Academic Regulations
Programme Structure
&
Detailed Syllabus

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

Department of Electrical and Electronics 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 ELECTRICAL AND ELECTRONICS ENGINEERING (B. Tech)
GR17 REGULATIONS

Gokaraju Rangaraju Institute of Engineering andTechnology 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	Core Courses	Project Work	B.Tech. project or UG project or UG major project
8		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 & Continuous 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
1	First year first semester to first year second semester	Regular course of study of first year first semester.
2	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.
3	Second year first semester to second year second semester	Regular course of study of second year first semester.
4	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.
5	Third year first semester to third year	Regular course of study of third year first semester.

	second semester	
6	**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.**
7	**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.,

$$SGPA(S_k) = \sum \quad \sum$$

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 $k \geq 2$.

$$CGPA = \sum \quad / \sum$$

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
1	**Second year first semester to second year second semester.**	**Regular course of study of second year first semester.**
2	**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.**
3	**Third year first semester to third year second semester.**	**Regular course of study of third year first semester.**
4	**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.**
5	**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**

I B.TECH **I SEMESER**

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	GR17A1007	Engineering Physics	2	1		3	4	30	70	100
ES	GR17A1009	Computer Programming	2	1		3	4	30	70	100
HS	GR17A1018	Basic Electrical Engineering	2	1		3	4	30	70	100
ES	GR17A1005	English	2	1		3	4	30	70	100
ES	GR17A1025	Engineering Workshop			2	2	4	25	50	75
ES	GR17A1029	Engineering Physics 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**

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	GR17A1008	Engineering Chemistry	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 Communication and Soft Skills			2	2	4	25	50	75
ES	GR17A1026	IT Workshop			2	2	4	25	50	75
BS	GR17A1030	Engineering Chemistry lab			2	2	4	25	50	75
		Total	**11**	**5**	**8**	**24**	**37**	**255**	**570**	**825**

EEE II B.Tech I semester

EEE II. B.Tech I-SEMESTER											
	Subject code	Name of subject	Credits			Total credits	Hours			Total Hours	Total Marks
			L	T	P		L	T	P		
BS	GR17A2058	Special functions and Complex variables	2	1		3	2	2		4	100
PC	GR17A2034	Electromagnetic Fields	3	1		4	3	2		5	100
PC	GR17A2035	Network Theory	3	1		4	3	2		5	100
PC	GR17A2036	DC Machines and Transformers	3	1		4	3	2		5	100
PC	GR17A2076	Computer Organization	2	1		3	2	2		4	100
PC	GR17A2037	DC Machines Lab			2	2			4	4	75
PC	GR17A2038	Electrical Networks Lab			2	2			4	4	75
PC	GR17A2039	Electrical Simulation Lab			2	2			4	4	75
		Total credits/Hours/Marks	**13**	**5**	**6**	**24**	**13**	**10**	**12**	**35**	**725**
MC	GR17A2001	Environmental Science			2	2			2	2	100

EEE II. B.Tech II-SEMESTER											
Group	Subject code	Name of subject	Credits			Total credits	Hours			Total Hours	Total Marks
			L	T	P		L	T	P		
HS	GR17A2104	Managerial Economics and Financial Analysis	2	1		3	2	2		4	100
PC	GR17A2040	Power Generation and Distribution	3	1		4	3	2		5	100
PC	GR17A2041	AC Machines	3	1		4	3	2		5	100
PC	GR17A2042	Control Systems	3	1		4	3	2		5	100
PC	GR17A2105	Principles of Digital Electronics	2	1		3	2	2		4	100
PC	GR17A2044	AC Machines Lab			2	2			4	4	75
PC	GR17A2045	Control Systems Lab			2	2			4	4	75
PC	GR17A2046	Analog and Digital Electronics Lab			2	2			4	4	1
		Total credits/Hours/Marks	**13**	**5**	**6**	**24**	**13**	**10**	**12**	**35**	**725**
MC	GR17A2002	Value Education and Ethics			2	2			2	2	100
MC	GR17A2106	Gender sensitization Lab			2	2			2	2	75

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY
LINEAR ALGEBRA AND SINGLE VARIABLE CALCULUS

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

Prerequisites: Vector algebra, Matrix algebra and Pre-calculus

Unit-I

Linear Algebra and Matrix eigen value problem: Rank of a matrix, Normal form, Consistency of a system of linear equations-Rank-Nullitytheorem, 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 pseudoinverse-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

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

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY
ADVANCED CALCULUS

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

Prerequisites: Analytical 2-D and 3-D geometry, differential and integral calculus

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)

Text Books

1. Advanced Engineering Mathematics: R.K.Jain and S.R.K.IyengarNarosa 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. GRIET Reference Manual

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY

ENGINEERING PHYSICS

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

Prerequisites: Fundamentals in Physics and Mathematics.

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.

Text Books

1. **Engineering Physics:** P.K.Palanisamy, Scitech Publishers.
2. **Engineering Physics:** S.O.Pillai, New age International.
3. **Applied Physics:** T.BhimaSankaram,GPrasad,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
COMPUTER PROGRAMMING

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

Prerequisites: Knowledge of Mathematics required

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, Multidimensionalarrays
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.

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

Reference Books

1. Programming in C, PradipDey, Manas Ghosh, Second Edition, Oxford University Press.
2. Let Us C, YashwanthKanetkar, 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
BASIC ELECTRICAL ENGINEERING

Course Code: GR17A1018 **L:2 T:1 P:0 C:3**

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 – DhanpatRai& 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
ENGLISH

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

Prerequisites: Familiarity with basic language and communication skills.

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

ENGINEERING WORKSHOP

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

Prerequisites

Knowledge in dimensions and units, Usage of geometrical instruments and analytical ability

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 JointSafety 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 asfuses, and relays including earthing. JobI Identification of phase, neutral and earthof domesticappliancesand their connection to two pin/three pin plugs. JobIIPreparation 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 of material 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. corrugated sheet, aluminium sheets etc. corrugated sheet, aluminium sheets etc.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 Narayanaet. 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, DhanpatRai 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**

Prerequisites: Fundamentals of Physics and Mathematics.

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

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY
COMPUTER PROGRAMMING LAB

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

Prerequisite: Basic operations of computer and knowledge of mathematics

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.
3. The program should request the user to input two numbers and display one of the following as per the desire of user.
    a. Sum of numbers
    b. Difference of numbers
    c. Product of the numbers
    d. Division of the numbers.
4. Write a C program using switch statement to accomplish the above task.
5. 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.
2. 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 snumbers
    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, PradipDey, Manas Ghosh, Second Edition, Oxford University Press.
2. Let Us C, YashwanthKanetkar, 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 Pu

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**

Prerequisites: Differential and integral calculus, multiple integrals and linear differential equations

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

Text Books

1. Advanced Engineering Mathematics: R. K. Jain and S. R. K. IyengarNarosa 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**

Prerequisites: Elementary calculus, Partial differentiation, Geometry and ordinary differential equations.

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-JaanKiusalaas -Cambridge University Press. 3.GRIET Reference manual.

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY
ENGINEERING CHEMISTRY

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

Prerequisites: Fundamentals in Engineering Chemistry Theory Course

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.

Text Books

1. A text book of Engineering Chemistry by PC Jain and Monica Jain, DhanpatRai 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 Bharathikumari and DrChJyothsna, VGS publications.
3. A text book of Engineering Chemistry by R.P.Mani, K.N.Mishra, B.Rama Devi, V.R.Reddy, Cengage learning publications

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY
DATA STRUCTURES

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

Prerequisites: Intermediate programming in a high-level language and introduction to computer science. Topics include program structure and organization, data structures (lists, trees, stacks, queues) C is the principal programming language.

Unit-I

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

Unit-II

Queues: Basic Queues Operations, Representation of a Queue using array, Implementation of Queue 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 arrays and 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.

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**

Prerequisites: Knowledge in dimensions and units, Usage of geometrical instruments and analytical ability.

Unit-I

INTRODUCTION TO ENGINEERING DRAWING: Principles of Engineering Graphics and their Significance 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 Firsthand 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 reference planes. 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., Section by 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 Views Conventions 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 Views Conventions.

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 McGraw Hill Education

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY
FUNDAMENTALS OF ELECTRONICS AND ENGINEERING

Course Code: GR17A1019 **L: 2 T: 1 P: 0 C: 3**

Prerequisites

- Fundamentals of Modern Physics
- Fundamentals of Electrical Networks

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 an amplifier, 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 signal model 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 of 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.

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 JrJ.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**

Prerequisites: Familiarity with basic language and communication skills.

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; AedaAbidi, 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

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY
IT WORKSHOP

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

Prerequisites:

- Fundamentals of Computer and its parts.
- Identification of peripherals of computer.

PC Hardware introduces the students to a personal computer and its basic peripherals, installation of system software like MS Windows, Linux and the required device drivers. In addition hardware and software level troubleshooting process, tips and tricks would be covered. The students should work on working PC to install Windows and Linux on the same PC. Students are suggested to work similar tasks in the Laptop scenario wherever possible.
Internet & World Wide Web module introduces the different ways of hooking the PC on to the internet from home and workplace and effectively usage of the internet. Usage of web browsers, email, newsgroups and discussion forums would be covered. In addition, awareness of cyber hygiene, i.e., protecting the personal computer from getting infected with the viruses, worms and other cyber-attacks would be introduced. Productivity tools module would enable the students in crafting professional word documents, spread sheets and slide presentations.

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 Open Office: 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 as ping), 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, Understanding DML and DDL statements.

Task-9

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

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.

References Books

1. Introduction to Information Technology, ITL Education Solutions Limited, Pearson Education.
2. Introduction to Computers, Peter Norton, 6/e McGraw 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 should verify the installation and follow it up with viva

Tutorial/Lab 2: 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.

Tutorial/Lab 3: Understand the concepts of networking topics. **Tutorial/Lab 4:** DDL and DML statements

Tutorial/Lab 5: 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**

Prerequisites: Fundamentals in Engineering Chemistry Laboratory

List of Experiments

Task-1 Estimation of Total Hardness in sample water by complexometry

Task-2 Estimation of percentage available chlorine in Bleaching Powder.

Task-3 Estimation of Fe^{2+} by permanganometry.

Task-4 Determination of strength of an acid by potentiometric titration method

Task-5 Determination of strength of an acid by using conductometry.

Task-6 Determination of Strength of an acid in Pb-Acid battery by titrimetric method

Task-7 Determination of percentage of Iron in Cement sample by colorimetry...

Task-8 Estimation of Calcium in port land cement.

Task-9 Determination of Viscosity of the given unknown liquid by Oswald‟s viscometer.

Task-10 Determination of surface tension of the given unknown liquid by stalagmometer.

Task-11 Preparation of Thiokol rubber.

Task-12 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 DrSudha Rani, DhanpatRai 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)

II YEAR SYLLABUS
I SEMESTER

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY
SPECIAL FUNCTIONS AND COMPLEX VARIABLES

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

Prerequisites: Co-ordinate Geometry, Calculus, Linear Differential Equations

Course Objectives: The objective of this course is to provide

Provide an overview of differential equations which occur in physical and engineering problems?
Explain solution of certain special types of differential equations like Bessel‟s differential equations Legendre differential equations and Chebeshev differential equations, and also on study of complex variables.

- Provide an overview of functions of complex variables which helps in solving many complex problems in heat conduction, fluid dynamics and electrostatics?
- Introduce the concepts of complex Integration and Applications of complex integration
- Identify the significant applications of Complex Power Series.

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

- Solve linear differential equations using power –series methods.
- Approximate polynomials in terms of Legendre, Bessel and chebyshev.
- Evaluate Real definite Integrals using Cauchy‟s Residue Theory.
- Interpret geometrically the Complex functions and their qualitative behavior in the Complex Plane.
- Describe Singularity and Residue Theory.
- Solve potential functions, stream functions and velocity potential.
- Illustrate the concepts of residues in the context of determination of real integrals.

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.Jain and S.R.K.Iyengar - Narosa Publishing House
2. Advanced Engineering Mathematics: Erwin Kreyszig-Wiley 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
ELECTRO MAGNETIC FIELDS

Course Code: GR17A2034 **L:3 T:1 P:0 C:4**

Prerequisites: Knowledge of Basic Electrical and Electronics Engineering (BEE), Vector Algebra.

Course Objectives: The Objectives of this course is to provide

- Basic skills required to understand, develop, and design various engineering applications involving electromagnetic fields
- Knowledge of Electromagnetic field theory that allows the student to have a solid theoretical foundation to be able in the future to design emission, propagation and reception of electro-magnetic wave systems
- Concept of conductors, dielectrics, inductance and capacitance
- Knowledge on the nature of magnetic materials.
- identify, formulate and solve fields and electromagnetic waves propagation problems in a multi-disciplinary frame individually or as a member of a group
- Solid foundation in engineering fundamentals required to solve problems and also to pursue higher studies
- Foundations of electromagnetism and its practice in modern communications such as wireless, guided wave principles such as fiber optics and electronic electromagnetic structures.

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

- Solve the problems in different EM fields
- Design a programming to generate EM waves subjected to the conditions
- Find the time average power density of EM Waves in different domains
- Know the Electromagnetic Relation using Maxwell Formulae
- Solve Electro Static and Magnetic to Static circuits using Basic relations.
- Analyze moving charges on Magnetic fields.
- Design circuits using Conductors and Dielectrics

Unit–I

Electrostatics: Electrostatic Fields Coulomb‟s Law ,Electric Field Intensity (EFI) EFI due to a line and a surface charge, Work done in moving a point charge in an electro static field, Electric Potential, Properties of potential function, Potential gradient, Guass‟s law ,Application of Guass‟s Law, Maxwell‟s first law, div (D) =ρυ. ,Laplace‟s and Poison‟s equations, Solution of Laplace‟s equation in one variable. Electric dipole, Dipole moment, Potential and EFI due to an electric dipole, Torque on an Electric dipole in an electric field.

Unit-II

Dielectrics &Capacitance: Behaviour of conductors in an electric field, Conductors and Insulators, Electric field inside a dielectric material, Polarization, Dielectric-Conductor and Dielectric-Dielectric boundary conditions, Capacitance, Capacitance of parallel plates, Spherical, Co-axial capacitors with composite dielectrics, Energy stored and energy density in a static electric field, Current density, Conduction and Convection Current densities, Ohm‟s law in point form. Equation of continuity.

Unit-III

Magneto Statics :Static magnetic fields Biot-Savart‟s law, Magnetic Field Intensity (MFI),MFI due to a straight current carrying filament, MFI due to circular, square and solenoid current Carrying wire, Relation between magnetic flux and magnetic flux density –Maxwell‟s second Equation, div(B)=0. Ampere‟s Law &Applications: Ampere‟s circuital law and its applications viz. MFI due to an infinite

sheet of current and a long current carrying filament–Point form of Ampere‟s Circuital law. Maxwell‟s third equation, Curl (H) =Jc.

Unit-IV

Force in Magnetic fields: Magnetic force Moving charges in a Magnetic field, Lorentz force equation, Force on a current element in a magnetic field, Force on a straight and a long current carrying conductor in a magnetic field, Force between two straight long and parallel current carrying conductors, Magnetic dipole and dipole moment, A differential current loop as a magnetic dipole, Torque on a current loop placed in a magnetic field. Scalar Magnetic potential and its limitations, Vector magnetic potential and its properties, Vector magnetic potential due to simple configurations, Vector Poisson‟s equations. Self and Mutual inductance, Neumann‟s formulae, Determination of self- inductance of a solenoid and toroid and mutual inductance between a straight long wire and a square loop wire in the same plane, Energy stored and density in a magnetic field. Introduction to Permanent magnets, their characteristics and applications.

Unit-V

Time Varying Fields: Time varying fields – Faraday‟s laws of electromagnetic induction, its integral and point forms, Maxwell‟s fourth equation, Curl (E) =-dB/dt, statically and dynamically induced EMFs, Simple Problems, Modification of Maxwell‟s equations for time varying fields, Displacement current.

Teaching Methodologies

1. EMF PPTs
2. Assignments uploaded in website
3. Software: MATLAB.

Text Book

1. “Engineering Electro Magnetics” by William H. Hayt& John. A. Buck Mc.Graw-Hill Companies, 7thEditon.2009.
2. “Electro Magnetic Fields” by Sadiku, Oxford Publications

Reference Books

1. “Introduction to Electro Dynamics” by DJ Griffiths, Prentice-Hall of India Pvt.Ltd. 2ndEdition.
2. “Electro Magnetics” by JP Tewari.
3. “Electro Magnetics” by J.D Kraus McGraw-Hill Inc.4th edition 1992.
4. “Electro magnetism” by Ashutosh Pramanik, PHI Publishers.

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY
NETWORK THEORY

Course Code: GR17A2035 **L:3 T:1 P:0 C:4**

Prerequisites : Knowledge of Basic Electrical and Electronics Engineering (BEE).

Course Objectives: The objective of this course is to provide

- Knowledge of three phase voltages and currents relations in star and delta connections.
- Knowledge of dc and ac transient analysis.
- Tie-set and cut-set methods of solving circuits.
- Dot convention, analysis of magnetic circuits.
- Introduction to various two-port network parameters for a given circuit.
- Evaluation of LPF, HPF, BSF and BPF.
- Evaluation of poles and zeros of a given transfer function.

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

- Measure Three phase voltages and currents, active, reactive powers.
- Express given Electrical Circuit in terms of A,B,C,D and Z,Y Parameter Model and solve the circuits.
- Solve Circuits using Cut set ,Tie Set Methods.
- Analyse dc and ac transient analysis for given circuit.
- Analyse LP, HP, BS and BP filters.
- Apply dot convention and to find out self and mutual inductance for a given circuit.
- Know poles and zeros of a given transfer function.

Unit-I

Magnetic Circuits and Network Topology Magnetic Circuits: Faradays laws of electromagnetic induction, concept of self and mutual inductance, dot convention, coefficient of coupling, analysis of series and parallel magnetic circuit, composite magnetic circuit.
Network Topology Definitions - graph, tree, co-tree, twig, link, basic cutset and tieset matrices for planar networks, loop and nodal methods of analysis of networks with dependent and independent voltage and current sources, Duality and Dual networks.

Unit-II

Three Phase Circuits Phase Sequence, Relation between line and phase voltages and currents in Star-Star, Delta-Delta, Star-Delta and Delta-Star balanced connections, analysis of unbalanced three phase circuits, measurement of active and reactive power.

Unit-III

DC and AC Transient Analysis
DC Transient Analysis: Transient response of RL, RC, RLC circuits(series and parallel) for dc excitation by classical approach and Laplace Transform methods, Initial Conditions, Transient response of RL and RC circuits for different inputs such as step, ramp, pulse and impulse using Laplace Transform method.
AC Transient Analysis Transient response of RL, RC, RLC circuits for sinusoidal excitation by classical and Laplace Transform methods.

Unit-IV

Network Parameters and Two Port Networks Driving point and transfer impedance function networks, poles and zeros necessary conditions for driving point function and for transfer function. Two port network parameters- Z, Y, hybrid, inverse hybrid, transmission and inverse transmission parameters,

relation between various parameters, condition for symmetry and reciprocity for above parameters, two port network parameters using transformed variables.

Unit-V

Filters Introduction to filters, constant K - RC, RL low pass, high pass, band pass, band stop filters.

Teaching Methodologies

1. NT ppts
2. Assignments uploaded in website
3. Softwares: Multisim.

Text Book

1. Fundamentals of Electric Circuits by Charles K.Alexander, Matthew N.O.Sadiku, Tata McGraw Hill Company.
2. Engineering Circuit Analysis by William H.Hayt.Jr, Jack E.Kemmerly and Steven M.Durbin by Tata McGraw Hill Company.
3. Circuits and Networks by T.K.Nagasarkar and M.S.Sukhija, Oxford University Press

Reference Books

1. Circuit Theory (Analysis and Synthesis) by A.Chakrabarti – DhanpatRai& Co
2. Network Theory by prof.B.N.Yoganarasimham.
3. Electrical Engineering Fundamentals by Vincent Deltoro
4. Circuit Theory by Sudhakar and ShyamMohan
5. Network Analysis by M.E.VanValkenburg, Prentice Hall of India

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY
DC MACHINES AND TRANSFORMERS

Course Code: GR17A2036 **L:3 T:1 P:0 C:4**

Prerequisites: In-depth knowledge of Physics oriented towards dynamics, heat, electricity, magnetism and calculus, analytical co-ordinate geometry and trigonometry.

Course Objectives: The objective of this course is to provide

- Strong back ground in different types of electrical DC machines.
- Visualization of solid foundation in mathematical and technical concepts required to engineering problems related to dc machines.
- Excel in post graduate programs or to succeed in industry.
- Foundation in the construction and operation of dc machines and its applications
- Background in single phase and three phase transformers.
- Foundation in design & applications of transformers.
- Basic knowledge of equivalent circuit of transformers and their phasor diagrams for different loads viz lead, lag & pure resistive loads.

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

- Understand energy conversion principles in DC machines & Transformers.
- Analyse role of Electrical machines in simple & complex applications.
- Articulate importance of extensive research in electrical machines.
- Design real time applications.
- Calculate AT required for different magnetic loading
- Draw armature winding for DC Machines
- Conduct test for voltages , currents, torque and speed curves for DC machines of various types.

Unit-I

D.C.Generators – Principle of operation– Action of commutator– constructional features– armature windings– lap and wave windings– simplex and multiplex windings–use of laminated armature– E.M.F Equation.

Armature reaction–Cross magnetizing and de-magnetizing AT/pole– compensating winding– commutation–reactance voltage–methods of improving commutation. Methods of Excitation – separately excited and self excited generators–build-up of E.M.F-critical field resistance and critical speed-causes for failure to self excitation and remedial measures. Load characteristics of shunt, series and compound generators.

Unit-II

D.C Motors–Principle of operation–Back E.M.F.-Torque equation– Characteristics and application of shunt, series and compound motors–Armature reaction and commutation.

Speed control of D.C. Motors: Armature voltage and field flux control methods. Motor starters (3 point and 4 point starters).

Unit-III

Testing of D.C. machines: Losses–Constant &Variable losses– calculation ofefficiency–condition for maximum efficiency.

Methods of Testing – Direct, indirect and regenerative testing–Brake test– Swinburne‟s test – Hopkinson‟s test – Field‟s test-separation of stray losses in a D.C .motor test.

Unit-IV

Transformers-Single phase transformers-types - constructional details- minimization of hysteresis and eddy current losses-EMF equation-operation on no load and on load- phasor diagrams Equivalent circuit-losses and efficiency- regulation. All day efficiency- effect of variations of frequency &supply voltage on iron losses.

Unit-V

Tests- OC and SC tests - Sumpner‟s test - predetermination of efficiency and regulation-separation of losses -parallel operation with equal and unequal voltage ratios- Auto transformers- equivalent circuit-comparison with two winding transformers. Poly phase transformers-Poly phase connections-Y/Y, Y/D, D/Y, D/D and open D.

Teaching Methodologies

1. EM-Ippts
2. Assignments uploaded in website

Text Books

1. Electric Machines by I.J. Nagrath&D.P. Kothari, Tata McGraw–HillPublishers, 3rdedition, 2004.
2. Electromechanics–I (D.C. Machines) S. KamakshaiahHi-Tech Publishers.
3. Electrical Machines by Rajput

Reference Books

1. Performance and Design of D.C Machines–by Clayton &Hancock, BPB Publishers
2. Electric Machinary–A.E.Frizgerald, C.Kingsleyand S.Umans, McGraw- Hill Companies, 5thediton
3. Electrical Machines–P.S. Bimbra., Khannapublishers
4. Electrical Machines - Bandhyopadhyaya

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY
COMPUTER ORGANIZATION

Course Code: GR17A2076 **L:2 T:1 P:0 C:3**

Prerequisites: Knowledge of Digital Logic Design.

Course Objectives: The Objectives of this course is to provide

- Comprehend operational concepts and understand register organization within a basic computer system
- Analyze the basic computer organization and understand the concepts of Micro programmed control
- Understand the design aspects of Central processing unit organization
- Understand various algorithms for arithmetic operations within a computer system
- Study the different ways of communicating with I/O devices and standard I/O interfaces.
- Study the hierarchical memory system including cache memory and virtual memory.
- Design of Multiprocessor systems using various interconnection structures

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

- Demonstrate knowledge of register organization of a basic computer system
- Incorporate In-depth understanding of control unit organization and micro programmed control.
- Understand the performance of central processing unit of a basic computer system.
- Apply various algorithms to perform arithmetic operations and propose suitable hardware for them.
- Analyze and emphasize various communication media in the basic computer system
- Develop an ability to analyze and design various memory structures
- Analyze the performance of a Multiprocessor System and various issues associated with its design.

Unit-I

Basic Structure of Computers: Computer Types, Functional unit, Data Representation, Fixed Point Representation, Floating – Point Representation, Error Detection codes.

Register Transfer Language and Micro operations: Register Transfer language, Register Transfer, Bus and memory transfers, Arithmetic Micro operations, Logic micro operations, Shift micro operations, Arithmetic logic shift unit.

Unit-II

Basic Computer Organization and Design: Instruction codes, Computer Registers, Computer instructions, Timing and Control, Instruction cycle, Memory Reference Instructions, Input – Output and Interrupt, Complete Computer Description.

Micro Programmed Control: Control memory, Address sequencing, micro program example, design of control unit, Micro program Sequencer, Hard wired control Vs Micro programmed control.

Unit-III

Central Processing Unit Organization: General Register Organization, STACK organization, Instruction formats, Addressing modes, DATA Transfer and manipulation, Program control, Reduced Instruction Set Computer.

Computer Arithmetic: Addition and subtraction, multiplication Algorithms, Floating – point Arithmetic operations, BCD Adder.

Unit-IV

Input-Output Organization: Peripheral Devices, Input-Output Interface, Asynchronous data transfer Modes of Transfer, Priority Interrupt, Direct memory Access, Input –Output Processor (IOP).

Pipeline and Vector Processing: Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline, Dependencies, Vector Processing.

Unit-V

Memory Organisation: Memory Hierarchy, Main memory- RAM and ROM chips, Memory Address map, Auxiliary memory – Magnetic Disks, Magnetic Tapes, Associative Memory – Hardware Organization, Match Logic, Cache Memory – Associative mapping, Direct mapping, Set associative mapping, Writing into cache and cache initialization, Cache Coherence, Virtual memory – Address Space and Memory Space, Address mapping using pages, Associative Memory page table, Page Replacement.
Multi Processors: Characteristics or Multiprocessors, Interconnection Structures, Cache Coherence, Shared Memory Multiprocessors.

Teaching Methodologies

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

Text Books

1. Computer Systems Architecture – M.Moris Mano, IIIrd Edition, Pearson/PHI
2. Computer Organization – Carl Hamacher, Zvonks Vranesic, SafeaZaky, Vth Edition, McGraw Hill.

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY
DC MACHINES LAB

Course Code: GR17A2037 **L:0 T:0 P:2 C:2**

Prerequisites: In –depth knowledge of D.C. Machines.

Course Objectives: The Objectives of this course is to provide

- Strong background in different types of excitation for dc motors and generators.
- Mathematical foundation and there by the relative production of emf with respect to flux.
- Knowledge on various lab experiments connected with dc motors.
- Knowledge on various lab experiments connected with dc generators and there by achieve the design concepts.
- Knowledge on application of dc motor concepts with respect to the performance characteristics of dc motors.
- Knowledge on application of dc generator concepts with respect to the performance characteristics of dc generators.
- Basic knowledge of drive systems for further study at post graduate level.

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

- Have knowledge of various parts of a electrical DC machines.
- Develop knowledge helpful for application of dc machines.
- Conduct speed control of different types of DC Motors.
- Use characteristics of various generators depending on their type of field excitation.
- Understand the concept of different types of windings viz lap and wave for armature.
- Perform test on Motor-Generator Set.
- Know the concept of commutation dc machines for conversion of AC to DC or DC to AC.

Contents

1. Speed Control of a D.C Shunt Motor
2. Brake Test on a DC Shunt Motor
3. Brake Test on a DC Compound Motor
4. Open Circuit Characteristics of a DC Shunt Generator
5. Load test on a D.C. Shunt Generator.
6. Load test on a D.C. Series Generator
7. Load test on D.C. Compound Generator
8. Hopkinson Test
9. Fields Test
10. Retardation Test on D.C. Shunt Motor
11. Swinburne's Test
12. Separation of Core Losses

Students Activity: Design of machine windings using software.

i) Lap winding for 12 slots 4-pole single layer progressive winding.
ii) Lap winding for 12 slots 4-pole single layer retrogressive winding.
iii) Double layer winding for 24 slots 4-pole progressive lap wound machine.
iv) Double layer winding for 30 slots 4-pole progressive lap wound machine.

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY
ELECTRICAL NETWORKS LAB

Course Code: GR17A2038 **L:0 T:0 P:2 C:2**

Prerequisites: In –depth knowledge of Networks.

Course Objectives: The objective of this course is to provide

- Concept of circuit elements lumped Circuits and various types of sources,V-I relation for various input signals and Kirchhoff‟s Laws and network reduction techniques.
- Concept of alternating quantities, analysis of R, L, C parameters applied with ac sinusoidal voltage, concept of reactance, impedance, susceptance and admittance and concept of real and reactive powers and power factor.
- Knowledge on network topology a technique used for analyzing and solving electrical networks, loop analysis and nodal analysis method, concept of duality and dual networks, concept of KVL & KCL.
- Concept of resonance, bandwidth, measurement of reactive and active power and measurement three phase voltages and currents.
- Concept of Superposition theorem for dc and ac. Excitations, Thevenin‟s theorem, Norton‟s theorem Maximum power transfer theorem, Compensation theorem for dc and ac excitations.
- Demonstration on networks thermos using components on breadboard.
- Simulation of an electrical circuit using electrical softwares

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

- Understand the knowledge of mathematics, science and engineering.
- Identify, formulate and solve engineering problems.
- Analyze and design basic lumped circuits.
- Participate and try to succeed in competitive examinations.
- Simulate network circuits.
- Use techniques, skills and modern engineering tools necessary for engineering practice.
- Connect hardware components practically on breadboard.

Contents

1. Thevenin‟s Theorem
2. Norton‟s Theorem
3. Maximum power Transfer Theorem
4. Superposition Theorem and Reciprocity Theorem
5. Z and Y parameters.
6. Transmission and Hybrid Parameters
7. Compensation and Milliman‟s Theorems
8. Series Resonance
9. Parallel Resonance
10. Locus of Current Vector in an R-L Circuit
11. Locus of Current Vector in an R-C Circuit
12. Measurement of 3-phase power by two watt meter method for unbalanced loads

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY
ELECTRICAL SIMULATION LAB

Course Code: GR17A2039 **L:0 T:0 P:2 C:2**

Prerequisites: Knowledge of Basic Electrical Engineering

Course Objectives: The objective of this course is to provide

- Strong background on electrical software‟s.
- Approach for solving engineering problems.
- Use electrical software‟s in their project works.
- Foundation for use of these software‟s in real time applications.
- Development of data acquisition, instrument control, data-logging, and measurement analysis applications.
- Knowledge about user-defined software and modular hardware that implements custom systems(virtual instruments)
- Knowledge about simpler system integration for hardware and their corresponding software

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

- Express programming and simulation for engineering programs.
- Know importance of these software‟s for lab experimentation.
- Articulate importance of software‟s in research by simulation work.
- In-depth knowledge of providing virtual instruments on lab view environment.
- Simulate basic electrical circuit in mat lab simulink.
- Solve and execute complex algorithms in real time.
- Integrate hardware and their corresponding software

MATLAB Contents

1. The Basics
2. Strings, Logic and Control Flow
3. Polynomials, Integration& Differentiation
4. Introduction to Simu link
5. Diode characteristics
6. MOSFET characteristics
7. IGBT characteristics
8. Transient analysis of linear circuit
9. Single phase Half wave diode rectifier
10. Single phase full wave diode rectifier
11. Single phase diode bridge rectifier with LC filter
12. 5Hp 240V DC motor with resistance starter
13. Three phase half wave diode rectifier

LABVIEW Contents

1. Virtual Instruments
2. Editing Techniques, Building VI, Creating the Sub VIZ
3. Using For loop, While loops and Charts
4. Creating an Array with Auto-Indexing
5. Using the Graph and Analysis VIs
6. Simple amplitude measurement

Building arrays using for loop and while loop

7. Random signal generation
8. Waveform minimum & maximum value display
9. Wave at interface

10. Force mass spring damper
11. Matrix fundamentals
12. Simple Pendulum
13. Three phase sine wave generation
14. Signal Modulation

Sci lab

1. Single phase half wave diode rectifier
2. Create the vector(X_1^2 , X_2^2 ,X_3^2 ,X_4^2) with X=1,2,3,4

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY
ENVIRONMENTAL SCIENCE

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

Prerequisites: Basic knowledge on basic sciences and natural resources

Course Objectives: The Objectives of this course is to provide

- Critically evaluate information on human/environmental system
- Integrate human ecology and science of environmental problems.
- Articulate issues of social construction of science
- To develop an understanding of systems and cycles on the earth: of how individual organisms
- Live on the earth
- How different organisms live together in complex communication
- The agricultural use of soil and pesticides
- The description of moving water on and in the earth, and its influence on humans
- The effect of human activities on atmospheric pollution and that effect on us.
- Use of fossil fuels and the effect on climate
- Alternate energy sources
- An understanding of human activities that influence the ocean.

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

- Importance of environment, its purpose, design and perspectives
- Environmental issues related to the exploitation of natural resources and development of the mankind
- Role of professionals in protecting the environment from degradation
- The solutions for environmental problems created by local, national and global Developmental activities.
- Critically evaluate literature on environmental problems;
- Develop relevant research questions for environmental investigation
- Use methods and tools of environmental research, including statistical analysis, GIS, and other techniques;

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. nvironmental 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

II-SEMESTER

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY
MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS

Course Code: GR17A2104 **L:2 T:1 P:0 C:3**

Course Objectives: The Objectives of this course is to provide

- Clear understanding of demand analysis, elasticity of demand and demand forecasting
- Production function and cost analysis necessary to decide the levels of production and cost of production of the products or services
- Different types of markets and competition, different forms of organisation and different methods of pricing
- Capital and capital budgeting
- Fundamentals of accounting and financial analysis.

Course Outcomes: After studying this course the engineering students - the prospective technocrats or techno-managers will be in a position to:

- understand the markets and competition;
- forecast the demand;
- plan the operations and the production;
- choose an appropriate form of organisation;
- know the cost and decide the price of the products and/or services produced, and
- understand the financial statements and make financial analysis.

Unit-I

Introduction & Demand Analysis: Definition and Scope: Definition, Nature and Scope of Managerial Economics.

Demand Analysis: Demand Determinants, Law of Demand and its exceptions.

Elasticity of Demand: Definition, Types, Measurement and Significance of Elasticity of Demand. Marginal and Incremental Analysis; Basic Calculus: The Calculus of Optimization.

Unit-II

Production & Cost Analysis: Production Function – Isoquants and Isocosts, MRTS, Least Cost Combination of Inputs, Cobb-Douglas Production function, Laws of Returns, Internal and External Economies of Scale. Cost Analysis: Cost concepts. Determinants of Costs – Cost Forecasting - Short Run and Long Run Costs –Type of Costs - Analysis of Risk and Uncertainty.

Unit-III

Markets & New Economic Environment: Types of competition and Markets. Business: Features and evaluation of different forms of Business Organisation: Sole Proprietorship, Partnership, Joint Stock Company, Public Enterprises and their types. New Economic Environment: Changing Business Environment in Post-liberalization scenario. Privatization and Globalization - Business and Government - Public-Private Participation (PPP) - Industrial Finance - Foreign Direct Investment(FDIs).

Unit-IV

Capital Budgeting: Capital: Capital Budgeting: Capital: Capital and its significance, Types of Capital. Methods and sources of raising capital. Management of Current Assets : Management of Receivables , Management of Cash , Management of Marketable

Securities and Management of Inventory Capital Budgeting: features of capital budgeting proposals, Methods of Capital Budgeting: Payback Method, Accounting Rate of Return (ARR) and Net Present Value Method .

Unit-V

Introduction to Financial Accounting & Financial Analysis: Introduction to Financial Accounting & Financial Analysis. Accounting Cycle: Journal, Ledger, Trial Balance, Final Accounts (Trading Account, Profit and Loss Account and Balance Sheet with simple adjustments). Tools for Financial Statement Analysis: Comparative statements, common size statements, cash flow analysis, ratio analysis- Analysis and Interpretation of Liquidity Ratios, Activity Ratios, Capital structure Ratios and Profitability ratios. DuPont Chart. Teaching Methodologies

Teaching Methodologies

- Lectures
- Power Point presentations
- Seminars
- Working out problems on black/white boards
- Conducting tutorials
- Giving homework and/or assignments etc.

Text Books

1. **Aryasri:** Managerial Economics and Financial Analysis, TMH, 2009.
2. **Atmanand:** Managerial Economics, Excel, 2008.

Reference Books

1. Ambrish Gupta, Financial Accounting for Management, Pearson Education, New Delhi.2009
2. H. Craig Peterson & W. Cris Lewis, Managerial Economics, PHI, 2009
3. Lipsey & Chrystel, Economics, Oxford University Press, 2009

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY
POWER GENERATION AND DISTRIBUTION

Course Code: GR17A2040 **L:3 T:1 P:0 C:4**

Prerequisites: Knowledge of Basic Electrical Engineering

Course Objectives: The Objectives of this course is to provide

- Concepts and phenomenon of different sources of power generation.
- Fundamental concepts of electric DC power distribution.
- Concepts of electric AC power distribution.
- Knowledge on tariff methods for electrical energy consumptions in the prospect of optimum utilization of electrical energy.
- Knowledge of different turbines used in the generating stations with the analytical methods.
- Knowledge on classification of substations.
- Idea about the economic aspects of power generation.

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

- Articulate power system concepts required to engineering problems.
- Design power system components for a specified system and application
- Analyse various power sources for generation of power merit/Demerits
- Formulate A.C and D.C distribution networks for necessary variable calculation
- Calculate usage of electrical power
- Plot the power/energy demand in the form of graph
- Discuss functions of substations

Unit-I

Thermal Power Stations: Line diagram of Thermal Power Station (TPS) showing paths of coal, steam, water, air, as hand flue gasses. Brief description of TPS components: Economizers, Boilers, Super heaters, Turbines, Condensers, Chimney and Cooling towers.

Gas and Nuclear Power Stations: Nuclear Power Stations: Nuclear Fission and Chain reaction, Nuclear fuels. Principle of operation of Nuclear reactor. Reactor Components: Moderators, Control rods, Reflectors and Coolants. Radiation hazards: Shielding and Safety precautions. Types of Nuclear reactors and brief description of PWR, BWR and FBR.

Gas Power Stations: Principle of Operation and Components (Block Diagram Approach Only)

Unit-II

Hydro electric power stations: Elements of hydro electric power station-types- concept of pumped storage plants-storage requirements, mass curve (explanation only) estimation of power developed from a given catchment area; heads and efficiencies.

Hydraulic Turbines: Classification of turbines, Impulse and reaction turbines, Pelton wheel, Francis turbine and Kaplan turbine-working proportions, Work done, Efficiencies, Hydraulic design–Draft tube-Theory-Functions and efficiency.

Unit-III

D.C. Distribution Systems: Classification of Distribution Systems, Comparison of DC vs AC and Under-Ground vs. Over Head Distribution Systems. Requirements and Design features of Distribution Systems.-Voltage Drop Calculations (Numerical Problems) in D.C Distributors for the following cases: Radial D.C Distributor fed one end and at the both the ends (equal/unequal Voltages) And Ring Main Distributor.

A.C. Distribution Systems. Voltage Drop Calculations (Numerical Problems) in A.C. Distributors for the following cases: Power Factors referred to receiving end voltage and with respect to respective load voltages.

Unit-IV

Substations: Classification of substations: Air insulated substations- Indoor & Outdoor substations: Substations layout showing the location of all the substation equipment. Bus bar arrangements in the Sub-Stations: Simple arrangements like single bus bar, sectionalized single bus bar, main and transfer bus bar system with relevant diagrams.

Gas insulated substations (GIS) –Advantages of Gas insulated substations, different types of gas insulated substations, single line diagram of gas insulated substations, busbar, construction aspects of GIS, Installation and maintenance of GIS, Comparison of Air insulated substations and Gas insulated substations.

Unit-V

Economic Aspects of Power Generation: Load curve, load duration and integrated load duration curves-load, demand, diversity, capacity, utilization and plant use factors-Numerical Problems. Tariff Methods: Costs of Generation and their division into Fixed, Semi-fixed and Running Costs. Desirable Characteristics of a Tariff Method. Tariff Methods: Flat Rate, Block- Rate, two-part, three – part, and power factor tariff methods and Numerical Problems

Teaching Methodologies

1. PS-I ppts
2. Assignments uploaded in website

Text Books

1. Electrical Power Systems by C. L. Wadhwa New Age International(P) Limited, Publishers1997.
2. A Text Book on Power System Engineering by M. L. Soni, P. V. Gupta, U. S. Bhatnagar and A. Chakraborti, Dhanpat Rai & Co.Pvt.Ltd.,1999.

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY
AC MACHINES

Course Code: GR17A2041 **L:3 T:1 P:0 C:4**

Prerequisites: In-depth knowledge of Physics oriented towards dynamics, heat, electricity, magnetism and calculus, analytical co-ordinate geometry and trigonometry, D.C Machines

Course Objectives: The Objectives of this course is to provide

- Strong back ground in 3ø Induction Motor, speed control techniques and its characteristics.
- Solid foundation in technical concepts required to control the speed of 3ø Induction Motor
- Knowledge on applications of 1ø Induction Motor
- Foundation in the theory and applications of above electrical machines.
- Strong background in AC Armature winding design.
- Sufficient background required to conduct the tests on Synchronous generators viz regulation by various methods, load tests and Synchronization for parallel operation.
- Sufficient background in synchronous motor testing of different types of synchronous motor rotors viz salient pole & cylindrical pole machines.

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

- Comprehend electrical machinery pertaining to Synchronous machines, Single phase motors in simple & complex applications.
- Express importance of application of electrical AC machines.
- In-depth knowledge of applying the concepts on real time applications.
- Articulate rotating magnetic field generation
- Calculate machine variables in direct and quadrature axis form for salient pole type
- Demonstrate working of single and three phase AC Machines
- Know the concept of harmonics created in supply systems, need for reduction and design of synchronous machines for reducing them.

Unit-I

Poly-phase Induction Motors: Poly-phase induction motors-construction details of cage and wound rotor machines-Production of a rotating magnetic field - Principle of operation - Rotor E.M.F and rotor frequency - Rotor reactance, rotor current and P.F at standstill and during operation.

Unit-II

Characteristics of Induction Motors: Rotor power input, rotor copper loss and mechanical power developed and their inter relation-Torque equation-Deduction from torque equation - Expressions for maximum torque and starting torque - Torque slip characteristic - Equivalent circuit - Phasor diagram - crawling and cogging. No-load Test and Blocked rotor test –Predetermination of performance-Methods of starting and starting current and Torque calculations

Speed Control Methods: Speed control-change of voltage, change of frequency, V/f ; Injection of an E.M.F into rotor circuit (qualitative treatment only)-Induction generator-Principle of operation.

Unit-III

Construction, Principle of operation, Characteristics & Regulation of Synchronous Generator : Constructional Features of round rotor and salient pole machines – Armature windings – Integral slot and fractional slot windings; Distributed and concentrated windings – Distribution, pitch and winding factors – E.M.F Equation.Harmonics in generated E.M.F. – Suppression of harmonics – Armature reaction - Leakage reactance – Synchronous reactance and impedance – Experimental determination - Phasor diagram – Load characteristics Regulation by synchronous impedance method, M.M.F. method, Z.P.F. method and A.S.A. methods – Salient pole alternators – Two reaction analysis –

Experimental determination of Xd and Xq (Slip test) Phasor diagrams – Regulation of salient pole alternators.

Unit-IV

Parallel Operation of Synchronous Generator: Synchronizing alternators with infinite bus bars – Synchronizing power torque – Parallel operation and load sharing - Effect of change of excitation and mechanical power input.

Synchronous Motors – Principle of Operation: Theory of operation – Phasor diagram – Variation of current and power factor with excitation – Synchronous condenser – Mathematical analysis for power developed, Hunting and its suppression – Methods of starting – Synchronous induction motor.

Unit-V

Single Phase Motors & Special Motors: Single phase Motors: Single phase induction motor – Constructional features- Double revolving field theory – Split-phase motors – Shaded pole motor.

Teaching Methodologies

1. EM-II ppts
2. Assignments uploaded in website

Text Books

1. Electric Machines –by I. J. Nagrath & D. P. Kothari, Tata Mc Graw Hill, 7th Edition.2009
2. Performance and Design of AC Machines-M. G. Say. BPB Publishers
3. Electrical Machines by Rajput

Reference Books

1. Electric machinery - A.E. Fitzgerald, C. Kingsley and S. Umans, McGraw Hill Companies, 5th edition
2. Electrical machines-P.S Bhimbra, Khanna Publishers.
3. Electrical Machines – J.B. Gupta, S.K. Khataria& Son‟s Publications
4. Electrical Machines - Bandhyopadhyaya

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY
CONTROL SYSTEMS

Course Code: GR17A2042 **L:3 T:1 P:0 C:4**

Prerequisites: Knowledge of Laplace Transforms, Differential equations and Matrices.

Course Objectives: The Objectives of this course is to provide

- Introduction on fundamental concepts of control systems
- Concept of block diagram algebra
- Knowledge on mathematical modeling of the system
- Concept of time response analysis of second order systems.
- Knowledge on stability analysis, root locus technique.
- Knowledge on frequency analysis i.e., Bode plots and Nyquist plots.
- Knowledge on controllability and observability

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

- Express the basic elements and structures of feedback control systems.
- Represent the mathematical model of a system.
- Apply routh-hurwitz criterion, rootlocus, bode plot and nyquist plot to determine the domain of stability of linear time-invariant system.
- Determine the steady-state response, errors of stable control systems and design compensators to achieve the desired performance.
- Analyse the stability of the system.
- Design lead, lag, lead-lag compensators.
- Express control system models on state space models, to express state transition matrix and calculation of variables.

Unit-I

Concepts of Control Systems and Transfer Function Representation Concepts of Control Systems: Open loop and closed loop control systems, different examples of control systems, classification of control systems, characteristics and effects of feedback, mathematical models differential equations, impulse response and transfer functions, translational and rotational mechanical systems.
Transfer Function Representation Transfer function of DC and AC Servomotor, Synchro transmitter and receiver, Block diagram representation of systems considering electrical systems as examples, Block diagram reduction techniques, signal flow graphs, reduction using Mason‟s gain formula.

Unit-II

Time Response Analysis Standard test signals, time response of first order systems, characteristic equation of feedback control systems, transient response of second order systems-time domain specifications, steady state response-steady state errors and error constants, effects of proportional derivative, proportional integral systems.

Unit-III

Stability Analysis Concept of stability, Routh stability criterion, qualitative and conditional stability. **Root Locus Technique** The root locus concept, construction of root loci, effects of adding poles and zeros to G(s)H(s) on the root locii. Frequency Response Analysis Frequency domain specifications, Bode diagrams, Determination of frequency domain specifications and transfer function from the Bode diagram-Phase and Gain margin, stability analysis from Bode plots.

Unit-IV

Stability analysis in frequency domain Polar plots, Nyquist plots and applications of Nyquist criterion to find the stability, effects of adding poles and zeros to G(s)H(s) on the shape of the Nyquist diagrams.

Unit-V

State Space Analysis of Continuous Systems Concepts of state, state variables and state model, derivative of state models from block diagrams, diagonalization - solving the time invariant state equations, state transition matrix and its properties, Controllability and Observability.

Teaching Methodologies

1. CS ppts
2. Assignments uploaded in website
3. Software‟s: MATLAB.

Text Book

1. Control Systems by A. Anand Kumar, 2nd edition, PHI Learning Private Limited
2. Automatic Control Systems 8th edition by B. C. Kuo 2003 John Wiley and Son‟s

Reference Books

1. Control Systems Engineering by I. J. Nagrath and M. Gopal, New Age International (P) Limited Publishers, 2nd edition
2. Control Systems Engineering by NISE 3rd Edition John Wiley
3. Modern Control Engineering by Katsuhiko Ogata Prentice Hall of India Pvt Ltd, 3rd edition, 1998.

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY
PRINCIPLES OF DIGITAL ELECTRONICS

Course Code: GR17A2105 **L:2 T:1 P:0 C:3**

Prerequisites

- Basics of number systems and Electronic devices and circuitry
- Basics of De-Morgan‟s Laws

Course Objectives: The Objectives of this course is to provide

- Types of number system existing in Digital electronics
- Illustration of Logic gates and their working function with examples
- Implementation of optimization methods of Logic Function
- Difference between types of existing Logic Circuit Design
- Relation of logic functions with real time applications
- Concept of logic function for the logic circuit design
- Construction of Logic Circuits and Counters

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

- Identify the different types of number systems and their use.
- Explain the principle concepts of Digital Logic Design.
- Implement the logic circuits using Combinational Logic IC‟s.
- Distinguish between the Sequential and Combinational Logic Circuits.
- Reconstruct the Logic Circuits for real time applications with Combinational Circuits
- Formulate the Digital Logic Circuit function.
- Design the Logic Circuit using Combinational and Sequential Circuits

Unit-I

Number systems and Boolean algebra: Digital systems, Number - Base Conversions, Octal and Hexa-decimal Numbers, Complements, Signed Binary Numbers, Binary Codes, Binary Storage and Registers, Binary Logic, Axiomatic Definition of Boolean Algebra, Basic Theorems and Properties of Boolean Algebra, Boolean Functions, Canonical and standard Forms, Other Logic Operations

Unit-II

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-III

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, and Multiplexers with design examples.

Unit-IV

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, Hazards.

Unit-V

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.

Teaching 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.

Reference books

1. ZviKohavi,SwitchingandFiniteAutomataTheory,2ndEdition,TMH
2. Frederick J. Hill and Gerald R Peterson, Introduction to Switching theory and logic design, 3rdEdition, John Wileyandsons,1981.
3. Switching Theory and Logic Design by A. Anand Kumar, 2nd Edition, PHI Publishers.

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY
AC MACHINES LAB

Course Code: GR17A2044 **L:0 T:0 P:2 C:2**

Course Objectives: The Objectives of this course is to provide

- Basic knowledge of transformers.
- Basic knowledge of induction motors.
- Basic knowledge of alternators.
- Design a practical transformer.
- Knowledge about an induction generator.
- Concept of back to back connection of a transformer.
- Concept of three phase to two phase conversion by Scott connection.

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

- Have knowledge of various parts of a electrical machine.
- Calculate the parameters of equivalent circuit of single phase induction motor.
- Conduct open circuit/ short circuit test on transformer.
- Conduct experiments on Ac Machines to find the characteristics.
- Draw the various characteristics of three phase induction motor.
- Perform test on synchronous Machine to find Direct and quadrature axis reactance.
- Conduct No Load and Full load tests on transformers/Induction Motor

Contents

1. OC, SC and Load tests on single phase transformer.
2. Sumpner‟s test.
3. V and inverted V curves of a 3-phase synchronous motor.
4. 4.Brake test on slip ring induction motor.
5. No-load and block rotor tests on squirrel cage induction motor.
6. Equivalent circuit of single phase induction motor.
7. Determination of Xd and Xq of a salient pole synchronous machine from slip test.
8. Regulation of alternator by synchronous impedance method and MMF method.
9. Hysteresis loss determination.
10. Scott connection.
11. Induction generator.
12. Heat run test on transformer.

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY
CONTROL SYSTEMS LAB

Course Code: GR17A2045 **L:0 T:0 P:2 C:2**

Course Objectives: The Objectives of this course is to provide

- Knowledge on Electrical Softwares.
- Basic knowledge on practical control system applications.
- Knowledge on applications of machines & electronic devices with control systems.
- Basic concepts like Root-Locus, Bode Plot, Lead Lag, PID, etc.
- Concept of transfer function for different systems.
- Concepts in real time applications.
- Development of new experiments of various control concepts in lab.

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

- Have a strong knowledge of Electrical Softwares
- Do various engineering projects.
- Formulate transfer function for given control system problems.
- Find time response of given control system model.
- Plot Root Locus and Bode plots for given control system model
- Design Lead, Lag, Lead-Lag systems in control systems
- Design PID controllers for given control system model

Contents

1. Transfer function from zeros and poles and viceversa
2. Step response of a given transfer function
3. Ramp response of a given transfer function
4. Impulse response of a given transfer function
5. Root Locus from a Transfer function
6. Bode Plot from a Transfer function
7. State Model from a Transfer function
8. Zeros and poles from state model.
9. Transfer functio of DC motor/Generator
10. Time Response of second order system.
11. DC Servomotor
12 . PID Controller
13. Characteristics of Synchros
14. Lag & Lead Compensator

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY
ANALOG AND DIGITAL ELECTRONICS LAB

Course Code: GR17A2046 **L:0 T:0 P:2 C:2**

Course Objectives: The Objectives of this course is to provide

- Concept of Operation Amplifier and 555 Timers.
- Classification of Analog I C's and Digital I C's
- Execution of the oscillators circuits, amplifiers circuits
- Concept of different types of waveform generators, clock pulse generation and digital logic implementation
- Knowledge on output waveforms and their functionality
- Knowledge on amplifiers, waveform generators and simple logic circuits
- Knowledge on analog computer and counters

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

- Recall the working operation of Operational Amplifiers, 555 Timer and their applications
- Compare the Digital and Analog IC"s
- Practice the amplifiers, waveform generators and oscillator circuits
- Differentiate the integrators and differentiators working operation
- Judge the different waveforms and their applications
- Predict the circuit output waveform and its value.
- Construct the Digital Logic Function and analog circuits.

Contents

1. Design of Operational Amplifier as proportional Amplifier
2. Design of Operational Amplifier as integrator
3. Design of Operational Amplifier as differential amplifier
4. Design of Operational Amplifier as summation amplifier
5. Design of Operational Amplifier for multiplying two time varying signals
6. Design of Operational Amplifier for generation of triangle wave
7. Design of Operational Amplifier for generation of Square
8. Design of Operational Amplifier for generation of sin wave
9. 555 timer as basic application of generating train of pulses
10. 555 timer as speed sensor / frequency to Voltage Converter
11. Design of Operational Amplifier as D/A converter
12. Design of Operational Amplifier as V/f to F/v converter
13. All gates using Xilinx software with Verilog code
14. 7800 series & I C"s and their applications
15. Combination circuits
16. Multiplexer and De multiplexer
17. Flip Flops implementation using Xilinx Software
18. Introduction to logic gates using Xilinx in Cool runner CPLD board

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY

VALUE EDUCATION AND ETHICS

Course Code: GR17A2002 **L:0 T:0 P:02 C:2**

Prerequisites: General awareness on Moral Science

Course Objectives: The objective of this course is to provide

- Define and classify values, ethics
- Explain about self analysis, importance of values
- Organise constructive thinking and team work to create mutual happiness and prosperity
- Elaborate on ethics and professional ethics using case studies.
- Importance of continuous learning, choosing right work and career.

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

- Choose the right value system by self analysis and right understanding
- Make use of positive thinking, dignity of labour for building harmony and peace in self, family and society
  Analysing the importance of personality on effective behavior
- Identify and solve ethical dilemmas by finding value based and sustainable solutions in professional life.
- Find sustainable technological solutions for saving environment
- Compile value and ethical systems for continuous happiness and prosperity
- Take part in effective team work bringing out win-win solutions for complex problems

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 Organizations 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

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

Course Objectives

- To develop students sensibility with regard to issues of gender in contemporary India.
- To provide a critical perspective on the socialization of men and women.
- To introduce students to information about some key biological aspects of genders.
- To expose the students to debates on the politics and economics of work.
- To help students reflect critically on gender violence.
- To expose students to more egalitarian interactions between men and women.

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

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

Unit-I

UNDERSTANDING GENDER: Gender: Why should we study it? (Towards a world of Equals: Unit – 1) Socialization: Making women, making men (Towards a World of Equals: Unit -2) Introduction. Preparing for Womanhood.Growing up Male.First lessons in Caste.Different Masculinities.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 Kanna d a 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