in a minimum of 75% of attendance in aggregate in all the courses concerned in the semester.

b) Condonation of shortage of attendance in aggregate up to 10% (65% and above and below 75%) in a semester may be granted. A committee headed by Dean (Academic Affairs) shall be the deciding authority for granting the condonation.

c) Students who have been granted condonation shall pay a fee as decided by the Academic Council.

d) Shortage of Attendance more than 10%(attendance less than 65% in aggregate) shall in no case be condoned.

e) Students whose shortage of attendance is not condoned in any semester are detained and are not eligible to take their end examinations of that semester. They may seek re-registration for that semester when offered next with the academic regulations of the batch into which he/she gets re-registered.

7. Paper Setting, Evaluation of Answer Scripts, Marks and Assessment

a) Paper setting and evaluation of the answer scripts shall be done as per the procedures laid down by the Academic Council from time to time.

b)Distribution and Weightage of marks

S. No	Components	Internal	External	Total
1	Theory	30	70	100
2	Practical	25	50	75
3	Engineering Graphics	30	70	100
4	Industry OrientedMini Project	25	50	75
5	Comprehensive Viva	-	100	100
6	Seminar	50	-	50
7	Major Project	50	150	200

c) **Continuous Internal Evaluation and Semester End Examinations:**The assessment of the student's performance in each course will be based on Continuous Internal Evaluation (CIE) and Semester-End Examination (SEE). The marks for each of the component of assessment are fixed as shown in the following Table.

Assessment Procedure:

S.No	Component of Assessment	Marks Allotted	Type of Assessment	Scheme of Examinations
1	Theory	30	Internal Exams & Continuous Evaluation	1) Two mid semester examinations shall be conducted for 20 marks each for a duration of 2 hours. Average of the two mid exams shall be considered **i) Subjective - 15 marks** **ii) Objective - 5 marks** **2) Tutorials - 5 marks** **3) Continuous Assessment – 5 marks**
		70	Semester-end examination	The semester-end examination is for a duration of 3 hours
2	Practical	25	Internal Exams & Continuou s Evaluation	**i) Internal Exam-10 marks** **ii) Record - 5 marks** **iii) Continuous Assessment - 10 marks**
		50	Semester-end examination	The semester-end examination is for a duration of 3 hours

d) **Industry Oriented Mini Project:** The Mini Project is to be taken up with relevance to Industry and is evaluated for 75 marks. Out of 75 marks, 25 marks are for internal evaluation and 50 marks are for external evaluation. The supervisor continuously assesses the students for 15 marks (Continuous Assessment – 10 marks, Report – 5 marks). At the end of the semester, Mini Project shall be displayed in theroad show at the department level for the benefit of all students and staff and the same is to be evaluated by Mini Project Review Committeefor 10 marks. The mini project report shall be presented before Project ReviewCommittee in the presence of External Examiner and the same is evaluated for 50 marks.Mini Project Review Committee consists of HOD, Mini Project Coordinator and Supervisor.

e) **Comprehensive Viva:** The comprehensive viva shall be conductedby a Committee consisting of HOD and two senior faculty members of the department. The student shall be assessed for his/her understanding of various courses studied during the programme of study. The Viva-voce shall be evaluated for 100 marks.

f) Seminar: For the seminar,the student shall collect information on a specialized topic andprepare atechnical report and present the same to a Committee consisting of HODand twoseniorfaculty and the seminarcoordinator of the department. The student shall be assessed for his/her understanding of the topic, its application and its relation with various coursesstudied during the programme of studyfor**50 marks.**

g) **Major Project:** Theproject work is evaluated for 200 marks.Out of 200,50 marksshall be for internal evaluation and 150 marksfor the external evaluation. The supervisor assesses the student for 25 marks (Continuous Assessment – 15 marks, Report – 10 marks). At the end of the semester, projects shall be displayed in the road show at the department level for the benefit of all students and staff and the same is to be evaluated by the Project Review Committee for 25 marks. The external evaluation for Project Work is a Viva-Voce Examination which is conducted by the Project

Review Committee in the presence of external examiner and is evaluated for 150 marks, Project Review Committee consists of HOD, Project Coordinator and Supervisor.

h) Engineering Graphics:

- Two internal examinations, each is of 10 marks .The average of the two internal tests shall be considered for the award of marks.
- Submission of day to day work - 15 marks.
- Continuous Assessment - 5 marks.

8. **Recounting of Marks in the End Examination Answer Books:** A student can request for re-counting of his/her answer book on payment of a prescribed fee.
9. **Re-evaluation of the End Examination Answer Books:** A student can request for re-evaluation of his/her answer book on payment of a prescribed fee.
10. **Supplementary Examinations:** A student who has failed to secure the required credits can appear for a supplementary examination, as per the schedule announced by the College.
11. **Malpractices in Examinations:** Disciplinary action shall be taken in case of malpractices during Mid/ End-examinations as per the rules framed by the Academic Council.
12. **Academic Requirements and Promotion Rules:**

a) A student shall be deemed to have satisfied the minimum academic requirements and earned the credits allotted to each theory or laboratories if he / she secures not less than 35% of marks in the Semester-end Examination and a minimum of 40% of the sum total of the Internal Evaluation and Semester-end examination taken together.

b) A student shall be promoted to the next semester only when he/she satisfies the requirements of all the previous semesters.

. No.	**Promotion**	**Conditions to be fulfilled**
	First year first semester to first year second semester	**Regular course of study of first year first semester.**
	First year second semester to second year first semester	**Regular course of study of first year second semester. (ii) Must have secured at least 24 credits out of 48 credits i.e., 50% credits up to first year second semester from all the relevant regular and supplementary examinations, whether the student takes those examinations or not.**
	Second year first semester to second year second semester	**Regular course of study of second year first semester.**

	Second year second semester to third year first semester	**Regular course of study of second year second semester. (ii) Must have secured at least 58 credits out of 96 credits i.e., 60% credits up to second year second semester from all the relevant regular and supplementary examinations, whether the student takes those examinations or not.**
	Third year first semester to third year second semester	**Regular course of study of third year first semester.**
	Third year second semester to fourth year first semester	**(i) Regular course of study of third year second semester.** **(ii) Must have secured at least 86 credits out of 144 credits i.e., 60% credits up to third year second semester from all the relevant regular and supplementary examinations, whether the student takes those examinations or not.**
	Fourth year first semester to fourth year second semester	**Regular course of study of fourth year first semester.**

13. Grade Points: A 10- point grading system with corresponding letter grades and percentage of marks, as given below, is followed

Letter Grade	Grade Point	Percentage of marks
O (Outstanding)	**10**	**Marks>=90**
A+ (Excellent)	**9**	**Marks>=80 and Marks < 90**
A (Very Good)	**8**	**Marks>=70 and Marks < 80**
B+ (Good)	**7**	**Marks>=60and Marks < 70**
B (Average)	**6**	**Marks>=50 and Marks < 60**
C (Pass)	**5**	**Marks>=40and Marks < 50**
F (Fail)	**0**	**Marks < 40**
Ab (Absent)	**0**	

Earning of Credit:

A student shall be considered to have completed a course successfully and earned the credits if he/she secures an acceptable letter grade in the range O-P. Letter grade 'F' in any Course implies failure of the student in that course and no credits earned.

Computation of SGPA and CGPA:

The UGC recommends the following procedure to compute the Semester Grade Point Average (SGPA) and Cumulative Grade Point Average (CGPA):

i) $S_k$the SGPA of k^{th} semester(1 to 8)is the ratio of sum of the product of the number of credits and grade points to the total creditsof all courses registered by a student, i.e.,

SGPA(S_k) =

Where C_i is the number of credits of the i^{th}course and $G_i$is the grade point scored by the student in the i^{th} course and n is the number of courses registered in that semester.

ii) The CGPA is calculated in the same manner taking into account all the courses m, registered by student over all the semesters of a programme, i.e., upto and inclusive of S_k, where $k \geq 2$.

CGPA = /

iii) The SGPA and CGPA shall be rounded off to 2 decimal points.

14. **Award of Class:** After a student satisfies all the requirements prescribed for the completion of the Degree and becomes eligible for the award of B. Tech Degree by JNTUH, he/she shall be placed in one of the following four classesbased on CGPA secured from the 192 credits.

	Class Awarded	CGPA Secured
14.1	First Class With Distinction	CGPA≥8.00 with no F or below grade/ detention anytime during the programme
14.2	First Class	CGPA≥ 8.00 with rest of the clauses of 13.1 not satisfied
14.3	First Class	CGPA ≥ 6.50and CGPA < 8.00
14.4	Second Class	CGPA ≥ 5.50 and CGPA < 6.50
14s.5	Pass Class	CGPA ≥ 5.00 and CGPA < 5.50

15. **Withholding of Results:** If the student has not paid dues to the Institute/ University, or if any case of indiscipline is pending against the student, the result of the student (for that Semester) may be withheld and the student will not be allowed to go into the next semester. The award or issue of the Degree may also be withheld in such cases.

16. **Transfer of students from the Constituent Colleges of JNTUH or from other Colleges/ Universities:** Transfer of students from the Constituent Colleges of JNTUH or from other Colleges/ Universities shall be considered only on case-to-case basis by the Academic Council of the Institute.

17. **Transitory Regulations:** Students who have discontinued or have been detained for want of attendance, or who have failed after having undergone the Degree Programme, may be considered eligible for readmission/re-registration to the same or equivalent subjects as and when they are offered.

18. **General Rules**

a) The academic regulations should be read as a whole for the purpose of any interpretation.
b) In the case of any doubt or ambiguity in the interpretation of the above rules, the decision of the Academic Council is final.
c) In case of any error in the above rules and regulations, the decision of the Academic Council is

final.

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

Academic Regulations for B.Tech (Lateral Entry)

under GR17

(Applicable for Batches Admitted from 2018-19)

1. All regulations as applicable for B.Tech Four year degree programme (Regular) will hold good for B.Tech (Lateral Entry Scheme) except for the following rules

a) Pursued programme of study for not less than three academic years and not more than six academic years.

b) A student should registerfor all 144 credits and secure allcredits. The marks obtained in all 144 credits shall be considered for the calculation of the final CGPA.

c) Students who fail to fulfil all the academic requirements for the award of the degree within six academic years from the year of their admission, shall forfeit their seat in B.Tech programme.

2. Academic Requirements and Promotion Rules:

a) A student shall be deemed to have satisfied the minimum academic requirements and earned the credits allotted to each theory or laboratories if he / she secures not less than 35% of marks in the Semester-end Examination and a minimum of 40% of the sum total of the Internal Evaluation and Semester-end examination taken together.

b) A student shall be promoted to the next semester only when he/she satisfies the requirements of all the previous semesters

S. No.	Promotion	Conditions to be fulfilled
	Second year first semester to second year second semester.	**Regular course of study of second year first semester.**
	Second year second semester to third year first semester.	**(i) Regular course of study of second year second semester.** **(ii) Must have secured at least 29 credits out of 48 credits i.e., 60% credits up to second year second semester from all the relevant regular and supplementary examinations, whether the student takes those examinations or not.**
	Third year first semester to third year second semester.	**Regular course of study of third year first semester.**
	Third year second semester to fourth year first semester.	**(i) Regular course of study of third year second semester.** **(ii) Must have secured at least 58 credits out of 96 credits i.e., 60% credits up to third year second semester from all the relevant regular and supplementary examinations, whether the student takes those examinations or not.**
	Fourth year first semester to fourth year second semester.	**Regular course of study of fourth year first semester.**

3. Award of Class: After a student satisfies all the requirements prescribed for the completion ofthe Degree and becomes eligible for the award of B. Tech Degree by JNTUH, he/she shall be placed in one of the following four classes based on CGPA secured from the 144 credits.

	Class Awarded	**CGPA Secured**
3.1	**First Class With Distinction**	**CGPA ≥ 8.00 with no F or below grade/ detention anytime during the programme**
3.2	**First Class**	**CGPA ≥ 8.00 with rest of the clauses of 3.1 not satisfied**
3.3	**First Class**	**CGPA ≥ 6.50 and CGPA < 8.00**
3.4	**Second Class**	**CGPA ≥ 5.50 and CGPA < 6.50**
3.5	**Pass Class**	**CGPA ≥ 5.00 and CGPA < 5.50**

Group	Subject code	Name of subject	Credits			Total credits	Total Hours	Internal Marks	External Marks	Total Marks
			L	T	P					
BS	GR17A1001	Linear Algebra and Single Variable Calculus	2	1		3	4	30	70	100
BS	GR17A1002	Advanced Calculus	2	1		3	4	30	70	100
BS	GR17A1008	Engineering Chemistry	2	1		3	4	30	70	100
ES	GR17A1005	English	2	1		3	4	30	70	100
HS	GR17A1018	Basic Electrical Engineering	2	1		3	4	30	70	100
ES	GR17A1009	Computer Programming	2	1		3	4	30	70	100
ES	GR17A1026	IT Workshop			2	2	4	25	50	75
ES	GR17A1030	Engineering Chemistry lab			2	2	4	25	50	75
BS	GR17A1027	Computer Programming lab			2	2	4	25	50	75
		Total	**12**	**6**	**6**	**24**	**36**	**255**	**570**	**825**

B.Tech II SEMESTER

Group	Subject code	Name of subject	Credits			Total credits	Total Hours	Internal Marks	External Marks	Total Marks
			L	T	P					
BS	GR17A1003	Transform Calculus and Fourier Series	2	1		3	4	30	70	100
BS	GR17A1004	Numerical Methods	2	1		3	4	30	70	100
BS	GR17A1007	Engineering Physics	2	1		3	4	30	70	100
ES	GR17A1010	Data Structures	2	1		3	4	30	70	100
ES	GR17A1023	Engineering Graphics	1		2	3	5	30	70	100
ES	GR17A1019	Fundamentals of Electronics Engineering	2	1		3	4	30	70	100
HS	GR17A1024	Business Communicatipon and Soft Skills			2	2	4	25	50	75
ES	GR17A1025	Engineering Workshop			2	2	4	25	50	75
BS	GR17A1029	Engineering Physics lab			2	2	4	25	50	75
		Total	**11**	**5**	**8**	**24**	**37**	**255**	**570**	**825**

II B.Tech(ECE) **I Semester**

Category	Subject code	Name of subject	Credits			Total credits	Hours			Total Hours	Total Marks
			L	T	P		L	T	P		
PC	GR17A2047	Electrical Circuits	2	1		3	2	2		4	100
PC	GR17A2048	Electronic Circuit Analysis	3	1		4	3	2		5	100
PC	GR17A2049	Signals and Systems	3	1		4	3	2		5	100
PC	GR17A2050	Probability Theory and Stochastic Processes	2	1		3	2	2		4	100
PC	GR17A2043	Digital Electronics	3	1		4	3	2		5	100
PC	GR17A2051	Electronics Circuits Analysis Lab			2	2			4	4	75
PC	GR17A2052	Signals and Systems Lab			2	2			4	4	75
PC	GR17A2053	DIgital Electronics Lab			2	2			4	4	75
Total			13	5	6	24	13	10	12	35	725
MC	GR17A2002	Value Education and Ethics					2	2		4	100
MC	GR17A2106	Gender sensitization Lab			2	2			2	2	75

II B.Tech(ECE) **II Semester**

Category	Subject code	Name of subject	Credits			Total credits	Hours			Total Hours	Total Marks
			L	T	P		L	T	P		
PC	GR17A2054	Electromagnetic Theory and Transmission Lines	3	1		4	3	2		5	100
PC	GR17A2055	Microcontrollers	3	1		4	3	2		5	100
PC	GR17A2056	Analog Communications	2	1		3	2	2		4	100
PC	GR17A2057	Analog Electronics	3	1		4	3	2		5	100
PC	GR17A2058	Special functions and Complex variables	2	1		3	2	2		4	100
PC	GR17A2059	Microcontrollers Lab			2	2			4	4	75
PC	GR17A2060	Analog Communications Lab			2	2			4	4	75
PC	GR17A2061	Analog Electronics Lab			2	2			4	4	75
Total			13	5	6	24	13	10	12	35	725
MC	GR17A2001	Environmental Science			2	2			2	2	100

I YEAR I SEMESTER

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INSTITUTE OF ENGINEERING AND TECHNOLOGY

LINEAR ALGEBRA AND SINGLE VARIABLE CALCULUS

Course Code: GR17A1001 **L: 2 T: 1 P: 0 C: 3**

Unit-I

Linear Algebra and Matrix eigen value problem: Rank of a matrix, Normal form, Consistency of a system of linear equations-Rank-Nullity theorem, Pseudo inverse of a matrix-Condition number of a matrix-Norm of matrix, Approximate solution of an over determined system of linear equations using the pseudo inverse-Moore penrose method, -Solution of a system of homogeneous linear equations.

Vector norms, Linear dependence and independence of vectors, Gram-Schmidt Orthogonalization of vectors, Matrix norms, Cayley Hamilton theorem determination of Eigen values and Eigen vectors of a square matrix-Properties of Eigen values and Eigen vectors of real and complex matrices

Unit-II

Matrix factorization and Quadratic Forms: Diagonalization of a matrix- Orthogonal diagonalization of symmetric matrices-Computation of matrix powers- -Singular value decomposition - QR factorization Quadratic forms-Definiteness of a quadratic form-Rank, index and signature of a quadratic form- Reduction of a quadratic form into a canonical form by an orthogonal transformation

Unit-III

Differential Calculus of functions of a single variable: Mean value theorems (Rolles', Lagrange's, Cauchy's, Taylor's and Maclaurin's theorems Geometrical Interpretation without proof) –L – Hospital rule , Hessian matrix . Approximation of functions by Taylor's and Maclaurin's theorems-Series expansion of functions, Power series representation total derivative; Tangent plane and normal line

Unit-IV

Linear differential equations of the first order and their applications: Formation of ODE-Methods to solve first order LDE (exact, reducible to exact, linear and Bernoulli equations)Applications-Growth and decay models-Newton's law of cooling- Applications to electrical circuits (LR and RC circuits)-Geometrical applications-Orthogonal trajectoriessolvable for p, equations solvable for y, equations solvable for x and Clairaut's type.

Unit-V

Linear differential equations of the higher order and applications: Equations with constant coefficients-Particular integrals for functions of the type - - Exponential shift - Method of variation of parameters. CauchyEuler equation; Power series solutions; Legendre polynomials, Bessel functions of the first kind and their properties
Applications-Deflection of beams, Simple harmonic motion (simple pendulum, spring-masssystems) and RLC circuits

Teaching Methodologies

- Tutorial sheets uploaded in website
- NPTEL video lectures
- MATLAB exercises for visualization

Text Books

1. Advanced Engineering Mathematics: R.K.Jain and S.R.K.Iyengar- Narosa Publishing House
2. Advanced Engineering Mathematics: Erwin Kreyszig, Wiley.
3. Higher Engineering Mathematics: B.S.Grewal-Khanna Publications.

References Books

1. Introduction to Linear Algebra-Gilbert Strang
2. Schaum's outline series on Linear Algebra
3. GRIET reference manual

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INSTITUTE OF ENGINEERING AND TECHNOLOGY

ADVANCED CALCULUS

Course Code: GR17A1002 **L: 2 T: 1 P: 0 C: 3**

Unit-I

Differential Calculus of functions of several variables and Function Optimization: Partial differentiation – Visualization of partial derivatives - Hessian matrix-Total differentiation-Jacobian and its utility

Optimization of functions of several variables without constraints- Constrained optimization of functions of several variables with one or more equality constraints-The Lagrange's multiplier method

Unit-II

Curve tracing principles and Applications of integration: Basic principles of tracing Cartesian, polar and parametric curves -Applications of the definite integral to evaluate arc lengths, surface areas of revolution and volumes of revolution

Unit-III

Multiple integrals and applications: Evaluation of Double integrals in Cartesian and polar coordinates-Changing the order of integration- Change of variables - Evaluation of triple integrals in Cartesian, cylindrical and spherical polar coordinates

Application of multiple integrals to evaluate plane areas and volumes of solids

Unit-IV

Vector Calculus: Vector differentiation in Cartesian coordinates-Gradient, Divergence and Curl and their physical interpretation-Directional derivatives-Angle between surfaces, Vector Identities, Irrotational fields and scalar potentials
Vector integration-Evaluation of line integrals-Work done by conservative fields-Surface integrals

Unit-V

Vector Field theorems: Green's theorem in the plane-Divergence theorem of Gauss-Stoke's theorem (Without Proofs)

Teaching Methodologies

- Tutorial sheets uploaded in website
- NPTEL video lectures
- MATLAB exercises for visualization

Text Books

1. Advanced Engineering Mathematics: R.K.Jain and S.R.K.Iyengar Narosa Publishing House
2. Schaum's outline series on Vector Analysis
3. Higher Engineering Mathematics: B.S.Grewal-Khanna Publications

Reference Books

1. Advanced Engineering Mathematics: Erwin Kreyszig-Wiley
2. Calculus and Analytical Geometry-Thomas & Finney-Narosa
3. Higher Engineering Mathematics: B.S.Grewal-Khanna Publications

GOKARAJU RANGARAJU

INSTITUTE OF ENGINEERING AND TECHNOLOGY

ENGINEERING CHEMISTRY

Course Code: GR17A1008 **L: 2 T: 1 P: 0 C: 3**

Unit-I

Water Technology: Sources of natural water, impurities, hardness: causes, types, expression, units, estimation of hardness of water using complexometric titration method, problems on hardness, Boiler feed water, boiler troubles (scale, sludge, carry over, Caustic Embrittlement, Boiler Corrosion). Internal treatment methods (carbonate, phosphate, Calgon), Softening of water – Lime Soda, Ion- Exchange and zeolite processes. Potable water- its characteristics and steps involved in Municipal Water Treatment, Chlorination-Break Point Chlorination, sterilization by ozonation. Desalination of Brackish water - Reverse Osmosis, Electrodialysis. Waste water-types of effluents, domestic and industrial effluents, sewage treatment-primary, secondary and tertiary .

Unit-II

Electrochemistry & Corrosion: Concept of Conductance -specific, equivalent, molar conductance and their inter relationships applications of conductance-conductometric titrations-(Strong acid Vs Strong Base and Weak Acid Vs Strong Base). EMF of a cell, Single Electrode Potential, Standard Electrode potential, potentiometric titrations(dichrometry), Electro chemical series and its applications, Electrochemical Cells-types, Galvanic cell: cell representation, Cell reactions, Cell EMF, Electrolytic cells, Concentration cell. Batteries-types, dry cell, Lithium Cells (liquid and solid cathode), Secondary cells: Pb-PbO2 cell, Fuel cells: H2-O2 fuel cells and their applications.

Corrosion: Causes and effects of corrosion-types of corrosion- chemical (Dry) corrosion-types and their mechanism, Electrochemical (Wet) corrosion and its mechanism, factors affecting the rate of corrosion – nature of metal and nature of environment. Corrosion Control Methods-Cathodic Protection: Sacrificial Anodic, Impressed Current Cathodic protection. Metallic Coatings –Anodic and Cathodic coatings, Methods of application of metallic coatings- Hot Dipping method (Galvanization and tinning), Electroplating (Cu coating), Electroless plating (Ni plating), Organic Coatings: Paints – its constituents and their functions.

Unit-III

Engineering Materials I: Cement-types-port land cement –composition, Setting & Hardening of Portland cement.
Ceramics-types-ceramic products - whitewares, Stone wares, preparation, properties and applications of ceramics.
Refractories-classification, properties (refractoriness, RUL, porosity, thermal spalling) and their application.
Lubricants: Classification with examples, mechanisms of lubrication (thick film, thin film, extreme pressure), solid lubricants, properties of lubricants- viscosity, flash point, fire point, cloud point, pour point (Definition and significance).

Unit-IV

Engineering Materials II: Electronic materials: Semiconductors, intrinsic & extrinsic semiconductors, Preparation of Pure Ge and Si by Zone Refining, Czochralski Crystal Pulling, Doping Techniques-Epitaxy, Diffusion & ion implantation.
Polymer Materials: Monomer, polymer, types of polymerization-addition and condensation, Plastics-Thermoplastic resins, Thermo set resins. Compounding & fabrication of plastics (compression & Injection moulding), Preparation, Properties, Engineering applications of High Density Poly Ethylene (HDPE), differences between HDPE & LDPE, Poly Vinyl Chloride (PVC), Bakelite & Nylon 6,6. Organic Light Emitting Diodes (an Overview). Biodegradable polymers-their advantages and their applications. Elastomers – preparation, properties and applications of Butyl rubber, Styrene-Butadiene Rubber. Conducting polymers, classification with examples-mechanism of conduction in trans poly acetylene and their applications.

Unit-V

Energy sources: Fossil Fuels: Fossil Fuels: Coal –types, analysis of coal- proximate and ultimate analysis and their significance, Calorific value of fuel – HCV, LCV, Determination of Calorific Value using BOMB calorimeter, analysis of flue gas using Orsat apparatus, Theoretical calculation of Calorific Value by Dulong's formula, Numerical Problems. Petroleum-its composition-synthetic petrol – Bergius and Fischer Tropsch's processes, cracking -definition, its types and significance, knocking and its mechanism in Internal Combustion engines, Octane Rating of Gasoline, Composition, and applications of natural gas, LPG, CNG. Bio-fuels: preparation of Bio-diesel by trans esterification method, advantages of Bio-fuel.

Teaching Methodologies

- White Board with marker, OHP & Power Point Presentation
- Conducting quizzes,
- Conducting Experiments
- Assignment uploaded in website.

Text Book

1. A text book of Engineering Chemistry by PC Jain and Monica Jain, Dhanpat Rai publishing company.

Reference Books

1. A text book of Engineering Chemistry by SS Dara and SS Umre, S Chand publications.
2. A text book of Engineering Chemistry by Dr Y Bharathi kumari and Dr Ch Jyothsna, VGS publications.
3. A text book of Engineering Chemistry by R.P.Mani, K.N.Mishra, B.Rama Devi, V.R.Reddy, cengage learning publication

GOKARAJU RANGARAJU

INSTITUTE OF ENGINEERING AND TECHNOLOGY

ENGLISH

Course Code: GR17A1005 **L: 2 T: 1 P: 0 C: 3**

Unit I

Sir C.V. Raman- Enjoying Every Day English & **Mother Teresa**- Inspiring Speeches and Lives

Unit II
i) Grammar : Types of Articles and their usages; Tense and Aspect; Subject verb Agreement; Prepositions; Redunduncies and clichés; Correction of Sentences;

ii) Vocabulary Development : Synonyms and Antonyms; One-word substitutes; prefixes and suffixes; words often confused; idioms and phrases; Standard Abbreviations in English

iii) Speaking & Writing skills : Information transfer; Public Speaking; Paragraph Writing; Punctuation; Essay Writing;

Unit-III
Connoisseur - Enjoying Every day English & **Sam Pitroda**- Inspiring Speeches and Lives

Unit IV
Bubbling Well Road- Enjoying Every day English & **Amarthya Kumar Sen**- Inspiring Speeches and Lives

Unit V
Cuddalore Experience- Enjoying Every day English &**Martin Luther King Jr.** (I have a dream) - Inspiring Speeches and Lives

Text Books

1. Enjoying Every day English by A. Rama Krishna Rao- Sangam Books
2. Inspiring Speeches and Lives by Dr.B.Yadava Raju, Dr.C.Muralikrishna, Maruthi Publications.

Reference Books

1. Murphy's English Grammar with CD, Murphy, Cambridge University Press.
2. Effective Technical Communication, M. Ashraf Rizvi, Tata McGraw Hill.
3. Technical Communication, Meenakshi Raman, Sangeeta Sharma, Oxford higher Education.
4. English for Engineers Made Easy, Aeda Abidi, Ritu Chaudhry, and CengageLearning.
5. Communicate or Collapse, PushpaLatha, Sanjay Kumar, PHI Learning Pvt.Ltd.
6. Communication Skills, Sanjay Kumar, PushpaLatha, Oxford Higher Education.
7. A Hand Book for Engineers, Dr. P. Eliah, BS Publications

GOKARAJU RANGARAJU

INSTITUTE OF ENGINEERING AND TECHNOLOGY

BASIC ELECTRICAL ENGINEERING

Course Code: GR17A1018 **L:3 T:1 P:0 C:4**

Unit-I

Basic Laws: Ohm's law , Kirchhoff's voltage and current laws , Nodes-Branches and Loops ,Series elements and Voltage Division , Parallel elements and Current Division , Star-Delta transformation, Independent sources and Dependent sources , Source transformation.

Unit-II

AC Fundamentals-I: Review of Complex Algebra , Sinusoids , Phasors , Phasor Relations ofCircuit elements , Impedance and Admittance , Impedance Combinations , Series and Parallel combination of Inductors and Capacitors, Mesh analysis and Nodal Analysis.

Unit-III

AC Fundamentals-II: RMS and Average values, Form factor, Steady State Analysis of Series,Parallel and Series Parallel combinations of R, L,C with Sinusoidal excitation, Instantaneous power, Average power, Real power, Reactive power and Apparent power, concept of Power factor, Frequency.

Unit-IV

Resonance and Network Theorems: Resonance in Electric circuits: Analysis of Series andParallel Resonance, Theorems: Superposition theorem, Thevinin's theorem, Norton's Theorem, Maximum Power Transfer Theorem, Reciprocity theorem.

Unit-V

Fundamentals Of Electrical Machines: Construction, Principle, Operation and Applications of–(i) DC Motor,(ii) Single phase Transformer (iii) Single phase Induction motor

Text Books

1. Fundamentals of Electric Circuits by Charles K.Alexander, Matthew N.O.Sadiku, Tata McGraw Hill Company.

Reference Books

1. Circuit Theory (Analysis and Synthesis) by A.Chakrabarti – Dhanpat Rai & Co
2. Basic Electrical Engineering by Nagasarkar, Oxford Publishers
3. Network Theory by Prof.B.N.Yoganarasimham.
4. Engineering Circuit Analysis by William H.Hayt.Jr, Jack E.Kemmerly and Steven
5. M.Durbin by Tata McGraw Hill Company.
6. Electrical Engineering Fundamentals by Vincent Deltoro 6.Circuit Theory by Sudhakar and ShyamMohan

GOKARAJU RANGARAJU

INSTITUTE OF ENGINEERING AND TECHNOLOGY

COMPUTER PROGRAMMING

Course Code: GR17A1009 **L:2 T:1 P:0 C:3**

Unit-I

Introduction to Computers: Computer Hardware and Software, System Software, Programming Languages, Program Development steps, Algorithms, Flowcharts.

Introduction to C: History of C, Structure of C-Program, Keywords, Identifiers, Data types,Constants, Variables, Operators, Expressions, Precedence and order of evaluation, Type Conversion and Type Casting .

Unit-II

Managing I/O: Input-Output statements, Formatted I/O.

Decision making statements: if, if-else, if-else-if, nested if, switch

Iterative Statements: while, do- while, for**.**

Unconditional statements: break, continue, goto.

Unit-III

Arrays: Introduction, One-Dimensional arrays, Declaring and Initializing arrays, Multidimensional arrays

Strings: Introduction to Strings, String operations with and without using String Handling functions,Array of strings.

Unit-IV

Functions: Introduction, Function definition, Function declaration, Function Calls, Return valuesand their types, Categories of Functions, Nested Functions, Recursion, Storage Classes, Passing arrays to Functions.

Pointers: Pointers and addresses, Pointer expressions and Pointer arithmetic, Pointers andFunctions, void pointer, Pointers and Arrays, Pointers and Strings, Array of pointers, Pointers to Pointers.

Dynamic memory allocation: malloc, calloc, realloc, free.

Unit-V

Structures: Basics of Structures, Nested Structures, Arrays of Structures, Arrays withinStructures, Structures and Functions, Pointers and Structures, Self-referential Structures, Unions. **Files:** Introduction, Types of Files, File Access Functions, I/O on Files, Random Access to Files,Error Handling, Command Line Arguments.

Teaching Methodologies

- White board and marker
- Power point presentations

Text Books

1. The C Programming Language, BRIAN W. KERNIGHAN Dennis M.Ritchie, Second Edition, PHI.
2. Computer Programming and Data structures by E Balaguruswamy, published by Mc GrawHill.
3. Programming in C, Ashok N Kamthane, 2nd edition, Pearson Publication.

Reference Books

1. Programming in C, Pradip Dey, Manas Ghosh, Second Edition, Oxford University Press.
2. Let Us C, Yashwanth Kanetkar, 10th Edition, BPB Publications.
3. C& Data structures, P.Padmanabham, B.S. Publications.
4. Computer science, A structured programming approach using C, B.A. Forouzan and R.F. Gilberg, Third edition, Thomson.
5. Programming with problem solving, J.A.Jones & K.Harrow, Dreamtech Press.
6. Programming in C, Stephen G.Kochan, III Edition, Pearson Education.
7. Problem solving and program design in C, Jeri. R. Hanly, Elliot B.Koffman, Pearson Publication.

GOKARAJU RANGARAJU

INSTITUTE OF ENGINEERING AND TECHNOLOGY

IT WORKSHOP

Course Code: GR17A1026 **L:0 T:0 P:2 C:2**

Task-1

Installation of OS Every student should install Ubuntu and RedHat Linux on the computer. Lab instructors should verify the installation and follow it up with viva.

Task-2

Hands on experience on OpenOffice: Every student should install open office on the computer. Students would be exposed to create word documents with images, tables, formula and with additional word processing features, Power point presentation, Excel and access. Lab instructors should verify the installation and follow it up with viva.

Task-3

Internet Based Applications: Students customize their web browsers with the LAN proxy settings, bookmarks, search toolbars and pop up blockers. Students should know what search engines are and how to use the search engines. A few topics would be given to the students for which they need to search on Google.

Task-4

Networking-Network Infrastructure: Understand the concepts of Internet, intranet, and extranet, local area networks (LANs), Wide area networks (WANs), Wireless networking, network topologies and access methods

Task-5

Network Hardware: Understand switches, routers, media types. static routing, dynamic routing(routing protocols), default routes; routing table and how it selects best route(s); routing table memory, network address translation (NAT).Introduction to Cisco Packet Tracer, design LAN using routers and switches.

Task-6

Network Protocols: Understand the Open Systems Interconnection (OSI) model, IPv4, IPv6,tunnelling, dual IP stack, subnet mask, gateway, ports, packets, reserved address ranges for local use (including local loopback IP) Understanding Cisco Router and Switches.

Task-7

Network Services: Understand names resolution, networking services, TCP/IP-Tools (such asping), tracert, pathping, Telnet, IPconfig, netstat, reserved address ranges for local use (including local loopback IP), protocols.

Task-8

Database -Core Database Concepts: Understand how data is stored in tables, UnderstandingDML and DDL statements.

Task-9

Creating and Insertion of Data: Understanding Data types, tables and how to insert data in to thetables.

Task-10

HTML Basic HTML Tags: Understand what are the tags used for creation of website.

Task-11

Designing a Static web page: Understand how to create static web page using forms and tables.

Teaching methodologies

- Power Point presentations.
- Assignments.
- Hands on experiment.

References Books

1. Introduction to Information Technology, ITL Education Solutions Limited, Pearson Education.
2. Introduction to Computers, Peter Norton, 6/e Mc Graw Hill
3. Upgrading and Repairing, PC's 18th e, Scott Muller QUE, Pearson Education
4. Comdex Information Technology Course tool kit Vikas Gupta, WILEY Dreamtech
5. IT Essentials PC Hardware and Software Companion Guide, Third Edition by David Anfinson and Ken Quamme- CISCO Press, Pearson Education
6. PC Hardware and A+Handbook – Kate J. Chase PHI(Microsoft)
7. ORACLE DATA BASE LOG PL/SQL Programming SCOTT URMAN, Tata Mc- Graw Hill
8. Introduction to Database Systems, C.J.Date Pearson Education.
9. Networking Fundamentals, Wiley, by Microsoft Official Academic Course, 1st Edition .

Suggested Tutorials on Lab:

Tutorial/Lab 1: Installation of Ubuntu and RedHat Linux on the computer. Lab instructors shouldverify the installation and follow it up with viva

Tutorial/Lab 2: Students would be exposed to create word documents with images, tables, formulaand with additional word processing features, Power point presentation, Excel and access. Lab instructors should verify the installation and follow it up with viva.

Tutorial/Lab 3: Understand the concepts of networking topics.

Tutorial/Lab 4: DDL and DML statements

Tutorial/Lab5: Designing of static web page and verify it.

GOKARAJU RANGARAJU

INSTITUTE OF ENGINEERING AND TECHNOLOGY

ENGINEERING CHEMISTRY LAB

Course Code: GR17A1030 **L:0 T:0 P:2 C:2**

List of Experiments

Task1: Estimation of Total Hardness in sample water by complexometry

Task2: Estimation of percentage available chlorine in Bleaching Powder.

Task3: Estimation of $Fe^{2+}$by permanganometry.

Task4: Determination of strength of an acid by potentiometric titration method

Task5: Determination of strength of an acid by using conductometry.

Task6: Determination of Strength of an acid in Pb-Acid battery by titrimetric method

Task7: Determination of percentage of Iron in Cement sample by colorimetry..

Task8: Estimation of Calcium in port land cement.

Task9: Determination of Viscosity of the given unknown liquid by Oswald's viscometer.

Task10: Determination of surface tention of the given unknown liquid by stalagmometer.

Task11: Preparation of Thiokol rubber.

Task12: Determination of percentage Moisture content in a coal sample.

Task 13. Estimation of ferrous iron by potentiometric titration using dichromate.

Task 14. Preparation of aspirin drug.

Reference Books

1. Laboratory Manual on Engineering Chemistry, by Dr Sudha Rani, Dhanpat Rai Publishing house.
2. A Text book on Experiments and calculations in Engineering Chemistry, by SS Dara,
3. S Chand publications.
4. Laboratory Manual of Organic Chemistry, by Raj K Bansal, Wiley Eastern Limited, New age international limited.
5. Engineering Chemistry practical manual prepared by faculty of engineering chemistry, GRIET(A) - (for college circulation only)

GOKARAJU RANGARAJU

INSTITUTE OF ENGINEERING AND TECHNOLOGY

COMPUTER PROGRAMMING LAB

Course Code: GR17A1027 **L:0 T:0 P:2 C:2**

Task- I

1. The heights of three students are 165, 148, 154 cm. respectively. Write a C program to sort the heights of the students in descending order.
2. Write a C program to find the roots of a quadratic equation using if-else.

a. The program should request the user to input two numbers and display one of the following as per the desire of user.

b. Sum of numbers

c. Difference of numbers

d. Product of the numbers

e. Division of the numbers.

3. Write a C program using switch statement to accomplish the above task.
4. In a mathematical number sequence let the first and second term in the Sequence are 0 and 1. Subsequent terms are formed by adding the preceding terms in the sequence. Write a C program to generate the first 10 terms of the sequence.

Task-II

1. Write a C program to construct pyramid of numbers.
2. The reliability of an electronic component is given by reliability $r=e^{-\lambda t}$ where λ is the component failure rate per hour and t is the time of operation in hours. Determine the reliability at various operating times from 0 to 3000 hours by plotting a graph using a C program. The failure rate λ is 0.001. Plot the graph with a special symbol.
3. Write a C program to accept the date of birth and the current date to find the age of the person . The output should specify the age of a person in terms of number of years, months and days.

Task- III

1. Write a C program to calculate the following Sum: $Sum=1-x^2/2!+x^4/4!-x^6/6!+x^8/8!-x^{10}/10!$

2. For a certain electrical circuit with an induction (L) and Resistance (R) , the damped natural frequency is given by $f=\sqrt{(1/LC - R^2/4C^2)}$. Write a C program to calculate the frequency for different values of C starting from 0.01 to 0.1.

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

Task - IV

1. Write a C program to find both the largest and smallest number in a list of integers.
2. Write a C Program to search whether a given number is present in set of integers
3. Write a C Program to sort a given list of integers.

Task - V

1. Write a C program to count the lines, words and characters in a given text.
2. Write a C program to sort the names of 5 students in the alphabetical order.
3. Ex: Rita, Sneha, Priti, Briya, kitti as Briya , Kitti, Priti, Rita, Sneha c) Write a C program to print all the rotations of a given string.
4. Ex: Rotations of the string "NEWS" are NEWS EWSNWSNESNEW

Task - VI

1.Write a C program to perform the following operations:

a. To insert a sub-string in a given main string at a given position.
b. To delete n Characters from a given position in a given string.
c. Write a C program to determine if the given string is a palindrome or not?

Task – VII

1.Write a C program that uses functions to perform the following:

a. Transpose of a matrix

b. Addition of Two Matrices

c. Multiplication of Two Matrices

Task - VIII

1. Write C programs that use both recursive and non-recursive functions

a. To find the factorial of a given integer.

b. To print the Fibonacci sequence

c. To find the GCD (greatest common divisor) of two given integers.

Task- IX

1. Using pointers, write a function that receives a character string and a character as argument and deletes all occurrences of this character in the string.
2. Write a function using pointer parameter that compares two integer arrays to see whether they are identical. The function returns 1 if they are identical, 0 otherwise.

Task –X

1. Write a C program that uses functions to perform the following operations on two complex numbers

a) Addition
b) Subtraction
c) Multiplication
d) Division

(Note: represent complex number using a structure.)

Task-XI

1.Write a c program which accepts employee details like (outer structure : name, employid, salary and (inner structure : area, street number, houseno)).Display the employee names and id belonging to a particular area.

2. Let us suppose that a hotel consists of name, address, average room charge and number of rooms. Then write a function to print out hotels with room charges less than a given value.(structures and functions)

Task – XII

1. Write a C Program to display the contents of a file.
2. Write a C Program for merging of two files into a single file.
3. Write a C Program to append data into a file.

Task - XIII

1. Write a C program which copies one file to another.
2. Write a C program to reverse the first n characters in a file.

(Note : The file name and n are specified on the command line.)

Task-XIV

1. Write a C program to develop Tic Tac Toe game
2. Write a C program to solve Towers of Hanoi

Text Books

1. Programming in C, Ashok N Kamthane, 2nd edition, Pearson Publication.

2. The C Programming Language, BRIANW. KERNIGHAN Dennis M.Ritchie, Second Edition, PHI.

3. Computer Programming and Data structures by E Balaguruswamy, published by Mc GrawHill.

Reference Books

1. Programming in C, Pradip Dey, Manas Ghosh, Second Edition, Oxford University Press.
2. Let Us C, Yashwanth Kanetkar, 10th Edition, BPB Publications.
3. C& Data structures, P.Padmanabham, B.S. Publications.
4. Computer science, A structured programming approach using C, B.A. Forouzan and R.F. Gilberg, Third edition, Thomson.Programming with problem solving, J.A.Jones & K.Harrow, Dreamtech Press.
5. Programming in C, Stephen G.Kochan, III Edition, Pearson Education.
6. Problem solving and program design in C, Jeri. R. Hanly, Elliot B. Koffman, Pearson Publication.

II SEMESTER

GOKARAJU RANGARAJU

INSTITUTE OF ENGINEERING AND TECHNOLOGY

TRANSFORM CALCULUS AND FOURIER SERIES

Course Code: GR17A1003 **L:2 T:1 P:0 C:3**

Unit-I

Improper Integrals and Beta, Gamma Functions: Beta and Gamma functions – Their properties– Evaluation of improper integrals in terms of Beta and Gamma functions.
Improper integrals of the first Kind- Improper integrals of the second kind Convergence of Improper Integrals

Unit-II

Laplace Transform: Introduction Basic theory of Lalace Transforms-Definition and existence of the Laplace Transform-Elementary functions- Properties of the Laplace transform-Convolution integral - Convolution theorem-Heaviside's unit step-function-Dirac delta function.

The inverse Laplace transform-Properties-Method of partial fractions- Heaviside's inversion formula-Inversion by convolution theorem.
Application of the Laplace transform to solve initial value problems and boundary value problems in ODE.
Solution of a system of linear differential equations-Solution of problems in electrical circuits by Laplace transforms method.
Laplace Transform Method for the solution of some Partial Differential Equations

Unit-III

Z-Transform and Fourier series: Introduction- Basic Theory of Z transform - Definition-Z transform of elementary sequences-Properties- The inverse Z Transform, Z transform to solve difference equations -Application of Z transform to find the sum of series
Definition of orthogonal functions-The concept of Weight function-Fourier series of 2L periodic functions- Fourier expansion of 2π periodic functions-Half range Fourier series expansions.

Fourier Series Expansions of Even and Odd functions

Unit-IV

Fourier Transform: Exponential Fourier series-Introduction – Definition-Fourier integrals –Fourier sine and cosine integral. The continuous one dimensional Fouriertransform-Properties-Convolution-Parseval's identity- Fourier Sine and Cosine transforms.

Unit-V

Partial differential equations: Introduction- formulation of First and Second order Partial Differential Equations -Solution of Lagrange's linear equations-Method of separation of variables to solve IBVP like 1-D heat, 1-D wave and BVP like 2-D Laplace's equations. Application of Fourier transform to the solution of partial differential equations

Teaching Methodologies

- Tutorial sheets uploaded in website
- NPTEL video lectures
- MATLAB exercises for visualization

Text Books

1. Advanced Engineering Mathematics: R. K. Jain and S. R. K. Iyengar Narosa Publishing House.
2. Advanced Engineering Mathematics: Erwin Kreyszig-Wiley
3. Schaum's outline series on Laplace transforms

Reference Books

1. Higher Engineering Mathematics: B. S. Grewal-Khanna Publications
2. Higher Engineering Mathematics: C. Das Chawla-Asian Publishers
3. GRIET reference manual

GOKARAJU RANGARAJU

INSTITUTE OF ENGINEERING AND TECHNOLOGY

NUMERICAL METHODS

Course Code: GR17A1004 **L:2 T:1 P:0 C:3**

Unit-I

Root finding techniques and Numerical solution of linear algebraic systems: Bisection method-RegulaFalsi- Fixed point iteration method-Newton Raphson method, Ramanujan's Method, Secant Method, Muller's Method, Lin-Bairstow's methos.

LU decomposition method- -Jacobi and Gauss Seidel iteration methods-Matrix Eigenvalue Problem Householder's Method, Eigen values of a Symmetric Tridiagonal Matrix.

Unit-II

Interpolation and Cubic Splines: Finite differences - Forward, backward and central differences, Relationship between operators- Interpolation with uniform data-Newton's forward and backward difference interpolation formulas- Gauss forward, Gauss backward and Stirling's central interpolation , Bessel's, Everett's formulae- Lagrange, Hermite's and Newton's divided difference interpolation formulas for non-uniform data- Cubic spline interpolation, Inverse Interpolation, Double Interpolation.

Unit-III

Curve fitting and B-spline approximation: Fitting a straight line, and second degree parabola, exponential and power curves to data, method of Least Squares for Continuous functions-Orthogonal Polynomials, Chebyshev Polynomials.
Approximation of functions by Cubic B-Splines, Applications of B-splines

Unit-IV

Numerical differentiation and numerical integration: Numerical differentiation using the Newton's forward, backward and central difference formulas- Maximum and Minimum Values of a Tabulated Functions
Numerical integration by Trapezoidal rule, Simpson's 1/3rd and 3/8th rules, Boole's and Weddle's Rules, Romberg Integration, Newton- Cotes Integration Formulae.

Unit-V

Numerical solution of initial and boundary value problems in ODE: Initial Value Problems: Picard's method of successive approximation, Solution by Taylor series method, Euler method, Runge-Kutta methods of second and fourth orders. Predictor-corrector methods, Combinations of first and second order P-C methods. Boundary Value Problems in ODE: Finite difference methods for solving second order linear ODE.

Teaching Methodologies

- Tutorial sheets uploaded in website
- NPTEL video lectures
- MATLAB exercises for visualization

Text Books

1. Advanced Engineering Mathematics: R.K.Jain and S.R.K.Iyengar- Narosa Publishing House.
2. Advanced Engineering Mathematics: Erwin Kreyszig- Wiley.
3. Introductory methods of Numerical Analysis (5th edition)-S.S.Sastry- PHI.

Reference Books

1. Applied Numerical Methods using MATLAB- Yang, Cao, Chung & Morris – Wiley Interscience
2. Numerical methods in Engineering with MATLAB-Jaan Kiusalaas -Cambridge University Presss
3. GRIET Reference Manual.

GOKARAJU RANGARAJU

INSTITUTE OF ENGINEERING AND TECHNOLOGY

ENGINEERING PHYSICS

Course Code: GR17A1007 **L:2 T:1 P:0 C:3**

UNIT-I

Crystal Structures: Lattice points, Space lattice, Basis, Bravais lattice, unit cell and lattice parameters, Seven Crystal Systems with 14 Bravais lattices , Atomic Radius, Co-ordination Number and Packing Factor of SC, BCC, FCC, Miller Indices, Inter planer spacing of Cubic crystal system.

Defects in Crystals: Classification of defects, Point Defects: Vacancies, Substitution, Interstitial, Concentration of Vacancies, Frenkel and Schottky Defects, Edge and Screw Dislocations (Qualitative treatment), Burger's Vector, Overview of Surface and Volume defects.

Principles of Quantum Mechanics: Waves and Particles, de Broglie Hypothesis, Matter Waves, Davisson and Germer's Experiment, Heisenberg's Uncertainty Principle, Schrodinger's Time Independent Wave Equation-Physical Significance of the wave Function-Particle in One Dimensional Potential Box.

UNIT –II

Electron Theory of Metals: Classical free electron theory, Derivation of Ohm's law, Mean free path, Relaxation time and Drift velocity, Failures of Classical free electron theory, Quantum free electron theory, Fermi-Dirac distribution, Fermi energy, Failures of Quantum free electron theory.

Band Theory of Solids: Electron in a periodic potential, Bloch Theorem, Kronig-Penny Model(Qualitative Treatment), origin of Energy Band Formation in Solids, Classification of Materials into Conductors, Semi Conductors & Insulators, Effective mass of an Electron.

Semiconductor Physics: Intrinsic Semiconductors and Carrier Concentration, Extrinsic Semiconductors and Carrier Concentration, Fermi Level in Intrinsic and Extrinsic Semiconductors, Hall Effect and Applications.

UNIT – III

Dielectric Properties: Electric Dipole, Dipole Moment, Dielectric Constant, Polarizability, Electric Susceptibility, Displacement Vector, Types of polarization: Electronic, Ionic and Orientation Polarizations and Calculation of Polarizabilities (Electronic & Ionic) -Internal Fields in Solids, Clausius -Mossotti Equation, Piezo-electricity, Pyro-electricity and Ferro- electricity.

Magnetic Properties: Magnetic Permeability, Magnetic Field Intensity, Magnetic Field Induction, Intensity of Magnetization, Magnetic Susceptibility, Magnetic Flux, Origin of Magnetic Moment, Bohr Magnetron, Classification of Dia, Para and Ferro Magnetic Materials on the basis of Magnetic Moment, Hysteresis Curve on the basis of Domain Theory of Ferro Magnetism, Soft and Hard Magnetic Materials, Anti-Ferro, Ferrites and their Applications.

UNIT – IV

Lasers: Characteristics of Lasers, Spontaneous and Stimulated Emission of Radiation, Meta-stable State, Population Inversion, Pumping mechanisms, Optical Feedback, Resonator, Characteristics of Laser, Einstein's Coefficients and Relation between them, Ruby Laser, Helium-Neon Laser, Semiconductor Diode Laser, Applications of Lasers.

Fiber Optics: Structure and Principle of Optical Fiber, Acceptance Angle, Numerical Aperture, Types of Optical Fibers (SMSI, MMSI, MMGI), Skew rays and Meridional rays, Attenuation in Optical Fibers: Scattering losses, absorption losses and bending losses, Application of Optical Fibers, Optical fiber Communication Link with block diagram.

UNIT –V

Nanotechnology: Origin of Nanotechnology, Nano Scale, Surface to Volume Ratio, Bottom-up

Fabrication: Sol-gel Process, Electrodeposition, Top-down Fabrication: Ball milling, Chemical Vapor Deposition, Physical, Chemical and Optical properties of Nano materials, Characterization (SEM, EDAX), Applications.

Teaching Methodologies

- Power Point Presentation.
- Assignments uploaded in website.

Text Books

1. **Engineering Physics:** S.O.Pillai, New age International.
2. **Engineering Physics:** P.K.Palanisamy, Scitech Publishers.
3. **Applied Physics:** T.Bhima Sankaram,G Prasad,BS Publications

Reference Books

1. **Solid State Physics:** Charles Kittel, Wiley & Sons (Asia) Pte Ltd.
2. **Fundamentals of physics:** Halliday, Resnick, Walker.
3. **Optical Electronics:** A.J Ghatak and K.Thyagarajan, Cambridge University Press.

GOKARAJU RANGARAJU

INSTITUTE OF ENGINEERING AND TECHNOLOGY

DATA STRUCTURES

Course Code: GR17A1010 **L:2 T:1 P:0 C:3**

Unit-I

Introduction to data structures: Stacks, Stack Operations, Representation of a Stack usingArrays, Stack Applications: Recursion, Infix to postfix Conversion, Evaluating Arithmetic Expressions.

Unit-II

Queues: Basic Queues Operations, Representation of a Queue using array, Implementation ofQueue Operations using arrays, Applications of Queues, Circular Queues, Priority Queues**,** Enqueue, Dequeue.

Unit-III

List: Introduction, single linked list, representation of a linked list in memory, Operations-insertion,deletion, display, search, circular linked list, Double linked list, Applications advantages and disadvantages of single linked list, Implementation of stack, queue using linked list

Unit-IV

Trees: Basic tree concepts, Binary Trees: Properties, Representation of Binary Trees using arraysand linked lists, operations on a Binary tree , Binary Tree Traversals (recursive), Creation of binary tree from in-order and pre(post)order traversals.

Unit-V

Sorting and Searching: Insertion (Insertion sort), selection (heap sort) and selection soft,exchange (bubble sort, quick sort), distribution (radix sort) and merging (merge sort) Algorithms, Searching: Linear, binary search, indexed sequential search.

Teaching Methodologies

- White Board
- Marker
- LCD Projector
- OHP Projector

Text Books

1. Data Structures, 2/e, Richard F, Gilberg, Forouzan, Cengage
2. Data Structures and Algorithms, 2008,G.A.V.Pai, TMH

Reference Books

1. Data Structure with C, Seymour Lipschutz, TMH
2. Classic Data Structures, 2/e, Debasis, Samanta, PHI, 2009
3. Fundamentals of Data Structure in C, 2/e, Horowitz, Sahni, Anderson Freed, University Press

GOKARAJU RANGARAJU

INSTITUTE OF ENGINEERING AND TECHNOLOGY

ENGINEERING GRAPHICS

Course Code: GR17A1023 **L:1 T:0 P:2 C:3**

Unit-I

INTRODUCTION TO ENGINEERING DRAWING: Principles of Engineering Graphics and theirSignificance Drawing Instruments and their Use Conventions in Drawing Lettering BIS Conventions. Curves used in Engineering Practice & their Constructions: a) Conic Sections, b) Cycloid, Epicycloid and Hypocycloid, c) Involutes.

SCALES: Different types of scales. Plain Scale, Diagonal Scale & Vernier Scale

Unit-II

ORTHOGRAPHIC PROJECTIONS: Principles of Orthographic Projections Conventions Firstand Third Angle Projections. Projections of Points and Lines inclined to both planes, True lengths, traces.

Unit -III

PROJECTIONS OF PLANES: Planes parallel, perpendicular and inclined to one of the referenceplanes. Plane inclined to both the reference planes.

PROJECTIONS OF SOLIDS: Projections of Regular Solids inclined to both planes.

Unit-IV

SECTIONS OF SOLIDS: Types of section planes, Section by a plane perpendicular to V.P., Sectionby a plane perpendicular to H.P.

DEVELOPMENT OF SURFACES: Development of Surfaces of Right Regular Solids Prisms,Cylinder, Pyramid, Cone and their parts.

Unit-V

ISOMETRIC PROJECTIONS: Principles of Isometric Projection Isometric Scale Isometric ViewsConventions Isometric Views of Lines, Plane Figures, Simple and Compound Solids Isometric Projection of objects having non- isometric lines. Isometric Projection of Spherical Parts.

TRANSFORMATION OF PROJECTIONS: Conversion of Isometric Views to Orthographic ViewsConventions.

Teaching Methodology

- Power point Presentations
  Working models
- white board & marker

Text Books

1. Engineering Drawing, N.D. Bhat / Charotar

Reference Books

1. Engineering Drawing and Graphics, Venugopal / New age.
2. Engineering Drawing- Johle/Tata Macgraw Hill.
3. Engineering Drawing, Narayana and Kannaiah / Scietech publishers. Engineering Drawing, Narayana and Kannaiah / Scietech publishers.
4. Engineering Drawing Basanth Agrawal/ C M Agrawal; 2e Mc Graw Hill Educati

GOKARAJU RANGARAJU

INSTITUTE OF ENGINEERING AND TECHNOLOGY

FUNDAMENTALS OF ELECTRONICS AND ENGINEERING

Course Code: GR17A1019 **L:3 T:1 P:0 C:4**

Unit-I

Semiconductors and pn Junction Diode: Semiconductor Physics: n and p type semiconductors,Mass Action Law, Continuity Equation, Hall Effect, Fermi level in intrinsic and extrinsic semiconductors, Open- circuited p-n junction, Energy band diagram of PN diode, forward bias and reverse bias, Current components in p-n diode, Law of junction, Diode equation, Volt-ampere characteristics of p-n diode, Temperature dependence of V-I characteristic, Transition and Diffusion capacitances, Breakdown Mechanisms in Semiconductor Diodes (Avalanche and Zener breakdown), Zener diode characteristics,

Unit-II

Diode Applications, Special Diodes: Half wave rectifier, ripple factor, full wave rectifier,Harmonic components in a rectifier circuit, Inductor filter, Capacitor filter, L- section filter, Π- section filter, and comparison of various filter circuits in terms of ripple factors, Simple circuit of a regulator using zener diode, Series and Shunt voltage regulators

Special Diodes: Characteristics of Tunnel Diode, Varactor Diode, LED, LCD.

Unit-III

Bipolar Junction Transistor: Junction transistor, Transistor current components, Transistor as anamplifier, Transistor construction, Detailed study of currents in a transistor, Input and Output characteristics of transistor in Common Base, Common Emitter, and Common collector configurations, Relation between Alpha and Beta and Gamma, typical transistor junction voltage values,

Junction Field Effect Transistors (JFET): JFET characteristics (n and p channels), Small signalmodel of JFET, MOSFET characteristics (Enhancement and depletion mode), Introduction to SCR and UJT.

Unit-IV

Biasing and stabilization : BJT biasing, DC equivalent model, criteria for fixing operating point,Fixed bias, Collector to base bias, Self bias techniques for stabilization, Stabilization factors, Compensation techniques, Compensation against variation in VBE and Ico, Thermal run away, Thermal stability.

Unit-V

Amplifiers: Small signal low frequency transistor amplifier circuits: h-parameter representation ofa transistor, Analysis of single stage transistor amplifier using h-parameters: voltage gain, current gain, Input impedance and Output impedance. Comparison of transistor configurations in terms of Ai, Ri, Av, Ro.

Teaching Methodologies

1. Power Point presentations
2. Tutorial Sheets
3. Assignments
4. Lab experiments with Multisim software

Text Books

1. David A. Bell; Electronic Devices and Circuits, Oxford University Press, 5th edition, 2008.
2. R.L. Boylestad and Louis Nashelsky; Electronic Devices and Circuits, Pearson/Prentices Hall, 9th Edition, 2006.

Reference Books

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

GOKARAJU RANGARAJU

INSTITUTE OF ENGINEERING AND TECHNOLOGY

BUSINESS COMMUNICATION AND SOFT SKILLS

Course code: GR17A1024 **L:0 T:0 P:2 C:2**

Unit-I
Just A Minute (JAM); Ice Breaking Activity: Self-Introduction ; Introducing others; elocution

Unit-II
Phonetics
Introduction to speech sounds; identification of sound symbols; vowel and consonants; Word stress and Rhythm; Word Accent; Difference in British and American Pronunciation; Indian English

Unit-III
Role play
Introduction to role play;; Telephonic Etiquette; situation handling; making requests; seeking permissions; greetings; showing gratitude; situation handling; non-verbal communication

Unit-IV
Debate and Brain-Storming
Introduction and features of Debate; Types of Debate; Understanding critical thinking; building sustainable arguments; assessing credibility of the argument; overcoming obstacles; Introduction to Brain-Storming; brain-storming technique

Unit-V
Describing a Person, Situation, Process and Object

Unit-VI
Letter Writing
Manual and Emailing; types and formats; letter writing expressions; content and body of the letter. Email etiquettes

Unit-VII
Report Writing
Formats and types of reports; structure of reports

Unit-VIII
Mind Mapping and Six Thinking Hats
Assimilation of thoughts; expansion of ideas on central idea; suggesting parameters to carry forward the thinking process without deviation

Reference Books

1. Business Communication; Hory Sankar Mukerjee; Oxford University Press
2. Business Communication; Meenakshi Raman, Prakash Singh; Oxford University Press
3. English and Soft skills; SP Dhanavel; Orient Blackswan
4. Soft Skills for Everyone; Jeff Butterfield; Cengage Learning
5. Communication Skills; Viva Career Skills Library
6. Personality Development and Soft Skills; Barun K Mitra; Oxford University Press
7. Six Thinking Hats, Penguin Books, Edward De Bono
8. English for Engineer's; Aeda Abidi, Ritu Chaudhry; Cengage Learning
9. Communication Skills ; Sanjay Kumar , Pushpalatha; Oxford University Press
10. Business English : The Writing Skills you need for today's work place: Geffner, Andrea: Fifth edition, Barron's Educational Series, Newyork

Software Used

- Sky Pronunciation Suite
- Clarity
- Mastering English

GOKARAJU RANGARAJU

INSTITUTE OF ENGINEERING AND TECHNOLOGY

ENGINEERING WORKSHOP

Course Code: GR17A1025 **L:0 T:0 P:2 C:2**

Unit-I

Carpentry Shop – 1:

Introduction to various types of wood such as Teak, Mango, Sheesham, etc. (Demonstration and their identification).Demonstration, function and use of commonly used hand tools. Care, maintenance of tools and safety measures to be observed. Job I Marking, sawing, planning and chiselling & their practice

Introduction to various types of wooden joints, their relative advantages and uses. Job II Preparation of half lap joint Job III Preparation of Mortise and Tenon Joint Safety precautions in carpentry shop.

Unit-II

Fitting Shop – 2:

Introduction to fitting shop tools, common materials used in fitting shop.

Description and demonstration of simple operation of hack-sawing, demonstration and description of various types of blades and their specifications, uses and method of fitting the blade.

Job I Marking of job, use of marking tools and measuring instruments.

Job II Filing a dimensioned rectangular or square piece of an accuracy of + 0.5 mm Job III Filing practice (production of flat surfaces). Checking by straight edge.

Job IV Making a cutout from a square piece of MS Flat using hand hacksaw such as T-fit and V-fit

2.3.Care and maintenance of measuring tools like callipers, steel rule, try square.

Unit-III

House wiring – 3:

Study, demonstration and identification of common electrical materials such as wires, cables, switches, fuses, PVC Conduits.Study of electrical safety measures and demonstration about use of protective devices such as fuses,and relays including earthing.JobI Identification of phase, neutral and earth of domestic appliances and their connection to two pin/three pin plugs.

JobII Preparation of a house wiring circuit on wooden board using fuse, switches,socket, holder, ceiling rose etc. in PVC conduit and PVC casing and capping wiring system.

Job III Two lamps in series and parallel connection with one way switch

JobIV Two lamps in series and one lamp in parallel connection with one way switch.

Job V Stair case lamp connection with two way switch.

Unit-IV

Tin- smithy – 4:

Introduction to tin -smithy shop, use of hand tools and accessories e.g. different types of hammers, hardand soft mallet, sheet and wire gauge, necessary allowance required during job fabrication, selection ofmaterial and specifications.Introduction and demonstration of hand tools used in tin - smithy shop.

Introduction and demonstration of various raw materials used in sheet metal shop e.g. M.S. sheet,galvanized-iron plain sheet, galvanised corrugated sheet, aluminium sheets etc.

4.4. Preparation of a rectangle tray and open scoop/ funnel.

Reference Books

1. Workshop Technology I,II,III, by S K Hajra, Choudhary and A K Chaoudhary. Media Promoters and Publishers Pvt. Ltd., Bombay
2. Workshop Technology by Manchanda Vol. I,II,III India Publishing House, Jalandhar.
3. Manual on Workshop Practice by K Venkata Reddy, KL Narayana et. al; MacMillan India Ltd.
4. Basic Workshop Practice Manual by T Jeyapoovan; Vikas Publishing House (P) Ltd.,New Delhi
5. Workshop Technology by B.S. Raghuwanshi, Dhanpat Rai and Co., New Delhi.
6. Workshop Technology by HS Bawa, Tata McGraw Hill Publishers, New Delhi.

GOKARAJU RANGARAJU

INSTITUTE OF ENGINEERING AND TECHNOLOGY

ENGINEERING PHYSICS LAB

Course Code: GR17A1029 **L:0 T:0 P:2 C:2**

List of Experiments:

Task1: Determine the energy gap of a given semiconductor.

Task 2: Calculate the energy loss in a given Ferro magnetic material by plotting B-H curve.

Task 3: Calculate the Numerical Aperture of a given optical fiber.

Task 4: Determine the Dielectric constant and Curie temperature of PZT material.

Task 5: Calculate the Acceptance angle of a given optical fiber.

Task 6: Draw V-I & L-I Characteristics of LASER diode.

Task7: Determine the bending losses in a given optical fibers.
Task8: Determine the Air-gap losses in a given optical fibers.

Task9: Determine the Hall Coefficient in Ge semiconductor by using Hall Experimental setup. **Task10:** Determine the carrier concentration, mobility of charge carrier in Ge semiconductor. **Task11**: Measure Ac voltage and frequency through CRO.

Task12: Measure Resistance and Capacitance by using digital multimeter.

Task13: Determination of wave length of a source -Diffraction Grating.

Task14: Determination of Rigidity modulus of a given wire - Torsional Pendulum
Task15: Dispersive power of the material of a prism
Task16: Determination of wave length of a source using N
Task17: Draw V-I and L-I characteristics – LED

II YEAR SYLLABUS
I SEMESTER

GOKARAJU RANGARAJU

INSTITUTE OF ENGINEERING AND TECHNOLOGY

ELECTRICAL CIRCUITS

Course Code: GR17A2047 **L:2 T:1 P:0 C:3**

Unit-I

Network Elements: Resistance, Capacitance, Self-inductance, Mutual inductance, Dotrule, Coefficient of coupling, Analysis of multi-winding coupled (series and parallel) circuits; Natural response and forced response.

DC Transients: Inductor, Capacitor, Source free RL, RC and RLC response,Evaluation of initial conditions, application of Unit-step function to RL, RC and RLC circuits, Concepts of Natural, Forced and Complete response.

Unit-II

Linear constant coefficient differential equations: time domain analysis of simple RL, RC and RLC circuits, Solution of network equations using Laplace transform

Unit-III

Sinusoidal steady state analysis: Characteristics of sinusoids, Forced Response to Sinusoidal Functions, The Complex Forcing Functions, The Phasor, Phasor Relationship for R,L and C, Impedance and Admittance, Phasor Diagram.

Unit-IV

Network Topology: Network terminology - Graph of a network - Incidence and reduced incidence matrices – Trees –Cutsets - Fundamental cutsets - Cutset matrix – Tiesets.

Network Functions: Poles and zeros of network functions, Network functions for the one- and two-ports, Restrictions on pole and zero locations for driving point functions and transfer functions.

Unit-V

Two Port Network Parameters: Open circuit impedance (Z) parameters - short circuit admittance(Y) parameters - transmission (ABCD) parameters and inverse transmission parameters - Hybrid (h) parameters and inverse hybrid parameters - Conversion between parameters - interconnection of two-port networks. Lattice networks, Image parameters.

Teaching methodologies

1. Power Point presentations
2. Tutorial Sheets
3. Assignments
4. Lab experiments with Pspice Software

Text Books

1. William H. Hayt Jr. and Jack E. Kemmerly, ' Engineering Circuit Analysis', 6th Edition, McGraw Hill 2008.
2. Vanvalkenburg M.E, 'Network Analysis', PHI, 3rd Edition, 2007.
3. Kuo F. F., "Network Analysis and Synthesis", 2nd Ed., Wiley India.,2008.

Reference Books

1. Edminister J. ' Circuit Theory', Schaum's outline Series, TMH 1998
2. Valkenberg V., Network Synthesis. 2008

GOKARAJU RANGARAJU

INSTITUTE OF ENGINEERING AND TECHNOLOGY

ELECTRONIC CIRCUIT ANALYSIS

Course Code: GR17A2048 **L:3 T:1 P:0 C:4**

Unit-I

Feedback Amplifiers: Classification of Amplifiers, Feedback concept, Transfer Gain with feedback, General characteristics of negative feedback amplifiers, Effect of Feedback on input and output Resistances, Method of Analysis of Feedback Amplifiers, Voltage series, voltage shunt, current series, and current shunt feedback amplifiers with discrete components and their analysis.

Unit-II

Oscillators: Condition for oscillations. RC-phase shift oscillators with Transistor and FET with necessary derivation for frequency of oscillation, Hartley and Colpitts oscillators, Wein bridge oscillator, Crystal oscillators, Frequency and amplitude stability of oscillators, Negative Resistance in Oscillator .

Unit-III

Multistage Amplifiers: Cascading Transistor Amplifiers, Choice of Transistor configuration in Cascade amplifier, High input Resistance Transistor Circuits – Darlington pair, Cascode amplifier, Frequency response and analysis of RC Coupling, Direct coupling and Transformer coupling, Difference amplifier Two Stage RC Coupled JFET amplifiers (in Common Source (CS) configuration).

Unit-IV

Power Amplifiers: Class A large signal Amplifiers, Second harmonic Distortions, Higher order harmonic Distortion, Transformer Coupled Audio power amplifier, Efficiency, Push-pull amplifiers, Class B Amplifiers, Class AB operation, Efficiency of Class B Amplifier, Complementary Symmetry push pull amplifier, stability and Heat sink.

Unit-V

Tuned Amplifiers: Introduction, Q-Factor, Small Signal Tuned Amplifier – Capacitance single tuned amplifier, Double Tuned Amplifiers, Effect of Cascading Single tuned amplifiers on Band

width, Effect of Cascading Double tuned amplifiers on Band width, Staggered tuned amplifiers, Stability of tuned amplifiers.

Text Books

1. Electronic Devices and Circuits - Salivahanan, N.Suresh Kumar, A. Vallavaraj, TATA McGraw Hill, Second Edition, 2011.
2. John D Ryder, "Electronic Fundamentals and Applications: Integrated and Discrete Systems" 5nd Edition, PHI, 2003. (UNIT- V for Tuned Amplifiers)

Reference Books

1. Robert L Boylestad and Louis Nashelsky, "Electronic Devices and Circuit Theory", 10th Edition, 2009, Pearson India.
2. Donald L. Schilling and Charles Belove, "Electronic Circuits - Discrete and Integrated", 3rd Edition, 2002, TMH.
3. Electronic Circuit Analysis and Design – Donald A. Neaman, McGraw Hill.

GOKARAJU RANGARAJU

INSTITUTE OF ENGINEERING AND TECHNOLOGY

SIGNALS AND SYSTEMS

Course Code: GR17A2049 **L:3 T:1 P:0 C:4**

Unit-I

Introduction to Continuous-time Signals and Systems: Typical signals (impulse, step, ramp, sinusoid, exponential, signum, sinc); Time-domain scaling, shifting, and folding; Continuous-time signal characteristics (periodicity, frequency, deterministic, random, symmetry, energy and power); Properties of continuous-time systems (linearity, time invariance, causality and stability). Analogy between vectors and signals; Orthogonal signal space; Signal approximation using orthogonal functions; Mean squared error; Closed set of orthogonal functions; Orthogonality in complex functions.

Unit-II

Fourier Series, Fourier Transform, and Laplace Transform: Representation of continuous-time periodic signals by Fourier series; Dirichlet's conditions; Properties of Fourier series, Parseval's theorem; Trigonometric and Exponential Fourier series; Complex Fourier spectrum; Fourier transform via Fourier series; Fourier transform of periodic and aperiodic signals; Convergence of Fourier transform; Properties of Fourier transforms, Parseval's theorem; Fourier transforms involving impulse function and Signum function; Introduction to Hilbert Transform; Definition of two-& one-sided Laplace transform, Region of convergence (ROC); Relation between LT and FT.

Unit-III

Signal Transmission through Linear Systems: Continuous-time Linear Time-Invariant system, Representation by differential equations, Transforms and State-variables; Impulse response, Convolution; Transfer function, frequency response; Ideal vs. realizable LPF, HPF and BPF characteristics; Signal bandwidth, system bandwidth, rise-time, gain-bandwidth; Distortion; Causality and Paley-Wiener criterion for physical realization.

Unit-IV

Sampling & Discrete-time Signals: Sampling theorem – Graphical and analytical proof for Band Limited Signals; Impulse-train sampling; Natural and Flat-top Sampling; Reconstruction of signal

from its samples; Under-sampling and Aliasing; Band-pass Sampling Theorem; DT signal characteristics (periodicity, frequency, deterministic, random, symmetry, energy and power).

Unit-V

Z-Transform: Discrete time signal representation using complex exponential and sinusoidal components; z-Transform of a discrete sequence; Region of convergence of z-Transform, Constraints on ROC for various classes of signals; Relationship between z-Transform and DTFT (Fourier spectrum); Transfer function of a LTI system (No difference equations); Properties of z-Transform**,** Inverse z-Transform by Partial Fractions (simple poles only) .

Teaching methodologies

1. Power Point presentations
2. Tutorial Sheets
3. Assignments

Text Books

1. Alan V. Oppenheim, Alan S. Willsky and S. Hamid Nawab, "Signals and Systems",Second Edition, PHI Learning, New Delhi, 2007.
2. B. P. Lathi, Signals, Systems and Communications-B.S. Publications, 2003

Reference Books

1..M. J. Roberts, "Signals and Systems", Second Edition, Tata-McGraw Hill, 2012.

2.Simon Haykin and Barry Van Veen, "Signals and Systems", Edition, John Wiley and Sons, 2002.

GOKARAJU RANGARAJU

INSTITUTE OF ENGINEERING AND TECHNOLOGY

PROBABILITY THEORY AND STOCHASTIC PROCESSES

Course Code: GR17A2050 **L:2 T:1 P:0 C:3**

Unit-I

PROBABILITY & RANDOM VARIABLES

Probability introduced through Sets and Relative Frequency: Experiments and Sample Spaces, Discrete and Continuous Sample Spaces, Events, Probability Definitions and Axioms, Mathematical Model of Experiments, Probability as a Relative Frequency, Joint Probability, Conditional Probability, Baye's Theorem, Independent Events, Random Variable, Functions of random variable, Discrete and Continuous, Mixed Random Variable, Distribution and Density functions, Binomial, Poisson, Uniform, Gaussian Distribution.

Unit-II

OPERATIONS ON SINGLE VARIABLE – EXPECTATIONS

Introduction, Expected Value of a Random Variable, Function of a Random Variable, Moments about the Origin, Central Moments, Variance and Skew, Characteristic Function, Moment Generating Function, Transformations of a Random Variable: Monotonic Transformations for a Continuous Random Variable, Non-monotonic Transformations of Continuous Random Variable, Transformation of a Discrete Random Variable. Vector Random Variables

Unit-III

OPERATIONS ON & MULTIPLE RANDOM– EXPECTATIONS

Joint Distribution Function, Properties of Joint Distribution, Marginal Distribution Functions, Conditional Distribution and Density - Point Conditioning, Conditional Distribution and Density - Statistical Independence, Sum of Two Random Variables, Sum of Several Random Variables, Central Limit Theorem, Expected Value of a Function of Random Variables: Joint Moments about the Origin, Joint Central Moments, Joint Characteristic Functions.

Unit-IV

RANDOM PROCESSES -TEMPORAL CHARACTERISTICS

The Random process, classification, deterministic and no ndeterministic processes, distribution and density Functions, stationarity and statistical independence, first-order stationary processes, second-order and wide-sense stationarity, auto correlation function and its properties, cross-correlation function and its properties, covariance functions, Gaussian random processes, random signal response of linear systems, autocorrelation and cross-correlation functions of input and output.

Unit-V

RANDOM PROCESSES-SPECTRAL CHARACTERISTICS AND NOISE

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

MODELLING OF NOISE

Introduction to noise, types and sources of noises, noise in communication system, Arbitrary Noise Sources, Resistive and Thermal Noise Source, Effective Noise Temperature, Average Noise Figures, Average Noise Figure of cascaded networks.

Teaching methodologies

1. Power Point presentations
2. Tutorial Sheets
3. Assignments
4. Experiments with Matlab software

Text Books

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

GOKARAJU RANGARAJU

INSTITUTE OF ENGINEERING AND TECHNOLOGY

DIGITAL ELECTRONICS

Course Code: GR17A2043 **L:3 T:1 P:0 C:4**

Unit -I

Boolean algebra & Logic Gates: Digital systems, Number- Base Conversions, Signed Binary Numbers, Binary Codes, Axiomatic Definition of Boolean Algebra, Basic Theorems, Boolean Functions, Canonical and standard Forms. Logic Gates: Digital Logic Gates, Integrated Circuits.

Gate-level Minimization; The Map Method, Four- Variable Map, Five-Variable Map, Product-of-Sums Simplification, Don't-care Conditions, NAND and NOR Implementation, Exclusive-OR Function.

Unit-II

Combinational logic: Introduction to Combinational circuits, Analysis Procedure, Design Procedure, Code-conversion,Binary Adder-Subtractor, Carry Propagation, Half Subtractor, Full Subtractor, Binary Subtractor, Decimal Adder, BCD adder, Binary Multiplier, Magnitude Comparator, Decoders, Encoders, Multiplexers with design examples. Introduction to VHDL, VHDL for combinational circuits.

Unit-III

Sequential Logic: Flip-Flops, Triggering of Flip Flops, Analysis of Clocked Sequential Circuits, State Reduction and Assignment, Flip-Flop Excitation Tables, Design Procedure, Fundamentals of Asynchronous Sequential Logic: Introduction, Analysis procedure, Circuits with Latches, Design Procedure.

VHDL for sequential circuits

Unit-IV

Registers and Counters: Registers with parallel load, Shift registers; Serial Transfer, Serial Addition, Universal Shift Register, Ripple Counters; Binary Ripple Counter, BCD Ripple Counter, Synchronous Counters; Binary Counter, Up-Down Counter, BCD Counter, Binary Counter with

Parallel Load, Counter with Unused States, Ring Counter, Johnson Counter, VHDL for Registers and Counters.

Unit-V

Memory and Programmable Logic: Random-Access Memory, Write and Read Operations, Timing waveform, Types of Memories, Memory Decoding; Internal Construction, Coincident Decoding, Address Multiplexing, Read-Only Memory; Combinational Circuit Implementation, Types of ROMs, Combinational PLDs, Programmable Logic Array, Programmable Array Logic.

T**eaching methodologies**

1. Power Point presentations
2. Tutorial Sheets
3. Assignments

4. Lab experiments with Xlinix software

Text Books

1.M Morris Mano and Michael D.Ciletti, Digital Design, Fourth Education, Pearson 5th ed2013.

2.Charles H.Roth Jr.,Larry L. Kinney, Fundamentals of Logic Design, Cengaue learning 6th edition, 2013

3.J. Bhaskar, " A VHDL Primer", 3rd edition, Addison Wesley, 2007

Reference Books

1. Zvi Kohavi and Niraj K Jha, Switching and Finite Automata Theory, 3rd Edition, TMH,2010.
2. Frederick J. Hill and Gerald R Peterson, Introduction to Switching theory and logic design, 3rd Edition, John Wiley and sons, 1981.
3. C. H. Roth, "Digital System Design using VHDL", PWS Publishing, 2003

GOKARAJU RANGARAJU

INSTITUTE OF ENGINEERING AND TECHNOLOGY

ELECTRONIC CIRCUIT ANALYSIS LAB

Course Code: GR17A2051 **L:0 T:0 P:2 C:2**

List of Experiments

1. Design and Simulate the Common Base Amplifier
2. Design and Simulate the Common Emitter Amplifier
3. Design and Simulate the Common Source Amplifier
4. Design and Simulate two stage RC Coupled Amplifier
5. Design and Simulate the Cascade Amplifier
6. Design and Simulate Darlington Pair
7. Design and Simulate RC Phase Shift Oscillator using Transistor
8. Design and Simulate Wien Bridge Oscillator using Transistor
9. Design and Simulate Hartely and Colpitt's Oscillator
10. Design and Simulate Class A power Amplifier.
11. Design and Simulate Class-B Push Pull Amplifier.
12. Design and Simulate Single Tuned Voltage Amplifier.

GOKARAJU RANGARAJU

INSTITUTE OF ENGINEERING AND TECHNOLOGY

SIGNALS AND SYSTEMS LAB

Course Code: GR17A2052 **L:0 T:0 P:2 C:2**

List of experiments

1. Basic operations on matrices.
2. Generation of various signals and sequences (periodic and aperiodic), such as unit impulse, unit step, square, saw tooth, Triangular, sinusoidal, ramp, sinc.
3. Operations on signals and sequences such as addition, multiplication, scaling, shifting, folding, 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 signals and sequences.
7. Verification of linearity and time invariance properties of a given continuous/discrete system.
8. Computation of unit sample, unit step and sinusoidal responses of the given LTI system and verifying its physical realizability and stability properties.
9. Gibbs phenomenon.
10. Finding the Fourier transform of a given signal and plotting its magnitude and phase spectrum.
11. Finding the Laplace and Inverse Laplace transform of a given signal.
12. Finding the Z and Inverse Z transform of a given signal.
13. Locating the zeros and poles and plotting the pole-zero maps in S-plane and Z-plane for the given transfer function..
14. Sampling Theorem Verification.

Note: A minimum of 12 (Twelve) experiments have to be performed and recorded by the candidate to attain eligibility for Practical Examination.

Lab Methodologies

1. Assignments
2. Lab experiments with Matlab Software

GOKARAJU RANGARAJU

INSTITUTE OF ENGINEERING AND TECHNOLOGY

DIGITAL ELECTRONICS LAB

Course Code: GR17A2053 **L:0 T:0 P:2 C:2**

List of Experiments

1. DESIGN AND SIMULATION OF COMBINATIONAL CIRCUITS USING VHDL

Experiment 1: Realization of Gates

Experiment 2: Half adder, Full adder

Experiment 3: Magnitude comparator

Experiment 4: Decoder

Experiment 5: Multiplexer

Experiment 6: Demultiplexer

Experiment 7: Binary to Grey Code Converter

Experiment 8: Parity Checker

2. DESIGN AND SIMULATION OF SEQUENTIAL CIRCUITS USING VHDL

Experiment 9: D and T Flip-Flops

Experiment 10: Frequency Divider

Experiment 11: Left Shift Register

Experiment 12: Serial to Parallel Shift Register

Experiment 13: Binary Counter

Experiment 14: Asynchronous BCD Up Counter Experiment 15: Synchronous Down Counter

Note: A minimum of 12 (Twelve) experiments have to be performed and recorded by the candidate to attain eligibility for Practical Examination.

Lab methodologies

1. Assignments
2. Lab experiments with Xilinx Software

GOKARAJU RANGARAJU

INSTITUTE OF ENGINEERING AND TECHNOLOGY

VALUE EDUCATION AND ETHICS

Course Code: GR17A2002 **L:0 T:0 P:0 C:0**

Unit-I

Values and self-development –social values and individual attitudes, Work ethics, Indian vision of Moral and non-moral valuation, Standards and principles. Importance of cultivation of values, Sense of duty, Devotion, Self-reliance, Confidence, Concentration, Truthfulness, Honesty, Humanity, and National unity. .Basic manners-courtesy, respect; humility, modesty, politeness Discovery and acceptance of one's own abilities, talents, strengths/ weaknesses; optimism to face challenges with hope and resilience.

Unit-II

Personality and Behavior Development-God and scientific attitude, Positive thinking, Integrity and discipline, Punctuality, Love and Kindness, Avoiding fault finding, Free from anger, Dignity of labor, Universal brotherhood and religious tolerance, True friendship, Happiness Vs suffering,Doing best, Saving nature.SWOT Analysis, Who am I, Attributes, Importance of Self Confidence, Self Esteem.

Unit-III

Character and Competence-Science Vs God, Holy books Vs blind faith, Self-management and good health, Equality:Social equality, Economic equality, Egalitarianism, Equality before the law, Equal opportunity, Racial equality

All religions and same message, Mind your mind, Self-control, Honesty, Studying effectively.

Unit-IV

Professional consciousness Ethics: Ethical Human conduct, Development ofhuman consciousness, Holistic technologies, Universal human order, Code of conduct.Professional Ethics and Information Professions, Ethlcal Principles and Professional Relationships

Unit-V

Legislative procedures: Supreme Court and High Courts-jurisdiction, powers, appointment and transfer of judges; Separation of Powers; Distribution of Legislative and Administrative Powers between Union and States

Rights and Rules, Human Rights, Copy rights, IPR, RTI Act, Lokpal.

Text Books

1. Chakraborty,S.K., Values and Ethics for Originations Theory and Practice, Oxford University Press, New Delhi, 2001
2. R R Gaur, R Saugal, G P Bagaria, "A foundation course in Human values and Professional Ethics", Excel books, New Delhi, 2010.

Reference Books

1. Frankena, W.K., Ethics, Prentice Hall of India, New Delhi, 1990.
2. Kapoor, S.K., Human rights under International Law and Indian Law, Prentice Hall of India, New Delhi, 2002.

GOKARAJU RANGARAJU

INSTITUTE OF ENGINEERING AND TECHNOLOGY

GENDER SENSITIZATION LAB

Course Code: GR17A2106 **L:0 T:0 P:2 C:2**

Unit-I

UNDERSTANDING GENDER: Gender: Why should we study it? (Towards a world of Equals: Unit – 1) Socialization: Making women, making men (Towards a World of Equals: Unit -2) Introduction. Preparing for Womanhood.Growing up Male.First lessons in Caste. Different Masculinities. Institutional/System Influences on Gender Stereotypes Legal and Political Frameworks for Gender Equality

Unit-II

GENDER AND BIOLOGY: Missing Women: Sex Selection and its Consequences (Towards a World of Equals: Unit – 4) Declining Sex Ratio. Demographic Consequences. Gender Spectrum: Beyond the Binary (Towards a World of Equals: Unit – 10) Two or Many? Struggles with Discrimination. Developmental changes in the female, Reproductive Health, Special Health Risks to Women and Ethical concerns in Women's Health

Unit-III

GENDER AND LABOUR: Housework: the Invisible Labour(Towards a World of Equals: Unit – 3) "My Mother doesn`t Work". "Share the Load". Women`s Work: Its Politics and Economics (Towards a World of Equals: Unit – 7) .Gender equality and the world of work, Gender and working poverty and Gender dimensions of various key labour market indicators.

Unit-IV

ISSUES OF VIOLENCE: Sexual Harassment: Say No! (Towards a World of Equals: Unit – 6) Sexual Harassment, not Eve – teasing – Coping with Everyday Harassment – Further Reading: "Chupulu" Domestic Violence: Speaking Out (Towards a World of Equals: Unit – 8) Is Home a Safe Place? – When Women Unite [Film]. Rebuilding Lives. Further Reading. Wife battering.,Domesticabuse.,Intimate Partner Violence (IPV),Family violence.,Relationshipviolence.,Spousal violence and Dating violence.

Unit-V

GENDER STUDIES: Knowledge: Through the Lens of Gender (Towards a World of Equals: Unit – 5) Point of View. Gender and the Structure of Knowledge. Further Reading. Unacknowledged Women Artists of Telangana. Whose History? Questions for Historians and Others (Towards a World of Equals: Unit – 9) .Abortion rights,Femicide, Femme invisibility,First-wave feminism, Heterosexual transvestites, Partial-birth abortion, Radical feminism, Same-sex marriage and Women's suffrage

Text Books

1. Towards a World of Equals: A Bilingual Textbook on Gender" Telugu Akademi, Hyderabad Written by A. Suneetha, Uma Bhrugubanda, DuggiralaVasanta, Rama Melkote, Vasudha Nagaraj, Asma Rasheed, GoguShyamala, Deepa Sreenivas and Susie Tharu.

2. Sen, Amartya. "More than Once Million Women are Missing". New York Review of Books 37.20 (20 December 1990). Print. `We Were Making History……' Life Stories of Women in the Telangana People`s Struggle. New Delhi : Kali for Women, 1989.
3. TriptiLahiri. "By the Numbers: Where India Women Work." Women`s Studies Journal (14 November 2012) Available online at: http://blogs. Wsj.com/India real time/2012/11/14/by
– the –numbers – where- Indian- women-work.
4. K. Satyanarayana and Susie Tharu (Ed.) Steel Nibs Are Sprouting: New Dalit Writing

From South India, Dossier 2: Telugu And Kannada
http://harpercollints.co.in/BookDetail.asp?Book Code=3732

Reference Books

1. Vimala "Vantilu (The Kitchen)". Omen Writing in India: 600BC to the Present, Volume II The 20th Century. Ed. Susie Tharu and K. Lalita. Delhi: Oxford University Press, 1995. 599-601.
2. Shatrughna, Veena et al. Women`s Work and its Impact on Child Health and Nutrition, Hyderabad, National Institute of Nutrition, India Council of Medcial Research 1993. B.Tech (ANE) R-15 Malla Reddy College of Engineering and Technology (MRCET) 113
3. Stress Shakti Sanghatana. "We Were Making History…'Life Stories of Women in the Telangana People`s Struggle. New Delhi:Kali of Women, 1989.
4. Menon, Nivedita. Seeing Like a Feminist. New Delhi. Zubaan-Penguin Books, 2012.
5. Jayaprabha, A. "Chupulu (Stares)". Women Writing in India: 600BC to the Present. Volume II: The 20th Century Ed. Susie Tharu and K. Lalita. Delhi: Oxford University Press, 1995. 596-597.
6. Javeed, Shayam and AnupamManuhaar. "Women and Wage Discrimination in India: A Critical Analysis". International Journal of Humanilities and Social Science Invention 2, 4(2013).
7. Gautam, Liela and Gita Ramaswamy. "A 'Conversation' between a Daughter and Mother". Broadsheel on Contemporany Politics. Special Issue on Sexuality and Harassment: Gender Politics on Campus Today. Ed.Madhumeeta Sinha and Asma Rasheed. Hydrabad: Anveshi research Center for Women`s Studies, 2014.
8. Abdulali Sohaila. " I Fought For My Life…and Won." Available online at: http://www.thealternative. In/lifestyle/i-fought-for-my lifeand-won-sohaila-abdulal/
9. Jeganathan Pradeep, Partha Chatterjee (Ed). "Community, Gender and Violence Subaltern Studies XI". Permanent Block and Ravi Dayal Publishers, New Delhi, 2000
10. K. Kapadia. The Violence of Development: The Politics of Identity, Gender and Social Inequalities in India. London: Zed Books, 2002.
11. S. Benhabib. Situating the self: Gender, Community, and Postmodernism in Contemporary Ethics, London: Routledge, 1992.
12. Virginia Woolf A Room of One`s Oxford: Black Swan. 1992.
13. T. Banuri and M. Mahmood, Just Development: Beyond Adjustment with a Human Face

II SEMESTER

SYLLABUS

GOKARAJU RANGARAJU

INSTITUTE OF ENGINEERING AND TECHNOLOGY

ELECTROMAGNETIC THEORY AND TRANSMISSION LINES

Course Code: GR17A2054 **L:3 T:1 P:0 C:4**

Unit-I

Electrostatics: Coulomb's Law, Electric Field Intensity, Electric Field due to Various Charge Distributions, Electric Flux Density, Gauss' Law and Applications, Scalar Electric Potential, Energy Density, Current, Current Density, Continuity Equation, Conductivity, Power Absorbed in Conductor, Dielectric Polarization, Permittivity, Relaxation Time, Electrostatic Boundary Conditions, Poisson's and Laplace's Equations, Capacitance, Method of Images.

Unit-II

Magneto statics: Magnetic Flux Density, Magnetic Field Intensity, Magnetic Field due to Various Current Configurations, Biot-Savart Law, Ampere's Circuital Law and Applications, Vector Magnetic Potential, Forces due to Magnetic Fields, Magnetization, Permeability, Magneto static Boundary Conditions, Inductance, Magnetic Energy.

Maxwell's Equations (Time Varying Fields): Faraday's Law, Displacement

Current Density, Maxwell's Equations in Various Forms, Boundary Conditions, Potential Relations, Conductor/Dielectric Characterization, Loss Tangent.

Unit-III

Uniform Plane Waves: Solutions in Lossy and Lossless Media, Propagation Characteristics, Intrinsic Impedance, Skin Depth, Propagation in Dispersive Media, Poynting Vector and Theorem, Wave Polarization- Linear, Elliptical and Circular.

Reflection/ Transmission of Plane Waves: Reflection at Normal Incidence, Standing Waves, Surface Impedance, Power Absorbed in a Plane Conductor, Propagation Vector, Reflection at Oblique Incidence, Brewster Angle, Total Internal Reflection.

Unit-IV

Transmission Lines-1: Transmission Line Parameters, Transmission Line Equations, Characteristic Impedance, Propagation characteristics, Lossless/ Low Loss Line Analysis, Conditions for Distortionless Transmission and Minimum Attenuation. Finite Transmission Line,

Input Impedance, Short Circuit and Open Circuit Lines, Reflection Coefficient, VSWR. UHF Lines as Circuit Elements - λ/2, λ/4, λ/8 Lines. Impedance Transformations and Matching.

Unit-V

Transmission Lines-2: Smith Chart– Theory and Applications, Single Stub Matching. Propagation between Parallel Plates, Modes, Cut-off Frequencies, Phase and Group Velocities, Wavelengths, Wave Impedances.

Teaching methodologies

1. Power Point presentations
2. Tutorial Sheets
3. Assignments

Text Books

1. 'Elements of Electromagnetics', Mathew N.O. Sadiku, Oxford Univ. Press, 4th ed., 2007
2. 'Engineering Electromagnetics', William H. Hayt Jr. and John A. Buck, McGraw-Hill, 8th ed., 2012
3. 'Theory and Problems of Electromagnetics', Joseph A Edminister, 2nd ed., Tata Mc-Graw Hill, 1993

Reference Books

1. 'Engineering Electromagnetics', Nathan Ida, Springer (India) Pvt. Ltd., New Delhi, 2nd ed., 2005
2. 'Electromagnetic Field Theory Fundamentals', Bhag Singh Guru, Huseyin R Hiziroglu, Cambridge Univ. Press, 2004
3. 'Electromagnetics', John D Kraus, McGraw Hill, 4th ed., 1992
4. 'Electromagnetic Waves and Radiating Systems', E.C. Jordan and K.G. Balmain, PHI, 2nded, 2000

GOKARAJU RANGARAJU

INSTITUTE OF ENGINEERING AND TECHNOLOGY

MICRO CONTROLLERS

Course Code: GR17A2055 **L:3 T:1 P:0 C:4**

Unit-I

Microprocessors: Introduction to 8086 Architecture, Introduction to Microprocessors, 8086 Architecture: Functional diagram, register organization, memory segmentation, programming model, memory addresses, physical memory organization, signal description of 8086, timing diagrams, interrupts of 8086.

Unit-II

Introduction and 8051 Architecture: Introduction to microcontrollers, comparing microprocessors and microcontrollers, 4,8,16 and 32 bit microcontrollers, Development systems for Microcontrollers, Architecture; Architecture of 8051, pin configuration of 8051microcontroller, hardware input pins, output pins ports and external memory, counters and timers, serial data input/output and interrupts.

Unit-III

Moving Data and Logical Operations: Introduction, Addressing modes, External Data moves, Code Memory Read-only Data Moves, PUSH and POP Opcodes, Data Exchanges, Logical Operations; Introduction, Byte-Level Logical Operations, Bit- Level Logical Operations, Rotate and Swap Operations.

Unit-IV

Arithmetic Operations, Jump and Call Opcodes: Introduction, Flags, Incrementing and Decrementing, Addition, Subtraction, Multiplication and Division, Decimal Arithmetic, Jump and Call opcodes, introduction, The jump and call program range, Jumps, Calls and Subroutines, call and returns, Interrupts and Returns.

Unit-V

8051 Microcontroller Design: Introduction, Microcontroller specification, Microcontroller Design, Testing the Design, Timing subroutines, Serial Data Transmission.

Applications and Serial Data Communication: Keyboards, Displays, Pulse Measurement, D/A and A/D Conversions, Multiple Interrupts, Serial data Communication;

Teaching methodologies

- Power Point presentations
- Tutorial Sheets
- Assignments

Text Books

1. D.V.Hall, Microprocessors and Interfacing, TMH,2nd edition 2006.
2. Kenneth J. Ayala, The 8051 Microcontroller Architecture Programming and Applications, 2nd Edition, Penram International Publishers (I), 1996.

Reference Books

1. A. K. Ray and K. M. Bjurchandani, TMH, 2nd edition, Advanced Microprocessors and Peripherals TMH, 2006.
2. Mohammed Ari Mazidi and Janci
3. Gillispie, The 8051 Microcontroller and Embedded Systems, Pearson Education Asia, New Delhi, 2003.

GOKARAJU RANGARAJU

INSTITUTE OF ENGINEERING AND TECHNOLOGY

ANALOG COMMUNICATION

Course Code: GR17A2056 **L:2 T:1 P:0 C:3**

Unit-I

Amplitude Modulation: Introduction to communication system, Need for modulation, Amplitude Modulation, Definition, Time domain and frequency domain description, single tone modulation, power relations in AM waves, Generation of AM waves, square law Modulator, Switching modulator, Detection of AM Waves; Square law detector, Envelope detector, 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.

Unit-II

SSB Modulation: Frequency domain description, Frequency discrimination method for generation of SSB Modulated Wave, Time domain description, Phase discrimination method for generating 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-III

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

Unit-IV

Noise in Modulation: Noise in Analog communication Systems, Noise in AM (DSB and SSB) Systems, , Noise in Angle Modulation System, Threshold effect in Angle Modulation System, Pre-emphasis and de-emphasis.

Unit-V

Pulse Modulation: Types of Pulse modulation, PAM (Single polarity, double polarity) PWM: Generation and demodulation of PWM, PPM, Generation and demodulation of PPM, Time Divison Multiplexing. Frequency Division Multiplexing.

Teaching methodologies

1. Power Point presentations
2. Tutorial Sheets
3. Assignments

Text Books

1. Communication Systems - Simon Haykin, John Wiley, 5th Ed. 2009
2. Principles of Communication Systems–Taub& Schilling, GautamSahe, TMH, 3rd 2007

Reference Books

1. Analog and Digital Communication, K. Sam Shanmugam, Wiley ,2005
2. Electronics Communication Systems -Fundamentals through Advanced, Wayne Tomasi, 5th Edition, 2009, PHI.

GOKARAJU RANGARAJU

INSTITUTE OF ENGINEERING AND TECHNOLOGY

ANALOG ELECTRONICS

Course Code: GR17A2057 **L:3 T:1 P:0 C:4**

Unit-I

Linear and Nonlinear Waveshaping Circuits: Elementary signals used in waveshaping circuits, Qualitative and quantitative discussions for all test signals (step, ramp, exponential, pulse input, symmetrical square wave) for RC and RL circuits, Attenuators, Design aspects of High pass & Low pass RC circuits, Diode clippers and clampers (all types) characteristics and applications.

Unit-II

Multivibrators: Design and analysis of Bistable, Monostable & Astable Multivibrators, Schmitt trigger, comparator, using transistors.

Unit-III

Operational Amplifier: Block-diagram representation of op-amp, schematic symbol,IdealOp-amp characteristics, open-loop and closed-loop Op-amp configurations, differential amplifier, DC, AC analysis of differential Amplifier, differential amplifier with swamping resistors, constant current bias, current mirror, cascaded differential amplifier stages, level translator.

Unit-IV

Op-Amp with Negative Feedback: Introduction, block diagram representation of feedback configurations, voltage-series feedback amplifier & characteristics; voltage-shunt feedback amplifier & characteristics; differential amplifier & configurations.

Unit-V

Applications of Op-Amp: Introduction, Summing, Scaling, and Averaging amplifiers; Inverting, Non inverting and Differential configuration, Instrumentation amplifier, Sample and Hold circuit. Converters: (A/D and D/A): Successive Approximation, Binary weighted resistors and R – 2R ladder.

Teaching methodologies

1. Power Point presentations
2. Tutorial Sheets
3. Assignments

Text Books

1. David A Bell, “Solid State Pulse Circuits”, Prentice Hall Inc, Fourth Edition, 2005.
2. Op-Amps and Linear Integrated Circuits, Ramakant A. Gayakwad, Prentice Hall of India(p) Ltd,3rd Ed., 2002.
3. Microelectronic Circuits, Sedra and Smith, Oxford University 6th ed., 2013

References Books

1. Pulse and Digital Circuits – A. Anand Kumar, 2nd ed., 2008, PHI.
2. Fundamentals of Pulse and Digital Circuits – Ronald J. Tocci, 3 ed.., 2008.
3. Pulse and Digital Circuits – Motheki S. PrakashRao, 2006, TMH.
4. Op Amps and Linear Integrated Circuits-Concepts and Applications James M. Fiore, Cengage Learning/ Jaico, 2009
5. Microelectronic Analysis and Design, M H Rashid, Cengage learning, 2nded, 2011
6. Linear Integrated Circuits, D. Roy and Choudhury, Shail B. Jain, 4th Edition, New Age International (P) Limited, 2010.
7. Operational Amplifiers and Linear Integrated Circuit Theory and Applications, Denton J Dailey, McGraw-Hill, 1989. 8. Applications and Design with Analog Integrated Circuits, J. Michael Jacob, 2nd Edition, PHI, 2003.

GOKARAJU RANGARAJU

INSTITUTE OF ENGINEERING AND TECHNOLOGY

SPECIAL FUNCTIONS AND COMPLEX VARIABLES

Course Code: GR17A2058 **L:2 T:1 P:0 C:3**

Unit-I

Special Functions I

Introduction to series solution of differential equations at regular and regular singular points. Legendre polynomials- properties – rodrigue's formula – recurrence relations – orthogonality. Laguaree Polynimials- Properties— recurrence relations – orthogonality.

Unit-II

Special Functions II

Bessel functions – properties – recurrence relations – orthogonality.Chebyshev polynomials –properties – recurrence relations – orhogonality. Hermite polynomials –properties – recurrence relations – orhogonality.

Unit-III

Functions of a Complex variable

Continuity – differentiability – Analycity – Cauchy – Riemann equations – Maxima – Minima principle – Harmonic and conjugate harmonic functions –Milne Thompson method.

Conformal mapping: Transformations , IM Z, , , sin z, cos z, z + . Translation, rotation, inversion and bilinear transformation – fixed points – cross ratio – Invariance of circles and cross ratio – determination of bilinear transformation of 3 given points.

Unit-IV

Complex integration

Line integral – evaluation along a path – Cauchy's integral theorem – Cauchy's integral formula – Generalized integral formula.

Complex power series: Radius of convergence, Expansion in Taylor series, Maclaurin's series, Laurent's series.

Unit- V

Singular points, Residues and Applications of Complex Integration

Singular points – Isolated singular point – pole of order m – essential singularity. Residue – Evaluation of residue by formula and by Laurent series – Residue theorem. Evaluation of real integrals of the types

(a) Improper integrals $\int_{-\infty}^{\infty} f(x)\,dx$ (b)$\int_{-\infty}^{\infty} f(cos\theta, sin\theta)d\theta$

(c) $\int_{-\infty}^{\infty} f(x)cos\,mx\,dx$ (d) Integrals by indentation

Teaching methodologies

1. Tutorial sheets uploaded in website
2. NPTEL video lectures
3. MATLAB exercises for visualization

Text Books

1. Advanced Engineering Mathematics: R.K.JainandS.R.K.Iyengar-Narosa Publishing House
2. Advanced Engineering Mathematics: Erwin Kreyszig- Wiley Publications
3. Higher Engineering Mathematics: B.S.Grewal-Khanna Publications

Reference Books

1. Schaum's Outline series on complex variables.
2. Higher Engineering Mathematics: B.S.Grewal, Khanna Publications

GOKARAJU RANGARAJU

INSTITUTE OF ENGINEERING AND TECHNOLOGY

MICRO CONTROLLERS LAB

Course Code: GR17A2059 **L:0 T:0 P:2 C:2**

List of experiments on 2G kit

1. LED patterns

a) Blinking LEDs, b) Serial lights, Alternate c) Half on/Half off, d) on/off

2.Switches & LEDs

a) Press switch to make corresponding LED on,

b) Press switch to make corresponding LED off

c) First switch press, last LED on,

d) First switch press, last LED off

3.LCD

a) Character &string display on LCD,

b) SW1-Display strring1 on first line of LCD,

c) SW2-Display strring1 on second line of LCD

4.UART

a) Echo Program,

b) Take command from PC & glow corresponding LED,

c) Press Switch & display switch number on PC,

d) Display data received by UART on LCD

5.TRIAC

a) 220V AC bulb switch on/off,

b) 220 V AC fan speed control with fixed step size.

6.ADC

a) Raw ADC value display on LCD,

b) Raw ADC value display on Hyper Terminal,

c) Engineering unit conversion and display on LCD,

d) Engineering unit conversion and display on Hyper Terminal

e) Limit checking for temperature value and switching on fan using triac

f) Limit checking for ambient light value and switching on light using triac.

7.DAC

a) Fixed step incremented DAC, output seen on multi-meter,

b) DAC input value received from Hyper Terminal

c) DAC input value taken from switches

8.DC motor

a) DC motor control-CW, CCW and stop using switches,

b) DC motor control- CW, CCW and stop using commands received from Hyper Terminal

9.ZigBee

a) Receive data on ZigBee from PC ZigBee dongle and display data on LEDs

b) Receive data on ZigBee from PC ZigBee dongle and display data on LCD

c) Read ADC and transmit data using ZigBee

d) Triac based control of fan and light using data received on ZigBee

10.RF 433MHz

a) Receive data on RF from another kit with RF transmitter. Connect PCs to both kits. Type in data in Hyper Terminal of Transmitter kit & see on Hyper Terminal of Receiver kit

b) Read switches on transmitter kit, send their status on RF to receiver kit and control motor using switch status

11).Bluetooth

a) Transfer data to PC using Bluelink,

b) Receive data from PC using BlueLink & display on LCD

c) Transfer data from mobile phone(using a J2ME app) and receive using Blue link and control motor operation

d) Transfer data from mobile phone(using a J2ME app) and receive using BlueLink and control electrical appliance operation

12. Ethernet

a) Transfer data to PC using WIZI05SR and display on Hyper Terminal,

b) Implement an embedded web server

13. RTC

a) Read and display RTC data on LCD,

b) Read and display RTC data on Hyper Terminal,

c) Set RTC using Hyper terminal and display data on Hyper Terminal,

d) Implement an Event Logger with Time Stamp display

14. SDcard

a) Transfer data to PC, store on SDcard and retrieve it back(block transfer)

b) Implement FAT file system on SDcard c) Implement data acquisition system and store data in a CSV file on SD card with time stamp

Note: A minimum of 10 (Ten) experiments have to be performed and recorded by the candidate to attain eligibility for Practical Examination

Lab methodologies

- Assignments
- Lab experiments with Arduino software

GOKARAJU RANGARAJU

INSTITUTE OF ENGINEERING AND TECHNOLOGY

ANALOG COMMUNICATION LAB

Course Code: GR75A2060 **L:0 T:0 P:2 C:2**

List of Experiments

1. AM modulator and demodulator

a) To construct AM modulator and demodulator circuit and to trace message, carrier, modulated and demodulated signal.

b) To determine the modulation index of AM by classical method and trapezoidal method.

2. FM modulator and demodulator

a) To construct frequency modulator and demodulator circuit and to trace message, carrier, modulated and demodulated signal.

3. Sample & hold and PAM

a) To construct sample and hold circuit and to trace the message and sample and hold signal.

b) To construct PAM circuit and to trace the input and PAM signal.

4. Pre-emphasis and de-emphasis

a) To construct pre-emphasis and de-emphasis circuit and to determine the frequency response.

5. Tuned and wideband amplifiers

a) To construct tuned and wideband amplifiers and to determine the frequency response.

6. Frequency mixer and ring modulator

a) To construct a frequency mixer and to test its operation.

b) To construct a ring modulator and to trace the DSB-SC waveform.

c) .Simple and delayed AGC: To construct simple and delayed with and without AGC circuit and to test its impact.PWM and PPM: To construct PWM and PPM circuit and trace the output waveforms.

7. SSB SC Modulation and Demodulation
8. Design of Mixer
9. PAM and Reconstruction
10. Effect of Noise on the Communication Channel
11. Diode Detector Characteristics.
12. Squelch Circuit

Note: A minimum of 12 (Twelve) experiments have to be performed and recorded by the candidate to attain eligibility for Practical Examination**.**

All the above experiments can be performed either on trainer kits/matlab.

Lab methodologies

- Assignments
- Lab experiments with Hardware and Software: Hard ware: Kits
- Software: Matlab & Codecomposer Studio

GOKARAJU RANGARAJU

INSTITUTE OF ENGINEERING AND TECHNOLOGY

ANALOG ELECTRONICS LAB

Course Code: GR17A2061 **L:0 T:0 P:2 C:2**

List of Experiments

1. Design and simulate linear and non-linear wave shaping circuits.
2. Design and simulate Bistable/Monostable and Astable Multi vibrator(using BJT)
3. Design and simulate Schmitt trigger(using BJT)
4. Design and simulate Miller sweep/Bootstrap sweep generator(using BJT)
5. Design and verify experimentally the theoretical closed loop gain using LM324AD IC for Operational Amplifier as Inverting, Non-Inverting and voltage follower.

6.. Construct & Verify Summing Amplifier using LM324AD IC.

7.. Test that, the Subtractor output is the difference of two inputs.

8. Design LM324AD IC as Integrator and Differentiator
9. Design & Verify Astable Multivibrator for 164Hz.
10. Construct and test LM324AD IC as Monostable Multivibrator for R=100K.

12. Design Function Generator using LM324AD IC.Construct Wien Bridge Oscillator for f0=1 KHz and study its operation using LM324AD IC.

13. Construct RC Phase Shift Oscillator for f0= 650Hz and study its operation using LM324AD IC.

14. Design R-2R ladder type Digital to Analog Converter for R=1KΩ.

Note: A minimum of 12(Twelve) experiments have to be performed and recorded by the candidate to attain eligibility for Practical Examination.

Lab methodologies

1. Assignments
2. Lab experiments with Hardware and Software: Hard ware: Analog Discovery.
3. Software: Multisim 14

GOKARAJU RANGARAJU

INSTITUTE OF ENGINEERING AND TECHNOLOGY

ENVIRONMENTAL SCIENCE

Course Code: GR17A2001 **L:0 T:0 P:2 C:2**

Unit-I

Introduction to Environment, Ecology and Ecosystems: Definition, Scope and Importance ecosystem, public awareness and Participation, Ecology, Concept of ecosystem, Classification of ecosystem, Structure , components and function of ecosystem, Typical ecosystem, Food chain, Food web, Biodiversity-Types and Values, biogeochemical cycles.

Unit–II

Natural Resources: Definition, Occurrence, Classification of resources, Important Natural Resources for Human society, Utilization-Positive and negative effects of water resources, Mineral resources, forest resources, Energy resources, Land resources, renewable and non-renewable resources.

Unit-III

Environmental Pollution: Definition, Classification of pollution, Types of pollution and pollutants, Cause, effects and control of Air pollution, water pollution, Soil pollution, Noise pollution, Thermal and Nuclear pollution.

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Unit-IV

Environmental Problems and Management Policies: Natural Disasters-Types, Causes and Effects, Global warming, climate change-EI NiNo-La Nina, Ozone layer-location, role and degradation, Deforestation and desertification, Green belt Development, Rain water harvesting, Renewable and alternative resources.

Unit-V

National Policy on Environment Protection and Sustainability: Air (pollution and prevention) act 1981, Water(Pollution and prevention) Act 1974, Pollution Act 1977, Forest conservation Act; wild life protection act; Municipal solid waste management and handling Act, Hazardous waste management and handling rules, Role of IT in environment, environmental ethics, environmental economics.

Sustainable development: cause and threats to sustainability, stratagies for achieving sustainable development, Concept of green buildings and clean development Mechanism (CDM).

Teaching Methodology

1. White board and marker
2. OHP and Field visit

Text Books

1. Text Book of Environmental Studies, ErachBarucha. University Press
2. Text book of Environmental Science and Technology by M.Anji Reddy 2007

Reference Books

1. Biotechnology & Environmental Chemistry. Surinder Jeswal& Anupama Deswal, DhanpatRai & Co Pvt. Ltd.
2. A Text Book of Environmental Science. Aravind Kumar. APH Publishing Corporation.
3. Glimpses of Environment. Dr. KVSG. Murali Krishna. Environmental Protection Society