Academic Regulations

Programme Structure

&

Detailed Syllabus

Bachelor of Technology

(B. Tech)

(Four Year Regular Programme)

(Applicable for Batches admitted from 2017-18)

Department of Electronics and Communications Engineering

GOKARAJU RANGARAJU

INSTITUTE OF ENGINEERING AND TECHNOLOGY

Bachupally, Kukatpally, Hyderabad, Telangana, India

500 090

Academic Regulations

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY, HYDERABAD
DEPARTMENT OF ELECTRONICS AND COMUNICATIONS ENGINEERING (B. Tech)
GR17 REGULATIONS

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

1. **Programme Offered:** The programme offered by the Department is B. Tech in Electronics and Communications 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 Electronics and Communications Engineering Programme shall be made subject to the eligibility, qualifications and specialization prescribed by the State Government/University from time to time. Admissions shall be made either on the basis of the merit rank obtained by the student in the common entrance examination conducted by the Government/Universityor on the basis of any other order of merit approved by the Government/University, subject to reservations as prescribed by the Government/University from time to time.

4. **Programme Pattern:**
   a) Each Academic year of study is divided into two semesters.
   b) Minimum number of instruction days in each semester is 90.
   c) **Student is introduced to "Choice Based Credit System (CBCS)"**
   d) Grade points, based on percentage of marks awarded for each course will form the basis for calculation of SGPA (Semester Grade Point Average) and CGPA (Cumulative Grade Point Average).
   e) The total credits for the Programme is 192. Typically each semester has 24 credits.
   f) A student has a choice of registering for credits from the courses offered in the programme ensuring the total credits in a semester are between 20 and 28.
   g) **All the registered credits will be considered for the calculation of final CGPA.**
   h) Each semester has - 'Continuous Internal Evaluation (CIE)' and 'Semester End Examination (SEE)'. Choice Based Credit System (CBCS) and Credit Based Semester System (CBSS) as indicated by UGC and course structure as suggested by AICTE are followed.

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

S. No.	Broad Course Classification	Course Group/ Category	Course Description
1	Foundation Courses (FnC)	BS – Basic Sciences	Includes mathematics, physics and chemistry subjects
2		ES - Engineering Sciences	Includes fundamental Engineering subjects
3		HS – Humanities and Social sciences	Includes subjects related to humanities, social sciences and management
4	Core Courses (CoC)	PC – Professional Core	Includes core subjects related to the parent discipline/ department/ branch of Engineering.
5	Elective Courses (EℓC)	PE – Professional Electives	Includes elective subjects related to the parent discipline/ department/ branch of Engineering.
6		OE – Open Electives	Elective subjects which include interdisciplinary subjects or subjects in an area outside the parent discipline/ department/ branch of Engineering.
7	Core Courses	Project Work	B.Tech. project or UG project or UG major project
8		Industrial training/ Mini-project	Industrial training/ Internship/ UG Mini-project/ Mini-project
9		Seminar	Seminar/ Colloquium based on core contents related to parent discipline/ department/ branch of Engineering.
10	Minor courses	-	1 or 2 Credit courses (subset of HS)
11	Mandatory Courses (MC)	-	Mandatory courses Credits/Marks are not counted for grading/pass percentage

5. **Award of B. Tech Degree:** A student will be declared eligible for the award of B. Tech Degree if he/she fulfills the following academic requirements:
   a) He/She pursues the course of study and completes it successfully in not less than four academic years and not more than eight academic years.
   b) A student has to register for all the 192 credits and secure all credits.
   c) A student, who fails to fulfill all the academic requirements for the award of the

degree within eight academic years from the date of admission, shall forfeit his/her seat in B. Tech course.

d) The Degree of B. Tech in Electronics and Communications Engineering shall be conferred by Jawaharlal Nehru Technological University Hyderabad (JNTUH), Hyderabad, for 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 for shortage of attendance in aggregate up to 10% (65% and above and below 75%) in a semester may be granted. A committee headed by Dean (Academic Affairs) shall be the deciding authority for granting the condonation.

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

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

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

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

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

b) **Distribution and Weightage of marks**

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

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

Assessment Procedure:

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

d)Industry Oriented Mini Project: The Mini Project is to be taken up with relevance to Industry and is evaluated for 75 marks. Out of 75 marks, 25 marks are for internal evaluation and 50 marks are for external evaluation. The supervisor continuously assesses the students for 15 marks (Continuous Assessment – 10 marks, Report – 5 marks). At the end of the semester, Mini Project shall be displayed in theroad show at the department level for the benefit of all students and staff and the same is to be evaluated by Mini Project Review Committeefor 10 marks. The mini project report shall be presented before Project 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 conductedby a Committee consisting of HOD and two senior faculty members of the department. The student shall be assessed for his/her understanding of various courses studied during the programme of study. The Viva-voce shall be evaluated for 100 marks.

f) Seminar: For the seminar, the student shall collect information on a specialized topic andprepare a technical report and present the same to a Committee consisting of HODand 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 relationwith various courses studied during the programme of studyfor **50 marks.**

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

h) Engineering Graphics:

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

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

12. Academic Requirements and Promotion Rules:

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

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

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

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

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

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

Earning of Credit:

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

Computation of SGPA and CGPA:

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

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

$$\text{SGPA } (S_k) = \sum_{i=1}^{n} (Ci * Gi) / \sum_{i=1}^{n} Ci$$

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

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

$$\text{CGPA} = \sum_{i=1}^{m} (Ci * Gi) / \sum_{i=1}^{m} Ci$$

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

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

	Class Awarded	CGPA Secured
14.1	**First Class With Distinction**	**CGPA $\geq$ 8.00 with no F or below grade/ detention anytime during the programme**
14.2	**First Class**	**CGPA $\geq$ 8.00 with rest of the clauses of 14.1 not satisfied**
14.3	**First Class**	**CGPA $\geq$ 6.50 and CGPA < 8.00**
14.4	**Second Class**	**CGPA $\geq$ 5.50 and CGPA < 6.50**
14.5	**Pass Class**	**CGPA $\geq$ 5.00 and CGPA < 5.50**

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

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

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

18. General Rules

a) The academic regulations should be read as a whole for the purpose of any interpretation.
b) In the case of any doubt or ambiguity in the interpretation of the above rules, the decision of the Academic Council is final.
c) In case of any error in the above rules and regulations, the decision of the Academic Council is final.
d) The college may change or amend the academic regulations or syllabi at any time and the changes or amendments made shall be applicable to all the students with effect from the dates notified by the college.

Academic Regulations for B.Tech (Lateral Entry) under GR17

(Applicable for Batches Admitted from 2018-19)

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

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

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

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

2. **Academic Requirements and Promotion Rules:**

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

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

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

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

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

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

I BTECH **I SEMESTER**

Category	Subject code	Name of subject	Credits			Total credits	Total Hours	Total Marks
			L	T	P			
BS	GR17A1001	Linear Algebra and Single Variable Calculus	2	1		3	4	100
BS	GR17A1002	Advanced Calculus	2	1		3	4	100
BS	GR17A1008	Engineering Chemistry	2	1		3	4	100
HS	GR17A1005	English	2	1		3	4	100
ES	GR17A1018	Basic Electrical Engineering	2	1		3	4	100
ES	GR17A1009	Computer Programming	2	1		3	4	100
ES	GR17A1025	Engineering Workshop			2	2	4	75
BS	GR17A1030	Engineering Chemistry lab			2	2	4	75
ES	GR17A1027	Computer Programming lab			2	2	4	75
		Total	12	6	6	24	36	825

I BTECH **II SEMESTER**

Category	Subject code	Name of subject	Credits			Total credit	Total Hours	Total Marks
			L	T	P			
BS	GR17A1003	Fourier Series and Transform Calculus	2	1		3	4	100
BS	GR17A1004	Numerical Methods	2	1		3	4	100
BS	GR17A1007	Engineering Physics	2	1		3	4	100
ES	GR17A1010	Data Structures	2	1		3	4	100
ES	GR17A1023	Engineering Graphics	1		2	3	5	100
ES	GR17A1019	Fundamentals of Electronics Engineering	2	1		3	4	100
HS	GR17A1024	Business Communication and Soft Skills			2	2	4	75
ES	GR17A1026	IT Workshop			2	2	4	75
BS	GR17A1029	Engineering Physics lab			2	2	4	75
		Total	11	5	8	24	37	825

II BTECH **I SEMESTER**

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

II BTECH II SEMESTER

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

Group	Sub-Code	Name Of Subject	Credits			Total credits	Total Hours	Total Marks
			L	T	P			
PC	GR17A3042	Antennas and Wave Propagation	2	1		3	4	100
PC	GR17A3041	Digital Communications	3	1		4	5	100
PC	GR17A3043	VLSI Design	3	1		4	5	100
Open Elective 1			**2**	**1**		**3**	**4**	**100**
Professional Elective 1			**3**	**1**		**4**	**5**	**100**
PE	GR17A3104	Linear Control Systems						
PE	GR17A3109	System Modeling and Simulation						
PE	GR17A2063	Database Management Systems						
PC	GR17A3045	Digital Communications Lab			2	2	4	75
PC	GR17A3044	VLSI Design Lab			2	2	4	75
PC	GR17A3100	Advanced English Communication Skills Lab			2	2	4	75
Total			**13**	**5**	**6**	**24**	**35**	**725**

III BTECH **I SEMESTER**

III BTECH **II SEMESTER**

Group	Sub-Code	Name of Subject	Credits			Total credits	Total Hours	Total Marks
			L	T	P			
PC	GR17A2104	Managerial Economics and Financial Anaysis	2	1		3	4	100
PC	GR17A3048	Microwave Engineering	3	1		4	5	100
PC	GR17A3046	Digital Signal Processing	3	1		4	5	100
Open Elective 2			**2**	**1**		**3**	**4**	**100**
Professional Elective 2			**3**	**1**		**4**	**5**	**100**
PE	GR17A2077	Computer Networks						
PE	GR17A3110	Information Theory and Coding						
PE	GR17A3057	Software Engineering						
PC	GR17A3049	Digital Signal Processing Lab			2	2	4	75
PC	GR17A2072	Object Oriented Programming through Java Lab			2	2	4	75
PC	GR17A3101	Industry Oriented Mini Project			2	2	4	75
Total			**13**	**5**	**6**	**24**	**35**	**725**

IV BTECH **I SEMESTER**

Group	Sub-Code	Name Of Subject	Credits			Total credits	Total Hours	Total Marks
			L	T	P			
PC	GR17A3102	Management Science	3	1		4	5	100
PC	GR17A4060	Cellular Mobile Communications	2	1		3	4	100
PC	GR17A3070	Embedded Systems Design	2	1		3	4	100
Open Elective 3			**3**	**1**		**4**	**5**	**100**
Professional Elective 3			**3**	**1**		**4**	**5**	**100**
PE	GR17A4059	Electronic Measurements and Instrumentation						
PE	GR17A4072	Digital Signal Processors and Architectures						
PE	GR17A4150	Modern Control Systems						
PC	GR17A4066	Microwave Engineering Lab			2	2	4	75
PC	GR17A4068	Embedded Systems Lab			2	2	4	75
PC	GR17A4067	Communication Protocols Lab			2	2	4	75
Total			**13**	**5**	**6**	**24**	**35**	**725**

IV BTECH **II SEMESTER**

Group	Sub-Code	Name of Subject	Credits			Total credits	Total Hours	Total Marks
			L	T	P			
PC	GR17A4069	Digital Image Processing	2	1		3	4	100
Professional Elective 4			**3**	**1**		**4**	**5**	**100**
PE	GR17A4070	Radar Systems						
PE	GR17A4061	Optical Communications						
PE	GR17A4063	Wireless Communication and Networks						
Professional Elective 5			**2**	**1**		**3**	**4**	**100**
PE	GR17A4151	Principles of cloud Computing						
PE	GR17A4152	Audio and Video Engineering						
PE	GR17A4153	Radio Navigational Aids						
PC	GR17A4076	Digital Image Processing Lab			2	2	4	75
SPW	GR17A4142	Comprehensive Viva Voce			1	1	2	50
SPW	GR17A4143	Seminar			1	1	2	100
SPW	GR17A4144	Major Project			10	10	14	200
Total			7	3	**14**	**24**	**35**	**725**

Open Elective 1		Course Title	Department Offering
OE - I	GR17A3151	Water Resources Engineering	CE
	GR17A3152	Solar & Wind Energy Systems	EEE
	GR17A3153	Applied Thermodynamics	ME
	GR17A3154	Principles of E- Commerce	CSE
	GR17A3155	Datamining and Applications	IT
	GR17A3156	Computer Architecture and Organization	ECE
Open Elective 2		**Course Title**	**Department Offering**
OE - II	GR17A3161	Transportation Engineering	CE
	GR17A3162	Sensors & Transducers	EEE
	GR17A3163	Automobile Engineering	ME
	GR17A3164	Human Computer Interaction	CSE
	GR17A3165	Essentials of Big Data Analytics	IT
	GR17A3166	Principles of Operating Systems	ECE
Open Elective 3		**Course Title**	**Department Offering**
OE - III	GR17A4161	Green Building Technology	CE
	GR17A4162	Soft Computing Techniques	EEE
	GR17A4163	Operations Research	ME
	GR17A4164	Mobile Computing and Applications	CSE
	GR17A4165	Business Intelligence	IT
	GR17A4166	Principles Of Satellite Communications	ECE

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
Antennas and Wave Propagation

Course Code: GR17A3042 **L T P C**
III Year I Semester 2 1 0 3

UNIT I

Antenna Basics and Thin Linear Wire Antennas: Principle of Radiation, Standing wave and Travelling Wave Current Distributions on wire antennas, Fields due to Hertzian Dipole, Near and Far fields, Far fields of Half Wave Dipole, Quarter Wave Monopole and Folded Half-Wave Parameters–Radiation Resistance, Antenna Polarization, Radiation Patterns, Beam Width, Radiation Intensity. Beam Area, Directivity, Gain, Antenna Aperture, Effective length, Reciprocity in Antennas, Equivalence of characteristics in Transmission and Reception, Relation between Directivity and Maximum Effective Aperture, Friis Transmission Formula, Bandwidth, Antenna Temperature.

UNIT II

Antenna Arrays

Uniform Linear Arrays of Isotropic Sources, Broadside Arrays (BSA). End fire Arrays (EFA), EFAs with Increased Directivity. Principle of Pattern Multiplication, Binomial arrays, Effect of Amplitude Distribution on Side-Lobe-Level and Beam width, Dolph-Chebychev Arrays.

UNIT III

Special Antennas: Travelling Wave Antenna, Yagi-Uda Arrays, Vee and Rhombic Antennas, Small Loop Antenna, Helical Antenna, Log-Periodic Antenna, Micro strip Patch Antenna.

UNIT IV

Aperture Antennas, Antenna Measurements: Slot Antenna, Waveguide Horn Antenna, Reflector Antennas: Flat-sheet/ Corner Reflectors, Parabolic Reflector, Lens Antennas - Dielectric Lenses, Metal-plate Lenses ,Antenna Measurements- Pattern Measurement, Outdoor/ Indoor Test Ranges, Absolute Gain Measurement.

UNIT V

Radio-Wave Propagation: Ground Wave Propagation - Space and Surface Waves, Curved Earth Reflections,; Space Wave Propagation – Plane Earth Reflection, Effect of Earth Curvature, Visible Horizon, Effective Heights of Antennas, VHF Communication between aerials placed far apart; Surface Wave Propagation- Factors affecting Magnitude of Surface Wave; Propagation in

Troposphere- Refraction in Troposphere, Standard Atmosphere, Radio horizon, Super Refraction, Condition for Duct Propagation, M-Curves, Tropospheric Scatter. Sky Wave Propagation–Structure and Layers of Ionosphere, Electrical Properties of Ionosphere, Refraction and Reflection by Ionosphere, Critical Frequency, MUF. LUF, Skip Distance, Maximum Single-hop Distance, Virtual Height, Ionospheric Measurements, Dominant mechanisms of Propagation in Various Frequency Ranges

TEXT BOOKS

1. Antennas and Wave Propagation - J.D. Kraus, RJ. Marhefka and Ahmad S. Khan. TMH, New Delhi, 4th ed., (Special Indian Edition), 2010.
2. Antenna and Wave Propagation – Harish AR and Sachidananda M, Oxford University Press, 2007
3. Electromagnetic Waves and Radiating Systems - E.C. Jordan and K.G. Balmain. PHI, 2nd ed., 2000.

REFERENCES

1. Antenna Theory and Design - Warren L. Stutzman, Gary A. Thiele, John Wiley & Sons, 3rd edition. 2013
2. Antenna Theory- Analysis and Design- C.A. Balanis, John Wiley & Sons, 3rd ed.. 2005.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
DIGITAL COMMUNICATIONS

Course Code: GR17A3041 **L T P C**
III Year I Semester **3 1 0 4**

UNIT I

Elements of Digital Communication Systems: Model of Digital Communication Systems, Digital Representation of Analog Signal, Sampling Theorem, Pulse Code Modulation**;** PCM Generation and Reconstruction, Quantization Noise, Non Uniform Quantization and Compounding, DPCM, Adaptive DPCM, DM and Adaptive DM, Noise in PCM and DM.

UNIT II

Digital Modulation Techniques: Introduction, ASK, ASK Modulator, Coherent ASK Detector, Non-Coherent ASK Detector, FSK, Band width and Frequency Spectrum FSK, Non Coherent FSK Detector, Coherent FSK Detector, FSK Detection using PLL, BPSK, Coherent PSK Detection, QPSK, Differential PSK.

UNIT III

Base band Transmission and Optimal Reception of Digital Signal: Pulse Shaping for Optimum Transmissions, Base band Signal Receiver, Probability of Error, Optimum Filter, Matched Filter, Probability of error using Matched Filter Optimal of Coherent Reception, Calculation of Error Probability of ASK, BPSK, BFSK, QPSK.

UNIT IV

Error Control Codes: Linear Block Codes; Matrix Description of Linear Block Codes, Error Detection and Error Correction Capabilities of Linear Block Codes. Cyclic Codes**;** Algebraic Structure, Encoding, Syndrome Calculation, Decoding. Convolution Codes**;** Encoding, Decoding using State, Tree and Trellis Diagrams, Decoding using Viterbi Algorithm.

UNIT V

Spread Spectrum Modulation: Use of Spread Spectrum, Direct Sequence Spread Spectrum (DSSS), and Code Division Multiple Access, Ranging using DSSS, Frequency Hopping Spread Spectrum, and PN-Sequences: Generation and Characteristics, Synchronization in Spread Spectrum Systems.

TEXT BOOKS

1. DigitalCommunications,8thEdition,JohnWiley&Sons,SimonHaykin,Inc2007

REFERENCES

1. TaubandSchilling,PrinciplesofCommunicationSystems,2ndEdition, TMH,1986
2. DigitalandAnalogCommunicationSystems,JohnWiley&Sons,Inc,2002
3. Analog and Digital Communications, second edition, Hsuhwei, Schaum's outline, TMH,2003
4. Communication systems 3rd edition, Simnon Hayking, John Wiley & Sons, 1999

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
VLSI DESIGN

Course Code: GR17A3043 **L T P C**
III Year I Semester **2 1 03**

UNIT I
Introduction: Introduction to IC Technology–MOS transistors, NMOS, CMOS & BiCMOS fabrication Technologies; fabrication processes: Oxidation, Lithography, Diffusion, Ion implantation, Metallization, Etching, Planarization, Encapsulation, Integrated Resistors and Capacitors, Manufacturing issues.

UNIT II **Basic**
Electrical Properties: Basic Electrical Properties of MOS and BiCMOS Circuits: Ids-Vds relationships, MOS transistor threshold Voltage Vt, gm, gds, Figure of merit ωo; Pass transistor, NMOS Inverter, Various pull ups, CMOS Inverter-analysis and design, BiCMOS Inverters, Power, Sources of Power Dissipation, Dynamic Power, Static Power, Robustness, Variability, Reliability, Circuit simulation, SPICE tutorials, device models.

UNIT III
VLSI Circuit Design Processes, Gate Level Design: VLSI Design Flow, MOS Layers, Stick Diagrams, Design Rules and Layout, 2μm CMOS Design rules for wires, contacts and Transistors, Layout Diagrams for NMOS and CMOS Inverters and Gates, Scaling of MOS circuits, CMOS Nano technology. Switch logic, Alternate gate circuits, Time delays, driving large capacitive loads, wiring capacitance, Fan–in, Fan–out, Choice of layers.

UNIT IV
Data path Subsystems, Array Subsystems: Subsystem Design, Shifters, Adders, ALUs, Multipliers, Parity generators, Comparators, Zero/One Detectors, Counters. SRAM, DRAM, ROM, Serial Access Memories, Content Addressable Memory.

UNIT V
Semicustom Integrated Circuit Design, IC Testing: PLAs, Programmable Array Logic, FPGAs, CPLDs, Standard cells design approach. Need for testing ICs, Test Principles, Wafer-level, Package- level testing, System-level Test Techniques, and Layout Design for improved Testability and Principles of Design for testability (DFT).

TEXTBOOKS
1. Essentials of VLSI circuits and systems – Kamran Eshraghian, Douglas A.Pucknell, Sholeh Eshraghian, PHI,2011,
2. CMOS VLSI Design–A circuits and systems perspective, Neil H.E Weste, David Harris, Fourth Edition, Addison Wesley, 2011.

REFERENCES

1. CMOS logic circuit Design- John. P. Uyemura, Springer, 2013.
2. Modern VLSI Design - Wayne Wolf, Pearson Education, 3rdEdition, 1997.
3. VLSI Design–A. Albert Raj, Latha, PHI, 2008
4. Introduction to VLSI–Mead & Convey, BS Publications, 2010

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

DATA BASE MANAGEMENT SYSTEMS

(ProfessionalElective-I)

Course Code: GR17A2063 **L TP C**

III Year I Semester **3 1 0 4**

UNIT I

Data base System Applications, data base System VS file System – View of Data – Data Abstraction – Instances and Schemas – data Models – the ER Model – Relational Model – Other Models –Data base System Structure, Data base Users and Administrator – Transaction Management –Data base design and ER diagrams –Attributes and Entity sets – Relationships and Relationship sets –Design Issues, Extended ER Features, Concept Design with the ER Model

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.

UNIT III

Form of Basic SQL Query – Database Languages – DDL – DML – database Access for applications 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's – AND, OR and NOT – Impact on SQL Constructs – Outer Joins – Disallowing NULL values, Integrity Constraint over relations, Introduction to Views – Destroying /altering Tables and Views.

UNIT IV

Schema refinement – Problems Caused by redundancy – Decompositions – Problem related to decomposition – reasoning about FDS – FIRST, SECOND, THIRD Normal forms – BCNF – Lossless join Decomposition – Dependency preserving Decomposition – Schema refinement in Data base Design – Multi valued Dependencies – Fourth Normal Form.

UNIT V

Transaction Concept: Transaction State – Implementation of Atomicity and Durability-Concurrent – Executions – 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.

TEXT BOOKS

1. Data base Management Systems, Raghurama Krishnan, Johannes Gehrke, TATAMcGrawHill 3rd Edition
2. Data base System Concepts, Silberschatz, Korth, McGraw hill, V edition.

REFERENCES

1. Introduction to Database Systems, C.J.Date Pearson Education.
2. Data base Systems design, Implementation, and Management, Rob & Coronel 5th Edition. Thomson.
3. Database Management Systems P. Radha Krishna HI-TECH Publications 2005.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

LINEAR CONTROL SYSTEMS

(Professional Elective-I)

Course Code: GR17A3104 **L T P C**

III Year I Semester **3 1 0 4**

UNIT I

Introduction to control system: Classification, open-loop, closed-loop system

Mathematical Models of Physical Systems: Modeling of mechanical system elements, Electrical systems, Analogous Systems, Transfer function, Procedure for deriving transfer functions, Servomotors, Synchronous.

Block Diagrams: Block Diagram and Signal flow graphs: Block Diagrams, of a closed-loop system, block diagrams and transfer functions of multivariable systems, procedure for drawing a block diagram, block diagram reduction,

Signal Flow Graphs: construction of Signal Flow Graphs (SFG), Basic properties of signal flow graph, Signal flow graph algebra, construction of signal flow graph

UNIT II

Time Response Analysis I: Time response of control system, Standard test signals, Time response of first-order systems, second-order systems, steady state errors and error constrains, types of control systems, effect of adding poles and zeros to transfer functions, dominant poles of transfer functions.

UNIT III

Time Response Analysis II: Routh Stability Criterion: Introduction, Bounded Input and Bounded Output(BIBO), Necessary conditions for stability, Routh stability criterion, difficulties in the formulation of the Routh table, applications of the Routh stability criterion to linear feedback system, relative stability analysis. Root locus concepts, construction of root loci, rules for the construction of the root locus, effect of adding poles and zeros to G(s) and H(s).

UNIT IV

Frequency Domain Analysis: Correlation between time and frequency response, Polar plots, inverse polar plots, Bode plots, basic factors of G(jw)H(jw), general procedure for constructing Bode plots, all pass and minimum phase systems, computation of Gain Margin and Phase margin, Nyquist plots: principle of argument, Nyquist stability criterion.

UNIT V

State Space Analysis: Concepts of state, state variables and state models, state-space representation, state transition matrix and state transition equation.

TEXT BOOKS

1. I. J. Nagrath, M. Gopal,"Control Systems Engineering",Fifth Edition, NewAge International, New Delhi, 2007.

REFERENCES

1. A.Anand Kumar, "Control Systems", Seventh printing, PHI Learning New Delhi, 2012
2. Katsuhiko Ogata, "Discrete Time Control Systems", Second Edition, PHI Learning New Delhi, 2006.
3. R. Ananda natarajan, P. Ramesh Babu, "Control Systems Engineering", Second edition, Sci Tech Publications Pvt. (India) Ltd, 2008

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

SYSTEMS MODELING & SIMULATION

(Professional Elective-I)

Course Code: GR17A3109 **L T P C**

III Year I Semester **3 1 0 4**

UNIT I

System Models: Concept of a system, System Environment, Stochastic activities, continuous and Discrete Systems, System Modeling, Physical and Mathematical Models for Systems, Static and Dynamic Categorization of these physical and mathematical Models. Principles used in modeling. System Simulation: Monte–Carlo Method: Comparison of Simulation and analytical methods, Experimental nature, Types of Simulation, Numerical Computation Technique for continuous model and for Discrete model, Distributed Lag Models, Cobweb Models.

UNIT II

Continuous System Simulation: Differential Equations, Analog Computers, Analog Models, hybrid Computers, digital – Analog Simulations, Continuous System Simulation Languages (CSSLS), CSMP – III, Hybrid Simulation, Feedback Systems, Simulation of an, Interactive Systems, Real-Time Simulation. System Dynamics: Exponential Growth Models, Exponential Decay Models, Logistic Curves, Generalization of Growth Models, Simple System Dynamics Diagrams, Multi-segment Models, Representation of Time Delays, WORLD Models.

UNIT III

Probability Concepts In Simulation: Stochastic Variables, Discrete Probability functions, Continuous Probability functions, Measures of Probability functions, Numerical Evaluation of Continuous Probability functions, continuous Uniformly Distributed Random Numbers, A Uniform Random Number Generator, Generating Discrete Distributions. Arrival Patterns and Service Times: Poisson's Arrival patterns, Exponential Distribution, Erlang Distribution, Hyper-Exponential Distribution, Normal Distribution, Queuing Disciplines, Mathematical Solutions of Queuing Problems.

UNIT IV

Introduction To Gpss: GPSS Programs, General Description Action Times, Succession of Events, Choice of Paths, Simulation of a manufacturing Shop, Conditional Transfers, Control

Statements, Functions, Simulation of a Super Market, Transfer modes, GPSS Model of a Simple Telephone system.

UNIT V

Random Access Systems: Aloha, Slotted Aloha, Carrier Sense Multiple Access, Delay Calculations in CSMA/CD, Performance comparisons, Reservation Techniques. Routing And Flow Allocation: Routing Model, Shortest Path Algorithms, Capacity Constrains, Flow control and Routing, Routing in Practice.

TEXT BOOKS

1. Geoferey Gordon “System Simulation”,PHI, Second Edition.
2. A.M.Law and W.David Kelton, "Simulation Modelling and analysis", Mc Graw Hill Inc. New York ,1991

REFERENCES

1. Hayes, Khanna Publications.
2. Networks Jeremiah F, “Modeling and Analysis of computer Communications Networks”.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
ADVANCED ENGLISH COMMUNICATION SKILLS LAB

Course Code: GR17A3100 **L T P C**
III Year I Semester **0 0 2 2**

Introduction

- Gather ideas and information, to organize ideas relevantly and coherently.
- Engage in debates.
- Participate in group discussions.
- Face interviews.
- Write project/research reports/technical reports.
- Make oral presentations.
- Write formal letters.
- Transfer information from non-verbal to verbal texts and vice versa.
- To take part in social and professional communication.

Objectives:

This Lab focuses on using computer-aided multimedia instruction for language development to meet the following targets:

- To improve the studentsfluency in English, through a well-developed vocabulary and enable them to listen to English spoken at normal conversational speed by educated English speakers and respond appropriately in different socio-cultural and professional contexts.
- Further, they would be required to communicate their ideas relevantly and coherently in writing.

Syllabus:

The following course content is prescribed for the Advanced Communication Skills Lab:

- Functional English-starting a conversation–responding appropriately and relevantly–using the right body language–role play in different situations, Discourse Skills.
- Vocabulary Building–synonyms and antonyms, word roots, one-word substitutes, prefixes and suffixes, study of word origin, analogy, idioms and phrases, Collocations.
- Reading Comprehension–reading for facts, guessing meanings from context, scanning, skimming, inferring meaning, Critical reading.
- Writing Skills–structure and presentation of different types of writing–Resume writing/

- E-correspondence/Technicalreportwriting/Portfoliowriting–planningfor writing – research abilities/data collection/organizing data/tools/analysis– improving one's writing.
- Group Discussion–dynamics of group discussion, intervention, summarizing, and modulationof voice, body language, relevance, fluency and coherence.
- Presentation Skills–Oral presentations (individual and group) through JAM sessions/seminars and written presentations through posters/projects/reports/ PPTs/e-mails/ assignments etc.

Interview Skills–concept and process, pre-interview planning, opening strategies, answering strategies, interview through tele and video-conferencing.

Minimum Requirement:

The English Language Lab shall have two parts:

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

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

System Requirement (Hardware component): Computer network with LAN with minimum 60 multimedia systems with the following specifications:

i) P–IV Processor

   a) Speed–2.8GHZ

   b) RAM–512MBMinimum c)HardDisk–80GB

ii) Head phones of High quality

Suggested Software:

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

Suggested Software:

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

The following software from 'train2success.com'

- preparingfor being interviewed,
- Positive Thinking,
- Interviewing Skills
- Telephone Skills,
- Time Management
- Team Building,
- Decision making

English in Mind, Herbert Puchta and Jeff Stranks with Meredith Levy, Cambridge

Books Recommended:

1. Technical Communication by Meenakshi Raman &Sangeeta Sharma, Oxford University Press2009.
2. Advanced Communication Skills Laboratory Manual by SudhaRani, D,Pearson Education2011.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
VLSI DESIGN LAB

Course Code: GR17A3044 **L T P C**
III Year I Semester **0 0 2 2**

Design and implementation of the following CMOS digital/analog circuits using Cadence/Mentor Graphics/Synopsys CAD tools including: Gate-level design, Transistor-level design, Hierarchical design, Verilog HDL Equivalent/VHDL design, Logic Synthesis, Simulation and Verification, Scaling of CMOS Inverter for Different Technologies, Study of Secondary Effects (Temperature, Power Supply and Process Corners), Circuit Optimization with Respect to Area, Performance and/or Power, Layout, Extraction of Parasitics and Back Annotation and Related, Modifications in Circuit Parameters and Layout Consumption, DC/ Transient Analysis, Verification of Layouts (DRC, LVS)

VLSI Programs:

Task1: Introduction to Layout Design Rules

Task2: Layout of Basic Logic Gates

Task3: Layout of CMOS Inverter

Task4: Layout of CMOS NOR/NAND Gates

Task5: Layout of CMOS XOR and MUX Gates

Task6: Layout of CMOS 1-bit Full Adder

Task7: Layout of Static/Dynamic Logic Circuit (Register Cell)

Task8: Layout of Latch

Task9: Layout of Pass Transistor

Task10: Layout of any Combinational Circuit (Complex CMOS Logic Gate)-Learning about DataPaths

Task11: Introduction to SPICE Simulation and Coding of NMOS/CMOS Circuit

Task12:SPICE Simulation of Basic Analog Circuits: Inverter/Differential Amplifier

Task13: Analog Circuit Simulation (AC Analysis)–CS &CD Amplifier.

Task14: System Level Design using PLL

Task15: Finite State Machine Design

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

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
DIGITAL COMMUNICATION LAB

Course Code: GR17A3045 **L T P C**
III Year I Semester **0 0 2 2**

List of Experiments:
Task1: Design and Implementation of Uniform Quantizer.
Task2: PCM Generation and Detection
Task3: Differential Pulse Code Modulation
Task4: Delta Modulation and Demodulation
Task5: Time Division Multiplexing of 2 Band Limited Signals
Task6: Design and implementation of ASK Generator and Detector
Task7: Design and implementation of PSK Generator and Detector
Task8: Design and implementation of FSK Generator and Detector
Task9: Quadrature Phase Shift Keying modulation &Detection.
Task10: Differential Phase Shift Keying
Task11: Design and Implementation of Convolutional Coders
Task12: Design and Implementation of Cyclic code Encoder and its corresponding Syndrome Calculator
Task13: Generation of PN Sequence and Gold Sequences
Task14: BER Analysis of binary digital Modulation Schemes (ASK, PSK and FSK) in the presence of Additive White Gaussian Noise
Task15: BER Analysis of Direct Sequence Spread Spectrum Communication system in the presence of AWGN and interference.

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

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
WATER RESOURCES ENGINEERING
(Open Elective-1)

Course Code: GR17A3151 **L T P C**
III Year. I Semester **31 0 4**

UNIT I

Introduction to Engineering Hydrology and its applications: Hydrologic Cycle, types and forms of precipitation, rainfall measurement, types of Rain gauges, computation of average rainfall over a basin, processing of rainfall data-adjustment of record-Rainfall Double Mass Curve. Runoff-Factors affecting Runoff over a Catchment- Empirical and Rational Formulae.

Abstraction from rainfall: Evaporation, factors effecting evaporation, Measurement of evaporation- Evapotranspiration- Penman and Blaney & Criddle Methods -Infiltration, factors affecting infiltration, measurement of infiltration, infiltration indices'.

UNIT II

Distribution of Runoff: Hydrograph Analysis Flood Hydrograph – Effective Rainfall - Base Flow- Base Flow Separation - Direct Runoff Hydrograph– Unit Hydrograph, definition and limitations of application of Unit hydrograph, Derivation of Unit Hydrograph from Direct Runoff Hydrograph and vice versa S- hydrograph, Synthetic Unit Hydrograph.

UNIT III

Ground water Occurrence: Types of aquifers, aquifer parameters,' porosity' Specific yield, permeability, transmissivity and storage coefficient, Darcy's law, radial flow to wells in confined and unconfined aquifers, Types of wells, Well Construction - Well Development.

UNIT IV

Necessity and importance of irrigation: Advantages and ill-effects of irrigation, Types of irrigation, Methods of application of irrigation water, Indian Agriculture soils, Methods of improving soil fertility-Crop rotation, preparation land for irrigation, Standards of quality for irrigation water.

Soil-water-plant relationship: Vertical distribution of soil moisture, soil moisture constants, soil moisture tension, consumptive use, Duty and delta, factors Affecting duty- design discharge for a water course. The depth and frequency of Irrigation, Irrigation efficiencies-Water Logging.

UNIT V

Classification of canals: Design of Irrigation canals by Kennedy's and Lacey's theories, balancing depth of cutting, IS standards for canal design canal lining.

Design discharge over a catchment: computation of design discharge–rational formula, SCS curve number method, flood frequency analysis introductory part only. Stream gauging-measurement and estimation of stream flow.

TEXT BOOKS

1. A text book of hydrology by P. Jaya Rami Reddy, laxmi publications pvt limited
2. Irrigation and water power engineering- B.C. Punmia, PandeB. B.Lal, Ashok kumarjain, Arun kumarjain- Laxmi publications 16th edition

REFERENCES

l. Elementary hydrology by V.P. Singh PHI publications
2. Irrigation and Water- Resources &Water Power by P'N 'Modi' StandardBook House.
3. Irrigation Water Management by D'K' Majundar' Printice Hall ofIndra.
4. Irrigation and Hydraulic structures by S'K'Grag'
5. Applied Hydrology by VenTe Chow' David R' Maidmentlarry W'MaysTataMC. GrawHill'
6. Introduction to Hydrology by Warren Viessman' Jr' Garyl' Lewis'
7. Handbook of Hydrology by David R. Maidment (Editour-in-chief)-McGrow - Hill

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
SOLAR AND WIND ENERGY SYSTEMS
(Open Elective- I)

Course Code:GR17A3152 **L T P C**
III Year I Sem **3 1 0 4**

UNIT I

Solar Energy Basics: The sun as a source of energy, The Earth Sun, Earth Radiation Spectrums,Extra-terrestrial and Terrestrial Radiations, Spectral Energy Distribution of Solar Radiation, Depletion of Solar Radiation, Solar Radiation Data, Measurement of Solar Radiation, Solar Time(Local Apparent Time), Solar Radiation Geometry, Solar Day Length, Empirical Equations for Estimating Solar Radiation Availability on Horizontal Surface For Cloudy skies, Hourly Global, Diffuse and Beam Radiation on Horizontal Surface Under Cloudless Skies, Solar Radiation on Inclined Plane Surface

UNIT II

Solar Thermal Systems: Solar Collectors, Solar Water Heater, Solar Passive Space-Heating andCooling Systems, Solar Ustrial Heating Systems, Solar Refrigeration and Air-Conditioning Systems, Solar Cookers, Solar Furnaces, Solar Green House, Solar Dryer, Solar Distillation(or Desalination of Water), Solar Thermo-Mechanical Systems.

UNIT III

Solar Photovoltaic Systems: Solar Cell Fundamentals, Solar Cell Characteristics, Solar CellClassification, Solar Cell, Module, Panel and Array Construction, Maximizing The Solar PV Output and Load Matching, Maximizing Power point tracker(MPPT),Balance of System Components, Solar PV Systems, Solar PV Applications

UNIT IV

Wind Energy: Origin of Winds, Nature of Winds, Wind Turbine Siting, Major Applications of WindPower, Basics of Fluid Mechanics, Wind Turbine Aerodynamics.

UNIT V

Wind Energy Conversion Systems: Wind Energy Conversion Systems (WECS), Wind-DieselHybrid System, Effects of Wind Speed and Grid Condition (System Integration), Wind Energy Storage, Environmental Aspects.

TEXT BOOKS

1. B.H.Khan, “Non- Conventional Energy Resources”, 2nd edition, Tata McGraw-Hill, New Delhi

REFERENCES

1. SP Sukhatme, Solar Energy - Principles of thermal collection and storage, 2nd edition, Tata McGraw-Hill, New Delhi

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
APPLIED THERMODYNAMICS
(Open Elective-I)

Course Code:GR17A3153 **L T P C**
III B. Tech I Semester **3 1 0 4**

UNIT I

Steam Power Cycles: Carnot cycle, Rankine cycle, Modified Rankine - Schematic layouts, Thermodynamic Analysis, Concept of Mean Temperature of Heat addition, Methods to improve cycle performance – Regeneration &Reheating. Binary vapour cycle

Combustion: Fuels and combustion, basic chemistry, combustion equations, stochiometric air fuel ratio, volumetric and mass basis conversion, Flue gas analysis by Orsat apparatus.

UNIT II

Boilers : Classification – Working principles – with sketches including H.P. Boilers, L.P. Boilers and Modern H.P. Boilers – Mountings and Accessories – Working principles, Boiler horse power, equivalent of evaporation, efficiency and heat balance. Draught, classification – Height of chimney for given draught and discharge, condition for maximum discharge, efficiency of chimney – Artificial draught: induced, forced, balanced and steam jet draught,

UNIT III

Steam Nozzles: Function of a nozzle – applications - types, Flow through nozzles, thermodynamic analysis, assumptions -velocity of nozzle at exit-Ideal and actual expansion in nozzle, velocity coefficient, condition for maximum discharge, critical pressure ratio, criteria to decide nozzle shape: Super saturated flow, its effects, degree of super saturation and degree of under cooling - Wilson line.

Steam Condensers: Requirements of steam condensing plant – Classification of condensers – working Principle of different types – vacuum efficiency and condenser efficiency – air leakage, sources and its affects, Air pump- cooling water requirement. Cooling towers.

UNIT IV

Steam Turbines: Classification – Impulse turbine ,De-Laval Turbine its features; Mechanical details – Velocity diagram – effect of friction – power developed, axial thrust, blade or diagram efficiency – condition for maximum efficiency.-.

Reaction Turbine: Mechanical details – principle of operation, thermodynamic analysis of a stage.-Degree of reaction –velocity diagram – Parson's reaction turbine – condition for maximum efficiency.

Compounding: Methods to reduce rotor speed-Velocity compounding and pressure compounding, pressure velocity compounding, Velocity and Pressure variation along the flow – combined velocity diagram for a velocity compounded impulse turbine.

UNIT V

Gas Turbines: Simple gas turbine plant – Ideal cycle, essential components – actual cycle – methods for improvement of performance - regeneration, inter cooling and reheating –Closed and Semi-closed cycles – merits and demerits, Brief concepts about compressors, combustion chambers and turbines of Gas Turbine Plant.

Jet Propulsion: Principle of Operation –Classification of jet propulsive engines – Working Principles with Schematic diagrams and representation on T-S diagram - Thrust, Thrust Power and Propulsion Efficiency– Turbo jet engines – Needs and Demands met by Turbo jet – Schematic Diagram, Thermodynamic Cycle, Performance Evaluation Thrust Augmentation – Methods.

Rockets: Working Principle – Classification – Propellant Type – Thrust, Propulsive Efficiency – Specific Impulse – Solid and Liquid propellant Rocket Engines.

TEXT BOOKS

1. Thermal Engineering / R.K. Rajput / Lakshmi Publications
2. Thermal Engineering-P.L.Ballaney/ Khanna publishers
3. Thermal Engineering/R.S.Khurmi/JS Gupta/S.Chand.

REFERENCES

1. Thermodynamics and Heat Engines / R. Yadav / Central Book Depot

2. Gas Turbines and Propulsive Systems – P.Khajuria&S.P.Dubey - /Dhanpatrai

3. Gas Turbines / Cohen, Rogers and SaravanaMuttoo / Addison Wesley – Longman

4. Thermal Engineering-M.L.Marthur& Mehta/Jain bros

5. Gas Turbines – V.Ganesan /TMH

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

PRINCIPLES OF E-COMMERCE
(OPEN ELECTIVE- I)

Course Code: GR17A3154	**L T P C**
III Year I Semester	**31 0 4**

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 BOOKS

1. Kenneth C. Laudon Carol GuercioTraver, "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)

REFERENCES

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.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

DATA MINING AND APPLICATIONS

(Open Elective – I)

Course Code: GR17A3155	**L T P C**
III Year I Semester	**3 1 0 4**

UNIT I

Introduction: Fundamentals of data mining, Data Mining Functionalities, Classification of Data Mining systems, Data Mining Task Primitives, Major issues in Data Mining. Data Preprocessing: Need for Preprocessing the Data, Data Cleaning, Data Integration and Transformation, Data Reduction, Discretization and Concept Hierarchy Generation.

UNIT II

Mining Frequent Patterns, Associations and Correlations: Basic Concepts, Efficient and Scalable Frequent Itemset Mining Methods, Mining various kinds of Association Rules, From Association Mining to Correlation Analysis, Constraint- Based Association Mining

UNIT III

Classification and Prediction: Issues Regarding Classification and Prediction, Classification by Decision Tree Induction, Bayesian Classification, Rule-Based Classification, Classification by Back propagation, Support Vector Machines, Associative Classification, Prediction, Accuracy and Error measures, Evaluating the accuracy of a Classifier or a Predictor.

Cluster Analysis Introduction :Types of Data in Cluster Analysis, A Categorization of Major Clustering Methods, Partitioning Methods, Hierarchical Methods, Density-Based Methods, Outlier Analysis - Distance-Based Outlier Detection, Density-Based Local Outlier Detection

UNIT IV

Mining World Wide Web: Mining web page layout structure, Identification of authoritative web pages using web link structures, Automatic Classification of Web Documents, Web Usage

Mining.

Spatial Mining: Mining spatial association and colocation patterns, spatial clustering methods, spatial classification and spatial trend analysis.

UNIT V

Text Mining: Text Data analysis and Information retrieval, Dimensionality reduction for text, text mining approaches.

Applications and trends in Data Mining : Data Mining for Financial Data Analysis, , Data Mining for Telecommunication Industry, Data Mining for Intrusion Detection, Various themes on Data Mining, Social impacts of data mining

TEXT BOOKS

1. Data Mining – Concepts and Techniques - Jiawei Han and Micheline Kamber, Morgan Kaufmann Publishers, Elsevier, Second Edition, 2006.
2. Introduction to Data Mining – Pang-Ning Tan, Michael Steinbach and Vipin Kumar, Pearson education.
3. Data Mining – Introductory and advanced topics – Margaret H. Dunham &S.Sridhar, Pearson Education.

REFERENCES

1. Data Mining Techniques – Arun K. Pujari, Second Edition, Universities Press.
2. Data Warehousing in the Real World, Sam Anahory and Dennis Murray, Pearson Edn Asia.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
COMPUTER ARCHITECTURE AND ORGANIZATION
(OPEN ELECTIVE-I)

Course Code: GR17A3156 **L T P C**
III Year I Semester **3 1 0 4**

UNIT I
Introduction
Computing and Computers, Evolution of Computers, VLSI Era, System Design;
Register Level, Processor Level, CPU Organization, Data Representation, Fixed Point Numbers, Floating Point Numbers, Instruction Formats, Instruction Types, addressing modes.

UNIT II
Data Path Design
Fixed Point Arithmetic, Addition, Subtraction, Multiplication and Division, Combinational and SequentialALUs, Carry look ahead adder, Robertson algorithm, booth's algorithm, non-restoring division algorithm,Floating Point Arithmetic, Coprocessor, Pipeline Processing, Pipeline design, Modified booth's Algorithm

UNIT III
Control Design
Hardwired Control, Microprogrammed Control, Multiplier Control Unit, CPU Control Unit, Pipeline Control Instruction Pipelines, Pipeline Performance, Superscalar Processing, Nano Programming.

UNIT IV
Memory Organization

Random Access Memories, Serial Access Memories, RAM Interfaces, Magnetic Surface Re cording,Optical Memories, multilevel memories, Cache & Virtual Memory, Memory Allocation, Associative Memory.

UNIT V

System Organization

Communication methods, Buses, Bus Control, Bus Interfacing, Bus arbitration, IO and system control, IOinterface circuits, Handshaking, DMA and interrupts, vectored interrupts, PCI interr upts, pipelineinterrupts, IOP organization, operation systems, multiprocessors, fault tolera-- nce, RISC and CISC processors, Superscalar and vector processor.

TEXT BOOKS

1. John P.Hayes, 'Computer architecture and Organisation', TMHThird edition, 1998.
2. V. Carl Hamacher, Zvonko G. Varanesic and Safat G. Zaky, "Computer Organisation", V edition, McGraw-Hill Inc, 1996.

REFERENCES

1. Morris Mano, "Computer System Architecture", Prentice-Hall of India, 2000.
2. Paraami, "Computer Architecture", BEH R002, Oxford Press.
3. P.Pal Chaudhuri, "Computer organization and design", 2nd Ed., Prentice Hall of India, 2007.
4. G.Kane & J.Heinrich, "MIPS RISC Architecture", Englewood cliffs, New Jersey, Prentice Hall, 1992.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

DIGITAL SIGNAL PROCESSING

Course Code: GR17A3046	**L**	**T**	**P**	**C**
III Year II Semester	**3**	**1**	**0**	**4**

UNIT I

Introduction: Introduction to Digital Signal Processing: Discrete Time Signals &Sequences, Linear Shift Invariant Systems, Stability, and Causality, Linear Constant Coefficient Difference Equations, Frequency Domain Representation of Discrete Time Signals and Systems

UNIT II

Discrete Fourier series: DFS Representation of Periodic Sequences, Properties of Discrete Fourier Series, Discrete Fourier Transforms: Properties of DFT, Linear Convolution of Sequences using DFT, Computation of DFT, Relation between DTFT, DFS, DFT and Z-Transform.

Fast Fourier Transforms: Fast Fourier Transforms (FFT)-Radix-2, Decimation-in-Time and Decimation-in-Frequency FFT Algorithms, Inverse FFT, and FFT with General Radix -N.

UNIT III

Realization of Digital Filters: Applications of Z–Transforms, Solution of Difference Equations of Digital Filters, System Function, Stability Criterion, Frequency Response of Stable Systems, Realization of Digital Filters – Direct, Canonical, Cascade and Parallel Forms.

UNIT IV

IIR Digital Filters: Analog filter approximations–Butterworth and Chebyshev, Design of IIR Digital Filters from Analog Filters, Step and Impulse Invariant Techniques, Bilinear Transformation Method.

UNIT V

FIR Digital Filters: Characteristics of FIR Digital Filters, Frequency Response, Design of FIR Filters: Fourier Method, Digital Filters using Window Techniques, Frequency Sampling Technique, and Comparison of IIR &FIR filters.

TEXTBOOKS

1. Digital Signal Processing, Principles, Algorithms, and Applications: John G. Proakis, Dimitris G. Manolakis, Pearson Education/PHI,2007.

2. Discrete Time Signal Processing–A.V. Oppen heimand R.W.Schaffer, PHI, 2009

3. Fundamentals of Digital Signal Processing–Loney Ludeman, John Wiley, 2009

REFERENCES

1. Johnny R. Johnson, Introduction to Digital Signal Processing, PHI, 2001.

2. Andreas Antoniou, Digital Signal Processing, TMH, 2006.

3. John G.Proakis, Dimitris GManolakis, digital Signal Processing: Principles, Algorithms and Applications, Pearson Education, PHI, 2003

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
MICROWAVE ENGINEERING

Course Code:GR17A3048 **L T P C**
III Year II Semester **2 1 0 3**

Unit I

Microwave Transmission Lines: Rectangular Waveguide- Solution of Wave Equations, Modes of Propagation, Power Transmission and losses, Mode Excitation, Characteristics; Circular Waveguide- Solution of Wave Equations, Modes of Propagation, Power Transmission and losses, Mode Excitation, Characteristics; Strip Line- Propagation Constant, Characteristic Impedance, Attenuation; Micro strip Line- Effective Dielectric Constant, Characteristic Impedance, Attenuation

Unit II

Microwave Network Analysis, Reciprocal & Non-Reciprocal NetworksZ-, Y-, S-Matrix Concepts, Properties of S-Matrix, S-Matrix of two, three, four port, Reciprocal and non-reciprocal networks: E- and H- Plane Tees, Magic Tees, Hybrid Rings, Isolators; Wilkinson Power Divider-Even and Odd Mode Analysis; Directional Couplers and 90^0, 180^0 Hybrid, Ferrite Devices.

Unit III

Microwave Network Analysis, Reciprocal & Non-Reciprocal Networks: Filter design using Insertion Loss Method, Butterworth and Chebyschev realization of filters, Transformation of Low pass prototype to other filter types, Stepped Impedance Low Pass Filter, Realization of filters with Microstrip lines, Impedance Matching in RF Networks- L Network, Dealing with Complex Loads, 3-element matching, Wideband Matching Networks

Unit IV

Microwave Tubes and Introduction to Microwave Solid State Devices: Microwave Tubes- Principles of Operation: Klystron, Reflex Klystron, Travelling Wave Tube, Magnetron; Microwave Diodes: Schottky Diode, PIN Diode; Transferred Electron Devices: Gunn Effect Diode, RWH Theory, Modes of operation; Avalanche Transit-time Devices: IMPATT, TRAPATT

Unit V

Noise, Distortion, Oscillators, Mixers, Multipliers: Noise in Microwave Circuits, Noise Figure, Non-linear Distortion; Microwave Oscillators, Oscillator Phase Noise; Frequency Multipliers- Manley-Rowe Relations; Mixers- Single-ended mixer, Balanced Mixer

TEXT BOOKS

1. "Microwave Engineering", David M Pozar, John Wiley & Sons, 4th ed., 2012

2."Microwave Devices and Circuits", Samuel Y Liao, Pearson Education, 3rd ed., 1990

3."RF Circuit Design", Christopher Bowick, Elsevier Inc, 2008

REFERENCES

1."RF Circuit Design- Theory and Applications". Reinhold Ludwig and Pavel Bretchko, Prentice Hall Inc., 2000

2."Foundations for Microwave Engineering", RE Collin, John Wiley & Sons Inc, 2nd ed., 2002

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

Course Code: GR17A2104 LTPC
III Year I Semester 2 1 0 3

UNIT I

Introduction &Demand Analysis: 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 Organization: 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 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 (simple problems).

UNIT V

Introduction to Financial Accounting & Financial Analysis: Accounting concepts and Conventions-Double-Entry Book Keeping, 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.

TEXTBOOKS

1. Arya sri: Managerial Economics and Financial Analysis, TMH, 2009.
2. Atmanand: Managerial Economics, Excel, 2008.

REFERENCES

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,OxfordUniversityPress,2009

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

Computer Networks and Protocols

(**Professional Elective-II**)

Course Code: GR17A2077 **LTPC**

III Year I Semester **31 0 4**

Unit I

Computer Network Architecture: Layered structure, design issues for the layers, interfaces and services, OSI reference model, overview of TCP/IP architecture, Hardware and software components, network topologies.

Unit II

Peer to Peer Protocols: Peer – to – Peer protocols and service models; ARQ protocols and adaption function; Data-Link Controls-HDLC and PPP; Link sharing using packet multiplexers; Medium Access Control Protocols.

Packet-Switching protocols: Routing and Congestion Control Protocols-Interior & Exterior Routing Protocols.

Unit III

TCP/IP Architecture:

The Internet Protocols-IPv4 & IPv6, UDP & TCP, DHCP and Mobile IP; Internet Routing Protocols, Multicast Routing. Broadband Technology and services.

Unit IV

ATM Networks:

Layers, QoS, ATM Adaptation Layers, Signaling and PNNI Routing. Internetworking: Virtual Circuit and Datagram Subnets: Internet Control Protocols; Security Protocols; Internetworking: Virtual Circuit and Datagram Subnets: Internetworking Protocols; Tunneling; Fragmentation: Firewalls. Security Protocols: Security and Cryptographic Algorithm.

Unit V

Application Protocols

Application Protocols: Introduction, providing services, Applications layer paradigms, Client server model, Standard client-server application-HTTP, FTP, electronic mail, WWW, DNS, SSH, SMTP.

TEXT BOOKS

1. Computer Networks - Andrew S Tanenbaum, 4th Edition, Pearson Education
2. Data Communications and Networking - Behrouz A. Forouzan, Fifth Edition TMH, 2013.

REFERENCES

1. An Engineering Approach to Computer Networks - S. Keshav, 2nd Edition, Pearson Education.
2. Understanding communications and Networks, 3rd Edition, W. A. Shay, Cengage Learning.
3. Introduction to Computer Networks and Cyber Security, Chwan-Hwa (John) Wu, J. David Irwin, CRC Press.
4. Computer Networks, L. L. Peterson and B. S. Davie, 4th edition, ELSEVIER.
5. Computer Networking: A Top-Down Approach Featuring the Internet, James F. Kurose, K. W. Ross, 3rd Edition, Pearson Education.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

Information Theory and Coding

(**Professional Elective-II**)

Course Code: GR17A3110 **L T PC**

III Year I Semester **31 0 4**

UNIT I

Information Theory: Definition of Information, Entropy, Mutual Information, Properties of Mutual Information, Fundamental Inequality, I.T. Inequality, Divergence, Properties of Divergence, Divergence Inequality, Relationship between entropy and mutual information, Chain Rules for entropy, relative entropy and mutual information.

UNIT II

Channel Capacity: Uniform Dispersive Channel, Uniform Focusing Channel, Strongly Symmetric Channel, Binary Symmetric Channel, Binary Erasure Channel. Channel Capacity of the all these channels, Channel Coding Theorem, Shannon-Hartley Theorem

Data Compression: Kraft inequality, Huffman codes, Shannon-Fano coding, Arithmetic Coding

UNIT III

Linear Block Codes:

Systematic linear codes and optimum decoding for the binary symmetric channel;Generator and Parity Check matrices, Syndrome decoding on symmetric channels;Hamming codes; Weight enumerators and the MacWilliams identities; Perfect codes. Cyclic Codes,BCH codes; Reed-Solomon codes, Justeen codes, MDS codes, Alterant, Goppa and generalized BCH codes; Spectral properties of cyclic codes.

UNITIV

Decoding of BCH codes: Berlekamp's decoding algorithm, Massey's minimum shift register synthesis technique and its relation to Berlekamp's algorithm. A fast Berlekamp – Massey algorithm.

UNIT V

Convolution codes Wozencraft's sequential decoding algorithm, Fann's algorithm and other sequential decoding algorithms; Viterbi decoding algorithm, Turbo Codes, Concatenated Codes.

TEXT BOOKS

1. F.J. MacWilliams and N.J.A. Slone, The theory of error correcting codes,North Holland, 1977.
2. R.E. Balahut, Theory and practice of error control codes, Addison Wesley, 1983.
3. Thomas M. Cover, Joy A. Thomas, "Elements of Information Theory", Wiley Publishers.
4. Ranjan Bose," Information Theory Coding, Cryptography", TMH Publication.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

SOFTWARE ENGINEERING

(**Professional Elective-II**)

Course Code: GR17A3057	**L T P C**
III Year II Semester	**3 1 0 4**

UNIT I

Introduction to Software Engineering: The evolving role of software, Changing Nature of Software, Software myths.

A Generic view of process: Software engineering- A layered technology, a process framework, The Capability Maturity Model Integration (CMMI), Process patterns, process assessment, personal and team process models.

Process models: The waterfall model, Incremental process models, Evolutionary process models, The Unified process.

UNIT II

Software Requirements: Functional and non-functional requirements, User requirements, System requirements, Interface specification, the software requirements document.

Requirements engineering process: Feasibility studies, Requirements elicitation and analysis, Requirements validation, Requirements management.

System models: Context Models, Behavioural models, Data models, Object models, structured methods.

UNIT III

Design Engineering: Design process and Design quality, Design concepts, the design model.

Creating an architectural design: Software architecture, Data design, Architectural styles and patterns, Architectural Design.

Object-Oriented Design: Objects and object classes, An Object-Oriented design process, Design evolution.

Performing User interface design: Golden rules, User interface analysis and design, interface analysis, interface design steps, Design evaluation.

UNIT IV

Testing Strategies: A strategic approach to software testing, test strategies for conventional software, Black-Box and White-Box testing, Validation testing, System testing, the art of Debugging.

Product metrics: Software Quality, Metrics for Analysis Model, Metrics for Design Model, Metrics for source code, Metrics for testing, Metrics for maintenance.

Metrics for Process and Products: Software Measurement, Metrics for software quality.

Risk management: Reactive vs. Proactive Risk strategies, software risks, Risk identification, Risk projection, Risk refinement, RMMM, RMMM Plan.

UNIT V

Quality Management: Quality concepts, Software quality assurance, Software Reviews, Formal technical reviews, Statistical Software quality Assurance, Software reliability, The ISO 9000 quality standards.

TEXT BOOKS

1. Software engineering a practitioner's Approach, Roger S Pressman, 6th edition. McGrawHill International Edition.
2. Software Engineering, Ian Summerville, 7th edition, Pearson education.

REFERENCES

1. Software Engineering, A Precise Approach, Pankaj Jalote, Wiley India, 2010.
2. Software Engineering: A Primer, Waman S Jawadekar, Tata McGraw-Hill, 2008
3. Fundamentals of Software Engineering, Rajib Mall, PHI, 2005
4. Software Engineering, Principles and Practices, Deepak Jain, Oxford University Press.
5. Software Engineering1: Abstraction and modelling, Diner Bjorner, Springer International edition, 2006.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
DIGITAL SIGNAL PROCESSING LAB

Course Code: GR173049 **L T P C**
III Year II Semester **0 0 2 2**

The Programs shall be implemented in Software (Using MATLAB / LabView / C Programming/ Equivalent) and Hardware (UsingTI/Analog Devices/ Motorola/ EquivalentDSPprocessors).

Experiments Based on Matlab/Lab View/C Programming Equivalent

1 Generation of Sinusoidal waveform/signal based on recursive difference equations

2 Linear and circular convolutions and DFT

3 To find frequency response of a given system given in (Transfer Function/ Differential equation form) (Frequency response of analog Butterworth filter)

4 Implementation of DFT, inverse DFT and FFT of given sequence

5 Determination of Power Spectrum of a given signal (s).

6 Implementation of LP FIR filter for a given sequence (Frequency response and time-domain simulation of FIR filter (1))

7 Implementation of HP FIR filter for a given sequence

8 Implementation of LP IIR filter for a given sequence (First order IIR filter (LP): Frequency-response and time-domain simulation)

9 Implementation of HP IIR filter for a given sequence First order IIR filter (HP): Frequency response and time-domain simulation

10 Generation (Recovery) of Sinusoidal signal through filtering

11 Generation of DTMF signals

12 Implementation of Decimation Process

13 Implementation of Interpolation Process

14 Implementation of I/D sampling rate converters

15 Impulse response of first order and second order systems.

Experiments Based On DSP Processor

1 Generation of Sine wave with Buffer

2 Generation of Sum of sinusoidal signals

3 Linear Convolution of Two Signal sequences

4 Circular Convolution of Two signal sequences

5 Dot Product of Two Sequences

6 Square and Sawtooth wave generation

7 DFT of a sequence

8 IDFT of a sequence

9 Low pass and High Pass IIR filter design

10 Low pass and High Pass FIR filter design

NOTE: A minimum of 12 experiments, choosing 04 (Six) from experiments based on DSP Processor to be performed and recorded by the candidate to attain eligibility for Practical Examination.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
OBJECT ORIENTED PROGRAMMING THROUGH JAVA LAB

Course Code:GR17A3101	**L T P C**
III Year II Semester	**0 0 2 2**

Week 1: Write java programs that implement the following
- a) Constructor
- b) Parameterized constructor
- c) Method overloading
- d) Constructor overloading.

Week 2:a) Write a Java program that checks whether a given string is a palindrome or not. Ex: MADAM is a palindrome.

b) Write a Java program for sorting a given list of names in ascending order.

c) Write a Java Program that reads a line of integers, and then displays each integer and the sum of all the integers (Use StringTokenizer class of java.util)

Week 3: Write java programs that implement the following keywords
- a) this keyword
- b) super keyword
- c) static keyword
- d) final keyword

Week 4: a) Write a java program to implement method overriding

b) Write a java program to implement dynamic method dispatch.

c) Write a Java program to implement multiple inheritance.

d) Write a java program that uses access specifies.

Week5:a) Write a Java program that reads a file name from the user, then displays information about whether the file exists, whether the file is readable, whether the file is writable, the type of file and the length of the file in bytes.

b) Write a Java program that reads a file and displays the file on the screen, with a line number before each line.

c) Write a Java program that displays the number of characters, lines and words in a text file

Week 6: a) Write a Java program for handling Checked Exceptions.
b) Write a Java program for handling Unchecked Exceptions.

Week 7: a) Write a Java program that creates three threads. First thread displays "Good Morning" every one second, the second thread displays "Hello" every two seconds and the third thread displays "Welcome" every three seconds.
b) Write a Java program that correctly implements producer consumer problem using the concept of inter thread communication.

Week 8: a) Develop an applet that displays a simple message.
b) Develop an applet that receives an integer in one text field, and computes its factorial Value and returns it in another text field, when the button named "Compute" is clicked.

Week 9: Write a Java program that works as a simple calculator. Use a grid layout to arrange button for the digits and for the +, -,*, % operations. Add a text field to display the result.

Week 10: a)Write a Java program for handling mouse events.
b)Write a Java program for handling key events.

Week 11: Write a program that creates a user interface to perform integer divisions. The user enters two numbers in the textfields, Num1 and Num2. The division of Num1 and Num2 is displayed in the Result field when the Divide button is clicked. If Num1or Num2 were not an integer, the program would throw Number Format Exception. If Num2 were Zero, the program would throw an Arithmetic Exception Display the exception in a message dialog box.

Week 12: a) Write a java program that simulates a traffic light. The program lets the user select one of three lights: red, yellow, or green. When a radio button is selected, the light is turned on, and only one light can be on at a time No light is on when the program starts.
b) Write a Java program that allows the user to draw lines, rectangles and ovals.

Week 13: Create a table in Table.txt file such that the first line in the file is the header, and the remaining lines correspond to rows in the table. The elements are separated by commas. Write a java program to display the table using JTable component.

TEXT BOOKS :

1. Java;thecomplete reference,7th editon,Herbert Schildt, TMH.
2. Java How to Program, Sixth Edition, H.M.Dietel and P.J.Dietel, Pearson Education/PHI.
3. Introduction to Java programming, Sixth edition, Y.Daniel Liang, Pearson Education.
4. Big Java, 2nd edition, Cay Horstmann, Wiley Student Edition, Wiley India Private Limited.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
TRANSPORTATION ENGINEERING
(Open Elective-II)

Course Code: GR17A3161	**L T P C**
III Year II Semester	**3 1 0 4**

UNIT I

Highway development and planning: Highway development in India – Necessity for Highway Planning- Different Road Development Plans- Classification of Roads- Road Network Patterns – Highway Alignment- Factors affecting Alignment- Engineering Surveys – Drawings and Reports.

UNIT II

Highway geometric design: Importance of Geometric Design- Design controls and Criteria- Highway Cross Section Elements- Sight Distances- Stopping sight Distance, Overtaking Sight Distance, intermediate Sight Distance and Head light sight distance- Design of Horizontal Alignment- Design of Super elevation and Extra widening- Design of Transition Curves-Design of Vertical alignment-Gradients- Vertical curves.

UNIT III

Traffic engineering: Traffic flow parameters-Volume, Speed, Density and headway- Traffic Volume Studies- Data Collection and Presentation-speed studies- Data Collection and Presentation- Parking Studies, Parking types and Parking characteristics- Road Accidents-Causes and Preventive measures- Accident Data Recording – Condition Diagram and Collision Diagrams.

Traffic regulation and management: Road Traffic Signs – Types and Specifications – Road markings-Need for Road Markings-Types of Road Markings- Design of Traffic Signals – Webster Method –IRC Method.

UNIT IV

Intersection design: Types of Intersections – Conflicts at Intersections- Types of At-Grade Intersections- Channelization: Objectives –Traffic Islands and Design criteria-Types of Grade Separated Intersections- Rotary Intersection – Concept of Rotary and Design Criteria- Advantages and Disadvantages of Rotary Intersection.

UNIT V

Introduction to railway and airport engineering: Gradients- Grade Compensation- Cant and Negative Super elevation- Cant Deficiency – Degree of Curve – Crossings and Turn outs.

Factors affecting Selection of site for Airport – Aircraft Characteristics- Geometric Design of Runway- Computation of Runway length – Correction for runway length – Orientation of Runway – Wind Rose Diagram – Runway Lighting system.

TEXT BOOKS:

1. Highway Engineering – S.K.Khanna&C.E.G.Justo, Nemchand& Bros., 9th edition (2011).
2. Railway Engineering – A text book of Transportation Engineering – S.P.Chandola – S.Chand& Co. Ltd. – (2001).
3. Highway Engineering Design – L.R.Kadiyali and Lal- Khanna Publications.
4. Airport Planning and Design- S.K.Khanna and Arora,Nemchand Bros.

REFERENCES:

1. Highway Engineering – S.P.Bindra ,DhanpatRai& Sons. – 4th Edition (1981)
2. Traffic Engineering & Transportation Planning – Dr.L.R.Kadyali, Khanna publications – 8th Edition – 2011.
3. Railway Engineering – S.C.Rangwala –Charotar Publishers.
4. Air Transportation Planning & design – S.K.Khanna – Nem Chnd and Bros.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

SENSORS AND TRANSDUCERS

(Open Elective – II)

Course Code:GR17A3162 **L T P C**

III Year II Sem **31 0 4**

UNIT I

Introduction: Sensors / Transducers, principles, classification, parameters, characterizations

UNIT II

Introduction to mechanical & Electro Mechanical Sensors: Resistive Potentiometer, Inductive sensors, Capacitive Sensors, Ultrasonic Sensors

UNIT III

Basics of Thermal and Magnetic Sensors: Gas thermometric sensors, Thermal expansion type thermometric sensors, acoustic temperature sensors, dielectric constant and refractive index thermo sensors. Sensors and principles: Yoke coil sensor, coaxial type sensor, Force and displacement sensor

UNIT IV

SMART Sensors: Introduction, Primary sensors, Excitation, Amplification, Filters, Converters, Compensation, Information coding / processing, Data Communication, The Automation

UNIT V

Sensors their Applications: Flow - rate sensors, Pressure Sensors, Temperature Sensors, Torque & Position Sensors, Home Appliance Sensors - Distance Sensing Medical Diagnostic sensors, Sensors for Environmental Monitoring

TEXT BOOKS:

1. Sensors & Transducers By D. Patranabis , PHI Publications

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
AUTOMOBILE ENGINEERING
(Open Elective-II)

Course code:GR17A3163 **L T P C**
III B. Tech II Semester **3 1 0 4**

UNIT I

INTRODUCTION, ENGINE AND LUBRICATION SYSTEM

Components of four wheeler automobile – chassis and body – power unit –power transmission – rear wheel drive, front wheel drive, 4 wheel drive – types of automobile engines, Engine construction, turbo charging and super charging, Engine lubrication, splash and pressure lubrication systems, oil filters, oil pumps – crank case ventilation – engine service, reboring, decarbonisation, Nitriding of crank shaft.

Emissions : Emission from Automobiles – Pollution standards National and international – Pollution Control – Techniques – Energy alternatives – Photovoltaic, hydrogen, Biomass, alcohols, LPG and CNG.

UNIT II

FUEL SYSTEM AND COOLING SYSTEM

Fuel System in S.I. Engine : Fuel supply systems, Mechanical and electrical fuel pump – filters– carburetor – types – air filters – petrol injection-Multi point fuel injection(MPFI).

Fuel System in C.I. Engines: Requirements of diesel injection systems, types of injection systems, fuel pump, nozzle, spray formation, injection timing, testing of fuel pumps. CRDI engines.

Cooling System: Cooling Requirements, Air Cooling, Liquid Cooling, Forced Circulation System – Radiators – Types – Cooling Fan - water pump, thermostat, evaporative cooling – pressure sealed cooling – anti freeze solutions.

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UNIT III

IGNITION SYSTEM AND ELECTRICAL SYSTEM

Ignition System: Function of an ignition system, battery ignition system, constructional features of storage, battery, auto transformer, contact breaker points, condenser and sparkplug – Magneto coil ignition system, electronic ignition system using contact breaker, electronic ignition using contact triggers – spark advance and retard mechanism.

Electrical System : Charging circuit, generator, current – voltage regulator – starting system, bendix drive mechanism solenoid switch, lighting systems, Horn, wiper, fuel gauge – oil pressure gauge, engine temperature indicator etc.

UNIT IV

TRANSMISSION AND STEERING SYSTEM

Transmission System: Clutches, principle, types, cone clutch, single plate clutch, multi plate clutch, magnetic and centrifugal clutches, fluid fly wheel – gear boxes, types, sliding mesh, constant mesh, synchro mesh gear boxes, epicyclic gear box, over drive, torque converter. Propeller shaft – Hotch – Kiss drive, Torque tube drive, universal joint, differential rear axles – types – wheels and tyres.

Steering System: Steering geometry – camber, castor, king pin rake, combined angle toein, center point steering. Types of steering mechanism – Ackerman steering mechanism, Davis steering mechanism, steering gears – types, steering linkages.

UNIT V

SUSPENSION AND BRAKING SYSTEM

Suspension System: Objects of suspension systems – rigid axle suspension system, torsion bar, shock absorber, Independent suspension system.

Braking System: Mechanical brake system, Hydraulic brake system, Master cylinder, wheel Cylinder, tandem master cylinder, Requirement of brake fluid, Pneumatic and vacuum brakes.

TEXT BOOKS:

4. Automobile Engineering -R B Gupta
5. Automotive Mechanics – William Crouse
6. Automobile Engineering Vol. 1 & Vol. 2 / Kripal Singh

REFERENCES

1. Automotive Engineering / Newton Steeds & Garrett
2. Automotive Mechanics / G.B.S. Narang
3. Automotive Mechanics / Heitner
4. Automotive Engines / Srinivasan
5. Automobile Engineering – K.K. Ramalingam / Scitech Publications (India) PVT.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

HUMAN COMPUTER INTERFACE
(Open Elective-II)

Course Code: GR17A3164 **L T P C**
IIIYear II Semester **31 0 4**

UNIT I

Introduction: Importance of user Interface – definition, importance of good design. Benefits of good design. A brief history of Screen design, The graphical user interface – popularity of graphics, the concept of direct manipulation, graphical system, Characteristics, Web user – Interface popularity, characteristics- Principles of user interface.

UNIT II

Design process – Human interaction with computers, importance of human characteristics human consideration, Human interaction speeds, understanding business junctions.

UNIT III

Screen Designing: Design goals – Screen planning and purpose, organizing screen elements, ordering of screen data and content – screen navigation and flow.

UNIT IV

Windows – New and Navigation schemes selection of window, selection of devices based and screen based controls, Components – text and messages, Icons and increases – Multimedia, colors, uses problems, choosing colors, Software tools – Specification methods, interface – Building Tools.

UNIT V

Interaction Devices – Keyboard and function keys – pointing devices – speech recognition digitization and generation – image and video displays – drivers.

TEXT BOOKS:

1. The essential guide to user interface design, Wilbert O Galitz, Wiley DreamaTech.
2. Designing the user interface. 3rd Edition Ben Shneidermann , Pearson Education Asia.

REFERENCES:

1. Human – Computer Interaction. ALAN DIX, JANET FINCAY, GRE GORYD, ABOWD, RUSSELL BEALG, PEARSON.

2. Interaction Design PRECE, ROGERS, SHARPS. Wiley Dreamtech,

3. User Interface Design, Soren Lauesen Pearson Education

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

ESSENTIALS OF BIG DATA ANALYTICS

(Open Elective – II)

Course Code: GR17A3165	**L T P C**
III Year II Semester	**31 0 4**

UNIT I

INTRODUCTION TO BIG DATA AND HADOOP: Introduction to Big Data Platform – Big Data definition, Challenges of Conventional Systems: Enterprise/structured data, Social/unstructured Data, Unstructured data needs for Analytics, Analytics vs Reporting, Data Analytic Tools, History of Hadoop, Components of Hadoop, Analyzing the Data with Hadoop, Different Echo systems of Hadoop, IBM Big Data Platform Strategy and Introduction to Infosphere Big Insights.

UNIT II

HDFS (Hadoop Distributed File System): Significance of HDFS in Hadoop, Design of HDFS, HDFS Architecture overview, 5 daemons of Hadoop: Name Node, Data Node, Secondary Node, Job Tracker and Task Tracker, their functionality, Data Storage in HDFS: Introduction about Blocks, Data replication, Accessing HDFS: CLI (Command Line Interface) and admin commands, How to store various types of data in HDFS using CLI-command.

UNIT III

Map Reduce Map Reduce Architecture, Map Reduce Programming Model, Map Reduce Java API, Anatomy of Map Reduce Job run, Failures, Job Scheduling, Sort & Shuffle phase, Task Execution. Map Reduce Program using IBM BigInsights. Adaptive Map Reduce.

Introduction to Oozie: Overview of Managing job Execution. Apache Pig: Introduction to Apache Pig, Map Reduce Vs Apache Pig, SQL Vs Apache Pig, Pig Datatypes, Modes Of Execution in Pig.

UNIT IV

Data Stores on Hadoop Hive: Introduction, architecture, Integration with Hadoop, Hive Tables: Managed Tables, External Tables, Hive Query Language (Hive QL) Hbase: Introduction to HBase, Architecture, HBaseVs RDBMS, HBaseUseCasesHmaster. Introduction to Zookeeper.

UNIT V

BM APPLICATIONS ON HADOOP

Big SQL: Introduction to Big SQL, Datatypes, Big SQL Statistics.

Big Sheets: Introduction, Processing and Accessing BigSheets, Big SQL Integration.

TEXT BOOKS

1. Tom White "Hadoop: The Definitive Guide" Third Edit on, O'reily Media, 2012.

REFERENCES

1. Michael Berthold, David J. Hand, "Intelligent Data Analysis", Springer, 2007.
2. Jay Liebowitz, "Big Data and Business Analytics" Auerbach Publications, CRC press (2013)
3. Tom Plunkett, Mark Hornick, "Using R to Unlock the Value of Big Data: Big Data Analytics with Oracle R Enterprise and Oracle R Connector for Hadoop", McGraw-Hill/Osborne Media (2013), Oracle press.
4. AnandRajaraman and Jefrey David Ulman, "Mining of Massive Datasets", Cambridge University Press, 2012.
5. Bill Franks, "Taming the Big Data Tidal Wave: Finding Opportunities in Huge Data Streams with Advanced Analytics", John Wiley & sons, 2012.
6. Glen J. Myat, "Making Sense of Data", John Wiley & Sons, 2007
7. Pete Warden, "Big Data Glossary", O'Reily, 2011.
8. Michael Mineli, Michele Chambers, AmbigaDhiraj, "Big Data, Big Analytics: Emerging Business Intelligence and Analytic Trends for Today's Businesses", Wiley Publications, 2013.
9. ArvindSathi, "Big Data Analytics: Disruptive Technologies for Changing the Game", MC Press, 2012
10. Paul Zikopoulos, Dirk De Roos, Krishnan Parasuraman, Thomas Deutsch, James Giles, David Corigan, "Harness the Power of Big Data The IBM Big Data Platform", Tata McGraw Hill Publications, 2012.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
PRINCIPLES OF OPERATING SYSTEMS
(Open Elective-II)

Course Code: GR17A3166 **L T P C**
III Year II Semester **31 0 4**

UNIT I

Computer System and Operating System Overview: Overview of computer operating systems, operating systems functions, operating systems structures and systems calls, Evaluation of Operating Systems.

UNIT II

Process Management – Process concept- process scheduling, operations, Inter process communication. Multi Thread programming models. Process scheduling criteria and algorithms, and their evaluation.

UNIT III

Concurrency: Processsynchronization, the critical- section problem, Peterson's Solution, synchronization Hardware, semaphores, classic problems of synchronization, monitors and Synchronization examples

Memory Management: Swapping, contiguous memory allocation, paging, structure of the page table, segmentation

UNIT IV

Virtual Memory Management: virtual memory, demand paging, page-Replacement, algorithms, Allocation of Frames, Thrashing

Principles of deadlock – system model, deadlock characterization, deadlock prevention, detection and avoidance, recovery form deadlock,

UNIT V

File system Interface- the concept of a file, Access Methods, Directory structure, File system mounting, file sharing, protection.

File System implementation- File system structure, allocation methods, free-space management

Mass-storage structure overview of Mass-storage structure, Disk structure, disk attachment, disk scheduling, Introduction to Storage Area Networks (SAN), Introduction to Network Attached Storage.

TEXT BOOKS:

1. Operating System Principles, Abraham Silberchatz, Peter B. Galvin, Greg Gagne 8th Edition, Wiley Student Edition.
2. Operating systems - Internals and Design Principles, W. Stallings, 6th Edition, Pearson.

REFERENCES:

1. Modern Operating Systems, Andrew S Tanenbaum 3rd Edition PHI.
2. Operating Systems A concept - based Approach, 2nd Edition, D. M. Dhamdhere, TMH.
3. Principles of Operating Systems, B. L. Stuart, Cengage learning, India Edition.
4. Operating Systems, A. S. Godbole, 2nd Edition, TMH
5. An Introduction to Operating Systems, P.C.P. Bhatt, PHI.
6. Operating Systems, S, Haldar and A. A. Arvind, Pearson Education.
7. Operating Systems, R. Elmasri, A. G. Carrick and D. Levine, Mc Graw Hill.
8. Operating Systems in depth, T. W. Doeppner, Wiley.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
MANAGEMENT SCIENCE

Course Code: GR17A3102 **L T P C**
IV Year I Semester **3 1 0 4**

Unit I

Concepts of Management and Organization: Nature, Importance, Functions and Theories of Management; Systems Approach to Management; Leadership Styles; Social Responsibilities of Management.

Designing Organizational Structures: Basic concepts relating to Organisation; Departmentation and Decentralization, 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.

TEXT BOOKS

1. Aryasri: Management Science, TMH, 2009.
2. Stoner, Freeman, Gilbert, Management, 6th Ed, Pearson Education, New Delhi, 2004.
3. P. Vijay Kumar, N. Appa Rao and Ashnab, Chnalill, Cengage Learning India, 2012.

REFERENCES

1. Kotler Philip and Keller Kevin Lane: Marketing Management, Pearson, 2012.
2. Koontz and Weihrich: Essentials of Management, McGraw Hill, 2012.
3. Thomas N. Duening and John M. Ivancevich Management - Principles and Guidelines, Biztantra, 2012.
4. Kanishka Bedi, Production and Operations Management, Oxford Uiversity Press, 2012.
5. Samuel C. Certo: Modern Management, 2012.
6. Schermerhorn, Capling, Poole and Wiesner: Management, Wiley, 2012.
7. Parnell: Strategic Management, Cengage, 2012.
8. Lawrence R Jauch, R. Gupta and William F. Glueck: Business Policy and Strategic Management Science, McGraw Hill, 2012.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
CELLULAR AND MOBILE COMMUNICATIONS

Course Code: GR17A4060 **L T P C**
IV Year I Semester **2 1 0 3**

UNIT I

Introduction to Cellular Mobile Radio Systems: Introduction to Cellular Mobile System, Performance criteria, uniqueness of mobile radio environment, operation of cellular systems, Hexagonal shaped cells, Analog and Digital Cellular systems.

Elements Of Cellular Radio System Design: General description of the problem, concept of frequency channels, Co-channel Interference Reduction Factor, desired C/I from a normal case in a Omni directional Antenna system, Cell splitting, consideration of the components of Cellular system.

UNIT II

Interference: Introduction to Co-Channel Interference, real time Co-Channel interference, Co-

Channel measurement, design of Antenna system, Antenna parameters and their effects, diversity receiver, non-cochannel interference-different types.

Cell Coverage for Signal and Traffic: Signal reflections in flat and hilly terrain, effect of human made structures, phase difference between direct and reflected paths, constant standard deviation, straight line path loss slope, general formula for mobile propagation over water and flat open area, near and long distance propagation antenna height gain, form of a point to point model.

UNIT III

Cell Site And Mobile Antennas: Sum and difference patterns and their synthesis, Omni directional antennas, directional antennas for interference reduction, space diversity antennas, umbrella pattern antennas, minimum separation of cell site antennas, high gain antennas.

UNIT IV

Frequency Management and Channel Assignment: Numbering and grouping, setup access and paging channels channel assignments to cell sites and mobile units, channel sharing and borrowing, sectorization, overlaid cells, non-fixed channel assignment.

UNIT V

Handoff, dropped calls and cell splitting, types of handoff, handoff invitation, delaying handoff, forced handoff, mobile assigned handoff. Intersystem handoff, cell splitting, micro cells, vehicle locating methods, dropped call rates and their evaluation.

Digital Cellular Networks: GSM, multiplex access scheme, TDMA, CDMA.

TEXTBOOKS:

1. Mobile Cellular Telecommunications–W.C.Y. Lee, Tata McGraw Hill, 2ndEdition, 2006.
2. Principles of Mobile Communications – Gordon L. Stuber, Springer International 2nd Edition,2007.

REFERENCES:

1.Wireless Communications - Theodore. S. Rapport, Pearson education, 2nd Edition, 2002.
2.Wireless and Mobile Communications – Lee McGraw Hills, 3rd Edition, 2006.
3.Wireless Communication and Networking – Jon W. Mark and WeihuaZhqung, PHI, 2005.
4.Wireless Communication Technology – R. Blake, Thompson Asia Pvt. Ltd., 2004.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
EMBEDDED SYSTEMS DESIGN

Course Code: GR17A3070 **L T P C**
IV Year I Semester **2 1 0 3**

UNIT I

Introduction to Embedded Systems

Definition of Embedded System, Embedded Systems Vs General Computing Systems, History of Embedded Systems, Classification, Major Application Areas, Purpose of Embedded Systems, Characteristics and Quality Attributes of Embedded Systems.

UNIT II

Typical Embedded System

Core of the Embedded System: General Purpose and Domain Specific Processors, ASICs, PLDs, Commercial Off-The-Shelf Components (COTS), Memory: ROM, RAM, Memory according to the type of Interface, Memory Shadowing, Memory selection for Embedded Systems, Sensors and Actuators, Communication Interface: Onboard and External Communication Interfaces.

UNIT III

Embedded Firmware

Reset Circuit, Brown-out Protection Circuit, Oscillator Unit, Real Time Clock, Watchdog Timer, Embedded Firmware Design Approaches and Development Languages.

UNIT IV

RTOS Based Embedded System Design

Operating System Basics, Types of Operating Systems, Tasks, Process and Threads, Multiprocessing and Multitasking, Task Scheduling.

UNIT V

Task Communication

Shared Memory, Message Passing, Remote Procedure Call and Sockets, Task Synchronization: Task Communication/Synchronization Issues, Task Synchronization Techniques, Device Drivers, How to Choose an RTOS.

TEXT BOOKS:

1.Introduction to Embedded Systems - Shibu K.V, Mc Graw Hill.

2.Embedded Systems - Raj Kamal, TMH.

REFERENCES:

1. Embedded System Design - Frank Vahid, Tony Givargis, John Wiley.

2. Embedded Systems – Lyla, Pearson, 2013

3.An Embedded Software Primer - David E. Simon, Pearson Education.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

ELECTRONIC MEASUREMENTS AND INSTRUMENTATION

(Professional Elective-III)

Course Code: GR17A4059	**L T P C**
IV Year I Semester	**3 1 0 4**

UNIT I

Block Schemantics of Measuring Systems: Performance characteristics, Static characteristics, Accuracy, Precision, Resolution, Types of Errors, Gaussian Error, Root Sum Squares formula, Dynamic Characteristics, Repeatability, Reproducibility, Fidelity, Lag; Measuring Instruments: DC Voltmeters, D' Arsonval Movement, DC Current Meters, AC Voltmeters and Current Meters, Ohmmeters, Multimeters, Meter Protection, Extension of Range, True RMS Responding Voltmeters, Specifications of Instruments.

UNIT II

Signal Analyzers: AF, HF Wave Analyzers, Harmonic Distortion, Heterodyne wave Analyzers, Spectrum Analyzers, Power Analyzers, Capacitance-Voltage Meters, Oscillators. Signal Generators: AF, RF Signal Generators, Sweep Frequency Generators, Pulse and Square wave Generators, Function Generators, Arbitrary waveform Generator, Video Signal Generators, and Specifications.

UNIT III

Oscilloscopes: CRT, Block Schemantic of CRO, Time Base Circuits, Lissajous Figures, CRO Probes, High Frequency CRO Considerations, Delay lines, Applications: Measurement of Time, Period and Frequency Specifications.

Special Purpose Oscilloscopes: Dual Trace, Dual Beam CROs, Sampling Oscilloscopes, Strorage Oscilloscopes, Digital Storage CROs.

UNIT IV

Transuducers: Classification, Strain Gauges, Bounded, unbounded; Force and Displacement Transducers, Resistance Thermometers, Hotwire Anemometers, LVDT, Thermocouples, Synchros, Special Resistance Thermometers, Digital Temperatue sensing system, Piezoelectric Transducers, Variable Capacitance Transducers, Magneto Strictive Transducers.

UNIT V

Bridges: Wheat Stone Bridge, Kelvin Bridge, and Maxwell Bridge.

Measurement of Physical Parameters: Flow Measurement, Displacement Meters, Liquid level Measurement, Measurement of Humidity and Moisture, Velocity, Force, Pressure - High Pressure, Vacuum level, Temperature - Measurements, Data Acqisition Systems.

TEXTBOOKS

1. Electronic instrumentation: H.S.Kalsi - TMH, 2nd Edition 2004.
2. Modern Electronic Instrumentation and Measurement Techniques: A.D. Helbincs, W.D. Cooper: PHI, 5th Edition, 2003.

REFERENCES

1. Electronic Instrumentation and Measurements - David A. Bell, Oxford Uiv. Press, 1997.
2. Electronic Measurements and Instrumentation: B. M. Oliver, J. M. Cage TMH Reprint.
3. Measurement Systems - Emest O. Doebelin and Dhanesh N Manik, 6th Ed., TMH.
4. Electronic Measurements and Instrumentations by K. Lal Kishore, Pearson Education - 2010.
5. Industrial Instrumentation: T. R. PadmanabhamSpiriger 2009.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

DIGITAL SIGNAL PROCESSORS AND ARCHITECTURES

(Professional Elective-III)

Course Code: GR17A4072	**L**	**T**	**P**	**C**
IV Year I Semester	**3**	**1**	**0**	**4**

UNIT I

Introduction to Digital Signal Processing: Introduction, The sampling process, Discrete time sequences. Discrete Fourier Transform (DFT) and Fast Fourier Transform (FFT), lineartime-invariantsystems, Digital filters, Decimation and interpolation.

Computational Accuracy in DSP Implementatations: Number formats for signals and coefficients in DSP systems, Dynamic Range and Precision, Sources of error in DSP implementations, A/D Conversion errors, DSP computational errors, D/A Conversion Errors,

Compensating filter.

UNITII

Architectures for Programmable DSP Devices: Basic Architectural features, DSP Computational Building Blocks, Bus Architecture and Memory, Data Addressing Capabilities, Address Generation Unit, Programmability and Program Execution, Speed Issues, Features for External interfacing.

UNITIII

Programmable Digital Signal Processors: Commercial Digital signal-processing Devices, Data Addressing modes of TMS320C54XX DSPs, Data Addressing modes of TMS320C54XX Processors, Memory space of TMS320C54XX Processors, Program Control, TMS320C54XX instructions and Programming, On-Chip Peripherals, Interrupts of TMS320C54XX processors, Pipeline Operation of TMS320C54XX Processors.

UNITIV

Analog Devices Family of DSP Devices: Analog Devices Family of DSP Devices-ALU and MAC block diagram, Shifter Instruction, Base Architecture of ADSP 2100, ADSP-2181 high performance processor.

Introduction to Blackfin Processor-The Blackfin Processor, Introduction to Micro Signal Architecture, Overview of Hardware Processing Units and Register files, Address Arithmetic Unit, Control Unit, Bus Architecture and Memory, Basic Peripherals.

UNITV

Interfacing Memory and I/O Peripherals to Programmable DSP Devices:Memory space organization, External bus interfacing signals, Memory interface Parallel I/O interface, Programmed I/O, interrupts and I/O, Direct memory access (DMA).

TEXT BOOKS

1. Digital Signal Processing - Avtar Singh and S.srinivasan, ThomsonPublications, 2004
2. A practical Approach to Digital Signal Processing–K. Padmanabhan, R.Vijayarajeswaran, Ananth,S, New Age International, 2006/2009

REFERENCES

1. Embedded Signal Processing with the Micro signal Architecture Publisher: Woon–Seng Gan, Sen M. Kuo,Wiley-IEEE Press, 2007

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
MODERN CONTROL SYSTEMS
(Professional Elective-III)

Course Code: GR17A4150	**L**	**T**	**P**	**C**
IV Year I Semester	**3**	**1**	**0**	**4**

UNIT I
TRANSFER FUNCTIONS, BLOCKDIAGRAMS, AND SIGNAL FLOW GRAPHS:
Review of Z-Transform, Applications of Z-Transform, Signals between sampling instants-Submultiple sampling method & Delayed Z-Transform and the modified Z-Transform. Introduction to Pulse Transfer Function and Z-Transfer function, Relation between G(s) and G(z), Closed loop systems, Sampled Signal Flow Graph, Modified Z-Transfer function, Multirate Discrete Data Systems.

UNIT II

STATE VARIABLE TECHNIQUE:

State Equations of Discrete Data systems with Sample and Hold Devices, State equations of Digital Systems with All-Digital Elements, The State Transition Equations(the recursive method and the ztransform method), Relationship between State Equations and Transfer Functions, Characteristic Equation, Eigen Values and Eigen Vectors, Methods of Computing the Transition Matrix(The Cay-ley Hamilton Theorem, The Z-Transform Method), State Diagrams of Digital Systems.

UNIT III

TIME DOMAIN AND Z-DOMAIN ANALYSIS

Introduction, Prototype Second Order system, Comparison of Time Responses of Continuous Data and Discrete Data systems, Steady State Error analysis of Digital Control systems, Correlation between time response and root locations in S-plane and Z-plane, Dominant Characteristic Equation, Root loci of Digital Control systems, Effects of adding poles and Zeroes to Open loop transfer function.

UNIT IV

DESIGN OF DISCRETE DATA CONTROL SYSTEMS

Introduction, Cascade Compensation by continuous data Controllers, Design of Continuous Data Controllers with Equivalent Digital Controllers, Digital controllers, Design of Digital Control systems with Digital controllers through Bilinear transformation, Design in the Z-plane using Root Locus Diagram.

UNITV

DESIGN OF DIGITAL CONTROL SYSTEMS

Control System parameters, Conventional design tools- Root locus and Bode plots, compensation-Phase lead, phase lag and PID controllers. Applications of DSPs in control systems-PID controllers, Motor control and Robotics.

Text Book: BC Kuo, "Digital Control Systems", Second Edition, Saunders College Publishing, 1992.

References:

1.Nekoogar F and Moriarty G, "Digital Control Using Digital Signal Processing", Prentice Hall inc, 1999.

2.M. Gopal, " Digital Control and State Variable Methods(conventional and intelligent Control) Systems, Third Edition, TMH.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
MICROWAVE ENGINEERING LAB

Course Code:GR17A4066	**L T P C**
IV Year I Semester	**0 0 2 2**

List of Experiments:

Task1: Reflex Klystron Characteristics.

Task2: Gunn Diode Characteristics.

Task3: Attenuation Measurement.

Task4: Directional Coupler Characteristics.

Task5: VSWR Measurement.

Task6: Impedance and Frequency Measurement.

Task7: Waveguide parameters measurement.

Task8: Scattering parameters of Circulator.

Task9: Scattering parameters of Magic Tee.

Equipment required for Laboratories:

- Regulated Klystron Power Supply
- VSWR Meter -
- Micro Ammeter - 0 – 500 µA
- Multimeters
- CRO
- GUNN Power Supply, Pin Moderator
- Reflex Klystron
- Crystal Diodes
- Microwave components (Attenuation)
- Frequency Meter
- Slosted line carriage
- Probe detector
- wave guide shorts
- Pyramidal Horn Antennas
- Directional Coupler
- E, H, Magic Tees
- Circulators, Isolator
- Matched Loads

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
EMBEDDED SYSTEMS DESIGN LAB

Course Code:GR17A4068 **L T P C**
IV Year I Semester **0 0 2 2**

Experiments:

Task1: Program to configure system clock and GPIO

Task2: Program to use a software delay to toggle an LED on the evaluation board

Task3: Program to enable and configure Timers and Interrupts

Task4: Program to generate an exception

Task5: Program to enable and configure ADC and sample sequencer

Task5: Program to measure and display values from internal temperature sensor and add Hardware averaging

Task6: Program to use ROM peripheral driver library calls and to note size difference

Task7: Program to run USB bulk example code and windows side app on evaluation board

Task8: Program to create code to write to FLASH memory and read/write to EEPROM

Task9: Program to enable FPU and profile floating point code

Task10: Program to connect Kentec Display and to experiment with demo project

Task11: Program to write graphics library code

Task12: Program to transmit and receive data using UART

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
COMMUNICATION PROTOCOLS LAB

Course Code:GR17A4067	**L T P C**
IV Year I Semester	**0 0 2 2**

Experiments:

Task1: Write code to display string on the LCD

Task2: Write code to display a counter which runs from 0 to 100 on the LCD display(should be three digit number)

Task3: Serial communication on chip-UART –To transmit single character.

Task4: Write a code to receive and transmit back a character using serial communication

Task5: Write a program to transmit a character ‘a’ serially at a baud rate of 9600every second using the bit banging technique on PD1 port line.

Task6: Write a program to receive serial data at a baud rate of 9600 and display the received character on LCD. Use PD0 port line and bit banging technique for the reception.

Task7: Write a program to read serial data from an ultrasonic range finding module and displaying it.

Task8: Write a code to interface 7 segment display using I2C.

Task9: Write a code to interface 7 segment display using SPI.

Task10: Write arduino code for string which key has been pressed in the GRIET capacitive tour shield and toggle the LED connected to that switch

Task11: Write a program to transfer data using ZigBee.

Task12: Write a program to transfer data using Wi-Fi.

Task13: Write a program to transfer data using Bluetooth using blue term.

Task14: Write a program to Control of two ac loads using Bluetooth

Task15: Write a program to display numbers 0 to 9 on the 7 segment display on the GRIET software interface shield using bit banging.

The following are required components in communication protocols lab, with

- Arduino open software,
- Windows 8.1 Operating Systems
- Arduino board,
- LCD module,
- USR module,
- Sevensegment display,
- Capacitive touch shield,
- ZIGBEE Module,
- WIFI Module,
- BLUETOOTH Module,
- Load like Bulb,
- LED,

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
GREEN BUILDING TECHNOLOGY
(Open Elective-III)

Course Code: GR17A4161 **L T P C**

IV Year I Semester **3 1 0 4**

UNIT 1

Concept of Green Buildings:
Green building Definition, Features, Necessity, Initiatives, Green buildings in India, Green building Assessment- Green Building Rating Systems (BREEAM,USGBC,LEED,IGBC,TERI-GRIHA, GREEN STAR),Criteria for rating, Energy efficient criteria ,environmental benefits economic benefits, health and social benefits , Major energy efficiency areas for building, Contribution of buildings towards Global Warming. Life cycle cost of buildings, Codes and Certification Programs

UNIT II

Sources of Energy:
Renewable and Non-renewable sources of energy ; Coal, Petroleum, Nuclear, Wind, Solar, Hydro, Geothermal sources; potential of these sources, hazards, pollution; Global scenario with reference to demand and supply in India, Global efforts to reduce carbon emissions, Performance testing (new and existing): Building modeling , Energy analysis, Commissioning, Metering, Monitoring.

Carbon emission: Forecasting, Control of carbon emission, Air quality and its monitoring carbon foot print; Environmental issues, Minimizing carbon emission, Energy retrofits and Green Remodels.

UNIT III

Green Building Materials: Sustainably managed Materials, Depleting natural resources of building materials; renewable and recyclable resources; energy efficient materials; Embodied Energy of Materials , Green cement, Biodegradable materials, Smart materials, Manufactured Materials, Volatile Organic Compounds (VOC's), Natural Non-Petroleum Based Materials, Recycled materials, Renewable and Indigenous Building Materials, Engineering evaluation of these materials.
Green Building Planning Methods, Energy Conservation Measures in Buildings, Waste &Water management and Recycling in Sustainable Facilities, Heating, Ventilation and Air Conditioning, Passive Solar & Daylight, Plumbing and its Effect on Energy Consumption

UNIT IV

Design of Green Buildings; Sustainable sites, Impact of building on environment, Life cycle assessment, Principles of sustainable development in Building Design ,Design on Bioclimatic **and Specifications:** Environment friendly and cost effective Building Technologies, Integrated Life cycle design of Materials and Structures, Green Strategies for Building Systems, Alternative Construction and solar passive architecture, Considerations of energy consumption, water use, and system reliability, indoor air quality, noise level, comfort, cost efficiency in building design, Advanced Green building technologies and innovations.

UNIT V

Construction of Green Buildings: Energy efficient construction, Practices for thermal efficiency and natural lighting. Eco- friendly water proofing; ECB codes building rating, Maintenance of green buildings, Cost and Performance Comparisons and Benchmarking, Green Project Management Methods and Best Practices, Cost/benefit analysis of green buildings,Life-cycle analysis of green buildings, Case studies of rated buildings (new and existing)

TEXT BOOKS:

1. Alternative Building Materials and Technologies – By K S Jagadeesh, B V Venkatta Rama Reddy & K SNanjunda Rao – New Age International Publishers
2. Integrated Life Cycle Design of Structures – By AskoSarja – SPON Press
3. Non-conventional Energy Resources – By D S Chauhan and S K Sreevasthava – New Age InternationalPublishers
4. Green Buildings (McGraw hill publication): by Gevorkian
5. Emerald Architecture: case studies in green buildings, The Magazine of Sustainable Design
6. Understanding Green Building Guidelines: For Students and Young Professionals, Traci Rose Rider ,W. W. Norton & Company Publisher.
7. Understanding Green Building Materials,Traci Rose Rider, W. W. Norton & Company Publisher.

REFERENCES

1. IGBC reference guide
2. Free abridged versions of LEED reference guides
3. ECBC latest version
4. US GBC's Reference Material:

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

SOFT COMPUTING TECHNIQUES

(Open Elective-III)

Course Code: GR17A4162 **L T P C**

IV Year I Sem **31 0 4**

UNIT I

Neural Networks-I(Introduction & Architecture) Neuron, Nerve structure and synapse, Artificial Neuron and its model, activation functions, Neural network architecture: single layer and multilayer feed forward networks, recurrent networks. Various learning techniques; perception and convergence rule, Auto-associative and hetero-associative memory.

UNIT II

Neural Networks-II (Back propagation networks) Architecture: perceptron model, solution, single layer artificial neural network, multilayer perception model; back propagation learning methods, effect of learning rule co-efficient; back propagation algorithm, factors affecting back propagation training, applications.

UNIT III

Fuzzy Logic-I (Introduction) Basic concepts of fuzzy logic, Fuzzy sets and Crisp sets, Fuzzy set theory and operations, Properties of fuzzy sets, Fuzzy and Crisp relations, Fuzzy to Crisp conversion.

UNIT IV

Fuzzy Logic –II (Fuzzy Membership, Rules) Membership functions, interference in fuzzy logic, fuzzy if-then rules, Fuzzy implications and Fuzzy algorithms, Fuzzyfications & Defuzzificataions, Fuzzy Controller, Industrial applications.

UNIT V

Genetic Algorithm(GA) Basic concepts, working principle, procedures of GA, flow chart of GA, Genetic representations, (encoding) Initialization and selection, Genetic operators, Mutation, Generational Cycle, applications.

TEXT BOOKS:

1. S. Rajsekaran & G.A. Vijayalakshmi Pai, "Neural Networks,Fuzzy Logic and Genetic Algorithm:Synthesis and Applications" Prentice Hall of India.
2. Introduction to Artificial Neural Systems - Jacek M. Zuarda, Jaico Publishing House, 1997.
3. N.P.Padhy,"Artificial Intelligence and Intelligent Systems" Oxford University Press.

REFERENCES

1. Timothy J. Ross, "Fuzzy Logic with Engineering Applications" Wiley India

2. P. Vas: Artificial-Intelligence-Based Electrical Machines and Drives: Application of Fuzzy, Neural, Fuzzy- Neural, and Genetic-Algorithm-Based Techniques, Oxford University Press, 1999.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

OPERATION RESEARCH
(Open Elective-III)

Course Code: GR17A4163	**L T P C**
IV B. Tech I Semester	**31 0 4**

UNIT I

INTRODUCTION: Development – Definition– Characteristics and Phases of operations Research– Types of models – operation Research models– applications.

ALLOCATION: Linear Programming Problem Formulation – Graphical solution – Simplex method –Artificial variables techniques -Two–phase method, Big-M method – Duality Principle.

UNIT II

TRANSPORTATION MODELS: Formulation – Methods for finding feasible solution, Optimal solution, unbalanced transportation problem –Degeneracy.

ASSIGNMENT MODELS - Formulation – Optimal solution - Variants of Assignment Problem

UNIT III

SEQUENCING: Introduction – Flow –Shop sequencing – n jobs through two machines – n jobs through three machines – Job shop sequencing – two jobs through 'm' machines.

INVENTORY : Introduction – Single item – Deterministic models – Purchase inventory models with one price break and multiple price breaks – shortages are not allowed – Stochastic models – demand may be discrete variable or continuous variable – Instantaneous production. Instantaneous demand and continuous demand and no set up cost.

UNIT IV

THEORY OF GAMES: Introduction – Minimax (maximin) – Criterion and optimal strategy – Solution of games with saddle points – Rectangular games without saddle points – 2 X 2 games – dominance principle– m X 2 & 2 X n games -graphical method.

WAITING LINES: Introduction – Single Channel – Poisson arrivals – exponential service times – with infinite population and finite population models– Multichannel – Poisson arrivals – exponential service times with infinite population single channel Poisson arrivals.

UNIT V

REPLACEMENT: Introduction – Replacement of items that deteriorate with time – when money value is not counted and counted – Replacement of items that fail completely, group replacement.

DYNAMIC PROGRAMMING: Introduction – Bellman's Principle of optimality – Applications of dynamic programming- capital budgeting problem – shortest path problem – linear programming problem.

TEXT BOOKS

1. Operations Research/ Prem Kumar Gupta,Dr.D.S. Hira

2. Operations Research / S. D.Sharma-Kedarnath

3. Operation Research /J.K.Sharma/MacMilan.

REFERENCES

1. Operations Research / R.Pannerselvam,PHI Publications.

2. Introduction to O.R /Taha/PHI

3. Operations Research / Wagner/ PHI Publications.

4. Introduction to O.R/Hiller &Libermann (TMH).

5. Operations Research /A.M.Natarajan,P.Balasubramani,A. Tamilarasi/Pearson Education.

6. Operations Research: Methods & Problems / Maurice Saseini, ArhurYaspan& Lawrence Friedman

7. O.R/Wayne L.Winston/Thomson Brooks/cole

GOKARAJU RANGARAJUINSTITUTE OF ENGINEERING AND TECHNOLOGY
MOBILE COMPUTING AND APPLICATIONS
(Open Elective III)

Course Code: GR17A4164	**L T P C**
IV Year I Semester	**3 1 0 4**

UNIT I

Introduction to Mobile Computing: Introduction, applications, simplified referenced model.

Medium Access Control: Motivation for a specialized MAC (Hidden and exposed terminals, Near and far terminals), SDMA, FDMA, TDMA, CDMA, Comparison.

UNIT II

Telecommunication systems: GSM:Mobile services, System architecture, Radio interface, Protocols, Localization and calling, Handover, Security, and New data services.

UNIT III

Mobility and location-based services: Introduction, Data Acquisition of Location Information, GIS, Location Information Modeling, Location-Based Services Applied, Utilizing Location-Based Services with Mobile Applications, Representing Location with UML, Security and Privacy of Location Information, Localization and Internationalization, Latest Developments in Location-Based Efforts

UNIT IV

The Mobile Development Process: Introduction, Back to the Dimensions of Mobility, Applying the Wisdom Methodology to Mobile Development, UML-Based Development Cycle for Mobile Applications

Architecture, Design, and Technology Selection for Mobile Applications: Introduction, Practical Concerns with Architectures, Architectural Patterns for Mobile Applications

UNIT V

Mobile Application Development Hurdles: Introduction, Voice User Interface Hurdles, Hurdles with Multimodal Applications, Problems with Building Location-Based Applications, Power Use.

Testing Mobile Applications: Introduction, Validating the Mobile Use Cases before Development, The Effect of the Dimensions of Mobility on Software Testing, Stress Testing and Scalability Issues, Testing Location-Based Functionality.

Support for Mobility: File systems: Consistency, coda, little work, Ficus, Mio-NFS, Rover.

Outlook: Architecture of future networks.

TEXT BOOKS

1. **Jochen Schiller**, "Mobile Communications", Second Edition, Pearson education, 2004. (Unit I-All chapters, Unit II-All chapters, & Unit V: Last two chapters)
2. **Reza B'far, "**Mobile Computing Principles: Designing And Developing Mobile Applications With UML And XML", Cambridge University Press, 2005. (Unit III-All chapters, Unit IV-All chapters and Unit V - First two chapters).

REFERENCES

1. **Adelstein, Frank, Gupta, Sandeep KS, Richard, Golden, Schwiebert, Loren,** "Fundamentals of Mobile and Pervasive Computing", ISBN: 0071412379, McGraw-Hill Professional, 2005.

2. **Hansmann, Merk, Nicklous, Stober**, "Principles of Mobile Computing", Springer, second edition, 2003.

3. **Martyn Mallick,** "Mobile and Wireless Design Essentials", Wiley DreamTech, 2003.

(Open Elective – III)

Course Code:GR17A4165 **L T P C**
IV Year I Semester **3 1 0 4**

UNIT I

Business Data and Business Intelligence: An Introduction: What is data? Data and business, Big Data, Information and insight, challenges in data decision, operational and informational data, Data decision challenge, Decision Support System, understanding Business Intelligence, Business Intelligence and its components, Importance of Business Intelligence, Business Intelligence areas, Business Intelligence Implementation, Business Intelligence and Integration Implementation, Overview of IBM Cognos BI.

UNIT II

Data warehouse: An Overview Data warehouse architecture, Data warehouse Modelling and Design, Challenges , Data Modelling requirements, Modelling Techniques; Entity relationship Modelling, Dimensional Modelling, Temporal Modelling, Multidimensional data modelling, ERM Vs MDDM, What is Metadata, Types of metadata, Benefits of metadata, Data Analytics Techniques: OLAP and OLTP systems

UNIT III

Building and Accessing a Data Warehouse: Enterprise data warehouse, Challenges of Building a Warehouse, Data warehouse for decision support system, Data Analytics, Data analytics techniques, Information Mining Vs Data mining, Usage of Data Mining, Information Integration, Data warehouse Master Data Management System, MDM Logical Architecture, DB2 UDB Warehouse

UNIT IV

IBM Cognos BI: IBM Cognos Framework Manager, Connection of Framework Manager to Cognos Business Intelligence, Framework Manager Query Model, Frame work manager Model Types, Enterprise Components, Architecture, Security, Query Modes, Model types, Framework Manager Workflow, Administration Workflow, Cognos Configuration

UNIT V

Query and Reporting: Query and Process flow, Report studio, Generation of different reports such as List, cross tab ,Charts, Prompts etc, Focus reports using prompts and filters, Drilling from one report to another, Report using Relational Data

TEXT BOOKS

1. Chuck Ballard, Dirk Herreman, Don Schau, Rhonda Bell,Data Modeling Techniques for Data Warehousing , IBM [ebook]

2. Business Analytics : Data Analytics & Decision Making by S. Christian Albright and Wayne L. Winston.
3. Analytics at Work by Morisson
4. Competing on Analytics - Davenport
5. IBM Cognos 10 Report Studio : Practical Examples by Philip & Roger
6. IBM Cognos BI 10.2 Administration Essentials by Mehmood Awan Khalid

GOKARAJU RANGARAJUINSTITUTE OF ENGINEERING AND TECHNOLOGY

PRINCIPLES OF SATELLITE COMMUNICATIONS

(OPEN ELECTIVE-III)

Course Code: GR17A04166	**L T P C**
IV Year I Semester	**31 0 4**

UNIT I

Introduction: Origin of satellite communications, Historical background, basic concepts of satellite communications, frequency allocations for satellite services, applications, future trends of satellite communications.

UNIT II

Orbital Mechanics and Launchers: Orbital Mechanics look angle determination, orbital perturbations, orbit determination, launches and launch vehicles, orbital effects in communication systems performance.

UNIT III

Satellite Subsystems: Attitude and orbital control system, Telemetry, Tracking, command and monitoring, power systems, communication subsystems, satellite antenna equipment reliability and space qualification.

UNIT IV

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

UNIT V

Earth Station Technology: Introduction, transmitters, receivers, Antennas, tracking systems, terrestrial interface, primary power test methods.

Low Earth Orbit and Geo-stationary Satellite Systems: Orbit consideration, coverage and frequency considerations, delay and throughput considerations, system considerations, operational NGSO constellation designs.

TEXT BOOKS

1. Satellite communications-Timothi Pratt, Charles Bostian and Jeremy Allnutt, WSE, Wiley

Publications, 2nd Edition, 2003.

2. Satellite communications Engineering-Wilbur L.Prichard, Robert A. Nelson & Henry

G. Suyderhoud, 2nd Edition, Pearson Publications, 2003.

REFERENCES

1. Satellite communications: Design principles-M. Richharia, BS publications, 2nd Edition,

2003.

2. Fundamentals of Satellite communications-K.N.Rajarao, PHI, 2004.

3. Satellite communications-Dennis Roddy, McGraw Hill, 2nd Edition, 1996.

GOKARAJU RANGARAJUINSTITUTE OF ENGINEERING AND TECHNOLOGY
DIGITAL IMAGE PROCESSING

Course Code:GR17A4069 **L T P C**
IV Year II Semester31 0 4

UNIT I

Digital image fundamentals - Digital Image through scanner, digital camera. Concept of gray levels. Gray level to binary image conversion. Sampling and quantization. Relationship between pixels. Imaging Geometry.

UNIT II

Image Transforms 2-D FFT, Properties. Walsh transform, Hadamard Transform, Discrete cosine Transform, Haar transform, Slant transform, Hoteling transform. Image enhancement Point processing. Histogram processing. Spatial filtering. Enhancement in frequency domain, Image smoothing, Image sharpening.

UNIT III

Color image processing: Pseudo color image processing, full color image processing. Image Restoration Degradation model, Algebraic approach to restoration, Inverse filtering, least mean square filters, Constrained Least Squares Restoration, Interactive Restoration.

UNIT IV

Segmentation and Thresholding: Image segmentation, Detection of discontinuities. Edge linking and boundary detection, Thresholding, Region oriented segmentation.

UNIT V

Image Compression Techniques: Image compression Redundancies and their removal methods, Fidelity criteria, Image compression models, Source encoder and decoder, Error free compression, Lossy compression.

TEXT BOOKS

1. Digital Image processing – R.C. Gonzalez & R.E. Woods, Addison Wesley/ Pearson education, 2nd Education, 2002.
2. Fundamentals of Digital Image processing – A.K.Jain , PHI.

REFERENCES

1. Digital Image processing using MAT LAB – Rafael C. Gonzalez, Richard E Woods and Steven L. Edition, PEA, 2004.
2. Digital Image Processing – William K. Pratt, John Wilely, 3rd Edition, 2004.
3. Fundamentals of Electronic Image Processing – Weeks Jr., SPIC/IEEE Series, PHI.

GOKARAJU RANGARAJUINSTITUTE OF ENGINEERING AND TECHNOLOGY

RADAR SYSTEMS

(Professional Elective-IV)

Course Code: GR17A4070 **L T P C**

IV Year II Semester **3 1 0 4**

Unit I

Introduction to RADAR: General form of RADAR range equation – block diagram of simple pulsed RADAR and determination of range - maximum Unambiguous range, Radar resolution cell volume, pulse repetition frequency

Unit II

Radar Radiation Patterns and Displays: Cosecant squared radiation pattern for RADAR antennas - RADAR displays - synthetic and Raw displays, Radar Types based on frequency, Waveform, prf, applications. Detection and false alarm Probability - integration of RADAR pulses-RADAR cross section of various targets.

Unit III

Radar Systems: Doppler frequency shift and determination of velocity –Block diagram and working principle of CW Doppler RADAR, FMCW Radar and Pulsed Doppler RADAR. MTI Radar block diagram and use of Delay line cancellers- Blind speed.

Unit IV

Digital MTI processingTracking Radar: Monopulse tracking-Amplitude comparison monopulse system in one/ two coordinates (block diagram)-phase comparison monopulse, Sequential lobing, Conical scan tracking Radar –tracking in range-comparison between Monopulse and conical scan tracking RADARs.

Unit IV

Radar Receivers: Block diagram of super heterodyne receiver- Detection of Radar signals in noise –Matched filter criterion- detection criterion – Extraction of information and waveform design.

Special purpose radars: Synthetic Aperture Radar- Height finder- 3D radars -Radar Beacons-Radar Jamming.

TEXT BOOKS

1. Introduction to Radar Systems – Merrill I. Skolnik, SECOND EDITION, McGraw-Hill, 1981.

REFERENCES

1. Introduction to Radar Systems – Merrill I. Skolnik, THIRD EDITION, Tata McGraw-Hill, 2001.

GOKARAJU RANGARAJUINSTITUTE OF ENGINEERING AND TECHNOLOGY
OPTICAL COMMUNICATIONS
(Professional Elective-IV)

Course Code: GR17A4061 **L T P C**

IV Year II Semester **3 1 0 4**

UNIT I

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

UNIT II

Single mode fibers- Cut off wavelength, Mode Field Diameter, Effective Refractive Index. [2]. Fiber materials — Glass, Halide, Active glass, Chalgenide glass, Plastic optical fibers. Signal distortion in optical fibers- Attenuation, Absorption, Scattering and Bending losses, Core and Cladding losses.

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

UNIT III

Fiber Splicing- Splicing techniques, Splicing single mode fibers. Fiber alignment and joint loss-Multimode fiber joints, single mode fiber joints,. Optical sources- LEDs, Structures, Materials, Quantum efficiency, Power, Modulation, Power bandwidth product. Injection Laser Diodes-Modes, Threshold conditions, External quantum efficiency,Laser diode rate equations,Resonant frequencies. Reliability of LED & ILD.

UNIT IV

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

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

UNIT V

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

TEXT BOOKS

1. Optical Fiber Communications – Gerd Keiser, McGraw-Hill International edition, 3rd Edition,2000.
2.Optical Fiber Communications – John M. Senior, PHI, 2nd Edition, 2002.

REFERENCES

1. Fiber Optic Communications – D.K. Mynbaev , S.C. Gupta and Lowell L. Scheiner, Pearson Education, 2005.
2. Text Book on Optical Fibre Communication and its Applications – S.C.Gupta, PHI, 2005.
3. Fiber Optic Communication Systems – GovindP. Agarwal , John Wiley, 3rd Edition, 2004.
4. Fiber Optic Communications – Joseph C. Palais, 4th Edition, Pearson Education, 2004.

GOKARAJU RANGARAJUINSTITUTE OF ENGINEERING AND TECHNOLOGY

WIRELESS COMMUNICATION NETWORKS

(Professional Elective-IV)

Course Code: GR17A4063	**L**	**T**	**P**	**C**
IV Year II Semester	**3**	**1**	**0**	**4**

UNIT I

Multiple access techniques for wireless communication: Introduction, FDMA, TDMA, Spread Spectrum, Multiple Access, SDMA, Packet radio, Packet radio protocols, CSMA protocols, Reservation protocols.

Introduction to wireless networking: Introduction, Difference between wireless and fixed telephone networks, Development of wireless networks, Traffic routing in wireless networks.

UNIT II

Wireless data services: CDPD, ARDIS, RMD, Common channel signaling, ISDN, BISDN and ATM, SS7, SS7 user part, signaling traffic in SS7.

Mobile ip and wireless access protocol: Mobile IP Operation of mobile IP, Co-located address, Registration, Tunneling, WAP Architecture, overview, WML scripts, WAP service, WAP session protocol, wireless transaction, Wireless datagram protocol.

UNIT III

Wireless Lan Technology: Infrared LANs, Spread spectrum LANs, Narrow bank microwave LANs, IEEE 802 protocol Architecture, IEEE802 architecture and services, 802.11 medium access control, 802.11 physical layer.

UNIT IV

Blue Tooth: Overview, Radio specification, Base band specification, Links manager specification, Logical link control and adaptation protocol.

UNIT VI

Mobile Data Networks: Introduction, Data oriented CDPD Network, GPRS and higher data rates, Short messaging service in GSM, Mobile application protocol.

Wireless ATM & Hiper Lan: Introduction, Wireless ATM, HIPERLAN

TEXT BOOKS:

1. Wireless Communications, Principles, Practice – Theodore S. Rappaport, PHI, 2nd Ed., 2002.

2. Wireless Communication and Networking – William Stallings, PHI, 2003.

REFERENCES:

1. Wireless Digital Communications – Kamilo Feher, PHI, 1999.

2. Principles of Wireless Networks – Kaveh Pah Laven and P. Krishna Murthy, Pearson Education, 2002.

3. Wireless Communications – Andreaws F. Molisch, Wiley India, 2006.

GOKARAJU RANGARAJUINSTITUTE OF ENGINEERING AND TECHNOLOGY

PRICIPLES OF CLOUD COMPUTING

(Professional Elective-V)

Course Code:GR17A4151 **L T P C**

IV Year II Semester **2 1 0 3**

UNIT I

INTRODUCTION

Introduction to Cloud Computing - Understanding Cloud Computing - Developing Cloud Services - A Simple Model of the Cloud - Infrastructure as a Service - Platform as a Service - Software as a Service.

UNIT II

DATA CENTERS

Overview of Data Centers - Application Architecture Models - Data Center Architecture - Data Center Services- Server Architecture : Client and Server 108 SE-Engg&Tech-SRM-2013 Packet Processing - Configuring a Web Server - Network Architecture Design Options - Application Architectures : Integration of Applications - Multitier Applications.

UNIT III

DATA CENTER DESIGN AND SECURITY

Data Center Design: Types of Server Farms and Data Centers - Data Center Topologies - Data Center Security: Vulnerabilities and Common Attacks - Network Security Infrastructure - Security Fundamentals - Data Center Security Framework.

UNIT IV

VIRTUALIZING SOFTWARE

Introduction to Server Virtualizing software – Introduction to VMware vSphere - Configuring vSphere Environment - Creating and Managing Virtual Networking - Configuring and Managing Storage - Managing Virtual Machines.

UNIT V

USING CLOUD SERVICES

Collaborating on Calendars, Schedules, Task Management, Event Management, Project Management - Collaborating on Databases - Storing and Sharing Files and Other Online Content - Collaborating via Web-Based Communication Tools - Collaborating via Social Networks and Groupware - Collaborating via Blogs and Wikis.

TEXT BOOKS

1. Michael Miller, “Cloud Computing”, Pearson Education, New Delhi, 2009.

2. Toby Velte, Anthony Velte, Robert Elsenpeter, “Cloud Computing: A Practical Approach”, McGraw Hill, 2009.

REFERENCES

1. Mauricio Arregoces, Maurizio Portolani, “Data Center Fundamentals”, Cisco Press, 2004

2. Scott Lowe, Jason W, Mc. Carty and Mathew K. Johnson, “VMware, Vsphere 4 Administration, Instant Reference”, Published by Sybex, 2009.

3. George Reese, “Cloud Application Architectures Building Applications and Infrastructure in the Cloud”, O'Reilly Media, 2009.

4. GranttSauls “Introduction to Data Centers”, Certified Data Centers Specialist, Tutorial. 5. Brendan O’Brien, Alberto Rodriguez, Stephen Sutherland and Mark Wheatley, “Server Virtualization Software”, Tutorial, 2009.

GOKARAJU RANGARAJUINSTITUTE OF ENGINEERING AND TECHNOLOGY
AUDIO AND VIDEO ENGINEERING
(Professional Elective-V)

Course Code: GR17A4152	**L T P C**
IV Year II Semester	**2 1 0 3**

UNIT I

Audio Devices and Applications

Microphone sensitivity, Nature of response and directional characteristics, Measurement microphones, various types of microphones, Various types of loud speakers, Characteristic impedance of loud speakers, Headphone types, The basics of magnetic recording, Sound cards, Sound mixers, PA systems and installations, Digital consoles.

UNIT II

Introduction to Video Signals

Video signal dimensions, Horizontal sync composition, Vertical sync details, function of vertical pulse train, Scanning sequence details, geometric form and aspect ratio, Image continuity, No. of scanning lines, Interlaced scanning, Resolution, brightness, Contrast, Picture transmission, TV transmitter, TV receiver, Synchronization, Receiver controls, Perception of brightness and colour, Additive and subtractive colour mixing , Video signals for colour transmission, luminance signal(Y), Compatibility, Colour difference signals, encoding of colour difference signals, Formation of chrominance signals.

UNIT III

Television signal Transmission and Propagation

Picture signal transmission, Positive and negative modulation, vestigial sideband transmission, Standard channel BW, Television transmitter, TV signal propagation, Interference suffered by TV channels, TV broadcast channels for terrestrial transmission

UNIT IV

Television Receiver

RF Tuner, IF Subsystem, Video amplifier, Sound section, Sync separation and processing, Deflection circuits, Scanning currents in the yoke, DC power supplies, Electronic tuners, IF subsystem, Y signal channel, Chroma decoder, Separation of U and V colourphasors.

UNIT V

Television Systems and Standards

NTSC colour system, PAL colour system, SECAM colour TV system, ATSC, ISDB-T and DTMB, Overview of DVB-T, DVB-C and DVB-IP, DVB-H, Cable television network

TEXT BOOKS

1. Audio Video Systems Principles Practices and Troubleshooting, by Bali & Bali, Khanna Publications
2. Audio Engineering, Know it all series, Newnes Press, ISBN 978-1-85617-526-5
3. Audio Video Systems (R.G. Gupta) Tata McGraw Hill 1995
4. R.R.Gulati, " Monochrome Television Practice, Principles, Technology and servicing , Second edition, New age International Publishes, 2004
5. R.R.Gulati "Monochrome and colour television ", New age International Publisher, 2003

REFERENCES

1. Modern Television Practice by R.R. Gulati.
2. Essential Guide to Digital Video by John Watkinson, Snell & Wilcox Inc Publication.
3. Guide To Compression By John Watkinson, Snell & Wilcox Inc Publication
4. A.M Dhake, "Television and Video Engineering", Second edition, TMH, 2003.
5. S.P.Bali, " Colour Television, Theory and Practice", TMH, 1994

GOKARAJU RANGARAJUINSTITUTE OF ENGINEERING AND TECHNOLOGY

RADIO NAVIGATIONAL AIDS

(Professional Elective-V)

Course Code:GR17A4153 **L T P C**

IV Year II Semester **2 1 0 3**

UNIT I

Navigational Systems: Review of Navigational Systems: Aircraft navigational system, Geometry of the earth. Navigation equation, Navigation errors, Radio navigation system types and Performance parameters, ILS System, Hyperbolic navigation systems, Loran, Omega, Decca Radio direction finding, DME, TACAN and VORTAC.

UNIT II

Inertial Navigation: Inertial navigation system, Sensing instruments: Accelerometer. Gyro-copes, Analytic and Gimbaled platforms, Mechanization, Error analysis, Alignment.

UNIT III

Global Positioning System (GPS) for Navigation: Overview of GPS, Reference systems. Satellite orbits, Signal structure, Geometric dilution of precision (GDOP), or Precision dilution of recision (PDOP), Satellite ephemeris, Satellite clock, Ionospheric group delay. Tropospheric group delay, Multipath errors and Receiver measurement errors.

UNIT IV

Differential GPS and WAAS: Standard and precise positioning service local area DGPS and Wide area DGPS errors, Wide Area Augmentation System (WAAS) architecture, Link budget and Data Capacity, Ranging function, Precision approach and error estimates.

UNIT V

GPS Navigational Applications: General applications of GPS, DGPS, Marine, Air and Land Navigation, Surveying, Mapping and Geographical information systems, Military and Space.

TEXT BOOKS

1. Myron Kavton and Walter Friend, R. - “Avionics Navigation Systems”, Wiley,1997
2. Parkinson. BW. Spilker - “Global Positioning System Theory and Applications”, Progress in Astronautics, Vol. I and II, 1996.

REFERENCES

1. Hoffman. B., Wellenhof. H... Lichtenegger and J. Collins - “GPS Theory and Practice”, Springer Verlang Wien New York, 1992.
2. Elliot D. Kaplan - “Understanding GPS Principles and Applications”, Artech House. Inc., 1996. 3. Lieck Alfred. - “GPS Satellite Surveying”, John Wiley, 1990

GOKARAJU RANGARAJUINSTITUTE OF ENGINEERING AND TECHNOLOGY

DIGITAL IMAGE PROCESSING LAB

Course Code: GR17A4076 **L T P C**

IV Year II Semester **0 0 2 2**

LIST OF PROGRAMS

Task1. Write program to read, display, resize and perform various conversions on digital image using MATLAB software.

- Read and display image in MATLAB
- Resize given image
- Convert given color image into gray-scale image
- Convert given color/gray-scale image into black & white image
- Draw image profile
- Separate color image in three R G & B planes
- Create color image using R, G and B three separate planes
- Flow control and LOOP in MATLAB

Task2. To write and execute image processing programs using point processing method.

- Obtain Negative image
- Obtain Flip image
- Thresholding
- Contrast stretching

Task3. To write and execute programs for image arithmetic operations.

- Addition of two images
- Subtract one image from other image
- Calculate mean value of image
- Different Brightness by changing mean value

Task4. To write and execute programs for image logical operations.

- AND operation between two images
- OR operation between two images
- Calculate intersection of two images

Task5. To write a program for histogram calculation and equalization.

- Standard MATLAB function
- Program without using standard MATLAB functions

Task6. To write and execute program for geometric transformation of image.

- Translation

- Scaling
- Rotation
- Shrinking
- Zooming

Task7. To understand various image noise models and to write programs for image restoration.

- Remove Salt and Pepper Noise
- Minimize Gaussian noise
- Median filter and Weiner filter

Task8. To write and execute programs to remove noise using spatial filters.

- Understand 1-D and 2-D convolution process
- Use 3x3 Mask for low pass filter and high pass filter

Task9. To write and execute programs for image frequency domain filtering.

- Apply FFT on given image
- Perform low pass and high pass filtering in frequency domain
- Apply IFFT to reconstruct image

Task10. To write a program for edge detection using different edge detection mask.

Task11. To write and execute program for converting from RGB to HSI.

Task12. To write and execute program for Discrete Cosine transform on given image and perform inverse Discrete Cosine transform to reconstruct image.

Task13. To write and execute program for wavelet transform on given image and perform inverse wavelet transform to reconstruct image.

Task14. To write and execute programs for image transforms.

Task15. Fuzzy based project to be simulated by the student.