ACADEMIC REGULATIONS
PROGRAM STRUCTURE
and
DETAILED SYLLABUS

Bachelor of Technology
(Electrical and Electronics Engineering)

(Effective for the students admitted from the Academic Year 2014-15)

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY
(Autonomous)

Gokaraju Rangaraju
Institute of Engineering and Technology, Hyderabad
Department of Electrical and Electronics Engineering (B.Tech)
GR14 Regulations

Gokaraju Rangaraju Institute of Engineering &Technology 2014 Regulations (GR14 Regulations) are given hereunder. These regulations govern the programmes offered by the Department of Electrical and Electronics Engineering with effect from the students admitted to the programmes in 2014-15 academic year.

1. **Programme Offered:** The programme offered by the Department is B.Tech in Electrical 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 Electrical 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/University or 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) The total credits for the Programme is 200.
   d) All the registered credits will be considered for the calculation of the final percentage of marks.

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) A student shall be declared eligible for the award of B.Tech degree, if 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 200 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 Electrical 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 but less than 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.

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

b) Distribution and Weightage of Marks

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 and semester-end examinations. The marks for each of the component of assessment

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 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) Attendance - 5 marks
		70	Semester-end examination	The semester-end examination is for a duration of 3 hours
2	Practical	25	Internal Exams & Continuous Evaluation	1) Lab Internal :10 marks 2) Record : 5 marks 3) Continuous Assessment : 5 marks 4) Attendance : 5 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, 25 marks are for internal evaluation and 50 marks are for external evaluation. The supervisor continuously assesses the student for 15 marks (Attendance – 5 marks, Continuous Assessment – 5 marks, Report – 5 marks). At the

end of the semester, Mini 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 Mini Project Review Committee for 10 marks. The Mini Project report shall be presented before Project Review Committee 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 conducted by 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 and prepare a technical report and present the same to a Committee consisting of HOD, two senior faculty and the seminar coordinator of the department. The student shall be assessed for his/her understanding of the topic, its application and its relation with various courses studied during the programme of study for 50 marks.

g) Major Project: The project work is evaluated for 200 marks. Out of 200, 50 marks shall be for internal evaluation and 150 marks for the external evaluation. The supervisor assesses the student for 25 marks (Attendance – 5 marks, Continuous Assessment – 15 marks, Report – 5 marks). At the end of the semester, Projects shall be displayed in the road show at the department level for the benefit of all the students and staff and the same is to be evaluated by the Project Review Committee for 25marks. 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 20 marks .The average of the two internal tests shall be considered for the award of marks.
- Submission of day to day work - 5 marks.
- Attendance - 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 in an end semester examination can appear for a supplementary examination, as per the schedule announced by the College/Institute.

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:**
    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 securesnot 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 from II year to III year; or from III year to IV year only if he/she fulfills the academic requirements of minimum credits from the following examinations whether the candidate takes the examination or not.

Phase	Minimum Credits	No. of Examinations				
		I-I	I-II	II-I	II-II	III-I
II to III Year	37	2 Regular 1 Supply	1 Regular 1 Supply	1 Regular —	--- ---	--- —
III to IV Year	62	3 Regular 2 Supply	2 Regular 2 Supply	2 Regular 1 Supply	1 Regular 1 Supply	1 Regular

13. **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 Jawaharlal Nehru Technological University Hyderabad, he/she shall be placed in one of the following four classes (the marks awarded are from the aggregate marks secured for the 200 credits):

Class Awarded	% of Marks Secured
First Class with Distinction	Marks ≥ 70%
First Class	60% ≤ Marks < 70%
Second Class	50% ≤ Marks < 60%
Pass Class	40% ≤ Marks < 50%

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

15. **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.

16. **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 re-admission/re-registration to the same or equivalent subjects as and when they are offered.

17. **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 GR14 for B.Tech (Lateral Entry)

(Effective for the students admitted into II year from the Academic Year 2015-16)

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 a programme of study for not less than three academic years and not more than six academic years(para2(a))

b) Registered for 150 credits and secured 150 credits. The marks obtained in all 150 credits shall be considered for the calculation of the final percentage of marks (para2(b))

c) Students, who fail to fulfill all the academic requirements for the award of the degree within eight academic years from the year of their admission, shall forfeit their seat in B.Tech programme (para2(c))

2. Academic Requirements

A student shall be promoted from III year to IV year only if he/she fulfills the academic requirement of minimum credits from the following examinations whether the candidate takes the examination or not (para 12(b)).

Phase	Minimum Credits	No. of Examinations		
		II-I	II-II	III-I
III to IV Year	37	2 Regular 1 Supply	1 Regular 1 Supply	1 Regular —

3. Award of Degree or 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 Jawaharlal Nehru Technological University Hyderabad, he/she shall be placed in one of the following four classes (the marks awarded are from the aggregate marks secured for the 150 credits):

Class Awarded	% of Marks Secured
First class with Distinction	Marks ≥ 70%
First class	60% ≤ Marks < 70%
Second class	50% ≤ Marks < 60%
Pass class	40% ≤ Marks < 50%

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY
B.Tech (EEE) PROGRAMME STRUCTURE

I B.Tech (EEE) **I Semester**

Group	Sub-Code	Subject	L	T	P	Credits	Hours	Marks
BS	GR14A1001	Linear Algebra and Single Variable Calculus	2	1	-	3	4	100
BS	GR14A1002	Advanced Calculus	2	1	-	3	4	100
HS	GR14A1005	English	2	1	-	3	4	100
BS	GR14A1007	Engineering Physics	2	1	-	3	4	100
ES	GR14A1009	Computer Programming	2	1	-	3	4	100
ES	GR14A1018	Basic Electrical Engineering	3	1	-	4	5	100
ES	GR14A1025	Engineering Workshop			2	2	4	75
ES	GR14A1027	Computer Programming lab			2	2	4	75
BS	GR14A1029	Engineering Physics lab			2	2	4	75
		Total	**13**	**6**	**6**	**25**	**37**	**825**

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

Group	Sub-Code	Subject	L	T	P	Credits	Hours	Marks
BS	GR14A1003	Transform Calculus and Fourier Series	2	1	-	3	4	100
BS	GR14A1004	Numerical Methods	2	1	-	3	4	100
BS	GR14A1008	Engineering Chemistry	2	1	-	3	4	100
ES	GR14A1010	Data Structures	2	1	-	3	4	100
ES	GR14A1023	Engineering Graphics	1	-	2	3	5	100
ES	GR14A1019	Fundamentals of Electronics Engineering	3	1	-	4	5	100
HS	GR14A1024	Business Communication and Soft Skills			2	2	4	75
ES	GR14A1026	IT Workshop			2	2	4	75
BS	GR14A1030	Engineering Chemistry lab			2	2	4	75
		Total	**12**	**5**	**6**	**25**	**37**	**825**

II B.Tech (EEE) — I Semester

Group	Sub-Code	Subject	L	T	P	Credits	Hours	Marks
BS	GR14A2058	Special Functions and Complex Variables	2	1	-	3	4	100
PC	GR14A2034	Electromagnetic Fields	3	1	-	4	5	100
PC	GR14A2035	Network Theory	3	1	-	4	5	100
PC	GR14A2036	DC Machines and Transformers	3	1	-	4	5	100
PC	GR14A2076	Computer Organization	3	1	-	4	5	100
PC	GR14A2037	DC Machines Lab			2	2	4	75
PC	GR14A2038	Multism / Networks Lab			2	2	4	75
PC	GR14A2039	Lab View / Matlab Lab			2	2	4	75
		Total	**-**	**-**	**-**	**25**	**36**	**725**
MC	GR14A2001	Environmental Science	-	-	-	0	2	100
		Total	**18**	**5**	**6**	**25**	**40**	**825**

II B.Tech (EEE) — II Semester

Group	Sub-Code	Subject	L	T	P	Credits	Hours	Marks
HS	GR14A2104	Managerial Economics and Financial Analysis	2	1	-	3	4	100
PC	GR14A2040	Power Generation and Distribution	3	1	-	4	5	100
PC	GR14A2041	AC Machines	3	1	-	4	5	100
PC	GR14A2042	Control Systems	3	1	-	4	5	100
PC	GR14A2043	Principles of Digital Electronics	3	1	-	4	5	100
PC	GR14A2044	AC Machines Lab			2	2	4	75
PC	GR14A2045	Control Systems Lab			2	2	4	75
PC	GR14A2046	Analog and Digital Electronics Lab			2	2	4	75
		Total	**-**	**-**	**-**	**25**	**36**	**725**
MC	GR14A2002	Value Education and Ethics	-		-	0	2	100
		Total	**14**	**5**	**6**	**25**	**40**	**825**

III B.Tech (EEE) — I Semester

Group	Sub-Code	Subject	L	T	P	C	H	Marks
ES	GR14A3015	Operational Amplifiers	2	1		3	4	100
ES	GR14A3016	Power Transmission System	3	1		4	5	100
ES	GR14A2055	Micro controllers	3	1		4	5	100
ES	GR14A3017	Electrical Measurements and Instrumentation	3	1		4	5	100
ES	GR14A3018	Power Electronics	3	1		4	5	100
ES	GR14A3019	Sensors, Measurements and Instrumentation Lab			2	2	4	75
ES	GR14A3020	Power Electronics Lab			2	2	4	75
ES	GR14A2059	Microcontrollers Lab			2	2	4	75
		TOTAL	**14**	**5**	**6**	**25**	**36**	**725**

III B.Tech (EEE) — II Semester

Group	Sub-Code	Subject	L	T	P	C	H	Marks
ES	GR14A3021	Computer Methods in Power Systems	3	1		4	5	100
ES	GR14A3022	Switch Gear and Protection	3	1		4	5	100
ES	GR14A3023	Utilization of Electrical Energy	2	1		3	4	100
HS	GR14A3102	Management Science	3	1		4	5	100
	Open Elective		3	1		4	5	100
ES	GR14A3024	Non Conventional Sources of Energy						
ES	GR14A2049	Signals and Systems						
PC	GR14A2069	Operating Systems						
ES	GR14A3025	Power Systems Lab			2	2	4	75
HS	GR14A3100	Advanced English Communication Skills Lab			2	2	4	75
SPW	GR14A3101	Industry Oriented Mini Project			2	2	4	75
		TOTAL	**14**	**5**	**6**	**25**	**36**	**725**

IV B.Tech (EEE) — I Semester

Group	Sub-Code	Subject	L	T	P	C	H	Marks
PC	GR14A3046	Digital Signal Processing	3	1		4	5	100
PC	GR14A4022	Power Semiconductor Drives	3	1		4	5	100
PC	GR14A4023	Power System Operation and Control	2	1		3	4	100
	Elective -I		3	1		4	5	100
PE	GR14A4024	HVDC Transmission						
PE	GR14A4025	Neural and Fuzzy Systems						
PE	GR14A2063	Database Management Systems						
	Elective -II		3	1		4	5	100
PE	GR14A4026	Electrical Distribution Systems						
PE	GR14A4037	Advanced Control Systems						
PE	GR14A2070	Object Oriented Programming through Java						
PC	GR14A4027	DSP Based Electrical Lab			2	2	4	75
PC	GR14A4028	Power Systems Simulation Lab			2	2	4	75
PC	GR14A4029	Power Electronics and Drives Lab			2	2	4	75
		TOTAL	**14**	**5**	**6**	**25**	**36**	**725**

IV B.Tech (EEE) — II Semester

Group	Sub-Code	Subject	L	T	P	C	H	Marks
PC	GR14A4030	Programmable Logic Controllers	2	1		3	4	100
	Elective -III		2	1		3	4	100
PE	GR14A4031	Power System Automation						
PE	GR14A4032	Flexible AC Transmission Systems						
PE	GR14A3070	Embedded Systems						
	Elective -IV		2	1		3	4	100
PE	GR14A4035	EHV AC Transmission						
PE	GR14A4036	Modern Power Electronics						
PE	GR14A4034	DSP Based Electro Mechanical Systems						
PC	GR14A4038	Programmable Logic Controllers Lab			2	2	4	75
SPW	GR14A4142	Comprehensive Viva			2	2	4	100
SPW	GR14A4143	Seminar			2	2	4	50
SPW	GR14A4144	Major Project			10	10	12	200
	TOTAL		**6**	**3**	**16**	**25**	**36**	**725**

I-Year

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY

LINEAR ALGEBRA AND SINGLE VARIABLE CALCULUS

Course Code: GR14A1001 L:2 T:1 P:0 C:3
I Year I Semester

Unit-I

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

Vector norms, Linear dependence of vectors, Gram-Schmidt orthogonalization of vectors, Matrix norms.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 factorizations and Quadratic Forms: Diagonalization of a matrix-Orthogonal diagonalization of symmetric matrices-Computation of matrix powers- Computation of 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 Lagrange's method and 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) - Approximation of functions by Taylor's and Maclaurin's theorems-Series expansion of functions.

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 trajectories.

Unit-V

Linear differential equations of the higher order and applications: Equations with constant coefficients-Particular integrals for functions of the type e^{ax}, x^n, sinax, cos ax, e^{ax}.V(x) Exponential shift - Method of variation of parameters.

Applications - Deflection of beams, Simple harmonic motion (simple pendulum, spring-mass systems) and RLC circuits.

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.
3. Higher Engineering Mathematics: B.S.Grewal-Khanna Publications.

References

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: GR14A1002 L:2 T:1 P:0 C:3
I Year I Semester

Unit-I
Differential Calculus of functions of several variables and Function Optimization: Partial differentiation - Hessian matrix-Total differentiation-Jacobians. Optimization of functions of several variables without constraints-Constrained optimization of functions of several variables with equality constraints-The Lagrange's multiplier method.

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

Unit-III
Multiple integrals and applications: Evaluation of Double integrals in Cartesian and polar coordinates-Changing the order of integration- Change of variables - Evaluation of triple integrals in Cartesian, cylindrical and spherical polar coordinates. Application of multiple integrals to evaluate plane areas and volumes of solids.

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

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

Teaching Methodologies

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. Schaum's outline series on Vector Analysis
3. Higher Engineering Mathematics: B.S.Grewal-Khanna Publications

Reference Books

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

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY

ENGLISH

Course Code: GR14A1005 L:2 T:1 P:0 C:3
I Year I Semester

Unit-I

1. Chapter entitled Sir C.V. Raman: A Path breaker in the saga of Indian Science from "Enjoying Every day English", Published by Sangam Books, Hyderabad.
2. Chapter Entitled Mother Teresa from "Inspiring Speeches and Lives", Published by Maruthi Publications, Guntur

Tutorial-1: Present a small biographical sketch of an inspiring personality
Tutorial-2: Prepare an essay on "Charity begins at home."

Unit-II

Grammar & Vocabulary Development: Articles: Types of Articles and their usages; Tense and Aspect; Subject and Verb Agreement; Prepositions

Vocabulary Development: Synonyms and Antonyms; One-word substitutes; prefixes and suffixes; words often confused; idioms and phrases.

Speaking & Writing skills: Information transfer: verbal to graphical presentation and from graphical presentation to verbal. Public Speaking: Body Language, Presentation Skills and its Features.

Tutorial-3: Worksheet on the usage of Tenses, Articles and Prepositions
Tutorial-4: Exercises on vocabulary
Tutorial-5: Interpretation of data from different formats

Unit-III

1. Chapter Entitled The Connoisseur from "Enjoying Every day English", Published by Sangam Books, Hyderabad
2. Chapter Entitled Sam Pitroda from "Inspiring Speeches and Lives", Published by Maruthi Publications, Guntur.

Tutorial-5: Story Analysis
Tutorial-6: Present a person who bears risk taking ability to solve the problems of people/society
Tutorial-7: Describe a strange event that occurred in your life

Unit-IV

1. Chapter Entitled Bubbling Well Road from "Enjoying Every day English", Published by Sangam Books, Hyderabad
2. Chapter Entitled Amartya Kumar Sen from "Inspiring Speeches and Lives", Published by Maruthi Publications, Guntur

Tutorial-9: Oral Presentation on "Does the quality of Unity in Diversity helped us to acquaint easily with the trends of globalization?"

Tutorial-10: Develop an essay "The ways to impart moral and ethical values amongst the students."

Unit-V

1. Chapter entitled The Cuddalore Experience from "Enjoying Every day English", Published by Sangam Books, Hyderabad
2. Chapter Entitled Martin Luther King Jr. (I have a dream) from "Inspiring Speeches and Lives", Published by Maruthi Publications, Guntur

Tutorial-11: Presentation on "The possible ways to educate students about Disaster Management."

Tutorial-12: Write or present "Is every present leader was a follower?"

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, Cengage Learning.
5. Communicate or Collapse, Pushp Latha, Sanjay Kumar, PHI Learning Pvt.Ltd.
6. Communication Skills, Sanjay Kumar, Pushp Latha, Oxford Higher Education.
7. A Hand Book for Engineers, Dr. P. Eliah, BS Publications

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY

ENGINEERING PHYSICS

Course Code: GR14A1007 L:2 T:1 P:0 C:3
I Year I Semester

Unit-I

Crystal Structures: Lattice points, Space lattice, Basis, Bravias lattice, unit cell and lattice parameters, Seven Crystal Systems with 14 Bravias 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.

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 and Ferro- electricity.

Magnetic Properties: Magnetic Permeability, Magnetic Field Intensity, Magnetic Field Induction, Intensity of Magnetization, Magnetic Susceptibility, 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, Ferrites and their Applications.

Unit-IV

Lasers: Characteristics of Lasers, Spontaneous and Stimulated Emission of Radiation, Meta-stable State, Population Inversion, 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), Attenuation in Optical Fibers, 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; Top-down Fabrication: Chemical Vapor Deposition, Physical, Chemical and Optical properties of Nano materials, Characterization (SEM, EDAX), Applications.

Teaching Methodologies

1. Power Point Presentation.
2. Assignments uploaded in website.

Text Books

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

Reference Books

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

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY

COMPUTER PROGRAMMING

Course Code: GR14A1009 L:2 T:1 P:0 C:3
I Year I Semester

Unit-I

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

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

Unit-II

Managing I/O: Input-Output statements, Formatted I/O.
Decision making statements: if, if-else, if-else-if, nested if, switch.
Iterative Statements: while, do- while, for**.**
Unconditional statements: break, continue, goto.

Unit-III

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

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

Unit-IV

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

Pointers: Pointers and addresses, Pointer expressions and Pointer arithmetic, Pointers and Functions, 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 within Structures, Structures and Functions, Pointers and Structures, Self-referential Structures, Unions.

Files: Introduction, Types of Files, File Access Functions, I/O on Files, Random Access to Files, Error Handling, Command Line Arguments.

Teaching Methodologies

1. White board and marker
2. Power point presentations

Text Books

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

Reference Books

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

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY

BASIC ELECTRICAL ENGINEERING

Course Code: GR14A1018 L:3 T:1 P:0 C:4
I Year II Semester

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 of Circuit 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 and Parallel Resonance, Theorems: Superposition theorem, Thevinin's theorem, Norton's Theorem, Maximum Power Transfer Theorem, Reciprocity theorem.

Unit-V

Fundamentals Of Electrical Machines: Construction, Principle, Operation and Applications of

(i) DC Motor,

(ii) Single phase Transformer

(iii) Single phase Induction motor

Text Books

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

Reference Books

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

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY

ENGINEERING WORKSHOP

Course Code: GR14A1025 L:0 T:0 P:2 C:2
I Year I Semester

Unit-I
Carpentry Shop – 1:

1.1. Introduction to various types of wood such as Teak, Mango, Sheesham, etc. (Demonstration and their identification).
1.2. 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
1.3. Introduction to various types of wooden joints, their relative advantages and uses.
Job II Preparation of half lap joint
Job III Preparation of Mortise and Tenon Joint
1.4. Safety precautions in carpentry shop.

Unit-II
Fitting Shop – 2:

2.1. Introduction to fitting shop tools, common materials used in fitting shop.
2.2. 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:

3.1 Study, demonstration and identification of common electrical materials such as wires, cables, switches, fuses, PVC Conduits.
3.2 Study of electrical safety measures and demonstration about use of protective devices such as fuses, and relays including earthing.

Job I I dentification of phase, neutral and earth of domestic appliances And their connection to two pin/three pin plugs.
Job II Preparation of a house wiring circuit on wooden board using fuse, switches, socket, holder, ceiling rose etc. in PVC conduit and PVC casing and capping wiring system.
Job III Two lamps in series and parallel connection with one way switch
Job IV 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:

4.1 Introduction to tin -smithy shop, use of hand tools and accessories e.g. different types of hammers, hard and soft mallet, sheet and wire gauge, necessary allowance required during job fabrication, selection of material and specifications.
4.2 Introduction and demonstration of hand tools used in tin -smithy shop.
4.3 Introduction and demonstration of various raw materials used in sheet metal shop e.g. M.S. sheet, galvanized-iron plain sheet, galvanised corrugated sheet, aluminium sheets etc.
4.4. Preparation of a rectangle tray and open scoop/ funnel.

Reference Books

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

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY

COMPUTER PROGRAMMING LAB

Course Code: GR14A1027 L:0 T:0 P:2 C:2
I Year I Semester

Task- I

a) 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.

b) Write a C program to find the roots of a quadratic equation using if-else.

c) 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.

Write a C program using switch statement to accomplish the above task.

d) 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

a) Write a C program to construct pyramid of numbers.

b) 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.

c) 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

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

b) 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.

c) 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

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

b) Write a C Program to search whether a given number is present in set of integers

c) Write a C Program to sort a given list of integers.

Task - V

a) Write a C program to count the lines, words and characters in a given text.

b) Write a C program to sort the names of 5 students in the alphabetical order.

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.

Ex: Rotations of the string "NEWS" are NEWS EWSN WSNE SNEW

Task - VI

a) Write a C program to perform the following operations:
i) To insert a sub-string in a given main string at a given position.
ii) To delete n Characters from a given position in a given string.

b) Write a C program to determine if the given string is a palindrome or not?

Task - VII

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

i) Transpose of a matrix
ii) Addition of Two Matrices
iii) Multiplication of Two Matrices

Task - VIII

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

i) To find the factorial of a given integer.
ii) To print the Fibonacci sequence
iii)To find the GCD (greatest common divisor) of two given integers.

Task- IX

a) 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.

b) 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

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

i) Addition
ii) Subtraction
iii) Multiplication
iv) Division
(Note: represent complex number using a structure.)

Task-XI

a) 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.

b) 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

a) Write a C Program to display the contents of a file.

b) Write a C Program merging of two files in a single file.

c) Write a C Program to append data into a file.

Task - XIII

a) Write a C program which copies one file to another.

b) 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

a) Write a C program to develop Tic Tac Toe game

b) Write a C program to solve Towers of Hanoi

Text Books

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

Reference Books

1. Programming in C, Pradip Dey, Manas Ghosh, Second Edition, Oxford University Press.
2. Let Us C, Yashwanth Kanetkar, 10th Edition, BPB Publications.
3. C& Data structures, P.Padmanabham, B.S. Publications.
4. Computer science, A structured programming approach using C, B.A. Forouzan and R.F. Gilberg, Third edition, Thomson.
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

ENGINEERING PHYSICS LAB

Course Code: GR14A1029 L:0 T:0 P:2 C:2
I Year I Semester

List of Experiments

1. Determine the energy gap of a given semiconductor.
2. Calculate the energy loss in a given Ferro magnetic material by plotting B-H curve.
3. Calculate the Numerical Aperture of a given optical fiber.
4. Determine the Dielectric constant and Curie temperature of PZT material.
5. Calculate the Acceptance angle of a given optical fiber.
6. Draw V-I & L-I Characteristics of LASER diode.
7. Determine the bending losses in a given optical fibers.
8. Determine the Air-gap losses in a given optical fibers.
9. Determine the Hall Coefficient in Ge semiconductor by using Hall Experimental setup.
10. Determine the carrier concentration, mobility of charge carrier in Ge semiconductor.
11. Measure Ac voltage and frequency through CRO.
12. Measure Resistance and Capacitance by using digital multimeter.
13. Diffraction Grating.
14. Newtons Ring.

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY

TRANSFORM CALCULUS AND FOURIER SERIES

Course Code: GR14A1003 L:2 T:1 P:0 C:3
I Year II Semester

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.

Unit-II

Laplace Transform: 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.

Unit-III

Z-Transform and Fourier series: Definition-Z transform of elementary sequences-Properties- The inverse Z Transform, Application of Z transform to solve difference equations Definition of orthogonal functions-The concept of Weight function-Fourier series of periodic functions- Fourier expansion of periodic functions-Half range Fourier series expansions.

Unit-IV

Fourier Transform: Exponential Fourier series-The continuous one dimensional Fourier transform-Properties-Convolution-Parseval's identity- Fourier Sine and Cosine transforms.

Unit-V

Partial differential equations: Formation of PDE-Solution of Lagrange's linear equations-Method of separation of variables to solve IBVP like 1-D heat, 1-D wave and BVP like 2-D Laplace's equations. Application of Fourier transform to the solution of partial differential equations.

Teaching Methodologies

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
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: GR14A1004 L:2 T:1 P:0 C:3
I Year II Semester

Unit-I

Root finding techniques and Numerical solution of linear algebraic systems: Bisection method-Regula Falsi- Fixed point iteration method-Newton Raphson method - Rate of convergence of the above methods (without proof). LU decomposition method-Cholesky's method-Jacobi and Gauss Seidel iteration methods- Convergence of iterative methods (without proof).

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 formulas- Lagrange and Newton's divided difference interpolation formulas for non-uniform data-Cubic spline interpolation.

Unit-III

Curve fitting and B-spline approximation: Method of least squares- Fitting a straight line, and second degree parabola, exponential and power curves to data-Approximation of functions by B-Splines (Linear and Quadratic cases only).

Unit-IV

Numerical differentiation and numerical integration: Numerical differentiation using the Newton's forward, backward and central difference formulas-Numerical integration by Trapezoidal rule, Simpson's 1/3rd and 3/8th rules-Gauss-Legendre one point, two point and three point rules.

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

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.
3. Introductory methods of Numerical Analysis (5th edition)-S.S.Sastry-PHI.

Reference Books

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

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY

ENGINEERING CHEMISTRY

Course Code: GR14A1008 L:2 T:1 P:0 C:3
I Year II Semester

Unit-I

Water Technology: Sources of natural water, impurities, hardness: causes, types, expression, units, estimation of hardness of water using complex metric titration method, problems on hardness, Boiler feed water, boiler troubles(scale, sludge, carry over, Caustic Embrittlement, Boiler Corrosion). Internal reatment methods(carbonate, phosphate, calgon), Softening of water – Lime Soda, Ion-Exchange process. Alkalinity of water and its determination, Potable water- its characteristics and steps involved in Municipal Water Treatment, Chlorination-Break Point Chlorination, sterilization by ozonation. Desalination of Brackish water - Reverse Osmosis. Waste water-types of effluents, domestic and industrial effluents(on over view)

Unit-II

Electrochemistry & Corrosion: Concept of Conductances-specific, equivalent, molar conductances and their inter relation ships applications of conductance-conductometric titrations-(Strong acid Vs Strong Base and Weak Acid Vs Strong Base). EMF of a cell, Electrode- Single Electrode Potential, Standard Electrode potential, Electro chemical series and its applications, Electrochemical Cells-types, Galvanic cell: cell representation, Cell reactions, Cell EMF, Electrolytic cells, Concentration cell. Batteries-types Lithium Cell(Li-thionyl Chloride), Secondary cells: Pb-PbO_2 cell, Fuel cells: H_2-O_2 fuel cells and their applications.

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(Galvanisation), Cementation(Sheradising), Electroplating(Cu coating), Organic Coatings: Paints – its constituents and their functions.

Unit-III

Engineering Materials I: Cement-types-portland cement –composition, Setting & Hardening of Portland cement. Ceramics-types-ceramic products - white wares, Stone ware, properties and applications of ceramics. Refractories-classification,properties(refractoriness,RUL,thermal spalling, thermal conductivity) and their application.

Lubricants: Classification with examples, mechanisms of lubrication (thick film, thin film, extreme pressure), properties of lubricants- viscosity, flash point, fire point, cloud point, pour point (Definition and significance).

Unit-IV

Engineering Materials II: Electronic materials : Semi conductors, 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 Hi Density Poly Ethylene(HDPE), Poly Vinyl Chloride(PVC), Bakelite & Nylon 6,6. Liquid Crystal Polymers and their applications, Organic Light Emmiting Diodes (an Over View). Biodegradable polymers-their advantages and their applications. Elastomers – preparation, properties and applications of Butyl rubber, Thiokol rubber, Styrene-Butadiene Rubber. Conducting Polymers-classification with examples-mechanism of conduction in trans poly acetylene and their applications.
Rubber. Conducting Polymers-classification with examples-mechanism of conduction in trans poly acetylene and their applications.

Unit-V

Energy sources: 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, Theoretical calculation of Calorific Value by Dulong's formula, Numerical Problems. Petroleum-its composition-synthetic petrol – Bergius and Fischer Tropsch's process method , cracking (Definition) and its 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 transesterification method, advantages of Bio-fuel.

Teaching Methodologies

1. White Board with marker, OHP & Power Point Presentation
2. Conducting quizzes,
3. Conducting Experiments
4. Assignment uploaded in website.

Text Books

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

Reference Books

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

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY

DATA STRUCTURES

Course Code: GR14A1010 L:2 T:1 P:0 C:3
I Year II Semester

Unit-I
Introduction to data structures: Stacks, Stack Operations, Representation of a Stack using Arrays, Stack Applications: Recursion, In-fix 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, Enqueue, Dequeue, Circular Queues, Priority Queues.

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, arrays, 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), exchange (bubble sort, quick sort), distribution (radix sort) and merging (merge sort) Algorithm, Searching: Linear, binary search, indexed sequential search.

Teaching Methodologies

1. White Board
2. Marker
3. LCD Projector
4. OHP Projector

Text Books

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

Reference Books

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

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY

ENGINEERING GRAPHICS

Course Code: GR14A1023 L:1 T:0 P:2 C:3
I Year II Semester

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 First and 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.

Teaching Methodology
Power point Presentations, Working models, white board & marker

Text Books

1. Engineering Drawing, N.D. Bhat / Charotar
2. Engineering graphics with Auto CAD- R.B. Choudary/Anuradha Publishers

Reference Books

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

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY

FUNDAMENTALS OF ELECTRONICS ENGINEERING

Course Code: GR14A1019 L:3 T:1 P:0 C:4
I Year II Semester

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 a transistor, Analysis of single stage transistor amplifier using h-parameters: voltage gain, current gain, Input impedance and Output impedance. Comparison of transistor configurations in terms of Ai, Ri, Av, Ro.

Teaching Methodologies

- Power Point presentations
- Tutorial Sheets
- Assignments
- Lab experiments with Multisim software

Text Books

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

Reference Books

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

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY

BUSINESS COMMUNICATION AND SOFT SKILLS

Course Code: GR14A1024 L:0 T:0 P:2 C:2
I Year II Semester

Unit-I
Just A Minute (JAM): Introduction to public speaking, analyzing and assimilating ideas, audience, voice modulation, Pronunciation and enunciation.

Unit-II
Phonetics: Introduction to speech sounds; identification of sound symbols; vowel and consonants

Unit-III
Roleplay: Introduction to role play; situation handling; non-verbal communication

Unit-IV
Debate: Introduction and features of Debate; Types of Debate; Understanding critical thinking; building sustainable arguments; assessing credibility of the argument; overcoming obstacles

Unit-V
Describing a Person, Situation, Process and Object: Introduction to techniques of clear, brief and impersonal description to a listener or reader.

Unit-VI
Letter Writing: Manual and Emailing, types and formats, content and body of the letter. Email etiquette.

Unit-VII
Report Writing: Formats and types of reports

Unit-VIII
Mind Mapping: Assimilation of thoughts, expansion of ideas on central idea, suggesting parameters to carry forward the thinking process without deviation.

Reference Books

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

Software Used

1. Sky Pronunciation Suite
2. Clarity
3. Mastering English

GOKARAJU RANGARAJU
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IT WORKSHOP

Course Code: GR14A1026 L:0 T:0 P:2 C:2
I Year II Semester

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).
Task 6: Network Protocols: Understand the Open Systems Interconnection (OSI) model, IPv4, IPv6-ipv4toipv6 tunneling protocols to ensure backward compatibility, dual IP stack, subnetmask, gateway, ports, packets, reserved address ranges for local use (including local loopback IP).

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.

Teaching Methodologies

1. Power Point presentations.
2. Assignments.
3. Hands on experiment.

References

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

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY

ENGINEERING CHEMISTRY LAB

Course Code: GR14A1030 L:0 T:0 P:2 C:2
I Year II Semester

List Of Experiments

1. Estimation of Total Hardness in sample water by complexometry
2. Estimation of percentage available chlorine in Bleaching Powder.
3. Estimation of Fe2+ by permanganometry.
4. Determination of strength of an acid by potentiometric titration method
5. Determination of strength of an acid using conductometry.
6. Determination of Strength of an acid in Pb-Acid battery titrimetric method
7. Determination of percentage of Iron in Cement sample by colorimetry..
8. Estimation of Calcium in port land cement.
9. Determination of Viscosity of the given unknown liquid by Oswald's viscometer.
10. Determination of surface tention of the given unknown liquid by stalagnometer.
11. Preparation of Thiokol rubber.
12. Determination of percentage Moisture content in a coal sample.

Reference Books

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

II-Year

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY

SPECIAL FUNCTIONS AND COMPLEX VARIABLES

Course Code: GR14A2058 L:2 T:1 P:0 C:3
II Year I Semester

Unit-I
Special Functions I: Solution to Cauchy-Euler Problem. Introduction to series solution of differential equations. Legendre polynomials (as solution of second order differential equation) – properties – Rodrigue's formula – recurrence relations – orthogonality.

Unit-II
Special Functions-II: Bessel Functions – properties – recurrence relations – orthogonality. Chebyshev polynomials (as solution of second order differential equation) – properties – recurrence relations – orthogonality.

Unit-III
Functions of a Complex variable: Continuity – differentiability – Analyticity – Cauchy-Riemann equations – Maxima-minima principle – Harmonic and conjugate harmonic functions – Milne-Thompson method.
Elementary functions: General power Principal value. Logarithmic function.
Conformal mapping: Transformations e^z, Im z, Z^2, Z^n (n is a positive integer), sinz, cosz, z + (a/z). Translation, rotation, inversion and bilinear transformation – fixed point – cross ratio – invariance of circles and cross ratio – determination of bilinear transformation mapping 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 series.

Unit-V
Singular points, Residues and Applications of Complex Integration: Singular points – isolated singular point – pole of order m – essential singularity. (Distinction between real analyticity and complex analyticity). 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) $\int_{c}^{c+2\pi} f(\cos\theta, \sin\theta)d\theta.$

(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: GR14A2034 L:3 T:1 P:0 C:4
II Year I Semester

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) =ρ_v. ,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.

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NETWORK THEORY

Course Code: GR14A2035 L:3 T:1 P:0 C:4
II Year I Semester

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 circui.

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 Books

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
6. Electric Circuits by David A. Bell,Oxford University Press

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY

DC MACHINES AND TRANSFORMERS

Course Code: GR14A2036 L:3 T:1 P:0 C:4
II Year I Semester

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

Unit-III
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. DC Machines and Transformers PPTS
2. Assignments uploaded in website

Text Books

1. Electric Machines by I.J. Nagrath&D.P. Kothari, TataMcGraw Hill Publishers, 3rd edition, 2004.
2. Electromechanics–I (D.C. Machines) S. KamakshaiahHi-Tech Publishers.

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. Electro mechanical Energy Conversion with Dynamics of Machines by R.D.Begamudre, New AgeInternational(P)Ltd., Publishers, 2ndedition, 1998.
5. Electric Machines–M.V. Deshpande, Wheeler Publishing,1997.
6. Electrical Machines-S.K. Battacharya,

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY

COMPUTER ORGANIZATION

Course Code: GR14A2076 L:3 T:1 P:0 C:4
II Year I Semester

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.

References Books

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

GOKARAJU RANGARAJU
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DC MACHINES LAB

Course Code: GR14A2037 L:0 T:0 P:2 C:2
II Year I Semester

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 AUTO- CAD 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.

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MULTISIM/NETWORKS LAB

Course Code: GR14A2038 L:0 T:0 P:2 C:2
II Year I Semester

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
13. Measurement of Active and Reactive power of star and delta connected balanced loads

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LABVIEW/MATLAB LAB

Course Code: GR14A2039 L:0 T:0 P:2 C:2
II Year I Semester

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 VI
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
7. Building arrays using for loop and while loop
8. Random signal generation
9. Waveform minimum & maximum value display
10. Wave at interface
11. Force mass spring damper
12. Matrix fundamentals
13. Simple Pendulum
14. Three phase sine wave generation
15. Signal Modulation

Sci lab

1.Single phase half wave diode rectifier

2.Create the vector(X12, X22,X32,X42) with X=1,2,3,4

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY

ENVIRONMENTAL SCIENCE

Course Code: GR14A2001 L:4 T:0 P:0 C:0
II Year I Semester

Unit-I

Introduction to Environment, Ecology and Ecosystems: Definition, Importance and Scope of Environmental Studies, 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.

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. Role of individuals in conservation of important natural resources.

Unit-III

Environmental Pollution: Definition, Classification of Pollution, Types of Pollution and Pollutants. Causes, effects and control of – Air Pollution, Water Pollution, Soil Pollution, Marine Pollution, Noise Pollution, Thermal Pollution and Nuclear Pollution.

Unit–IV

Environmental Problems and Management Policies: Natural Disasters-Types, causes and effects; Global warming, Climate change-El Nino-La Nina, Ozone layer- location, role and degradation; Deforestation and desertification. Management: Technological solutions, Preventive methods, control techniques; Green Belt development, Rainwater harvesting, Renewable and alternate 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; Wildlife Protection Act; Municipal solid waste management and handling Act; Biomedical 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; Strategies for achieving sustainable development; Concept of Green buildings and Clean Development Mechanism (CDM).

Teaching Methodology

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

Text Books

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

Reference Books

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

GOKARAJU RANGARAJU
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MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS

Course Code: GR14A2104 L:2 T:1 P:0 C:3
II Year II Semester

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. Demand Forecasting, Factors governing demand forecasting, methods of demand forecasting.

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. Break-even Analysis (BEA)-Determination of Break-Even Point (simple problems) - Managerial Significance.

Unit-III
Markets & New Economic Environment: Types of competition and Markets, Features of Perfect competition, Monopoly and Monopolistic Competition. Price-Output Determination in case of Perfect Competition and Monopoly. Pricing: Objectives and Policies of Pricing. **Methods of Pricing. 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.

Unit-IV
Capital Budgeting: Capital: Capital and its significance, Types of Capital, Estimation of Fixed and Working capital requirements, Methods and sources of raising capital.
Capital Budgeting: features of capital budgeting proposals, Methods of Capital Budgeting: Payback Method, Accounting Rate of Return (ARR) and Net Present Value Method and Internal Rate of Return (IRR) (simple problems).

Unit-V
Introduction to Financial Accounting & Financial Analysis: Accounting Concepts and Conventions - Double-Entry Book Keeping. Accounting Cycle:

Journal, Ledger, Trial Balance, Final Accounts (Trading Account, Profit and Loss Account and Balance Sheet with simple adjustments).

Financial Analysis: Analysis and Interpretation of Liquidity Ratios, Activity Ratios, Capital structure Ratios and Profitability ratios. Du Pont Chart.

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: GR14A2040 L:3 T:1 P:0 C:4
II Year II Semester

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: GR14A2041 L:3 T:1 P:0 C:4
II Year II Semester

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. Analysis of short circuit current wave form – Determination of sub-transient, transient and steady state reactance's.

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

Reference Books

1. Electro mechanics-II (transformers and induction motors) S. Kamakashaiah Hitech publishers.
2. Electric machinery - A.E. Fitzgerald, C. Kingsley and S. Umans, McGraw Hill Companies, 5th edition
3. Electrical machines-P.S Bhimbra, Khanna Publishers.
4. Theory of Alternating Current Machinery- by Langsdorf, Tata McGraw-Hill Companies, 2nd edition.
5. Electrical Machines – M.V Deshpande, Wheeler Publishing
6. Electrical Machines – J.B. Gupta, S.K. Khataria& Son's Publications

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY

CONTROL SYSTEMS

Course Code: GR14A2042 L:3 T:1 P:0 C:4
II Year II Semester

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.Classical control design techniques- Compensation techniques Lag, Lead, Lead-Lag Controllers design in frequency domain, PID Controllers.

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. Modern Control Engineering by Katsuhiko Ogata Prentice Hall of India Pvt Ltd, 3rd edition, 1998.
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 by N. K. Sinha, New Age International (P) Limited Publishers, 3rd edition, 1998.
3. Control Systems by S. Kesavan, Hitech Publications.
4. Control Systems Engineering by NISE 3rd Edition John Wiley.
5. "Modeling and Control of Dynamic Systems" by Narciso F. Macia George J. Thaler, Thomson Publishers.
6. Control Systems by A. Anand Kumar, 2nd edition, PHI Learning Private Limited.

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY

PRINCIPLES OF DIGITAL ELECTRONICS

Course Code: GR14A2043 L:3 T:1 P:0 C:4
II Year II Semester

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,SwitcshingandFiniteAutomataTheory,2ndEdition,TMH
2. FrederickJ.Hill and GeraldR Peterson, Introductionto Switchingtheory and logicdesign, 3rdEdition, JohnWileyandsons,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: GR14A2044 L:0 T:0 P:2 C:2
II Year II Semester

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. 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. Rotor resistance starter for slip ring induction motor.
12. Induction generator.
13. Heat run test on transformer.
14. Star - delta starter for squirrel cage induction motor.

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY

CONTROL SYSTEMS LAB

Course Code: GR14A2045 L:0 T:0 P:2 C:2
II Year II Semester

Contents

1. Transfer function from zeros and poles
2. Zeros and poles from transfer function
3. Characteristics of synchros
4. Time response of series rlc circuits
5. State model from transfer function
6. State model from zeros and poles
7. Zeros and poles from state model
8. Step response of a transfer function
9. Impulse response of a transfer function
10. Ramp response of a transfer function
11. Step response of a state model
12. Impulse response of a state model
13. Ramp response of a state model
14. Transfer function of a dc generator
15. Transfer function of a dc motor
16. Time response of second order system
17. Root locus from a transfer function
18. Bode plot from a transfer function
19. PID controller
20. Lag compensator
21. Lead compensator
22. Lag- lead compensator
23. Determination of transfer function of dc motor
24. Hysteresis control of speed and current of dc motor, output to keep armature current Within limits using lab view
25. Bang bang speed control of dc motor
26. Speed control of dc motor using PID controller with a tcho feedback

27. Experimental determination of frequency response of speed control of a dc motor and to Obtain the transfer function of the system using lab view
28. Nyquist plot from transfer function
29. Ac variable speed drive for 3 phase induction motors from 0.25kw to 7.5kw , 0.33hp To 10hp.
30. Millenium PLC applications

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY

ANALOG AND DIGITAL ELECTRONICS LAB

Course Code: GR14A2046 L:0 T:0 P:2 C:2
II Year II Semester

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: GR14A2002 L:2 T:0 P:0 C:0
II Year II Semester

Unit-I
Values and self development –social values and individual attitudes, Work ethics, Indian vision of Moral and non-moral valuation, Standards and principles, Value judgments. Importance of cultivation of values, Sense of duty, Devotion, Self reliance, Confidence, Concentration, Truthfulness, Cleanliness, Honesty, Humanity, Power of faith, National unity, Patriotism, Love for nature, Discipline.

Unit-II
Personality and Behavior Development-Soul and scientific attitude, 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, love for truth, Aware of self destructive habits, Association and cooperation, Doing best, Saving nature.

Unit-III
Character and Competence-Science Vs God, Holy books Vs blind faith, Self management and good health, Equality, Nonviolence, Humanity, Role of women, All religions and same message, Mind your mind, Self control, Honesty, Studying effectively.

Unit-IV
Professional consciousness Ethics: Ethical Human conduct, Development of human consciousness, Implications of value based living, Holistic technologies, Production systems, Universal human order, Code of conduct.

Unit-V
Legislative procedures: Rights and Rules, Human Rights, Valuable groups, Copy rights, IPR, RTI Act, Lokpal, Ombudsman.

Text Books

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

Reference Books

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

III-Year

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY

OPERATIONAL AMPLIFIERS

Course Code: GR14A3015 L:2 T:1 P:0 C:3
III Year I Semester

UNIT-I
Integrated Circuits: Classification, Chip Size and Circuit Complexity, Ideal and Practical Op-Amp, Op-amp characteristics-DC and AC Characteristics. 741 Op-Amp and its Features, Modes of operation-inverting, non-inverting, differential.

UNIT-II
OP-AMP Applications: Basic Applications of Op-Amp, Instrumentation Amplifier, AC Amplifier, V to I and I to V Converters, Sample & Hold Circuits. Differentiators and Integrators. Comparators. Schmitt Trigger. Multi vibrators, Introduction to Voltage Regulators Features of 723 Regulators.

UNIT-III
Active Filters & Oscillators: Introduction. First Order and Second Order Low Pass. High Pass and Band Pass Filters. Active Band Reject and All Pass Filters. Principle of Operation and Types of Oscillators RC, Wien Bridge and quadrature type. Wave form Generators- Triangular, Saw Tooth, Square Wave.

UNIT-IV
Timers & Phase Locked Loops: Introduction to 555 Timer, Functional Diagram,Monostable and Astable Operations and Applications, Schmitt Trigger, PLL- Introduction, Block Schematic, Principles and Description of individual Blocks of 565, VCO

UNIT-V
D-A and A-D Converters: Introduction, Basic DAC Techniques- Weighted Resistor Type. R-2R Ladder Type, inverted R-2R Type. Different types of ADCs-Parallel Comparator Type. Counter Type. Successive Approximation Register Type and Dual Slope Type DAC and ADC Specifications.

Text Books
1. Linear Integrated CircuitsD Roy Chowdhury. New age International (P) Ltd.2003
2. Op Ams and Linear ICs Ramakanth A Gayakwad PHI1987

Reference Books

1. Operational Amplifiers and Linear Integrated Circuits: William D Stanely PEI 2009
2. Operational Amplifiers and Linear Integrated Circuits K Lal Kishore pearson 2008

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY

POWER TRANSMISSION SYSTEM

Course Code: GR14A3016 L:3 T:1 P:0 C:4
III Year I Semester

UNIT-I

TRANSMISSION LINE PARAMETERS: Types of conductors-calculation of resistance for solid conductors - Calculation of inductance for single phase and three phase, single and double circuit lines, concept of GMR &GMD, symmetrical and asymmetrical conductor configuration with and without transposition, Numerical Problems.

Calculation of capacitance for 2 wire and 3 wire systems, effect of ground on capacitance, capacitance calculations for symmetrical and asymmetrical single and three phase, single and double circuit lines, Numerical Problems.

UNIT-II

PERFORMANCE OF SHORT &MEDIUM LENGTH TRANSMISSION LINES:

Classification of Transmission Lines - Short, medium and long line and their model representations- Nominal-T, Nominal-π and A,B,C,D Constants for symmetrical &Asymmetrical Networks, Numerical Problems. Mathematical Solutions to estimate regulation and efficiency of all types of lines -Numerical Problems.

UNIT-III

PERFORMANCE OF LONG LENGTH TRANSMISSION LINES: Long Transmission Line-Rigorous Solution, evaluation of A, B, C, D Constants, Interpretation of the Long Line Equations, Incident, Reflected and Refracted Waves-Surge Impedance and SIL of Long Lines, Wave Length and Velocity of Propagation of Waves- Representation of Long Lines - Equivalent-T and Equivalent π- network models (numerical problems).

Skin, Proximity and Ferranti effects - Charging Current - Effect on Regulation of the Transmission Line.

UNIT-IV

POWER SYSTEM TRANSIENTS, CORONA & SAG: Types of System Transients- Travelling or Propagation of Surges- Attenuation, Distortion, Reflection and Refraction Coefficients- Termination of lines with different types of conditions-Open Circuited Line, Short Circuited Line, T-Junction, Lumped Reactive Junctions(Numerical Problems).

Corona-Description of the phenomenon, factors affecting corona, critical voltages and power loss, Radio Interference.

SAG AND TENSION CALCULATIONS: Sag and Tension Calculations with equal and unequal heights of towers, Effect of Wind and Ice on weight of Conductor, Numerical Problems.

UNIT-V

OVER HEAD LINE INSULATORS: Types of Insulators, String efficiency and Methods for improvement, Numerical Problems - voltage distribution, calculation of string efficiency, Capacitance grading and Static Shielding.

UNDER GROUND CABLES: Types of Cables, Construction, Types of Insulating materials, Calculation of Insulation resistance and stress in insulation, Numerical Problems. Capacitance of Single and 3-Core belted cables, Numerical Problems. Grading of Cables - Capacitance grading, Numerical Problems, Description of Inter- sheath grading, HV cables.

Text Books

1. M.L.Soni, P.V.Gupta, U.S.Bhatnagar, A.Chakrabarthy, "Power System Engineering", DhanpatRai&Co Pvt.Ltd.
2. C.L.Wadhwa, "Electrical power systems" New Age International (P) Limited, Publishers, 1998.

Reference Books

1. I.J.Nagarath&D.P Kothari, "Power System Engineering", TMH2/e,2010
2. B.R.Gupta, "Power System Analysis and Design", Wheeler Publishing.

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY

MICROCONTROLLERS

Course Code: GR14A2055 L:3 T:1 P:0 C:4
III Year I Semester

Unit-I

Microprocessors: Introduction to microprocessors, 8086 Architecture, Register organization ,Memory segmentation, Programming Model, Timing diagrams, Interrupts, Instruction formats, Addressing modes, Instruction set, Macros Program, 8255 PPI, Various modes of operation, Interfacing to 8086.

Interfacing: keyboard, Display, stepper Motor, D/A converter, Memory, Interrupt structure of 8086, Interrupt service routine, Serial communication standards.

Unit-II

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

Unit-III

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

Unit-IV

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

Unit-V

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

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

Teaching methodologies

- Power Point presentations
- Tutorial Sheets
- Assignments

Text Books

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

Reference Books

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

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY

ELECTRICAL MEASUREMENTS AND INSTRUMENTATION

Course Code: GR14A3017 L:3 T:1 P:0 C:4
III Year I Semester

UNIT-I

Fundamentals of Electrical Measurements: Ammeters & Voltmeters PMMC & Moving Iron Instruments C.T.s and PTs Ratio and Phase angle errors. Measurement of Power and power factor. Measurement of Active and Reactive power.

UNIT-II

Measurement of Energy and Other Electrical Qualities: Single phase & Three phase energy meters. Crompton's Potentiometer, AC potentiometers.Measurement of resistance, Inductance and Capacitance by bridges.Wheatstone bridge, Carey Foster Bridge, Maxwell's Bridge, De sauty bridge, Schering Bridge.

UNIT-III

CRO and Digital Voltmeters: Cathode Ray Oscilloscope, Time base Horizontal & Vertical Amplifier, Measurement of phase, frequency, Sampling Oscilloscope, Digital storage Oscilloscope.

Digital Voltmeters- Successive Approximation, Ramp, Dual slope Integration, Micro processor based Ramp type DVM, Digital Frequency and phase Angle Meters.

UNIT-IV

Instrumentation Fundamentals: Transducers, Classification, Resistive Inductive and Capacitive type transducers, LVDT, Strain Gauge, gauge factor, Thermistors, Thermo couples, Piezo electric transducers, Photo-voltaic, photo conductive transducers, and photo diodes

UNIT-V

Measurement of non Electrical Quantities: Measurement of Displacement, Velocity, RPM, Acceleration, Flow.

Text Books

1. Electrical & Electronic Measurement & Instruments by A.K.Shawney Dhanpat Rai & Sons Publications.
2. Electrical Measurements and measuring Instruments by E.W.Golding and F.C.Widdis, Fifth Edition, Wheeler Publishing.

Reference Books

1. D.V.SMurthy, “Transducers and Instrumentation”, Prentice Hall of India, 2nd edition,2009.
2. H.S.Kalsi, “Electronic Instrumentation”, Tata McGraw-Hill Edition, 1995,1st Edition, 1995

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY

POWER ELECTRONICS

Course Code: GR14A3018 L:3 T:1 P:0 C:4
III Year I Semester

UNIT-I

POWER SEMI CONDUCTOR DEVICES: Thyristors – Silicon Controlled Rectifiers (SCR's) – BJT – Power MOSFET – Power IGBT and their characteristics and other thyristors – Basic theory of operation of SCR – Static characteristics – Turn on and turn off methods- Dynamic characteristics of SCR - Turn on and Turn off times -Salient points

Two transistor analogy of SCR, SCR - UJT firing circuit —– Series and parallel connections of SCR's – Snubber circuit details – Specifications and Ratings of SCR's, BJT, IGBT - Numerical problems – Line Commutation and Forced Commutation circuits.

UNIT-II

SINGLE PHASE HALF CONTROLLED CONVERTERS: Phase control technique – Single phase Line commutated converters – Mid point and Bridge connections – Half wave controlled converters with Resistive, RL loads and RLE load– Derivation of average load voltage and current -Active and Reactive power inputs to the converters without and with Free wheeling Diode –Numerical problems

SINGLE PHASE FULLY CONTROLLED CONVERTERS

Fully controlled converters, Mid point and Bridge connections with Resistive, RL loads and RLE load– Derivation of average load voltage and current – Line commutated inverters -semi-converters, Active and Reactive power inputs to the converters, Effect of source inductance – Expression for load voltage and current, Dual converters – Numerical problems.

UNIT-III

THREE PHASE LINE COMMUTATED CONVERTERS: Three phase converters – Three pulse and six pulse converters – Mid point and bridge connections average load voltage With R and RL loads ,Semi converters,– Effect of Source inductance– - Waveforms –Numerical Problems.

INVERTERS

Inverters – Single phase inverter – Basic series inverter – Basic parallel Capacitor inverter, bridge inverter – Waveforms – Voltage control techniques for inverters Pulse width modulation techniques – Numerical problems, Basics of Resonant Inverters.

UNIT-IV

AC VOLTAGE CONTROLLERS & CYCLO CONVERTERS: AC voltage controllers – Single phase two SCR's in anti parallel – With R and RL loads – modes of operation of Triac – Triac with R and RL loads – Derivation of RMS load voltage, current and power factor wave forms -Numerical problems -Cyclo converters – Single phase mid pointcyclo converters with Resistive and inductive load (Principle of operation only) – Bridge configuration of single phase cyclo converter (Principle of operation only) – Waveforms.

UNIT-V

CHOPPERS: Choppers – Time ratio control and Current limit control strategies – Step down choppers Derivation of load voltage and currents with R, RL and RLE loads- Step up Chopper – load voltage expression. Morgan's chopper – Jones chopper (Principle of operation only) Waveforms —AC Chopper – Problems.

Text Books

1. P.S.Bhimbra,"Power Electronics",Khanna publications.
2. M.D.Singh&K.B.Kanchandhani, Power Electronics, Tata McGrawHill Publishing company, 1998.

Reference Books

1. VedamSubramanyam, Power Electronicsby New Age International (P) Limited, Publishers
2. P.C.Sen, Power Electronics, Tata McGraw-Hill Publishing.

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY

SENSORS, MEASUREMENTS AND INSTRUMENTATION LAB

Course Code: GR14A3019 L:0 T:0 P:2 C:2
III Year I Semester

List of Experiments

1. Voltage and Current Detection Circuitry
2. Temperature and Pressure Detection Circuitry
3. Water flow and Level detection Circuitry
4. Position Indication (LVDT, POT)
5. Proximity sensors(inductive)
6. Distance(Ultrasonic) sensor
7. Light sensor
8. Humidity sensor
9. Rainfall sensor& Soil moisture sensor
10. Motion sensor
11. Measurement of Power and Energy
12. Accelerometer sensor
13. Measurement of Resistance by bridges
14. Measurement of Inductance by bridges
15. Measurement of Capacitance by bridges

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY

POWER ELECTRONICS LAB

Course Code: GR14A3020 L:0 T:0 P:2 C:2
III Year I Semester

LIST OF EXPERIMENTS

SIMULATION CIRCUITS

1. 1-Phase Half Wave Controlled Converter With R, RL& RLE Load
2. 1-Phase Semi Converter With R, RL & RLE-Load
3. 1-Phase Full Controlled Converter With R, RL & RLE–Load
4. 1-Phase Ac Voltage Controller With R, RL &RLE – Load
5. 1-Phase Cycloconverter
6. Phase Half & Full Bridge Inverter
7. 3- Phase Full Controlled Converter with R, RL & RLE –Load
8. 3- Phase Bridge Inverter
9. Buck converter
10. Boost converter

HARDWARE

11. Thyristorised Drive for PMDC Motor with Speed Measurement and Closed Loop Control
12. IGBT Based 4 Quadrant Drive for PMDC Motor with Speed Measurement & Closed Loop Control
13. Three Phase Input Thyristorised Drive For Dc Motor With Closed Loop Control Closed Loop of Dc Motor Using Three Phase Fed Four Quadrant Chopper Drive
14. Speed Control of Three Phase Wound Induction Motor
15. Single Phase Fully Controlled Bridge Converter
16. Single Phase Half Controlled Bridge Converter
17. Single Phase Cyclo Converter

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY

MICROCONTROLLERS LAB

Course Code: GR14A2059 L:0 T:0 P:2 C:2
III Year I Semester

List of experiments on 2G kit

1. LED patterns
- a) Blinking LEDs, b) Serial lights,
- c) Half on/Half off, d) Alternate on/off

2. Switches & LEDs
- a) Press switch to make corresponding LED on,
- b) Press switch to make corresponding LED off
- c) First switch press, last LED on,
- d) First switch press, last LED off

3. LCD
- a) Character &string display on LCD,
- b) SW1-Display strring1 on first line ofLCD,
- c) SW2-Display strring1 on first line of LCD, SW2

4. UART
- a) Echo Program,
- b) Take command from PC & glow corresponding LED,
- c) Press Switch & display switch number on PC,
- d) Display data received by UART on LCD

5. TRIAC
- a) 220V AC bulb switch on/off,
- b) 220 V AC fan speed control with fixed step size.

6. ADC
- a) Raw ADC value display on LCE,
- b) Raw ADC value display on Hyper Terminal,
- c) Engineering unit conversion and display on LCD,
- d) Engineering unit conversion and display on Hyper Terminal
- e) Limit checking for temperature value and switching on fan using triac
- f) Limit checking for ambient light value and switching on light using triac.

7. DAC
- a) Fixed step incremented DAC, output seen on multi-meter,
- b) DAC input value received from Hyper Terminal
- c) DAC input value taken from switches

8. DC motor

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

9. ZigBee

a) Receive data on ZigBee from PC ZigBee dongle and display data on LEDs
b) Receive data on ZigBee from PC ZigBee dongle and display data on LCD
c) Read ADC and transmit data using ZigBee d)Triac based control of fan and light using data received on ZigBee

10. RF 433MHz

a) Receive data on RF from another kit with RF transmitter. Connect PCs to both kits. Type in data in Hyper Terminal of Transmitter kit & see on Hyper Terminal of Receiver kit
b) Read switches on transmitter kit, send their status on RF to receiver kit and control motor using switch status

11. Bluetooth

a) Transfer data to PC using Bluelink,
b) Receive data from PC using BlueLink & display on LCD
c) Transfer data from mobile phone(using a J2ME app) and receive using Blue link and control motor operation
d) Transfer data from mobile phone(using a J2ME app) and receive using BlueLink and control electrical appliance operation

12. Ethernet

a) Transfer data to PC using WIZI05SR and display on Hyper Terminal,
b) Implement an embedded web server

13. RTC

a) Read and display RTC data on LCD,
b) Read and display RTC data on Hyper Terminal,
c) Set RTC using Hyper terminal and display data on Hyper Terminal,
d) Implement an Event Logger with Time Stamp display

14. SDcard

a) Transfer data to PC, store on SDcard and retrieve it back(block transfer)
b) Implement FAT file system on SDcard c) Implement data acquisition system and store data in a CSV file on SD card with time stamp

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

Lab methodologies

- Assignments
- Lab experiments with Arduino software

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY

COMPUTER METHODS IN POWER SYSTEMS

Course Code: GR14A3021 L:3 T:1 P:0 C:4
III Year II Semester

UNIT -I

Power flow Studies-1: Per-Unit System of Representation. Per-Unit equivalent reactance network of a three phase Power System, Numerical Problems. Ybus formation by Direct Inspection Method, Numerical Problems. Necessity of Power Flow Studies – Data for Power Flow Studies – Derivation of Static load flow equations – Load flow solutions using Gauss Seidel Method: Acceleration Factor, Load flow solution with and without P-V buses, Algorithm and Flowchart. Numerical Load flow Solution for Simple Power Systems (Max. 3-Buses): Determination of Bus Voltages, Injected Active and Reactive Powers (Sample One Iteration only) and finding Line Flows/Losses for the given Bus Voltages.

UNIT-II

Power flow Studies-2: Newton Raphson Method in Rectangular and Polar Co-Ordinates Form, Load Flow Solution with and without PV Busses- Derivation of Jacobian Elements, Algorithm and Flowchart. Decoupled and Fast Decoupled Methods.- Comparison of Different Methods – DC load Flow.

UNIT-III

Formation of Zbus: Partial network, Algorithm for the Modification of Zbus Matrix for addition of an element for the following cases: Addition of an element from a new bus and reference, Addition of element from a new bus to an old bus, Addition of element between an old bus to reference and Addition of element between two old buses (Derivations and Numerical Problems)-Modification of Zbus for the changes in network (Problems).

Short Circuit Analysis: Symmetrical fault Analysis: Short Circuit Current and MVA Calculations, Fault levels, Application of Series Reactors, Numerical Problems.

Symmetrical Component Theory: Symmetrical Component Transformation, Positive, Negative and Zero sequence components: Voltages, Currents and Impedances.

Sequence Networks: Positive, Negative and Zero sequence Networks, Numerical Problems.

Unsymmetrical Fault Analysis: LG, LL, LLG faults with and without fault impedance, Numerical Problems.

UNIT-IV

Steady State Stability Analysis: Elementary concepts of Steady State, Dynamic and Transient Stabilities.

Description of: Steady State Stability Power Limit, Transfer Reactance, Synchronizing Power Coefficient, Power Angle Curve and Determination of Steady State Stability and Methods to improve steady state stability.

UNIT-V

Power System Transient State Stability Analysis: Derivation of Swing Equation. Determination of Transient Stability by Equal Area Criterion, Application of Equal Area Criterion, Critical Clearing Angle Calculation - Solution of Swing Equation: Point-by-Point Method and Modified Euler's method. Multi machine stability. Methods to improve transient Stability.

TEXT BOOKS

1. Electric Power Systems by C. L. Wadhwa, New Age International.
2. Modern Power System Analysis by I.J.Nagrath&D.P.Kothari, Tata McGraw-Hill.

REFERENCE BOOKS

1. Power System Analysis by Grainger and Stevenson, Tata McGraw Hill.
2. Power System Analysis by HadiSaadat, TMH Edition.

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY

SWITCH GEAR AND PROTECTION

Course Code: GR14A3022 L:3 T:1 P:0 C:4
III Year II Semester

UNIT–I

INTRODUCTION TO CIRCUIT BREAKERS: Circuit Breakers: Elementary principles of arc interruption, Recovery, RestrikingVoltage and Recovery voltages.- Restriking Phenomenon, Averageand Max. RRRV, Numerical Problems- Current Chopping and Resistance Switching-CB ratings and Specifications.

Description and Operation of following types of circuit breakers:MinimumOil Circuit breakers, Air Blast Circuit Breakers, Vacuum and SF6 circuit breakers.

UNIT–II

ELECTRO MAGNETIC AND STATIC RELAYS:

Electromagnetic Relays: Principle of Operation and Construction of Attracted armature, Balanced Beam, induction Disc and Induction Cup relays. Application of relays: Overcurrent, Under voltage relays, Directional relays, Differential Relays. Universal torque equation, Distance relays: Impedance, Reactance and Mho and Off-Set Mho relays, Characteristics of Distance Relays and Comparison. Static Relays:Static Relays verses Electromagnetic Relays.

Static Relays: static Vs Electromagnetic relays, static over current relays.

UNIT–III

PROTECTION OF GENERATORS & TRANSFORMERS: Protection of generatorsagainstStator faults, Rotor faults, and Abnormal Conditions. Restricted Earth fault and Inter-turn fault Protection. Numerical Problems on Percentage Winding Unprotected. Protection of transformers: Percentage Differential Protection, Numerical Problem on Design of CT s Ratio, Buchholtzrelay Protection. Protection of lines:OverCurrent, Carrier Current and Zonal Protection,Transley Relay.

Protection of Bus bars: Differential protection, Frame Leakage Protection.

UNIT–IV

NEUTRAL GROUNDING: Grounded and Ungrounded Neutral Systems.-Effects of Ungrounded Neutral on system performance. Methods of Neutral Grounding: Solid, Resistance, Reactance-Arcing Grounds and Grounding Practices.

UNIT–V

PROTECTION AGAINST OVER VOLTAGES: Generation of Over Voltages in Power Systems.-Protection against Lightning Over Voltages-Valve type and Zinc- Oxide Lightning Arresters-Insulation Coordination-BIL, Impulse Ratio, Standard Impulse Test Wave, Volt-Time Characteristics.

Teaching Methodologies

1. Ppts
2. Assignments

Text Books

1. Sunil S Rao, Switch gear and Protection–Khanna Publishers.
2. BadriRam, D.N.Viswakarma, Power System Protection and Switch gear, TMH Publications.

Reference Books

1. C.L.Wadhwa, Electrical Power Systems–New Age international (P) Limited, Publishers, 6thedition
2. B.L.Soni, Gupta, Bhatnagar, Chakrabarthy, AText book on Power System Engineering, DhanpatRai&Co.

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY

UTILIZATION OF ELECTRICAL ENERGY

Course Code: GR14A3023 L:2 T:1 P:0 C:3
III Year II Semester

UNIT-I
ELECTRIC DRIVES: Type of electric drives, choice of motor, starting and running characteristics, speed control, temperature rise, particular applications of electric drives, types of industrial loads, continuous, intermittent and variable loads, load equalization.

UNIT-II
ELECTRIC HEATING: Advantages and methods of electric heating, resistance heating induction heating and dielectric heating .
ELECTRIC WELDING: Electric welding, resistance and arc welding , electric welding equipment, comparison between A.C and D.C Welding.

UNIT-III
ILLUMINATION: Introduction, terms used in illumination, laws of illumination, polar curves, photometry, integrating sphere, sources of light., Various Illumination Methods: Discharge lamps, MV and SV lamps, comparison between tungsten filament lamps and fluorescent tubes, Basic principles of light control, Types and design of street lighting and flood lighting.

UNIT-IV
ELECTRIC TRACTION-I: System of electric traction and track electrification, Review of existing electric traction systems in India, Special features of traction motor, methods of electric braking, plugging rheostatic braking and regenerative braking., Mechanics of train movement, Speed-time curves for different services, trapezoidal and quadrilateral speed time curves.

UNIT-V
ELECTRIC TRACTION-II: Calculations of tractive effort, power, specific energy consumption for given run, effect of varying acceleration and braking retardation, adhesive weight and coefficient of adhesion.

Text Books:
1. J.B.Gupta ,Utilization of Electric Power & Electric Traction
2. Partab,Art& Science of Utilization of Electrical Energy DhanpatRai& Sons

Reference Books

1. N.V.Suryanarayana, Utilization of Electric Power including Electrical Drives & Electric Traction, New Age International(P) Limited, Publishers,1996.
2. C.L.Wadhwa, Generation, Distribution and Utilization of Electrical Energy, New Age International(P) Limited, Publishers, 1997.

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY

MANAGEMENT SCIENCE

Course Code: GR14A3102 L:3 T:1 P:0 C:4
III Year II Semester

Unit-1

Introduction to Management &Organisation: Concepts of Management and Organization: Nature, Importance, Functions and Theories of Management;Systems Approach to Management; Leadership Styles; Social Responsibilities of Management. Designing Organisational Structures: Basic concepts relating to Organisation; Departmentation and Decentralisation, Types and Evolution of mechanistic and organic structures of organisation and suitability.

Unit-II

Operations &Marketing Management: Principles and Types of Plant Layout, Methods of production (Job, batch and Mass Production), Work Study -Basic procedure involved in Method Study and Work Measurement.Statistical Quality Control: Control Charts for Variables and Attributes (Simple Problems) and Acceptance Sampling, Deming's contribution to quality. Objectives of InventoryControl, EOQ, ABC Analysis, Purchase Procedures, Stores Management and Stores Records - Functions of Marketing, Marketing Mix, Marketing Strategies based on Product Life Cycle, Channels of Distribution.

Unit-III

Human Resources Management (HRM): Concepts of Personnel Management, HRM and HRD and Industrial Relations (IR), HRM vs. PMIR. Basic functions of HR Manager: Manpower planning, Recruitment and Selection, Training and Development, Placement, Wage and Salary Administration, Promotion, Transfer, Separation, Performance Appraisal, Grievance Handling and Welfare Administration, Job Analysis, Job Description, and Job Evaluation.

Unit-IV

Project Management (PERT/CPM): Network Analysis, Programme Evaluation and Review Technique (PERT), Critical Path Method (CPM), Identifying critical path, Probability of Completing the project within given time, Project Cost Analysis, Project Crashing (simple problems).

Unit-V

Strategic Management and Contemporary Strategic Issues: Mission, Goals, Objectives, Policy, Strategy, Programmes, Elements of Corporate Planning

Process, Environmental Scanning, Value Chain Analysis, SWOT Analysis, Steps in Strategy Formulation and Implementation, Generic Strategy alternatives. Contemporary Management Practices: Basic concepts of MIS, End User Computing, Materials Requirement Planning (MRP), Just-In-Time (JIT) System, Total Quality Management (TQM), Six Sigma and Capability Maturity Model (CMM) Levels, Supply Chain Management, Enterprise Resource Planning (ERP), Performance Management, Business Process Outsourcing (BPO), Business Process Re-engineering and Bench Marking, Balanced Score Card.

Teaching Methodologies

1. Lecture Method
2. Use of OHP
3. Power Point Presentation
4. Tutorials and Assignments

Text Book

1. Aryasri: Management Science, TMH, 2009.

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY

NON CONVENTIONAL SOURCES OF ENERGY
(Open Elective)

Course Code: GR14A3024 L:3 T:1 P:0 C:4
III Year II Semester

UNIT-I
Fundamentals of Solar Energy-Solar spectrum-Solar Radiation on Earth's surface- Solar radiation geometry-Solar radiation measurements-Solar radiation data-Solar radiation on horizontal and tilted surfaces. Solar Thermal conversion-Flat plate collectors- concentrated collectors- construction and thermal analysis-Solar applications-Solar ponds-Heliostat systems-water heater-air heater- solar still.

UNIT-II
Solar-Electric Power generation-Photo voltaic cells-Equivalent circuit- V-I Characteristics- Photovoltaic modules – constructional details- design considerations-Tracking-Maximum power point tracking–algorithms-PV solar system design with energy backup-Solar Thermo electric conversion.

UNIT-III
Wind Energy-Fundamentals of wind energy-power available in wind-BetzLimit-Aero dynamics of wind turbine-Wind turbines-Horizontal and vertical axis turbines –their configurations-Wind Energy conversion systems.

UNIT-IV
Energy from Bio Mass- Various fuels-Sources-Conversion technologies-Wet Processes–Dry Processes-Bio Gas generation–Aerobic and an aerobic digestion- Factors affecting generation of bio gas –Classification of bio gas plants-Different Indian digesters- Digester design considerations- Gasification process-Gasifiers – Applications. Geo thermal Energy-sources-Hydro thermal convective-Geo-pressure resources-Petro-thermal systems (HDR)-Magma Resources-Prime Movers.

UNIT-V
OTEC Systems-Principle of operation-Open and closed cycles, Energy from Tides- Principle of Tidal Power- Components of tidal Power plants-Operation Methods- Estimation of Energy in Single and double basin systems-Energy and Power from Waves-Wave energy conversion devices- Fuel Cells-Design and Principle of operation-Types of Fuel Cells-Advantages and disadvantages-Types of Electrodes- Applications-Basics of Batteries –Constructional details of Lead acid batteries- Ni-Cd Batteries.

Text Books

1. John Twidell&Wier, Renewable Energy Resouces, CRC Press,2009.
2. D.P. Kothari, Singal, Rakesh, Ranjan, Renewable Energy sources and Emerging Technologies, PHI, 2009.

Reference Books

1. G.D. Rai–Non Conventional Energy sources, Khanna publishers.
2. B.H.Khan, Non Conventional Energy Sources, PHI

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY

SIGNALS AND SYSTEMS
(Open Elective)

Course Code: GR14A2049 L:3 T:1 P:0 C:4
III Year II Semester

Unit-I

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

Unit-II

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

Unit-III

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

Unit-IV

Sampling & Discrete-time Signals: Sampling theorem – Graphical and analytical proof for BandLimited Signals; Impulse-train sampling; Natural and Flat-top Sampling; Reconstruction of signal from its samples; Under-sampling and Aliasing; Band-pass Sampling Theorem; DT signal characteristics (periodicity, frequency, deterministic, random, symmetry, energy and power).

Unit-V

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

Teaching methodologies

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

Text Books

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

Reference Books

1. M. J. Roberts, “Signals and Systems”, Second Edition, Tata-McGraw Hill, 2012.
2. Simon Haykin and Barry Van Veen, “Signals and Systems”, Edition, John Wiley and Sons, 2002.

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY

OPERATING SYSTEMS
(Open Elective)

Course Code: GR14A2069 L:3 T:1 P:0 C:4
III Year II Semester

Unit-I

Computer System and Operating System Overview: Overview of computer operating systems,operating systems functions, protection and security, distributed systems, special purpose systems, operating systems structures and system calls, operating systems generation

Unit-II

Process Management: Process concepts, threads, scheduling-criteria, algorithms, theirevaluation, Thread scheduling, case studies: Linux, Windows

Concurrency: Process synchronization, the critical- section problem, Peterson's Solution,synchronization Hardware, semaphores, classic problems of synchronization, monitors, Synchronization examples, atomic transactions. Case studies: Linux, Windows

Unit-III

Memory Management: Swapping, contiguous memory allocation, paging, structure of the pagetable , segmentation, virtual memory, demand paging, page replacement algorithms, Case studies: Linux, Windows, Principles of deadlock – system model, deadlock characterization, deadlock prevention, detection and avoidance, recovery from deadlock.

I/O systems: Hardware, application interface, kernel I/O subsystem, Transforming I/O requests,Hardware operation, performance.

Unit-IV

File system Interface: The concept of a file, Access Methods, Directory structure, file sharing,protection. File System implementation- File system structure, file system implementation, directory implementation, allocation methods, free-space management, efficiency and performance.

Mass-storage structure: Overview of Mass-storage structure, Disk structure, disk attachment,disk scheduling, swap-space management, RAID structure, stable-storage implementation, Tertiary storage structure.

Unit-V

Protection: Protection, Goals of Protection, Principles of Protection, Domain of protection, AccessMatrix, Implementation of Access Matrix, Access control,

Revocation of Access Rights, Capability-Based systems, Language – Based Protection, Security- The Security problem, program threats, system and network threats, cryptography as a security tool, user authentication, implementing security defenses, firewalling to protect systems and networks, computer – security classifications.

Teaching Methodologies

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

Text Books

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

References Books

1. Operating systems- A Concept based Approach-D. M. Dhamdhere, 2nd Edition, TMH
2. Operating System A Design Approach-Crowley, TMH.
3. Modern Operating Systems, Andrew S Tanenbaum 2nd edition Pearson/PHI.

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY

POWER SYSTEMS LAB

Course Code: GR14A3025 L:0 T:0 P:2 C:2
III Year II Semester

CONTENTS

1. Tripping Characteristics of an MCB of 1Ampere rating
2. Tripping sequence of protective devices
3. Tripping characteristics of protective devices
4. Testing of Instantaneous Over Current relay
   a) Phase Faults
   b) Earth Faults
5. a) Testing of differential relay
   B) Testing of percentage biased differential Relay
6. Testing of Negative sequence Relay
7. Model of a Transmission Line with Lumped Parameters
8. Characteristics of Bimetallic Thermal Over Load relays
9. a) Testing of Over Voltage Relay
   b) Testing of Under Voltage Relay
10. Current time Characteristics of Induction Disc type relay
11. Short circuit Analysis
12. Protection of Motor, transformer and bus
13. Protection of generator in parallel configuration

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY

ADVANCED ENGLISH COMMUNICATION SKILLS LAB

Course Code: GR14A3100 L:0 T:0 P:2 C:2
III Year II Semester

Unit-I
Functional English: Starting a conversation, responding appropriately and relevantly. Body Language, Role play in different situations

Unit-II
Vocabulary: Synonyms & Antonyms, Word Roots, One word substitutes, Prefixes & Suffixes, Study of word origin, Idioms and Phrases, Analogy.

Unit- III
Group Discussion: Introduction to Group Discussion its features and qualities desired in a participant of Group Discussion.

Unit-IV
Presentation Skills: Knowing audience; acquiring content; organizing ideas; foreseeing the possible clarifications sought; adopting of appropriate medium; positive stage presence; Presenting and feedback

Unit-V
Letter Writing & Résumé Writing: Manual and Emailing; types and formats; content and body of the letter. Email etiquettes; Resume Writing, tools required for writing resume's, role of cover letter in a resume.

Unit-VI
Interview Skills: Introduction, various types of questions asked in an interview, qualities required to be a competent interviewee.

Unit-VII
Reading comprehension: Introduction, types of reading, qualities of a good reader

Unit-VIII
Technical Report Writing
Formats and types of reports

Reference Books

1. English language laboratories: A Comprehensive Manual; NiraKonar, PHI Learning Pvt.Ltd.,Delhi.
2. Effective Technical Communication: A Guide for Scientist and Engineers;Barun K. Mitra, OUP.
3. Great Answers to Though Interview Questions; Martin John Yate; Seventh Edition;Kogan Page.
4. Business Communication; HorySankarMukerjee;OUP.
5. Technical Communication, Meenakshi Raman, Sangeeta Sharma, Oxford higher Education.
6. Professional Presentations; Malcom Goodale; Cambridge University Press.
7. Murphy's English Grammar with CD, Murphy, Cambridge University Press.
8. Effective Technical Communication, M. Ashraf Rizvi, Tata McGraw Hill.
9. Communication Skills, Sanjay Kumar, PushpLatha, Oxford Higher Education.
10. Business communication; Second Edition,Prentice Hall of India , New Delhi.
11. English for Engineers Made Easy, AedaAbidi, Ritu Chaudhry, Cengage Learning.
12. Effective Business Communication ; Seventh Edition; Murphy, HertaA.,Herbert W. Hildebrandt, and Jane P.Thomas 2009,Tata Mc Graw-Hill Publishing Company Limited, New Delhi.

IV-Year

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY

DIGITALSIGNALPROCESSING

Course Code: GR14A3046 L:3 T:1 P:0 C:4
IV Year I Semester

UNIT-I

Introduction: IntroductiontoDigitalSignalProcessing:DiscreteTime Signals &Sequences, Linear Shift Invariant Systems, Stability, and Causality, Linear Constant Coefficient Difference Equations, Frequency Domain RepresentationofDiscreteTimeSignalsandSystems

UNIT-II

Discrete Fourier series: DFSRepresentationofPeriodicSequences, Properties of Discrete Fourier Series, Discrete Fourier Transforms: Properties of DFT, Linear Convolution of Sequences using DFT, Computation of DFT: Over-LapAddMethod,Over-LapSaveMethod,RelationbetweenDTFT,DFS,DFTand Z-Transform.

FastFourier Transforms:FastFourierTransforms(FFT)-Radix-2, Decimation-in-TimeandDecimation-in-FrequencyFFTAlgorithms,InverseFFT, andFFTwithGeneralRadix -N.

UNIT-III

RealizationofDigitalFilters: ApplicationsofZ–Transforms,Solution of Difference Equations of Digital Filters, System Function, Stability Criterion, Frequency Response of Stable Systems, Realization of Digital Filters – Direct, Canonical,CascadeandParallelForms.

UNIT-IV

IIRDigital Filters: Analogfilterapproximations–Butterworthand Chebyshev,DesignofIIRDigitalFiltersfrom AnalogFilters,StepandImpulse InvariantTechniques,BilinearTransformationMethod.

UNIT-V

FIRDigitalFilters: CharacteristicsofFIRDigitalFilters,Frequency Response,DesignofFIRFilters:FourierMethod,DigitalFiltersusing Window Techniques,FrequencySamplingTechnique,and ComparisonofIIR&FIRfilters.

Teaching Methodologies

1. Tutorial sheets uploaded in website.
2. NPTEL video lectures.
3. PowerPoint presentations.

Text Books

1. DigitalSignalProcessing,Principles,Algorithms, andApplications:JohnG. Proakis,DimitrisG.Manolakis,PearsonEducation/PHI,2007.
2. DiscreteTimeSignalProcessing–A.V.OppenheimandR.W.Schaffer,PHI, 2009
3. FundamentalsofDigitalSignalProcessing–LoneyLudeman,JohnWiley, 2009

References

1. JohnnyR.Johnson,IntroductiontoDigitalSignalProcessing,PHI,2001.
2. AndreasAntoniou,DigitalSignalProcessing,TMH,2006.
3. JohnG.Proakis,DimitrisGManolakis,digitalSignalProcessing:Principles, Algorithmsand Applications,PearsonEducation, PHI,2003

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY

POWER SEMICONDUCTOR DRIVES

Course Code: GR14A4022 L:3 T:1 P:0 C:4
IV Year I Semester

UNIT-I

Phase controlled converter fed DC motor: Introduction to thyristor controlled drives, single phase semi and full controlled converters d.c separately excited and d.c. series motors, continous current operation, output voltage and current waveforms, speed and torque expressions, speed torque characteristics – problems on converter fed d.c motors. Three phase semi and fully controlled converters connected to d.c separately excited and d.c series motors, output voltage and current waveforms, speed torque expressions and characteristics, problems.

UNIT-II

Four quadrant operation of DC Drives: Introduction to four quadrant operation, motoring operations, electric breaking-plugging, dynamic and regenerative braking operations. Four quadrant operation of D.C motors by dual converters, Closed loop operation of DC motor (Block Diagram only)

UNIT-III

Control of DC motors by choppers: Single quadrant , two quadrant and four quadrant chopper fed dc separately excited and series motors, continuous current operation, voltage and current waveforms, speed torque expressions and characteristics, problems, closed loop operation only(Block diagram)

UNIT-IV

Control of induction motor: Variable voltage characteristics – control of induction motors by AC voltage controllers, waveforms, speed torque characteristics. Variable frequency characteristics – variable frequency control of induction motor by voltage source and current source inverters and cyclo converters. PWM control of VSI, CSI, comparison of VSI and CSI operations speed torque characteristics, problems on induction motor drives. Closed loop operation of induction motor drives(block diagram only). Static resistance control: slip power recovery, static scherbius drive, static Kramer drive, their performance and speed torque characteristics, advantages, applications, problems.

UNIT-V

Control of synchronous motor: Separate control &self control of synchronous motor operation of self controlled synchronous motors by VSI and CSI, Cyclo

converters. Load commutated CSI fed synchronous motor operation waveforms, speed torque characteristics, applications, advantages and problems, closed loop control operation of synchronous motor drives(block diagram only)

Text Books

1. GK Dubey, Fundamentals of Electric Drives Narosa Publications
2. M.H. Rashid, Power Electronic Circuits, Devices and applications, PHI.

Reference Books

1. MD Singh and KB Khanchandani, Power Electronics Tata McGraw-Hil Publishing company, 1998.
2. B.K.Bose, Modern Power Electronics and AC Drives by PHI.
3. VedamSubramanyam, Thyristor Control of Electric drives Tata McGraw Hill Publications

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY

POWER SYSTEM OPERATION AND CONTROL

Course Code: GR14A4023 L:2 T:1 P:0 C:3
IV Year I Semester

UNIT-I
Load Frequency Control
Necessity of keeping frequency constant.
Definitions of Control area – Single area control – Block diagram representation of an isolated power system – Steady state analysis – Dynamic response – Uncontrolled case.Proportional plus Integral control of single area and its block diagram representation, steady state response.
Load frequency control of 2-area system – uncontrolled case and controlled case, tie-line bias control.Load Frequency Control and Economic dispatch control.Numerical problems.

UNIT-II
Economic Operation of Power Systems: Optimal operation of Generators in Thermal Power Stations, - heat rate Curve – Cost Curve – Incremental fuel and Production costs, input-output characteristics, Optimum generation allocation with line losses neglected.
Optimum generation allocation including the effect of transmission line losses – Loss Coefficients, General transmission line loss formula.Numerical problems.

UNIT-III
Unit commitment and economic dispatch: Statementof Unit Commitment (UC) problem; constraints in UC: spinning reserve, thermal unit constraints, hydro constraints, fuel constraints and other constraints; UC solution methods: Priority- list methods, forward dynamic programming approach

UNIT-IV
Modelling of Turbine, Generator and Automatic Controllers
Modelling of Turbine: First order Turbine model, Block Diagram representation of Steam Turbines and Approximate Linear Models.
Modelling of Generator (Steady State and Transient Models): Description of Simplified Network Model of a Synchronous Machine (Classical Model), Description of Swing Equation (No Derivation) and State-Space II-Order Mathematical Model of Synchronous Machine.
Modelling of Governor: Mathematical Modelling of Speed Governing System – Derivation of small signal transfer function.

Modelling of Excitation System: Fundamental Characteristics of an Excitation system, Transfer function, Block Diagram Representation of IEEE Type-1 Model

UNIT-V

Reactive Power Control: Overview of Reactive Power control – Reactive Power compensation in transmission systems: Uncompensated and compensated transmission lines: shunt and Series Compensation.– advantages and disadvantages of different types of compensating equipment for transmission systems; load compensation – Specifications of load compensator.Numerical problems.

TEXT BOOKS

1. D.P. Kothari and I.J. Nagrath, 'Modern Power System Analysis', Third Edition, Tata McGraw Hill Publishing Company Limited, New Delhi, 2003.
2. C.L.Wadhwa, 'Power System Analysis', New Age International-6th Edition, 2010, ISBN: 978-81-224-2839-1

REFERENCE BOOKS

1. Power System Analysis by Grainger and Stevenson, Tata McGraw Hill.
2. AbhijitChakrabarti, SunithaHalder, " Power System Analysis, Operation and Control, PHI,3/e,2010.

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY

HVDC TRANSMISSION
(Elective-I)

Course Code: GR14A4024 L:3 T:1 P:0 C:4
IV Year I Semester

UNIT-I

HVDC Transmission: Introduction, equipment required for HVDC system, Comparison of AC and DC Transmission, limitations of HVDC transmission lines, reliability of HVDC systems, comparison of HVDC link with EHVAC link, HVDC converters.

UNIT-II

HVDC converter operation and analysis: Thyristors and their characteristics, silicon control rectifier, 6 pulse converter configuration, Ideal commutation process without gate control, DC output voltage, gate control of valves, analysis of voltage wave forms with overlap angle, analysis of commutating circuit, equivalent circuit of rectifier, Inverter operation with overlap, Equivalent circuit of inverter, complete equivalent circuit of HVDC link, power factor and reactive power of converters.

UNIT-III

HVDC Converter Control: AC transmission and its control, necessity of DC link control, rectifier control, inverter control, constant beta control, constant gamma control, compounding of rectifiers, current compounding of inverter, complete HVDC system characteristics, power reversal in a DC link, Voltage Dependent Current Order Limit (VDCOL), system control hierarchy, Individual phase control, cosine control of phase delay, linear control phase delay, equidistance pulse control, pulse frequency control, constant current control.

UNIT-IV

Harmonics in HVDC System: Harmonics due to converter, characteristic current harmonic in the 12 pulse converter, Harmonic model and equivalent circuit, design of AC filters, Single tune and double tune high pass filter, second order filter and C-type filter. Reactive power considerations of AC filters.

UNIT-V

Faults on AC Side of Converter Station: 3-phase symmetrical faults and asymmetrical faults, commutation failure, DC circuit breaker. Ground Electrodes for HVDC Systems: Advantage and problems with ground return, HVDC system

grounding, Resistance of electrodes-Electric current filed, resistance of electrode in uniform earth and non-uniform earth, distribution of current field between electrodes.

Text Book

1. HVDC transmission by S Kamakshaiah and V kamaraju, Tata McGraw Hills Publications.

Reference

1. Arillaga J., High Voltage Direct Transmission, (London) Peter Peregrinus, 1981.
2. K.R. Padiyar., HVDC Power Transmission Systems (English) 2nd Edition.

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY

NEURAL AND FUZZY SYSTEMS
(Elective-I)

Course Code: GR14A4025 L:3 T:1 P:0 C:4
IV Year I Semester

UNIT-I

INTRODUCTION TO NEURAL NETWORKS: Introduction, Humans and Computers, Organization of the Brain, Biological Neuron, Biological and Artificial Neuron Models, Hodgkin-Huxley Neuron Model, Integrate-and- Fire Neuron Model, Spiking Neuron Model, Characteristics of ANN, McCulloch-Pitts Model, Historical Developments, Potential Applications of ANN.

UNIT-II

ESSENTIALS OF ARTIFICIAL NEURAL NETWORKS: Artificial Neuron Model, Operations of Artificial Neuron, Types of Neuron Activation Function, ANN Architectures, Classification Taxonomy of ANN – Connectivity, Neural Dynamics (Activation and Synaptic), Learning Strategy (Supervised, Unsupervised, Reinforcement), Learning Rules, Types of Application.

FEED FORWARD NEURAL NETWORKS: Introduction, Perceptron Models: Discrete, Continuous and Multi-Category, Training Algorithms: Discrete and Continuous Perceptron Networks, Perceptron Convergence theorem, Limitations of the Perceptron Model, Applications.

UNIT-III

MULTILAYER FEED FORWARD NEURAL NETWORKS: Credit Assignment Problem, Generalized Delta Rule, Derivation of Back propagation (BP) Training, Summary of Backpropagation Algorithm, Kolmogorov Theorem, Learning Difficulties and Improvements.

ASSOCIATIVE MEMORIES: Paradigms of Associative Memory, Pattern Mathematics, Hebbian Learning, General Concepts of Associative Memory (Associative Matrix, Association Rules, Hamming Distance, The Linear Associator, Matrix Memories, Content Addressable Memory), Bidirectional Associative Memory (BAM) Architecture, BAM Training Algorithms: Storage and Recall Algorithm, BAM Energy Function, Proof of BAM Stability Theorem

Architecture of Hopfield Network: Discrete and Continuous versions, Storage and Recall Algorithm, Stability Analysis, Capacity of the Hopfield Network.

UNIT-IV

SELF-ORGANIZING MAPS (SOM) AND ADAPTIVE RESONANCE THEORY (ART): Introduction, Competitive Learning, Vector Quantization, Self-Organized Learning Networks, Kohonen Networks, Training Algorithms, Linear Vector

Quantization, Stability-Plasticity Dilemma, Feed forward competition, Feedback Competition, Instar, Outstar, ART1, ART2, Applications.

CLASSICAL AND FUZZY SETS: Introduction to classical sets - properties, Operations and relations; Fuzzy sets, Membership, Uncertainty, Operations, properties, fuzzy relations, cardinalities, membership functions.

UNIT-V

FUZZY LOGIC SYSTEM COMPONENTS: Fuzzification, Membership value assignment, development of rule base and decision making system, Defuzzification to crisp sets, Defuzzification methods.

APPLICATIONS:

NEURAL NETWORK APPLICATIONS: Process identification, Function Approximation, control and Process Monitoring, fault diagnosis and load forecasting.

FUZZY LOGIC APPLICATIONS: Fuzzy logic control and Fuzzy classification.

TEACHING METHODOLOGIES

1. White board
2. PPTs
3. Seminars

TEXT BOOKS

1. Neural Networks, Fuzzy logic, Genetic algorithms: synthesis and applications by Rajasekharan and Rai – PHI Publication.
2. Introduction to Artificial Neural Systems - Jacek M. Zuarda, Jaico Publishing House, 1997.

REFERENCE BOOKS

1. Neural Networks – Simon Hykins , Pearson Education
2. Neural Engineering by C.Eliasmith and CH.Anderson, PHI
3. Neural Networks and Fuzzy Logic System by Bork Kosko, PHI Publications

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY

DATABASE MANAGEMENT SYSTEMS
(Elective-I)

Course Code: GR15A2063 L:3 T:1 P:0 C:4
IV Year I Semester

Unit-I

Database System Applications: Database System VS File System, View of Data, DataAbstraction, Instances and Schemas, Data Models: the ER Model, Relational Model, Other Models, Database System Structure, Database Users and Administrator, Transaction Management, Database design and ER diagrams, Attributes and Entity sets, Relationships and Relationship sets, Design Issues, Extended ER Features, Conceptual Design with the ER Model, Logical database design.

Unit-II

Relational Model: Introduction to the Relational Model, Basic Structure, Database Schema, Keys,Relational Algebra, Relational Calculus.Data on External storage, File organization and Indexing, cluster Indexes, Primary and Secondary Indexes, Index data structures, Hash based Indexing Tree based indexing.

Unit-III

Form of Basic SQL Query, Database Languages, DDL, DML, database Access for application Programs, Examples of Basic SQL Queries, Introduction to Nested Queries, Correlated Nested Queries, Set Comparison Operators, Aggregative Operators, NULL values, Comparison using Null values, Logical connectivity: AND, OR and NOT, Impact on SQL Constructs, Outer Joins, Disallowing NULL values, Integrity Constraints over relations, Introduction to Views, Destroying /altering Tables and Views.

Unit-IV

Schema refinement: Problems Caused by redundancy, Decompositions, Problem related todecomposition, reasoning about FDS, FIRST, SECOND, THIRD Normal form, BCNF, Lossless join Decomposition, Dependency preserving Decomposition, Multi valued Dependencies, Fourth Normal Form.

Unit-V

Transaction Concept: Transaction State, Implementation of Atomicity and Durability, ConcurrentExecutions, Serializability, Recoverability, Implementation of Isolation, Testing for serializability, Lock based Protocols, Timestamp based protocols, Validation based protocols, Multiple Granularity Recovery and

Atomicity, Log based recovery, Recovery with concurrent transactions, Buffer Management.

Teaching Methodologies

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

Text Books

1. "Data base Management Systems", Raghurama Krishnan, Johannes Gehrke, TATA Mc Graw Hill 3rd Edition
2. "Data base System Concepts", Silberschatz, Korth, McGraw hill, V edition.

Reference Books

1. "Introduction to Database Systems", C.J.Date Pearson Education.
2. "Database Systems design, Implementation, and Management", Rob & Coronel 5th Edition. Thomson.
3. "Database Management Systems", P. Radha Krishna HI-TECH Publications 2005.
4. "Database Management System", ElmasriNavate Pearson Education.
5. "Database Management System" , Mathew Leon, Leo.

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY

ELECTRICAL DISTRIBUTION SYSTEMS
(Elective-II)

Course Code: GR14A4026 L:3 T:1 P:0 C:4
IV Year I Semester

UNIT-I

Distribution system planning: Introduction to distribution system, Distribution system planning, Factors effecting the system planning, Load modeling and characteristics: Coincidence factor, contribution factor, Loss factor, Relationship between the load factor and loss factor. Load growth, Classification of loads (Residential, commercial, Agricultural and Industrial) and their characteristics.

UNIT-II

Design Considerations of primary systems: Distribution feeders, Types of feeders, primary feeder voltage levels, feeder loading, Radial feeders with uniformly and non uniformly distributed loads, Applications of general circuit constants to radial feeders.

Design Considerations of secondary systems: Secondary voltage levels, secondary banking, one line diagram of secondary network system, secondary mains, limiters, network protectors.

UNIT-III

Distribution Substations: Substation bus schemes, substation location, Rating of distribution substation, substation service area with 'n' primary feeders, comparison of 4&6 feeder patterns.

Supervisory control& data acquisition system(SCADA): Substation functions by SCADA, advanced SCADA concepts

UNIT-IV

Distribution system Protection: Objectives of distribution system protection, over current Protective Devices-Fuses, Automatic Circuit Re-closer, Automatic Line sectionalizers and Automatic circuit breakers.

Coordination of protective devices: Objectives ofco-ordination, general coordination procedure, Fuse to Fuse coordination, Re-closer to fuse coordination, fuse to circuit breaker coordination, Re-closer to circuit breaker coordination.

UNIT-V

Applications of capacitors to Distribution systems: Different types of power capacitors, shunt and series capacitors, effect of shunt capacitors(Fixed and switched), effect of series capacitors, Power factor correction, Applications of

capacitors, capacitor allocation- Economic justification of capacitors, Procedure to determine the optimum capacitor location.

Distribution system Voltage Control: Importance of voltage control, methods of voltage control, Equipment for voltage control, AVB/ AVR for voltage control, Line drop compensation, voltage fluctuations.

TEXT BOOKS

1. Turan Gonen, Electric Power Distribution system Engineering– CRC Press.
2. V.Kamaraju, Electrical Power Distribution Systems, Tata McGraw-HillPublishing company, 2ndedition,2010.

REFERENCE BOOKS

1. G. RamMurthy,ElectricalPower Distribution hand book, 2ndedition, University press.
2. A.S.Pabla, Electric Power Distribution, Tata McGraw-Hill Publishing company,5thedition, 1997.

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY

ADVANCED CONTROL SYSTEMS
(Elective-II)

Course Code: GR14A4037 L:2 T:1 P:0 C:3
IV Year I Semester

UNIT-I

NON-LINEAR SYSTEMS: Definition of nonlinear systems, Characteristics of nonlinear systems,Common physical non-linearities, trajectories, phase portrait, singular points and theirclassification, limit cycle and behavior of limit cycle, Derivation of generalDescribing functions(DF), DF for different nonlinearities, Linearization by small signalanalysis (Taylor series expansion), linearization by nonlinearfeedback, linearization by inverse non-linearity

UNIT-II

IDENTIFICATION OF PLANT DYNAMICS: Relay control systems-Characteristics of relays, existence of limit cycles, stability of limit cycles. Frequency domain based identification-Identification of dynamic models of plants, Off-line identification of process dynamics, On-line identification of plant dynamics. Time domain based identification-State space based identification, Identification of simple systems.

UNIT-III

ADAPTIVE CONTROL: Definition of adaptive control system, functions of adaptive control, gain scheduling, model reference- Mathematical description - Direct and indirect model reference adaptive control, Multivariable systems - Stability andconvergence studies, series and parallel schemes and their industrial applications.

UNIT-IV

SELF TUNING REGULATORS: Different approaches to self-tuning - Recursive parameter estimation Implicit and explicit STR -LQG self-tuning - Convergence analysis Minimum variance and pole assignment approaches to multivariable self tuning regulators.

UNIT-V

SLIDING MODE CONTROL: Introduction, Concept of variable - structure controller and sliding control, reachability
condition, properties of sliding motion, implementation of switching control laws. Reduction of chattering in sliding and steady state mode. Some design examples of nonlinear systems.

Text Books

1. M. Vidyasagar, "Nonlinear Systems Analysis", 2nd Ed., Prentice Hall,1993.
2. Karl J. Astrom, B. Wittenmark, .Adaptive Control., 2nd Edition, PearsonEducation Asia, First Indian Reprint, 2001
3. A. Johnson and H. Moradi, New Identifications and Design Methods, Springer -Verlag, 2005.
4. Christopher Edwards, Sarah K. Spurgeon, .Sliding Mode control: Theory andApplication., 1998.

Reference Books

1. Hassan K. Khalil, Nonlinear Systems, Third Edition, Prentice Hall, 2002.
2. Chalam, V.V., Adaptive Control Systems, Techniques &Applications,Marcel Dekker, Inc. NY and Basel. 1987
3. Eveleigh, V.W., Adaptive Control and Optimisation Techniques, McGraw-Hill, 1967.
4. Shankar Sastry, Marc Bodson, Adaptive Control, Prentice Hall of India (P) Ltd.,1993.
5. S. Majhi, Advanced Control Theory-Relay Feedback Approach, Cengage Asia/IndiaPvt.Ltd, 2009.

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY

OBJECT ORIENTED PROGRAMMING THROUGH JAVA
(Elective-II)

Course Code: GR14A2070 L:3 T:1 P:0 C:4
IV Year I Semester

Unit-I

Introduction: OOP concepts, history of Java, Java buzzwords, data types, variables, scope and life time of variables, arrays, operators, expressions, control statements, type conversion and casting, simple java program.

Classes and Objects: concepts of classes, objects, constructors, methods, this keyword, garbage collection, overloading methods and constructors, parameter passing, recursion.

String handling: String, String Buffer, String Tokenizer.

Unit-II

Inheritance: base class object, subclass, member access rules, super uses, using final within heritance, method overriding, abstract classes.

Interfaces: defining an interface, implementing interface, differences between classes and interfaces and extending interfaces.

Packages: Defining, creating and accessing a package, importing packages, access control, exploring package - java.io

Unit-III

Exception handling: concepts of exception handling, benefits of exception handling, exception hierarchy, checked and unchecked exceptions, usage of-try, catch, throw, throws and finally, built in exceptions, creating own exception sub classes.

Multithreading: differences between multi-threading and multitasking, thread life cycle, creating threads, synchronizing threads, daemon threads, thread groups.

Unit-IV

Applets: concepts of applets, differences between applets and applications, life cycle of applet, types of applets, creating applets, passing parameters to applets.

Event Handling: events, event sources, event classes, event listeners, delegation event model, handling mouse and key board events, adapter classes. The AWT class hierarchy, user interface components-labels, buttons, canvas, scrollbars, text components, checkbox, checkbox groups, choices, lists.

Unit-V

Layout manager: layout manager types-border, grid, flow, card and grid bag.

Swing: Introduction, limitations of AWT, components, containers, exploring swing- JApplet,JFrame and JComponent, Icons and Labels, Text fields, buttons – The JButton class, Checkboxes, Radio buttons, Combo boxes, Tabbed Panes, ScrollPanes, Trees and Tables.

Teaching Methodologies

White-board, marker, power point presentations

Text Books

1. Java The complete reference, 8th editon, Herbert Schildt, TMH.
2. Understanding OOP with Java, up dated edition, T. Budd, Pearson education.

Reference Books

1. An Introduction to programming and OO design using Java, J. Nino and F.A. Hosch, John Wiley & sons.
2. An Introduction to OOP, second edition, T. Budd, pearson education.
3. Introduction to Java programming 6th edition, Y. Daniel Liang, pearson education.
4. An introduction to Java programming and object oriented application development, R. A. Johnson-Thomson

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY

DSP BASED ELECTRICAL LAB

Course Code: GR14A4027 L:0 T:0 P:2 C:2
IV Year I Semester

List of Experiments

1. Implementing a For Loop
2. Factorial of a number using a For Loop
3. Generation of Square wave
4. Generation of Triangular wave
5. Generation of Sine wave
6. Acquisition of signal from ADC
7. Initializing the Event Manager
8. Generation of PWM Pulses for 50%,75% Duty cycle
9. Implementing a delay routine
10. Interfacing an LED
11. Generation of simple PWM pulses of 10KHz
12. Generation of Sine PWM pulses

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY

POWER SYSTEMS SIMULATION LAB

Course Code: GR14A4028 L:0 T:0 P:2 C:2
IV Year I Semester

CONTENTS

1. Sinusoidal Voltages and Currents
2. Computation of line parameters
3. Modelling of transmission lines
4. Formation of bus Admittance matrix
5. Load Flow solution using Gauss Siedalmethod.
6. Load flow solution using Newton Raphsonmethod in polar coordinates
7. Load flow solution using Newton Raphsonmethod in Rectangular coordinates
8. Power flow solution of 3 – bus system
9. Power flow analysis of slack bus connected to different loads
10. Load flow analysis of 3 motor systems connected to slack bus
11. Three phase short circuit Analysis in a synchronous machine (Symmetrical fault Analysis)
12. Unsymmetrical fault Analysis: LG, LL, LLG Fault
13. Z–Bus Building Algorithm

    a)Obtain Symmetrical Components of a set of Unbalance dcurrents.

    b)Obtain the original Unbalanced phase voltages from Symmetrical Components.
14. Short circuit Analysis of a power system with 12 buses.
15. Determination of natural oscillations of rotor angle and grid frequency for a given synchronous machine.

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY

POWER ELECTRONICS AND DRIVES LAB

Course Code: GR14A4029 L:0 T:0 P:2 C:2
IV Year I Semester

CONTENTS

1. Firing angle control of thyristor based DC drive connected to DC motor using LabVIEW.
2. Closed loop speed control of DC motor using PI,PID, PD controllers using LabVIEW.
3. Closed loop speed control of DC motor- generator set with load using PI,PID controllers using LabVIEW.
4. Step,ramp,parabolic response of second order DC motor system using LabVIEW.
5. Closed loop speed control of dc motor with step, ramp,parabolic inputs and PI,PID controllers using LabVIEW.
6. Indirect speed control of DC motor using armature voltage control with PI,PID controllers using LabVIEW.
7. V/F control of AC drive connected to AC motor using LabVIEW.
8. Closed loop speed control of AC motor using PI,PID, PD controllers using LabVIEW.
9. Closed loop speed control of AC motor- DC generator set with load using PI,PID controllers using LabVIEW.
10. Step,ramp,parabolic response of second order AC motor system using LabVIEW.
11. Closed loop speed control of AC motor with step, ramp,parabolic inputs and PI,PID controllers using LabVIEW.
12. Indirect speed control of AC motor using armature V/F control with PI,PID controllers using LabVIEW.
13. Closed loop torque control of DC motor with PI,PID controllers using LabVIEW.
14. Closed loop torque control of AC motor with PI,PID controllers using LabVIEW.

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY

PROGRAMMABLE LOGIC CONTROLLERS

Course Code: GR14A4030 L:2 T:1 P:0 C:3
IV Year II Semester

Unit -I
PLC Basics PLC system, I/O modules and interfacing CPU processor programming equipment programming formats, construction of PLC ladder diagrams, devices connected to I/0 modules.

Unit-II
PLC Programming input instructions, outputs, operational procedures, programming examples using contacts and coils. Drill press operation.
Digital logic gates programming in the Boolean algebra system, conversion examples Ladder diagrams for process control Ladder diagrams and sequence listings, ladder diagram construction and flow chart for spray process system.

Unit-III
PLC Registers: Characteristics of Registers module addressing holding registers input registers, output registers PLC Functions Timer functions and industrial applications counters counter function industrial applications. Architecture functions, Number comparison functions, number conversion functions.

Unit- IV
Data Handling functions: SKIP, Master control Relay Jump Move FIFO, FAL, ONS, CLR and Sweep functions and their applications.
Bit Pattern and changing a bit shift register, sequence functions and applications, controlling of two axis and three axis Robots with PLC, Matrix functions.

Unit-V
Analog PLC operation: Analog modules and systems Analog signal processing multi bit data processing, analog output application examples. PID principles position indicator with PID control, PID modules, PID tuning, PID functions

TEXT BOOKS

1. Programmable Logic Controllers-Principle and Applications by John W Webb and Ronald A Reiss Filth edition, PHI
2. Programmable Logic Controllers — Programming Method and Applications by JR Hackworth and ED Hackworth — Jr- Pearson, 2004.

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY

POWER SYSTEM AUTOMATION
(Elective-III)

Course Code: GR14A4031 L:2 T:1 P:0 C:3
IV Year II Semester

Unit -I

SCADA fundamentals: Evolution of Automation Systems, SCADA in Power Systems, Advantages of SCADA in Power Systems, Power System Field, flow of data from the field to SCADA control center, open system - need and advantage, building blocks of SCADA systems, Remote terminal unit(RTU), Intelligent electronic devices(IEDs), Data concentrators and merging units.

Unit -II

SCADA Communication: SCADA communication systems, Master station, human machine interface(HMI), Building the SCADA systems, legacy, hybrid, and new systems. Classification of SCADA systems.
SCADA communication requirements, smart grid communication infrastructure, SCADA communication topologies. SCADA data communication techniques, Data communication, SCADA communication protocol architecture, evolution of SCADA communication protocol, SCADA and smart grid protocols, media for SCADA and smart grid communication. Guided, unguided(wireless) and Communication media, security and challenges for SCADA and smart grid communication.

Unit-III

Substation Automation(SA): Introduction, conventional substations, new smart devices for substation automation, the new integrated digital substation, substation automation technical issues, the new digital substation, substation automation architecture, new vs existing substation, SA application functions, data analysis: benefits of data warehousing.

Unit-IV

Energy management systems(EMS) for control centers: Introduction, Energy control centers, EMS framework, Data acquisition and communication(SCADA systems),general operation and management, Transmission operations and management: realtime,study mode simulations,post event analysis and energy scheduling and accounting,dispatching training simulator.

Unit-V

Distribution automation and distribution management (DA/DMS) system: introduction to distribution automation, subsystems in a distribution control center, DMS framework: integration with subsystems, DMS application functions, advanced real time DMS applications, DMS coordination with other systems.

Textbook

1. Power system SCADA and Smart Grids by Mini S.Thomas and John D. Mc Donald, CRC Press.

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY

FLEXIBLE AC. TRANSMISSION SYSTEMS
(Elective-III)

Course Code: GR14A4032 L:2 T:1 P:0 C:3
IV Year II Semester

Unit-I

FACTS Concepts: Transmission inter connections, Power flow in an AC system, loading capability limits, Dynamic stability considerations, importance of controllable parameters, basic types of FACTS controllers, benefits from FACTS controllers.

Unit-II

Voltage Source Converters: Single phase, three phase full wave bridge converters, transformer connections for 12pulse 24 and 48pulse operation.
Three level voltage source converter, pulse width modulation converter, basic concept of current source Converters, comparison of current source converters with voltage Source converters.

Unit III

Static Shunt Compensation: Objectives of shunt compensation, midpoint voltage regulation, voltage instability prevention, improvement of transient stability, Power oscillation damping, Methods of controllable vargeneration, variable impedance type static vargenerators, switching converter type vargenerators, hybrid vargenerators.

Unit-IV

SVC and STATCOM: The regulation and slope transfer function and dynamic performance, transient Stability enhancement and power oscillation damping operating point control and summary of compensator control.

Unit-V

Static Series Compensators. Concept of series capacitive Compensation, improvement of transient stability, power oscillation damping, Functional requirements, GTO Thyristorcontrolled series capacitor (GSC), Thyristor switched series capacitor (TSSC) and Thyristorcontrolled series capacitor (TCSC), control schemes for GSC, TSSC and TCSC.

TEXT BOOKS

1. "Understanding FACTS Devices 'N.G. Hingorani and L.Guygil EEE Press Publications 2000.

GOKARAJU RANGARAJU
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MOBILE APPLICATION DEVELOPMENT
(ELECTIVE-III)

Course Code: GR14A4082 L:2 T:1 P:0 C:3
IV Year II Semester

UNIT I

Java Concepts: OOPs Concepts, Inheritance in detail, Exception handling, Packages & interfaces o JVM & .jar file extension, Multi threading (Thread class & Runnable Interface), SQL-DML and DDL Queries.

Introduction to Android: What is Android? Setting up development environment, Dalvik Virtual Machine & .apk file extension, Fundamentals: a. Basic Building blocks - Activities, Services, Broadcast Receivers & Content providers b. UI Components - Views & notifications c. Components for communication -Intents & Intent Filters , Android API levels (versions & version names).

UNIT II

Application Structure(in detail): AndroidManifest.xml,uses-permission&uses-sdk, Resources & R.java , Assets , Layouts & Drawable Resources ,Activities and Activity lifecycle , First sample Application

Emulator-Android Virtual Device: Launching emulator , Editing emulator settings, Emulator shortcuts , Logcat usage , Introduction to DDMS, Basic UI design, Preferences, Menu, Intents, UI design, Tabs and Tab Activity, Styles & Themes , Examples.

UNIT III

Content Providers: SQLite Programming , SQLiteOpenHelper ,SQLiteDatabse ,Cursor , Reading and updating Contacts, Reading bookmarks, Examples.

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UNIT IV

Android Debug Bridge (adb) tool : Linkify- Web URLs, Email address, text, map address, phone numbers , MatchFilter & TransformFilter , Adapters and Widgtes- Adapters:-ArrayAdapters, BaseAdapters, ListView and ListActivity ,Custom listview GridView using adapters , Gallery using adapters ,Notifications,Examples.

Custom components: Custom Tabs, Custom animated popup panels, Other components, Examples.

UNIT V

Threads: Threads running on UI thread (runOnUiThread) , Worker thread ,

Handlers & Runnable ,AsynTask (in detail) ,Examples.
Advanced Concept: Live Folders ,Using sdcards , XML Parsing , JSON Parsing , Maps, GPS, Location based Services ,Accessing Phone services (Call, SMS, MMS) , Network connectivity services ,Sensors.

Text Books

1. Android How to Program with an Introduction to Java, Deitel, Deitel and Deitel, Prentice Hall, ISBN 978-0-13-299054-7.
2. Android for Programmers: An App-Driven Approach, Deitel, Deitel, Deitel, and Morgano, Prentice Hall, ISBN 978-0-13-2121361.

Reference Books

1. Java JDK 6 or later, Eclipse 3.6.2 or later, Android SDK – latest version, Android ADT plugin for Eclipse.
2. Andriod Studio Development Essentials, CreateSpace Independent Publishing Platform; 1 edition - Neil Smyth.
3. Andriod Apps for Absolute Beginners, Aprèss, Wallace Jackson.
4. Andriod Apps with Eclipse,Apress,Onur Cinar.

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EMBEDDED SYSTEMS
(Elective-III)

Course Code: GR14A3070 L:3 T:1 P:0 C:4
IV Year II Semester

Unit-I

Introduction to Embedded Systems: Embedded Systems, Processor Embedded to a system, Embedded hardware units and devices in a system, Embedded software in a system, Examples of Embedded systems, Soc(System on chip) and use of VLSI circuit design technology, complex system design and processors, Design process in Embedded system, formalization of system design, design process and design examples, classification of embedded systems, skills required for embed system design.

Unit-II

DevicesandBusesforDevicesNetwork: I/ODevices:-TypesandExamples ofI/Odevices,Synchronous,Iso-synchronousandAsynchronousCommunications from Serial Devices - Examples of Internal Serial-Communication Devices:- SPI, UART,ParallelPortDevices-TimerandCountingDevices–SerialCommunication using:'I2C','USB','CAN'-AdvancedI/OSerialhighspeedbuses:ISA,PCI,PCI-X,cPCIandadvancedbuses.

Unit-III

Programming Concepts and Embedded Programming in C, C++ : Programming in assembly language (ALP) vs High Level Language - C Program Elements:-Macrosandfunctions,UseofDateTypes,Structure,Pointers,Function Calls - Concepts of Embedded Programming in C++:- Objected Oriented Programming, Embedded Programming in C++, 'C' Program compilers – Cross compiler–Optimizationofmemoryneeds.

Unit-IV

RealTimeOperatingSystems: Definitionsofprocess,tasksandthreads–InterProcessCommunication:-Shareddataproblem,UseofSemaphore(s),Priority Inversion Problem and Deadlock Situations, Message Queues,Mailboxes,Pipes, Virtual (Logical) Sockets, Remote Procedure Calls (RPCs) - Operating System Services:-Goals,Structures,Kernel,ProcessManagement,MemoryManagement, DeviceManagement-RealTimeOperatingSystem-RTOS Taskscheduling models:- Co-operative Round Robin Scheduling, Cyclic Scheduling with Time Slicing.

Unit-V

SystemDesignTechniques: DesignMethodologies,RequirementAnalysis, Specification,System AnalysisandArchitectureDesign.DesignExamples:- TelephonePBX-System Architecture,Inkjetprinter-HardwareDesignand SoftwareDesign,PersonalDigitalAssistants,Set-topBoxes.

Text Books

1. Computers as Components-principles of embedded computer system design, Wayne Wolf, Elseveir.
2. The 8051 Microcontroller, Third Edition, Kenneth J.Ayala, Thomson.

References

1. Embedding system building blocks, Labrosse, via CMP publishers.
2. Embedded Systems, Raj Kamal, TMH.
3. Micro Controllers, Ajay V Deshmukhi, TMH.
4. Embedded System Design, Frank Vahid, Tony Givargis, John Wiley.
5. Microcontrollers, Raj kamal, Pearson Education.
6. An Embedded Software Primer, David E. Simon, Pearson Education.

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EHV AC TRANSMISSION
(Elective-IV)

Course Code: GR14A4035 L:2 T:1 P:0 C:3
IV Year II Semester

UNIT-I
E.H.V.A.C. Transmission line trends and preliminary aspect standard transmission voltages – Estimation at line and ground parameters-Bundle conductor systems-Inductance and Capacitance of E.H.V. lines – Positive, negative and zero sequence impedance – Line Parameters for Modes of Propagation.

UNIT-II
Electrostatic field and voltage gradients – Calculations of electrostatic field of AC lines – Effect of high electrostatic field on biological organisms and human beings - Surface voltage gradients and Maximum gradients of actual transmission lines – Voltage gradients on sub conductor.

UNIT-III
Electrostatic induction in un energized lines – Measurement of field and voltage gradients for three phase single and double circuit lines – Un energized lines. Power Frequency Voltage control and over-voltages in EHV lines: No load voltage – Charging currents at power frequency-Voltage control – Shunt and Series compensation – Static VAR compensation.

UNIT-IV
Corona in E.H.V. lines – Corona loss formulae- Attention of traveling waves due to Corona – Audio noise due to Corona, its generation, characteristic and limits. Measurements of audio noise radio interference due to Corona - properties of radio noise – Frequency spectrum of RI fields – Measurements of RI and RIV.

UNIT-V
Design of EHV lines based on steady state and transient limits - EHV cables and their characteristics.

TEACHING METHODOLOGIES
1. White board
2. PPTs
3. Seminars

TEXT BOOKS

1. EHVAC Transmission Engineering by R. D. Begamudre, New Age International (p) Ltd.
2. HVAC and DC Transmission by S. Rao.

REFERENCE BOOKS

1. Edison,"EHV Transmission line"- Electric Institution (GEC 1968).

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MODERN POWER ELECTRONICS
(Elective-IV)

Course Code: GR14A4036 L:2 T:1 P:0 C:3
IV Year II Semester

UNIT-I

Modern power semiconductor devices: Modern power semiconductor devices- MOS turn Off Thyristor(MTO) - Emitter Turn OffThyristor(ETO) Integrated Gate- Commutated Thyristor(IGCTs)-MOS-controlled Thyristors(MCTs)-Static Induction circuit comparison of their features.

UNIT-II

Resonant Pulse Inverters: Resonant pulse inverters-series resonant inverters-series resonant inverters with unidirectional switches series resonant inverters with bidirectional Switches-analysis of half bridge resonant inverter - evaluation of currents and Voltages of a simple resonant inverter-analysis of half bridge and full bridge resonant inverter with bidirectional switches

UNIT-III

Multi level Inverters: Multi level concept-Classification of multilevel inverters-Diode clamped multilevel inverter- principle of operation-main features improved diode Clamped inverter-principle of operation-Flying capacitors multi level inverter principle of operation-main features.

UNIT-IV

DC Power Supplies: DC power supplies-classification-switched mode dc power supplies-fly back Converter -forward converter- push pull converter-half bridge converter-Full bridge converter-Resonant dc power supplies-bidirectional dc power supplies-Applications.

UNIT-V

AC Power Supplies: AC power supplies classification-switched mode ac power supplies-Resonant AC power supplies-bi directional ac power supplies-multi stage conversions-control circuits-applications.
Introduction-power line disturbances-power conditioners-uninterruptible Power supplies-applications.

TEXT BOOKS

1 Power Electronics—Mohammed H.RashidPearson Education—Third Edition
2 . Power Electronics—Ned Mohan, Tore M.Undelandand William P. Robbins

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DSP BASED ELECTRO MECHANICAL SYSTEMS
(Elective-IV)

Course Code: GR14A4034 L:2 T:1 P:0 C:3
IV Year II Semester

UNIT-I
Introduction, Brief Introduction to Peripherals, Types of Physical Memory, Software Tools, Introduction to the C2xxDSP Core and Code Generation, The Components of the C2xx DSP Core, Mapping External Devices to the C2xx Core and the Peripheral Interface, System Configuration Registers, Memory, Memory Addressing Modes, Assembly Programming Using the C2xxDSP Instruction Set

UNIT-II
General Purpose Input/output (GPIO) Functionality, Pin Multiplexing (MUX) and General Purpose I/O Overview, Multiplexing and General Purpose I/O Control Registers, Using the General Purpose I/O Ports, General Purpose I/O Exercise, Introduction to Interrupts, Interrupt Hierarchy, Interrupt Control Registers, Initializing and Servicing Interrupts in Software, 5 Interrupt Usage Exercise,

UNIT-III
ADC Overview, Operation of the ADC, Analog to Digital Converter Usage Exercise, Overview of the Event Manager, Event Manager Interrupts, General Purpose(GP) Timers, Compare Units, Capture Units and Quadrature Encoded Pulse (QEP) Circuitry, General Event Manager Information, Exercise: PWM Signal Generation, Copy right©2004 CRC Press, LLC.

UNIT-IV
DSP-Based Implementation of DC-DC Buck-Boost Converters: Introduction, Converter Structure, Continuous Conduction Mode, Discontinuous Conduction Mode, Connecting the DSP to the Buck-Boost Converter, Controlling the Buck-Boost Converter, Main Assembly Section Code Description, Interrupt Service Routine, The Regulation Code Sequences,

UNIT-V
DSP-Based Control of Stepper Motors: Introduction, The Principle of Hybrid Stepper Motor, The Basic Operation, The Stepper Motor Drive System, The Implementation of Stepper Motor Control System Using the, LF2407DSP, The Subroutine of Speed Control Module

TEXT BOOKS

1. DSP based Electro –Mechanical Motion Control by – Hamid A TOLIYAT, STEVEN CAMPBELL 2004 CRC Press,llc

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E-COMMERCE
(Elective-IV)

Course Code: GR14A4091 L:3 T:1 P:0 C:4
IV Year II Semester

Unit-I

INTRODUCTION TO E-COMMERCE: E-commerce, Difference between E-commerce and E-business, Purpose of E-Commerce, Eight Unique Features of E-commerce Technology, Web 2:0, Types of E-commerce, Growth of the Internet and the Web, Origins and Growth of E-commerce, Understanding E-commerce.

Unit-II

E-COMMERCE BUSINESS MODELS AND CONCEPTS: E-commerce Business Models, Business-to-Consumer (B2C) Business Models, Business-to-Business (B2B) Business Models, Business Models in Emerging E-commerce Areas.

Unit-III

BUILDING AN E-COM WEB SITE: Building an E-commerce Web Site, Choosing Software, Choosing the Hardware, E-commerce Site Tools.

Unit- IV

ONLINE SECURITY AND PAYMENT SYSTEMS: Security Threats in the E-commerce Environment,Technology Solutions, payment systems, E-commerce Payment System, Electronic Billing Presentment and Payment.

Unit-V

ONLINE CONTENT AND MEDIA: Online Content, Online Publishing Industry, Online Entertainment Industry.

Text Book

1. Kenneth C. Laudon Carol Guercio Traver, “E-commerce: business, technology, society”, Fifth edition, Pearson Prentice Hall, 2009. (Unit-1:Chapter -1, Unit-II: Chapter-2, Unit-III: Chapter-4, Unit-IV: Chapter-5, Unit-V:Chapter-10)

Reference Books

1. Dave Chaffey, "E-Business and E-Commerce Management: Strategy, Implementation and Practice", Fifth edition, Pearson Education, 2013.
2. K.K. Bajaj, Debjani Nag, "E-Commerce: The Cutting Edge of Business", Second edition, McGraw Hill Education (India) Private Limited, 2005.
3. David Whiteley ,"E-Commerce: Strategy, Technologies And Applications", McGraw Hill Education (India) Private Limited, 2001.
4. SteffanoKorper, "The E-Commerce Book: Building the E-Empire", Morgan Kaufmann, 2000.

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PROGRAMMABLE LOGIC CONTROLLERS-LAB

Course Code: GR14A4038 L:0 T:0 P:2 C:2
IV Year II Semester

List of Experiments

Experiments on Millenium FBD Logic

1. Different applications of Push buttons.
2. Working of different types of Timers.
3. Working of different types of Counters.
4. Sequential operation of ON/OFF of a set of lights.
5. Latching and Unlatching of a Motor.
6. Automatic indication of water tank level.
7. Traffic lights indication.

Experiments on Millenium Ladder Logic

1. Logic Gates
2. Latching and Unlatching
3. Interlocking
4. Sequential operation of ON/OFF of a set of lights
5. Counters

Experiments on Siemen's Software

1. Logic Gates
2. Latching and Unlatching
3. Forward and Reverse direction control of Motors.

Introduction on Millenium PLC

Introduction on Simens PLC