Academic Regulations
Programme Structure
&
Detailed Syllabus

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

Department of Computer Science and Engineering

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

**GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY, HYDERABAD
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING (B. Tech)
GR17 REGULATIONS**

Gokaraju Rangaraju Institute of Engineering and Technology 2017 Regulations (GR17 Regulations) are given hereunder. These regulations govern the programmes offered by the Department of Computer Science and 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 Computer Science and 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 Computer Science and Engineering Programme shall be made subject to the eligibility, qualifications and specialization prescribed by the State Government/University from time to time. Admissions shall be made either on the basis of the merit rank obtained by the student in the common entrance examination conducted by the Government/University or on the basis of any other order of merit approved by the Government/University, subject to reservations as prescribed by the Government/University from time to time.

4. **Programme Pattern:**
   a) Each Academic year of study is divided into two semesters.
   b) Minimum number of instruction days in each semester is 90.
   c) **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 subjectsrelated 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 Computer Science and 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 Oriented Mini 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 the road show at the department level for the benefit of all students and staff and the same is to be evaluated by Mini Project Review Committee for 10 marks. The mini project report shall be presented before Project Review Committee in the presence of External Examiner and the same is evaluated for 50 marks. Mini Project Review Committee consists of HOD, Mini Project Coordinator and Supervisor.

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

f) Seminar: For the seminar, the student shall collect information on a specialized topic and prepare a technical report and present the same to a Committee consisting of HOD and two senior faculty and the seminar coordinator of the department. The student shall be assessed for his/her understanding of the topic, its application and its relation with various courses studied during the programme of study for **50 marks.**

g) Major Project: The project work is evaluated for 200 marks. Out of 200, 50 marks shall be for internal evaluation and 150 marks for the external evaluation. The supervisor assesses the student for 25 marks (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 to second year second semester**	**Regular course of study of second year first semester.**
4	**Second year second semester to third year first semester**	**Regular course of study of second year second semester. (ii) Must have secured at least 58 credits out of 96 credits i.e., 60% credits up to second year second semester from all the relevant regular and supplementary examinations, whether the student takes those examinations or not.**
5	**Third year first semester to third year 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 kth 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.,**

$$SGPA\ (S_k) = \sum_{i=1}^{n} (C_i * G_i) / \sum_{i=1}^{n} C_i$$

Where C_i is the number of credits of the ith course and G_i is the grade point scored by the student in the ith 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 $k \geq 2$.**

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 8.00 with no F or below grade/ detention anytime during the programme**
14.2	**First Class**	**CGPA 8.00 with rest of the clauses of 14.1 not satisfied**

14.3	First Class	CGPA ≥ 6.50 and CGPA < 8.00
14.4	Second Class	CGPA ≥ 5.50 and CGPA < 6.50
14.5	Pass Class	CGPA ≥ 5.00 and CGPA < 5.50

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

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

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

18. **General Rules**

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

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

(Applicable for Batches Admitted from 2018-19)

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

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

    b) A student should 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 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 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 $\geq$ 6.50 and CGPA < 8.00
3.4	Second Class	CGPA $\geq$ 5.50 and CGPA < 6.50
3.5	Pass Class	CGPA $\geq$ 5.00 and CGPA < 5.50

I BTECH   **I SEMESTER**

Category	Subject code	Name of subject	Credits			Total credits	Total Hours	Int.	Ext.	Total Marks
			L	T	P					
BS	GR17A1001	Linear Algebra and Single Variable Calculus	2	1		3	4	30	70	100
BS	GR17A1002	Advanced Calculus	2	1		3	4	30	70	100
BS	GR17A1007	Engineering Physics	2	1		3	4	30	70	100
ES	GR17A1009	Computer Programming	2	1		3	4	30	70	100
HS	GR17A1005	English	2	1		3	4	30	70	100
ES	GR17A1019	Fundamentals of Electronics Engineering	2	1		3	4	30	70	100
ES	GR17A1025	Engineering Workshop			2	2	4	25	50	75
ES	GR17A1027	Computer Programming lab			2	2	4	25	50	75
BS	GR17A1029	Engineering Physics lab			2	2	4	25	50	75
		TOTAL	**12**	**6**	**6**	**24**	**36**	**255**	**570**	**825**

I BTECH   **II SEMESTER**

Category	Subject code	Name of subject	Credits			Total credits	Total Hours	Int.	Ext.	Total Marks
			L	T	P					
BS	GR17A1003	Transform Calculus and Fourier Series	2	1		3	4	30	70	100
BS	GR17A1004	Numerical Methods	2	1		3	4	30	70	100
BS	GR17A1008	Engineering Chemistry	2	1		3	4	30	70	100
ES	GR17A1010	Data Structures	2	1		3	4	30	70	100
ES	GR17A1023	Engineering Graphics	1		2	3	5	30	70	100
ES	GR17A1018	Basic Electrical Engineering	2	1		3	4	30	70	100
HS	GR17A1024	Business Communication and Soft Skills			2	2	4	25	50	75
ES	GR17A1026	IT Workshop			2	2	4	25	50	75
BS	GR17A1030	Engineering Chemistry lab			2	2	4	25	50	75
		TOTAL	**11**	**5**	**8**	**24**	**37**	**255**	**570**	**825**

Category	Subject code	Name of subject	Credits			Total credits	Total Hours	Int.	Ext.	Total Marks
			L	T	P					
BS	GR17A2011	Probability and Statistics	2	1		3	4	30	70	100
PC	GR17A2062	Mathematical Foundation of Computer Science	2	1		3	4	30	70	100
PC	GR17A2063	Database Management Systems	3	1		4	5	30	70	100
PC	GR17A2064	Advanced Data structures through C++	3	1		4	5	30	70	100
PC	GR17A2065	Digital Logic Design	3	1		4	5	30	70	100
PC	GR17A2066	Advanced Data structures through C++ Lab			2	2	4	30	70	100
PC	GR17A2067	Databases Lab			2	2	4	25	50	75
PC	GR17A2068	Digital Logic Design Lab			2	2	4	25	50	75
		Total credits/Hours/Marks	13	5	6	**24**	**35**	**225**	**500**	**725**
MC	GR17A2001	Environmental Science			2	2	4	30	70	100

Category	Subject code	Name of subject	Credits			Total credits	Total Hours	Int.	Ext.	Total Marks
			L	T	P					
HS	GR17A2104	Managerial Economics and Financial Analysis	2	1		3	4	30	70	100
PC	GR17A2069	Operating Systems	3	1		4	5	30	70	100
PC	GR17A2070	Object Oriented Programming through Java	3	1		4	5	30	70	100
PC	GR17A2071	Formal Languages and Automata Theory	3	1		4	5	30	70	100
PC	GR17A2076	Computer Organization	2	1		3	4	30	70	100
PC	GR17A2072	Object Oriented Programming through Java Lab			2	2	4	30	70	100
PC	GR17A2073	Operating Systems Lab			2	2	4	25	50	75
PC	GR17A2074	Advanced Databases Lab			2	2	4	25	50	75
		Total credits/Hours/Marks	13	5	6	**24**	**35**	**225**	**500**	**725**
MC	GR17A2002	Value Education and Ethics			2	2	2	30	70	100
MC	GR17A2106	Gender sensitization Lab			2	2	2	25	50	75

III BTECH   **I SEMESTER**

Category	Subject code	Name of subject	Credits L	T	P	Total credits	Total Hours	Int.	Ext.	Total Marks
PC	GR17A3050	Unix and Shell Programming	2	1		3	4	30	70	100
PC	GR17A2055	Microcontrollers	3	1		4	5	30	70	100
PC	GR17A3051	Compiler Design	3	1		4	5	30	70	100
Open Elective 1			**2**	**1**		**3**	**4**	30	70	100
Professional Elective 1			**3**	**1**		**4**	**5**	30	70	100
PE	GR17A3061	Artificial Intelligence and Neural Networks								
PE	GR17A3053	Principles of Programming Languages								
PE	GR17A3107	Introduction to Data Sciences								
PC	GR17A3055	Unix Programming and Compiler Design Lab			2	2	4	25	50	75
PC	GR17A2059	Microcontrollers Lab			2	2	4	25	50	75
PC	GR17A3054	Advanced Java Programming Lab			2	2	4	25	50	75
		Total	**13**	**5**	**6**	**24**	**35**	**225**	**500**	**725**

III BTECH   **II SEMESTER**

Category	Subject code	Name of subject	Credits L	T	P	Total credits	Total Hours	Int.	Ext.	Total Marks
PC	GR17A3056	Design and Analysis of Algorithms	3	1		4	5	30	70	100
PC	GR17A3057	Software Engineering	3	1		4	5	30	70	100
PC	GR17A3059	Web Technologies	2	1		3	4	30	70	100
	Open Elective 2		**2**	**1**		**3**	**4**	30	70	100
	Professional Elective 2		**3**	**1**		**4**	**5**	30	70	100
PE	GR17A3062	Multicore Computing and Architecture								
PE	GR17A3111	Big Data Analytics								
PE	GR17A3058	Information Security								
PC	GR17A3063	Web Technologies Lab			2	2	4	25	50	75
PC	GR17A3100	Advanced English Communication Skills Lab			2	2	4	25	50	75
PC	GR17A3101	Industry Oriented Mini Project			2	2	4	25	50	75
		Total	**13**	**5**	**6**	**24**	**35**	**225**	**500**	**725**

IV BTECH   **I SEMESTER**

Category	Subject Code	Name of Subject	Credits			Total credits	Total Hours	Int.	Ext.	Total Marks
			L	T	P					
PC	GR17A2077	Computer Networks	3	1		4	5	30	70	100
PC	GR17A3067	Dataware housing and Datamining	2	1		3	4	30	70	100
PC	GR17A3102	Management Science	3	1		4	5	30	70	100
Open Elective 3			**2**	**1**		**3**	**4**	**30**	**70**	**100**
Professional Elective3			**3**	**1**		**4**	**5**	**30**	**70**	**100**
PE	GR17A4079	Cloud Computing								
PE	GR17A3069	Computer Graphics								
PE	GR17A4077	Software Testing Methodologies								
PC	GR17A4084	Scripting Languages Lab			2	2	4	25	50	75
PC	GR17A4146	DMDW and BI Lab			2	2	4	25	50	75
PC	GR17A4083	Advanced Network Programming Lab			2	2	4	25	50	75
Total			**13**	**5**	**6**	**24**	**35**	**225**	**500**	**725**

IV BTECH   **II SEMESTER**

Category	Subject Code	Name Of Subject	Credits			Total credits	Total Hours	Int.	Ext.	Total Marks
			L	T	P					
PC	GR17A4155	Unified Modeling Language	2	1		3	4	30	70	100
Professional Elective 4			**3**	**1**		**4**	**5**	**30**	**70**	**100**
PE	GR17A4088	Fundamentals of Image Processing								
PE	GR17A4101	Software Project Management								
PE	GR17A4089	Cyber Security								
Professional Elective 5			**2**	**1**		**3**	**4**	**30**	**70**	**100**
PE	GR17A4095	Information Retrieval Systems								
PE	GR17A4086	Real Time Operating Systems								
PE	GR17A4090	Design Patterns								
PC	GR17A4156	Unified Modeling Language Lab			2	2	4	25	50	75
S PW	GR17A4142	Comprehensive Viva Voce			1	1	2	30	70	100
SPW	GR17A4143	Seminar			1	1	2	30	70	100
SPW	GR17A4144	Major Project			10	10	14	100	100	200
Total			**7**	**3**	**14**	**24**	**35**	**275**	**500**	**775**

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	Data mining 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

UNIX AND SHELL PROGRAMMING

Course Code: GR17A3050   **L   T P C**

III Year I Semester   **2   1   0 3**

UNIT I

Introduction to UNIX: Functions of Operating Systems, Single user and Multi user OS, History of UNIX, Features of UNIX, Structure of UNIX, shell and kernel functionalities.

UNIX Utilities: Directory commands – mkdir, chdir, rmdir, who, ls; I/O redirection and File handling utilities – input output redirection operators, cat, touch, cp, mv, rm, ln, unlink, more; Disk utilities – du, df, mount, unmounts; Security by file permissions – chmod, umask, chown, chgrp; process utilities – ps, nice, nohup, kill; Networking commands – finger, ftp, telnet, arp, mail, wall, news; Backup utilities – cpio, tar; Text processing utilities and Filters - cat, tail, head, sort, nl, uniq, tr, comm, cmp, diff, cut, paste, join, tee, grep, egrep, fgrep; pipe operator, here documents.

UNIT II

Editors in UNIX: Visual Editor – Modes of operation, creating and editing files, Inserting and appending text, Deleting Text, Navigating cursors, Stream editor – Sed commands, regular expressions with Sed, Sed pattern flags, examples.

Working with UNIX shell: Introduction to shell, types of shell, shell Meta characters, shell variables, shell commands, control structures, positional parameters, command line arguments, shell script examples.

UNIT III

Unix File System: Types of Files, Hierarchical Unix file system, Structure of file system, file descriptors, System calls – File related system calls - usage of open, creat, read, write, close, unlink, link, symlink, lseek, stat, fstat, umask, dup, dup2, chmod, chown,; Directory handling system calls - opendir, readdir, closedir, rewinddir, seekdir, telldir, mkdir, rmdir, chdir, getcwd

The Standard I/O library function - fopen, fclose, fgetc, getc, fputc, putc, fgets, gets, fflush, fseek; Formatted I/O library function – fscanf, fprintf,sscanf,sprintf.

UNIT IV

Unix Process: process basics, process identifiers, process structure, process control, creating a new process, waiting for a process, process termination, Daemon Process, zombie process, orphan process, system call interface for process management - fork, vfork, exit, wait, waitpid, exec.

Signals: Signal concepts, unreliable signals, interrupted system calls, kill and raise functions, signal handling mechanism, signal function, alarm, pause, abort, sleep, system functions.

UNIT V

Awk - advanced filter: Simple awk filtering, Fields, variables and expressions, Arrays, Functions, control flow, example awk scripts.

Inter process Communication Overview: Introduction to IPC, IPC between processes on a single computer system, IPC between processes on different systems, streams and messages, name spaces, pipes, FIFOs.

TEXT BOOKS

1. Unix the ultimate guide, Sumitabha Das, TMH
2. Unix and Shell Programming, B.M.Harwani, Oxford university press.
3. Unix Network Programming, W.R.Stevens, Pearson/PHI

REFERENCES

1. Advanced Programming in the Unix environment, W.R.Stevens, Pearson education.
2. Unix system programming using C++, T.Chan, PHI
3. Unix for programmers and users, third edition, Graham Glass, King Ables, Pearson education.

MICROCONTROLLERS

Course Code:GR17A2055   **L T PC**

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

UNIT I

Introduction and 8086 Architecture: Introduction to microprocessors, 8086 Architecture: Functional diagram, Register organization, Memory segmentation, Programming model, Memory address, Physical memory organization, Signal description of 8086, Timing diagrams, Interrupts of 8086.

UNITII

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

UNITIII

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

UNIT IV

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

UNIT V

8051MicrocontrollerDesign: Introduction, Micro controller specification, Micro controller Design, Testing the Design, Timing sub routines, Serial Data Transmission.

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

Teaching methodologies:
- Power Point presentations
- Tutorial Sheets
- Assignments

TEXTBOOKS

1. D.V.Hall, Microprocessors and Interfacing, TMH,2nd edition 2006.

2. Kenneth J.Ayala, The 8051 Microcontroller Architecture Programming and Applications,2nd Edition, Penram International Publishers(I),1996.

REFERENCES

1. A.K.Ray and K.M. Bjurchandani, TMH, 2nd edition, Advanced Microprocessors and Peripherals TMH, 2006

2. Mohammed Ari Mazidi and Janci Gillispie,The 8051Microcontroller and Embedded Systems, Pearson Education Asia,New Delhi,2003.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

COMPILER DESIGN

Course Code:GR17A3051   **L T PC**

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

UNIT I

Overview of Compilation: Phases of Compilation – Lexical Analysis, Regular grammar and regular expression for common programming language features, pass and phases of translation, interpretation, bootstrapping, data structures in compilation – LEX lexical analyzer generator.

UNIT II

Top down Parsing: Context free grammars, Top down parsing – Backtracking, LL (1), recursive descent parsing, Predictive parsing, Preprocessing steps required for predictive parsing.
Bottom up parsing: Shift Reduce parsing, LR and LALR parsing, Error recovery in parsing, handling ambiguous grammar, YACC – automatic parser generator.

UNIT III

Semantic analysis: Intermediate forms of source programs – abstract syntax tree, polish notation and three address codes. Attributed grammars, Syntax directed translation, Conversion of popular programming languages language constructs into Intermediate code forms, Type checker.
Symbol Tables: Symbol table format, organization for block structures languages, hashing, tree structures representation of scope information.

UNIT IV

Block structures and non-block structure storage allocation: Static, Runtime stack and heap storage allocation, storage allocation for arrays, strings and records.
Code optimization: Consideration for Optimization, Scope of Optimization, local optimization, loop optimization, frequency reduction, folding, DAG representation.

UNIT V

Data flow analysis: Flow graph, data flow equation, global optimization, redundant sub expression elimination, Induction variable elements, Live variable analysis, Copy propagation.
Object code generation: Object code forms, machine dependent code optimization, register allocation and assignment, generic code generation algorithms, DAG for register allocation.

TEXT BOOKS
1. Principles of compiler design -A.V. Aho , J.D.Ullman, Pearson Education.
2. Modern Compiler Implementation in C- Andrew N. Appel, Cambridge
University Press.

REFERENCES

1. Lex&Yacc – John R. Levine, Tony Mason, Doug Brown, O'reilly
2. Modern Compiler Design- Dick Grune, Henry E. Bal, Cariel T. H. Jacobs,
Wiley dreamtech.
3. Engineering a Compiler-Cooper & Linda, Elsevier.
4. Compiler Construction- Louden, Thomson.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

ARTIFICIAL INTELLIGENCE AND NEURAL NETWORKS

(PROFESSIONAL ELECTIVE – I)

Course Code:GR17A3061   **L TPC**

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

UNIT I

Introduction: AI problems, foundation of AI and history of AI intelligent agents, Agents and Environments, concept of rationality, nature of environments, structure of agents, problem solving agents, problem formulation.

Searching: Searching for solutions, uniformed search strategies – Breadth first search, depth first Search. Search with partial information (Heuristic search) Greedy best first search, A* search. **Game Playing:** Adversal search, Games, minmax, algorithm, optimal decisions in multiplayer games, Alpha-Beta pruning, Evaluation functions, cutting of search.

UNIT II

Knowledge Representation & Reasons: logical Agents, Knowledge – Based Agents, Wumpus world, logic, Propositional logic, Resolution patterns in propositional logic, Resolution, Forward & Backward Chaining.

First order logic: Inference in First order logic, Propositional vs First order inference, unification & lifts, Forward chaining, Backward chaining, Resolution.

UNIT III

Characteristics of Neural Networks: Historical Development of Neural Networks Principles.**Artificial Neural Networks:** Terminology, Models of Neuron, Topology, Basic Learning Laws, Pattern Recognition Problem, Basic Functional Units, Pattern Recognition Tasks by the Functional Units.

UNIT IV

Feedforward Neural Networks: Introduction, Analysis of pattern Association Networks, Analysis of Pattern Classification Networks, Analysis of pattern storage Networks. Analysisof Pattern Mapping Networks.

Feedback Neural Networks: Introduction, Analysis of Linear Auto-associative FF Networks, Analysis of Pattern Storage Networks.

UNIT V

Competitive Learning Neural Networks & Complex pattern Recognition: Introduction, Analysis of Pattern Clustering Networks, Analysis of Feature mapping Networks, Associative Memory.

TEXT BOOKS

1. Artificial Intelligence – A Modern Approach. Second Edition, Stuart Russel, Peter Norvig, PHI/ Pearson Education.
2. Artificial Neural Networks B. YagnaNarayana, PHI

REFERENCES

1. Artificial Intelligence, 2nd Edition, E.Rich and K.Knight (TMH).
2. Artificial Intelligence and Expert Systems – Patterson PHI.
3. Expert Systems: Principles and Programming- Fourth Edn, Giarrantana/ Riley, Thomson.
4. PROLOG Programming for Artificial Intelligence. Ivan Bratka- Third Edition – Pearson Education.
5.Neural Networks Simon Haykin PHI
6. Artificial Intelligence, 3rd Edition, Patrick Henry Winston., Pearson Edition.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

PRINCIPLES OF PROGRAMMING LANGUAGE

(PROFESSIONAL ELECTIVE – I)

Course Code:GR17A3053   **L   TPC**

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

UNITI

Preliminary Concepts: Reasons for studying, concepts of programming languages, Programming domains, Language Evaluation Criteria, Influences on Language design, Language categories, Programming Paradigms – Imperative, Object Oriented, Functional Programming , Logic Programming.

Programming Language Implementation: Compilation and Virtual Machines,programming environments.

UNIT II

Syntax and Semantics: General Problem of describing Syntax and Semantics, formal methods of describing syntax - BNF, EBNF for common programming languages features, parse trees, ambiguous grammars, attribute grammars, denotational semantics and axiomatic semantics for common programming language features.

Data types: Introduction, primitive, character, user defined, array, associative, record, union, pointer and reference types, design and implementation uses related to these types. Names, Variable, concept of binding, type checking, strong typing, type compatibility, named constants, variable initialization.

UNIT III

Expressions and Statements: Arithmetic relational and Boolean expressions, Short circuit evaluation, mixed mode assignment, Assignment Statements, Control Structures – Statement Level, Compound Statements, Selection, Iteration, Unconditional Statements, guarded commands.

Subprograms and Blocks: Fundamentals of sub-programs, Scope and lifetime of variable, static and dynamic scope, Design issues of subprograms and operations, local referencing environments, parameter passing methods, overloaded sub-programs, generic sub-programs, parameters that are sub-program names, design issues for functions, user defined overloaded operators, co routines.

UNIT IV

Abstract Data types: Abstractions and encapsulation, introductions to data abstraction, design issues, language examples, C++ parameterized ADT, object oriented programming in small talk,

C++, Java, C#, Ada 95.

Concurrency: Subprogram level concurrency, semaphores, monitors, message passing, Java threads, C# threads.

Exception handling: Exceptions, Exception propagation, Exception handler in Ada, C++ and Java.

Logic Programming Language : Introduction and overview of logic programming, basic elements of prolog, application of logic programming.

UNIT V

Functional Programming Languages: Introduction, fundamentals of FPL, LISP, ML, Haskell, application of Functional Programming Languages and comparison of functional and imperative languages.

TEXT BOOKS

1. Concepts of Programming Languages Robert .W. Sebesta 6/e, Pearson
   Education.
2. Programming Languages –Louden, Second Edition, Thomson.

REFERENCES

1. Programming languages –Ghezzi, 3/e, John Wiley

2. Programming Languages Design and Implementation – Pratt
and Zelkowitz, Fourth Edition PHI/Pearson Education

3. Programming languages –Watt, Wiley Dreamtech

4. LISP Patric Henry Winston and Paul Horn Pearson Education.

5. Programming in PROLOG Clocksin, Springer

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

INTRODUCTION TO DATA SCIENCE

(PROFESSIONAL ELECTIVE – I)

Course Code:GR17A3107   **L TPC**

III Year I Semester   **3 1   04**

UNIT I
Introduction: What is Data Science? Big Data and Data Science hype - and getting past the hype,-Why now? Data fiction, Current landscape of perspectives, Skill sets needed
Statistical Inference: Populations and samples, Statistical modeling, probability distributions, fitting a model, Introduction to R

UNIT II
 Exploratory Data Analysis and the Data Science Process , Basic tools (plots, graphs and summary statistics) of EDA, Philosophy of EDA ,The Data Science Process, Case Study: RealDirect (online real estate _rm)
Three Basic Machine Learning Algorithms: Linear Regression, k-Nearest Neighbors (k-NN),k-means

UNIT III
Introduction to Machine learning, One More Machine Learning Algorithm and **Usage in Applications:** Motivating application: Filtering Spam, Why Linear Regression and k-NN are poor choices for Filtering Spam, Naive Bayes and why it works for Filtering Spam, **Data Wrangling:** APIs and other tools for scrapping the Web

UNIT IV
Feature Generation and Feature Selection (Extracting Meaning from Data): Motivating application: user (customer) retention,- Feature Generation (brainstorming, role of domain expertise, and place for imagination)
Feature Selection algorithms: Filters; Wrappers; Decision Trees; Random Forests

UNIT V
Data Science and Ethical Issues: Discussions on privacy, security, ethics, A look back at Data Science, Next-generation data scientists

TEXT BOOKS:
1. Cathy O'Neil and Rachel Schutt. Doing Data Science, Straight Talk From The Frontline. O'Reilly. 2014.
2. Kevin P. Murphy. Machine Learning: A Probabilistic Perspective. ISBN 0262018020. 2013.

REFERENCES
1. Foster Provost and Tom Fawcett. Data Science for Business: What You Need to Know about Data Mining and Data-analytic Thinking. ISBN 1449361323. 2013

UNIX PROGRAMMING AND COMPILER DESIGN LAB

Course Code:GR17A3055   **LTPC**

III Year I Semester   **0 0 2 2**

Task 1

a) Practice the following commands in UNIX environment

  (i) File Handling Utilities –cat,cp,rm,sort   (ii) Disk Utilities   -du,df

b) Practice the given commands in UNIX environment

  (i) Security by File Permissions- Umask, chmod   (iii) Process Utilities-Ps,kill

c) Demonstrate Text Processing Utilities in UNIX.-Head, Tail, Comp, Diff, Comm

d) Filter commands-Grep,Tee

Task2

a) Write a shell script to print the sum of even numbers from given n numbers.

b) Write a shell script that accepts a file name as argument and display specified number of lines from the beginning of file.

c) Write a shell script that takes an argument and checks if argument supplied is a file or a directory and reports accordingly. If the argument is a directory, display the contents of directory.

d) Write a shell script to demonstrate the creation of a menu to display list of files, process status, users of a system, current date, present working directory and exit from prompt (using case statement).

Task 3

a) Write an awk script to count the number of lines in a file that do not contain vowels.

b) Write an awk script to find the number of characters, words and lines in a file.

c) Create a student database file. Display all the records of the file, counts the number of records and display the average and total marks obtained by students.

Task 4

a) Write a C program that makes a copy of a file using standard I/O and system calls.

b) Implement in C the following UNIX commands using System calls

     A. cat   B. ls

c) Write a program that takes one or more file/directory names as command line input and reports the following information on the file.

     A. File type.   B. Number of links.

     C. Time of last access.   D. Read, Write and Execute permissions.

d) Write a C program that demonstrates redirection of standard output to a file.

     Ex: ls> f1.

Task 5

a) Write a C program to create a child process and allow the parent to display "parent" and the child to display "child" with Process ID's on the screen.

b) Write a C program to create a Zombie process.

c) Write a C program that illustrates how an orphan is created.

d) Write a C program that illustrates suspending and resuming processes using signals.

Task 6

a) Write a C program that illustrates how to execute two commands concurrently with a command pipe.   Ex: - ls –l | sort

b) Write C programs that illustrate communication between two unrelated processes using named pipe.

Task 7: Design a lexical analyzer for tokenizing an expression and identify comment lines in the program.

Task 8: Implement top down parsing techniques.

     c) Brute force technique   b) RDP

Task 9: Find the first set and follow of a given grammar.

Task 10: Design shift-reduce parser for a given grammar.

Task 11: Implement intermediate code generation and code generation for a given expression.

Task 12: a) LEX Program to count the number of lines, words and letters, **capital** letters, small letters and digits in a file.

b) Function usage in LEX program.

c) Design a simple arithmetic calculator: USE LEX and YACC.

Case Study: Implement parsing techniques for a given grammar and show DFA.

TEXT BOOKS

1. Unix the ultimate guide, SumitabhaDas,TMH.

2. Unix Network Programming, W.R.Stevens,Pearson/PHI

3. Principles of compiler design -A.V. Aho ,J.D.Ullman, Pearson Education.

4. Modern Compiler Implementation in C- Andrew N. Appel,
    Cambridge University Press.

REFERENCES

1. Unix System Programming using C++,T.Cahn.PHI.

2 .Unix for programmers and users , third edition, Graham Glass, King Ables, Pearson education.

3. Lex&Yacc – John R. Levine, Tony Mason, Doug Brown, O'reilly
4. Compiler Construction- Louden, Thomson

MICRO CONTROLLERS LAB

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

III Year I Semester   **0 0 2   2**

List of experiments on 2G kit

Task1: LED patterns

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

Task2: Switches & LEDs

a) Press switch to make corresponding LED on,
b) Press switch to make corresponding LED off.
c) First switch press, last LED on.
d) First switch press, last LED off.

Task3: LCD

    a) Character & string display on LCD
    b) SW1-Display string1 on first line of LCD
    c) SW2-Display string1 on first line of LCD,SW2

Task4: UART

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

Task5: TRIAC

    a) 220VAC bulb switch on/off
    b) 220VAC fan speed control with fixed step size

Task6: ADC

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

Task7: DAC

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

Task8: DC motor

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

Task9: ZigBee

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

Task10: RF433MHz

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

Task11: Bluetooth

    a) Transfer data to PC using Bluelink
    b) Receive data from PC using BlueLink & display on LCD
    c) Transfer data from mobile phone(using aJ2ME app) and receive using Blue link and control motor operation
    d) Transfer data from mobile phone(using a J2ME app) and receive using BlueLink and control electrical appliance operation

Task12: Ethernet

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

Task13: RTC

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

Task14: SDcard

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

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

Lab methodologies:
- Assignments
- Lab experiments with Arduino software

ADVANCED JAVA PROGRAMMING LAB

Course Code:GR17A3054   **LTPC**
III Year I Semester   **0 0 2 2**

Exception Handling and Packages:
Task 1:
Create a package griet.cse.hyd<your branch id>. <your id>.<your first name>.
        For e.g., griet.cse.Hyd05.14241A0510.Anu
        Now create a Greeter class in this package having the following features:
Attributes:
        name   String   //indicates name of the person to be greeted
        Member functions:
        Greeter(aName) //constructor to initialize the name of the person to be greeted by this greeter.
        Say Hello()   //returns a hello message with the name of the person initialized earlier.
        Say GoodBye()   //bids goodbye to the person named earlier.
Create another class in the same package called Advisor that has the following features:
Attributes:
        message string[5]   // contains five advice messages
Member functions:
        advisor() // default constructor to initialize an array of strings with atleast five advice messages
        getAdvice() // randomly selects an advice from the available list of messages and returns it to the
        caller of this method
Outside the package, from your working directory, create a class GreeterTest that constructs
Greeter objects for all command-line arguments and prints out the results of calling sayHello().
The program should then display an advice and finally bid goodbye to each of the persons/entities in
reverse order of the names entered at the command line.

   a) Create a class Number having the following features:
                Attributes
                        int   first number
                        int   second number
                        result   double stores the result of arithmetic operations performed
                on a and b
                Member functions
                        Number(x, y)   constructor to initialize the values of a and b
                        add ()   stores the sum of a and b in result
                        sub ()   stores difference of a and b in result
                        mul ()   stores product in result
                        div ()   stores a divided by b in result
                Test to see if b is 0 and throw an appropriate exception since division by zero
                is undefined.
                Display a menu to the user to perform the above four arithmetic operations.

b) Create a class BankAccount having the members as given below:
1. AccNo   integer   2. CustName string
3. AccType string (indicates 'Savings' or 'Current')   4. Balance float
Include the following methods in the BankAccount class:
1. void deposit(float amt);
2. void withdraw(float amt);
3. float getBalance( );

- deposit(float amt) method allows you to credit an amount into the current balance. If amount is negative, throw an exception Negative Amount to block the operation from being performed.
- withdraw(float amt) method allows you to debit an amount from the current balance. Please ensure a minimum balance of Rs. 1000/- in the account for savings account and Rs. 5000/- for current account, else throw an exception Insufficient Funds and block the withdrawal operation. Also throw an exception Negative Amount to block the operation from being performed if the amt parameter passed to this function is negative.
- getBalance() method returns the current balance. If the current balance is below the minimum required balance, then throw an exception Low Balance Exception accordingly.

Have constructor to which you will pass, accno, cust_name, acctype and initial balance. And check whether the balance is less than 1000 or not in case of savings account and less than 5000 in case of a current account. If so, then raise a Low Balance Exception.
In either case if the balance is negative then raise the Negative Amount exception accordingly.

c)   Create a class USERTRAIL with following specifications.
                              val1, val2 type int
                    Methods
                              - boolean show () will check if val1 and val2 are greater or less than Zero
      Have constructor which will val1, val2 and check whether if it is less than 0 then raise a custom Exception (name: Illegal value exception.)

IO Streams & GUI Programming:
Task 3:
Write a program which take source file and destination file as input as command line arguments. It copies the source file contents to destination file. If source file does not exist, it should give appropriate message to use. If destination file does not exist, it should be created. If it exists, program should ask that, "whether you want to overwrite?(Yes/No"). On the basis of user choice, appropriate action should be taken.
Note: Files may be any type of files like bitmap files, exe files, text files etc

a) Write a stream based program which will accept Roll Number, Name, Age and Address from user. Age and Roll-no should be numeric. Handle with built-in exception. None of the field should be blank. Handle with custom exception, Ask user, whether to write the data in the file .If answer is yes then data is saved into a file as an object (User can write many records in the file), otherwise terminate the current program .Write another program to display all the records saved into the file.
b)Write a program which will accept an input String from and write the input in the file io.txt,Show size of the file, Read contents from the file and display them on console, Delete io.txt file using File class.
Multithreading:

Task 5:
Write a multithreaded program that will accept 4 strings from the command line and search in a particular file for a given string and display the status of each search on the screen. Note that, all threads are operating on the same file. Write a Java application that will accept two filenames (text files) as command line arguments and use two threads to read contents from the two text files. Each of the threads should sleep for a random time after displaying filename with each line. Write a java application that will create and start two threads. One thread will read a text file (Number.txt) containing five positive integers one on each line. The second thread should calculate factorial of the number read by the first thread and print the message on the screen as "Factorial of x is y" ,here x is number & y is factorial of the number. The two threads should work in synchronization. Handle all necessary exceptions.

Task 6:
a) Implement three classes: Storage, Counter and Printer.
   - The Storage class should store an integer.
   - The Counter class should create a thread and starts counting from 0 (0,1,2,3…) and stores each value in the Storage class.
   - The Printer Class should create a thread that keeps reading the value in the Storage class and printing it.

b) Write a program that creates an instance of the Storage class and set up a Counter and Printer object to operate on it. Identify that, whether synchronization is required or not in this program. If yes, implement it.

c) Modify the above program to ensure that each number is printed exactly once, by adding suitable synchronization.

Networking &
Collections: Task 7:
a) Write console based networking application as follows, Write client Application which should send hello to server. Server application should accept client request and it should send welcome client message to client application.

b) Write a client application which will send login Id and password to the server as an object. Server Application should respond to the client request by validating login Id and Password. If login Id and Password are GRIET and CSE respectively send valid user or invalid user message to client application .Create a class called Login, attribute are user Id and password.

Task 8:
a) Write a program to add list of student names to ArrayList and it should find a particular name whether it exists or not in the list.

b) Create a Product class with Product Id & Product Name. Write a program to accept information of 10 products and store that in Hash Table. Search a particular product in the Hash Table. Remove a particular product id and product name from the Hash Table.

The product list is as follows:

Product Id	Product Name
P001	Maruti800
P002	MarutiZen
P003	MarutiEsteem

Task 9:
Implement vector class for this problem
- Create an Employee class which will have details like EmployeeNo, EmployeeName and Address. You should pass value for EmployeeNo, EmployeeName and Address through constructor.
- Create a method addInput( ) which will add employee details to vector.
- Create method display( ) which should display all data from vector using Enumeration.

Note :addInput( ) and display( ) should not be member functions of Employee class.

Task 10:
Create Phone book having user interface like

                           1. Add new phone book entry

                           2. Search Phone Number

                           3. Quit.

    Option 1: It allows add name and Phone no.

    Option 2: It has to take name as input from the user based on that it should return phone number

    Option 3: Will terminate the program

Use HashMap to store phone book entries.

JDBC:

Task 11:
- Write a java program to display the first 5 records from the table Emp. (Use Type-4 driver for oracle)
- Write a java program to display the first 5 records from the table Emp. (Use Type-1 driver for oracle)
- Write a java program to display the first 5 records from the table Emp. (Use Type-1 driver for MS-Access)
- Write a java program to find number of records in the table Emp. (Use Type-4 driver for Oracle)

Task 12:
Write a java program as follows:
Accept the empno from the user.
a)Write a method display( ) which takes the empno as parameter and displays the detail information of the employee.
b) Write a method update() which takes the empno as a parameter.
    Displays the current salary and updates the salary entered by user.
c) Delete the record of the employee whose empno is entered.If employee with the entered empno doesn't exists ask for the new empno .if employee with the empno does not exits display appropriate message to user.

                 Oracle Query to For Emp Table.

                 create table emp

                 (EMPNO   NOT NULL NUMBER(4),

                  ENAME   VARCHAR2(10) ,

                  JOB   VARCHAR2(9),

                  MGR   NUMBER(4),

                 HIREDATE DATE,

```
            SAL      NUMBER(7,2),
            COMM     NUMBER(7,2),
            DEPTNO   NUMBER(2)
        );
```

Task 13:

Any Applications on Result Set , Prepared Statement, Callable Statement,
Transaction Management.

WATER RESOURCES ENGINEERING
(Open Elective-I)

Course Code: GR17A3151	**LT**	**P C**
III Year I Semester	**2 1**	**0 3**

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: completion 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 Engineering and Hydraulic structures SK Grag, Khanna Publishers
3. Engineering hydrology- K.Subramanya Tata McGraw Hill

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, Maidment, Larry W.Mays TataMC. GrawHill
6. Introduction to Hydrology by Warren Viessman, Jr Garyl, Lewis
7. Irrigation and water power engineering- Dr. B.C. Punmia, Dr. Lal et. al.
8. Water Resources Engineering-Larry W. Mays, John Willey & sons
9. Irrigation Engineering Theory and Practise- A.M.Micheal, Vikas Publishers
10. NPTEL web and video courses

GOKARAJURANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

SOLAR AND WIND ENERGY SYSTEMS
(Open Elective- I)

Course Code: GR17A3152 **LTPC**
III Year I Semester **2** 103

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 and Cooling 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 Cell Classification, 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 Wind Power, Basics of Fluid Mechanics, Wind Turbine Aerodynamics.

UNIT V
Wind Energy Conversion Systems: Wind Energy Conversion Systems (WECS), Wind-Diesel Hybrid 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

APPLIED THERMODYNAMICS

(Open Elective-I)

Course Code:GR17A3153   LTPC

III B. Tech I Semester   **21 03**

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

Teaching Methodology: Power Point Presentations, Working models, White Board & Marker

PRINCIPLES OF E-COMMERCE

(OPEN ELECTIVE I)

Course Code: GR17A3154   **L T P C**

III Year I Semester   **2 1 0 3**

UNIT I

INTRODUCTION TO E-COMMERCE

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

UNIT II

E-COMMERCE BUSINESS MODELS AND CONCEPTS

E-commerce Business Models, Business-to-Consumer (B2C) Business Models, Business-to-Business (B2B) Business Models, Business Models in Emerging E-commerce Areas.

UNIT III

BUILDING AN E-COM WEB SITE

Building an E-commerce Web Site, Choosing Software, Choosing the Hardware, E-commerce Site Tools.

UNIT IV

ONLINE SECURITY AND PAYMENT SYSTEMS

Security Threats in the E-commerce Environment, Technology Solutions, payment systems, E-commerce Payment System, Electronic Billing Presentment and Payment.

UNIT V

ONLINE CONTENT AND MEDIA

Online Content, Online Publishing Industry, Online Entertainment Industry.

TEXT BOOK

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.

DATA MINING AND APPLICATIONS

(Open Elective – I)

Course Code: GR17A3155   **L   T P   C**

III Year I Semester   **2   1 0   3**

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.

COMPUTER ARCHITECTURE AND ORGANIZATION
(Open Elective-I)

Course Code: GR17A3156   **LTPC**

III Year I Semester   **2 103**

UNIT I

Introduction

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

UNIT II

Data Path Design

Fixed Point Arithmetic, Addition, Subtraction, Multiplication and Division, Combinational and
Sequential ALUs, Carry look ahead adder, Robertson algorithm, booth's algorithm, non-
restoring division algorithm,Floating Point Arithmetic, Coprocessor, Pipeline Processing, Pipelin
e design, Modified booth's Algorithm

UNIT III

Control Design

Hardwired Control, Microprogrammed Control, Multiplier Control Unit, CPU Control Unit, Pipe
line 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 interrupts, pipelineinterrupts, IOP organization, operation systems, multiprocessors, fault tolerance, RIS C and CISC processors, Superscalar and vector processor.

TEXT BOOKS:

1. John P.Hayes, 'Computer architecture and Organisation', TMH Third 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.

DESIGN AND ANALYSIS OF ALGORITHMS

Course Code: GR17A3056   **L** **TPC**

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

UNIT I

Introduction: Definition of algorithm, properties of an Algorithm, performance analysis-space complexity & time complexity, asymptotic notations: big oh notation, omega notation, theta notation, little oh notation & little omega notation.

Disjoint sets: disjoint set Representation, Operations, union and find

algorithms. **UNIT II**

Divide and conquer: General method, applications, binary search, quick sort, merge sort, strassen's matrix multiplication. Time complexities of divide and conquer algorithms.

Dynamic programming -1: General method, applications, matrix chain multiplication, optimal binary search trees, 0/1 knapsack problem

UNIT III

Dynamic programming -II: All pairs shortest path problem, travelling sales person problem, reliability design.

Greedy method: General method, applications- job sequencing with deadlines, knapsack problem, minimum cost spanning trees, single source shortest path problem.

UNIT 1V

Backtracking: General method, applications, n-queen problem, sum of subsets problem, graph coloring, Hamiltonian cycles.

UNIT V

Branch and Bound: General method, applications, travelling sales person problem: LC branch and bound solution. 0/1 knapsack problem: LC branch and bound solution, FIFO branch and bound solution

NP-hard and NP-complete problems: Basic concepts, non-deterministic algorithms, deterministic algorithms, Introduction to P class problems, NP class problems.

TEXT BOOKS

1. Ellis Horowitz, SatrajSahni and S Rajasekharam, Fundamentals of Computer Algorithms, Galgotia publishers

2. T H Cormen, C E Leiserson, and R L Rivest, Introduction to Algorithms, 3^{rd}Edn, Pearson Education

REFERENCES

1. R C T Lee, Hang and TT Sai, Introduction to Design and Analysis of Algorithms, A strategic approach, TMH

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

SOFTWARE ENGINEERING

Course Code: GR17A3057   **L   TPC**

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.

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.

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.

UNITV

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.

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- Sommerville, 7th edition, Pearson education.

REFERENCES
1. Software Engineering- K.K. Agarwal & Yogesh Singh, New Age International Publishers
2. Software Engineering, an Engineering approach- James F. Peters, Witold Pedrycz, John
Wiely.
3. Systems Analysis and Design- Shely Cashman Rosenblatt,Thomson Publications.
4. Software Engineering principles and practice- Waman S Jawadekar, The McGraw-
Hill Companies.

WEB TECHNOLOGIES

Course Code:GR17A3059   **L TPC**

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

UNIT I

HTML Common tags- List, Tables, images, forms, Frames, Cascading Style sheets, Introduction to Java Scripts, Objects in Java Script, Dynamic HTML with Java Script

UNIT II

XML: Document type definition, XML Schemas, Document Object model, Presenting XML, Using XML Processors (DOM and SAX)

Java Beans: Introduction to Java Beans, Advantages of Java Beans, BDK Introspection, Using Bound properties, Bean Info Interface, Constrained properties Persistence, Customizes, Java Beans API

UNIT III

Web Servers and Servlets: Tomcat web server, Introduction to Servlets: Lifecycle of a Servlet, The Servlet API, The javax.servlet Package, Reading Servlet parameters, Reading Initialization parameters. The javax.servlet HTTP package, Handling Http Request & Responses, Using Cookies-Session Tracking.

UNIT IV

JSP Application Development: The problem with servlet, The anatomy of JSP page, JSP Processing, Generating Dynamic Content, Using Scripting Elements Implicit JSP Objects, Conditional Processing – Displaying Values Using an Expression to set an Attribute, Declaring Variables and Methods, Error Handling and Debugging Sharing Data Between JSP pages, Requests, and Users Passing Control and Date between Pages, Sharing Session and Application Data, Memory Usage Considerations.

UNIT V

Database Access: Database Programming using JDBC, Studying javax.sql.* package, accessing a database from a JSP page, Application-specific database actions, Deploying java beans in a JSP page.

Model/View/Controller Architecture, JSP Application design with MVC Setting up, Introduction

to struts framework.

TEXT BOOKS:

1. Web Programming, building internet applications, Chris Bates 2nd edition,
   WILEY Dreamtech

2. The complete Reference Java2 Fifth Edition by Patrick Naughton and Herbert Schildt. TMH.

3. Java Server Pages –Hans Bergsten, SPD O'Reilly

REFERENCE BOOKS:

1. Programming world wide web-Sebesta,Pearson

2. Core SERVLETS ANDJAVASERVER PAGES VOLUME 1: CORE TECHNOLOGIES
   By Marty Hall and Larry Brown Pearson

3. Internet and World Wide Web – How to program by Dietel and Nieto PHI/Pearson Education
   Asia.

4. Jakarta Struts Cookbook, Bill Siggelkow, SPDO'Reilly for chap8.

5. Murach's Beginning JAVA JDK5, Murach, SPD

6. An Introduction to web Design and Programming –Wang-Thomson

7. Web Applications Technologies Concepts-Knuckles,John Wiley

8. Programming world wide web-Sebesta, Pearson

9. Web Warrior Guide to Web Programmming-Bai/Ekedaw-Thomas

10. Beginning Web Programming-Jon Duckett, WROX.

11. Java Server Pages, Pekowsky, Pearson.

MULTICORE COMPUTING AND ARCHITECTURE
(PROFESSIONAL ELECTIVE – II)

Course Code:GR17A3062   **L T PC**

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

UNIT I
Introduction to Multi-core Architecture: Motivation, Parallel Computing Platforms, Differentiation between Hyper Threading and Multi-Core architectures, Multi-Threading on Single-Core and Multi-Core Platforms, Understanding the Performance.
System Overview on Threading: Definition, Application Programming Models and Threading, Virtual Environment.

UNIT II
Programming Paradigms: Fundamental Concepts of Programming: Task Decomposition, Data Decomposition and Data Flow decomposition, Parallel Programming Patterns.
Threading and Parallel Programming Constructs: Synchronization, Critical sections, Deadlock, Synchronization Primitives, Flow-Control based Concepts

UNIT III
Models: Threading APIs for Microsoft Windows, Microsoft .Net Framework, POSIX threads.
Open MP: Challenges in Threading a Loop, Data- race conditions, Performance Oriented Programming, Open MP Environment Variables, Compiling, Debugging.

UNIT IV
Algorithm Structure Design Space: Introduction, Choosing an Algorithm Structure Pattern, Task Parallelism Pattern, Divide and Conquer Pattern, Recursive Data Pattern, Pipeline Pattern and Event –Based Coordination Pattern.
Basics of MPI: Getting Started, Basic Point-to-Point Message Passing, Collective Operations and Single –Core Processor Fundamentals.

UNIT V
Optimizations: Enhancing Parallelism, Dependence Analysis, Tiling for Locality and Communication, Aggregation for Communication. Load- Balancing Strategies, Virtualization. Speculative Parallelization, Transactional Memories. Bottlenecks, Small Critical Sections.

TEXT BOOKS

1. Multi-Core Programming-: Increasing Performance through Software , by ShameemAkther and J. Roberts, Intel Press, 2006 Intel Corporation. (Unit I to Unit III)
2. Patterns for Parallel Programming,Timothy G. Mattson, Beverly A. Sanders, Berna L. Massingil, pearson education,2004 (Unit –IV)
3. Parallel Programming: Techniques And Applications Using Networked Workstations And Parallel Computers, 2/E, Pearson Education India, 01-Sep-2006 (Unit V)

REFERENCES

1. Introduction to High Performance Computing for Scientists and Engineers ,Chapman & Hall/CRC Computational Science ,July 02, 2010 by CRC Press.

2. Computer Organization and Design, David A. Patterson, John L. Hennessy, Morgan Kaufmann Publishers, 1998.

BIG DATA ANALYTICS

(PROFESSIONAL ELECTIVE – II)

Course Code:GR17A3111   **L T PC**

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

UNIT I : INTRODUCTION TO BIG DATA AND HADOOP
Classification of Digital Data, Introduction to Big Data, Big Data Analytics, History of Hadoop, RDBMS Vs Hadoop, Analysing Data with Unix tools, Analysing Data with Hadoop, Hadoop Streaming, Hadoop Eco Systems, IBM Big Data Strategy, Introduction to Infosphere BigInsights.

UNIT II : HDFS(Hadoop Distributed File System)
The Design of HDFS, HDFS Concepts, Command Line Interface, Hadoop file system and interfaces, Data flow, Hadoop I/O-Data Integrity, Compression, Serialization, File-Based Data structures.

UNIT III : Map Reduce
Map Reduce programming Model, Anatomy of a Map Reduce Job Run, Failures, Job Scheduling, Shuffle and Sort, Task Execution, Map Reduce Types and Formats-Map Reduce Types, Input Formats, Output Formats, Map Reduce Features.

UNIT IV : PIG
Pig : Introduction to PIG, Execution Modes of Pig, Grunt, Pig Latin Editors, Comparison of Pig with Databases, Pig Latin, Pig on Hadoop, User Defined Functions, Data Processing operators.

UNIT V : Data Stores on Hadoop
Hive : Hive Shell, Hive Services, Hive Metastore, Comparison with Traditional Databases, HiveQL, Tables, Querying Data and User Defined Functions
Hbase : HBasics, Concepts, Schema Design, Loading Data, Online queries, Hbase Versus RDBMS, Introduction to Zookeeper

Text Books:
1. Tom White " Hadoop: The Definitive Guide" 4th edition, O'reily Media, 2012.
2. Seema Acharya, Subhasini Chellappan, "Big Data Analytics" Wiley 2015

Reference Books:
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. Anand Rajaraman and Jef rey 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, Ambiga Dhiraj, "Big Data, Big Analytics: Emerging Business Intelligence and Analytic Trends for Today's Businesses", Wiley Publications, 2013.
9. ArvindSathi, "BigDataAnalytics: Disruptive Technologies for Changing the Game", MC Press, 2012
10. Paul Zikopoulos ,Dirk DeRoos , 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

INFORMATION SECURITY

(PROFESSIONAL ELECTIVE – II)

Course Code:GR17A3058　　　　　　　　　　　　　　　**L　T　PC**

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

UNIT I
Security Attacks(Interruption, Interception, Modification and Fabrication), Security Services (Confidentiality, Authentication, Integrity, Non-repudiation, access Control and Availability) and Mechanisms, A model for Internetwork security.

Conventional Encryption Principles, Conventional encryption algorithms(DES,Blowfish,Idea), cipher block modes of operation, location of encryption devices, key distribution, Approaches of Message Authentication, Secure Hash Functions(MD-5,SHA-1) and HMAC.

UNIT II
Public key cryptography principles, public key cryptography algorithms (RSA, Deffie-Hellman), digital signatures, digital Certificates, Certificate Authority and key management, Kerberos, X.509 Directory Authentication Service.

UNIT III
Email privacy: Pretty Good Privacy (PGP) and S/MIME.

UNIT IV
IP Security Overview, IP Security Architecture, Authentication Header, Encapsulating Security Payload, Combining Security Associations and Key Management, Web Security Requirements, Secure Socket Layer (SSL) and Transport Layer Security (TLS), Secure Electronic Transaction (SET).

UNIT V
Basic concepts of SNMP, SNMPv1 Community facility and SNMPv3.
Intruders, Viruses and related threats ,Firewall Design principles, Trusted System, Intrusion Detection Systems.

TEXT BOOKS
1. Network Security Essentials (Applications and Standards) by William Stallings Pearson Education.
2. Hack Proofing your network by Ryan Russell, Dan Kaminsky, Rain ForestPuppy, Joe Grand, David Ahmad, Hal Flynn IdoDubrawsky, Steve W.Manzuik and Ryan Permeh, wileyDreamtech

REFERENCES
1. Fundamentals of Network Security by Eric Maiwald (Dreamtech press)

2. Network Security - Private Communication in a Public World by CharlieKaufman, Radia Perlman and Mike Speciner, Pearson/PHI.
3. Cryptography and network Security, Third edition, Stallings, PHI/Pearson
4. Principles of Information Security, Whitman, Thomson.
5. Network Security: The complete reference, Robert Bragg, Mark Rhodes, TMH
6. Introduction to Cryptography, Buchmann, Springer.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

WEB TECHNOLOGIES LAB

Course Code:GR17A3063   **L T PC**

III Year II Semester   **0 0 2 2**

XML editor like Altova Xml-spy [www.Altova.com/**XML**Spy – free] , Stylusstudio , etc.,
1. A database either Mysql or Oracle
2. JVM(Java virtual machine) must be installed on your system
3. BDK(Bean development kit) must be also be installed

Task -1:

Design the following static web pages required for an online book store web site.

1) **HOME PAGE:**

The static home page must contain three **frames**.

Top frame : Logo and the college name and links to Home page, Login page, Registration page, Catalogue page and Cart page (the description of these pages will be given below).
Left frame : At least four links for navigation, which will display the catalogue of respective links. For e.g.: When you click the link **"CSE"** the catalogue for **CSE** Books should be displayed in the Right frame.
Right frame: The *pages to the links in the left frame must be loaded here*. Initially this page contains description of the web site.

Logo	Web Site Name			
Home	Login	Registration	Catalogue	Cart
CSE ECE EEE CIVIL	Login: Password:			

2) **LOGIN PAGE:**

This page looks like below:

Logo	Web Site Name			
Home	<mark>Login</mark>	Registration	Catalogue	Cart
CSE ECE EEE CIVIL	Login : [_____] Password: [_____] [Submit] [Reset]			
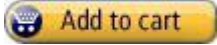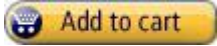
3) CATOLOGUE PAGE:

The catalogue page should contain the details of all the books available in the web site in a table.

The details should contain the following:

1. Snap shot of Cover Page.
2. Author Name.
3. Publisher.
4. Price.
5. Add to cart button.

Logo	Web Site Name			
Home	Login	Registration	<mark>Catalogue</mark>	Cart
CSE CEE EEC		Book : XML Bible Author : Winston Publication : Wiely	$ 40.5	

CIVIL		Book : AI Author : S.Russel Publication : Princeton hall	$ 63	Add to cart
		Book : Java 2 Author : Watson Publication : BPB publications	$ 35.5	Add to cart
		Book : HTML in 24 hours Author : Sam Peter Publication : Sam publication	$ 50	Add to cart

Note: Week 2 contains the remaining pages and their description.

Task -2:

4) CART PAGE:

The cart page contains the details about the books which are added to the cart.

The cart page should look like this:

Logo	Web Site Name			
Home	Login	Registration	Catalogue	<mark>Cart</mark>

	Book name	**Price**	**Quantity**	**Amount**
CSE				
ECE				
EEE	Java 2	$35.5	2	$70
CIVIL	XML bible	$40.5	1	$40.5
	Total amount -			$130.5

5) REGISTRATION PAGE:

Create a "*registration form* "with the following fields

> 1) Name (Text field)
> 2) Password (password field)
>
> 3) E-mail id (text field)
>
> 4) Phone number (text field)
>
> 5) Sex (radio button)
>
> 6) Date of birth (3 select boxes)
>
> 7) Languages known (check boxes – English, Telugu, Hindi, Tamil)
>
> 8) Address (text area)

Task 3:

VALIDATION:

Write *JavaScript* to validate the following fields of the above registration page.

1. Name (Name should contains alphabets and the length should not be less than 6 characters).
2. Password (Password should not be less than 6 characters length).
3. E-mail id (should not contain any invalid and must follow the standard pattern name@domain.com)

4. Phone number (Phone number should contain 10 digits only).

Note : You can also validate the login page with these parameters.

Task 4:

Design a web page using **CSS (C**ascading **S**tyle **S**heets**)** which includes the following:

1) Use different font, styles:

In the style definition you define how each selector should work (font, color etc.). Then, in the body of your pages, you refer to these selectors to activate the styles.

For example:

```
<HTML>
<HEAD>
<style type="text/css">
B.headline {color:red; font-size:22px; font-family:arial; text-
decoration:underline}
</style>

</HEAD>

<BODY>
<b>This is normal bold</b><br>
Selector {cursor:value}

For example:

<html>
<head>
<style type="text/css">
.xlink {cursor:crosshair}
.hlink{cursor:help}
</style>
</head>

<body>
<b>
<a href="mypage.htm" class="xlink">CROSS LINK</a>
<br>
<a href="mypage.htm" class="hlink">HELP LINK</a>
</b>
</body>
</html>

<b class="headline">This is headline style bold</b>
```

```
</BODY>

</HTML>
```

2) Set a background image for both the page and single elements on the
 page. You can define the background image for the page like this:

```
BODY {background-image:url(myimage.gif);}
```

3) Control the repetition of the image with the background-repeat property.

As background-repeat: Tiles the image until the entire page is filled, just like an
repeat background image in   ordinary plain HTML.

4) Define styles for links as

> A:link
> A:visited
> A:active
> A:hover

Example:

```
<style type="text/css">
A:link {text-decoration: none}
A:visited {text-decoration: none}
A:active {text-decoration: none}
A:hover {text-decoration: underline; color: red;}
</style>
```

5) Work with layers:

For example:

```
LAYER 1 ON TOP:
<div style="position:relative; font-size:50px; z-index:2;">LAYER 1</div>
<div style="position:relative; top:-50; left:5; color:red; font-size:80px; z-index:1">LAYER 2</div>
LAYER 2 ON TOP:
<div style="position:relative; font-size:50px; z-index:3;">LAYER 1</div>
```

```
<div style="position:relative; top:-50; left:5; color:red; font-size:80px; z-
index:4">LAYER 2</div>
```

6) Add a customized cursor:

Selector {cursor:value}
For example:

```
<html>
<head>
<style type="text/css">
.xlink {cursor:crosshair}
.hlink{cursor:help}
</style>
</head>

<body>
<b>
<a href="mypage.htm" class="xlink">CROSS LINK</a>
<br>
<a href="mypage.htm" class="hlink">HELP LINK</a>
</b>
</body>
</html>
```

Task 5:

Write an XML file which will display the Book information which includes the following:

1) Title of the book

2) Author Name

3) ISBN number

4) Publisher name

5) Edition

6) Price

Write a Document Type Definition (DTD) to validate the above XML file.

Display the XML file as follows.

The contents should be displayed in a table. The header of the table should be in color GREY. And the Author names column should be displayed in one color and should be capitalized and in bold. Use your own colors for remaining columns.

Use XML schemas XSL and CSS for the above purpose.

Note: Give at least for 4 books. It should be valid syntactically.

Hint: You can use some xml editors like XML-spy

Task 6:

VISUAL BEANS:

Create a simple visual bean with a area filled with a color.

The shape of the area depends on the property shape. If it is set to true then the shape of the area is Square and it is Circle, if it is false.

The color of the area should be changed dynamically for every mouse click. The color should also be changed if we change the color in the "property window ".

Task 7:

1) Install TOMCAT web server and APACHE.
   While installation assign port number 4040 to TOMCAT and 8080 to APACHE. Make sure that these ports are available i.e., no other process is using this port.

2) Access the above developed static web pages for books web site, using these servers by putting the web pages developed in week-1 and week-2 in the document root.
   Access the pages by using the urls : http://localhost:4040/rama/books.html (for tomcat)

   http://localhost:8080/books.html (for Apache)

Task 8:

   User Authentication :

   Assume four users user1,user2,user3 and user4 having the passwords pwd1,pwd2,pwd3 and pwd4 respectively. Write a servelet for doing the following.

   1. Create a Cookie and add these four user id's and passwords to this Cookie.

   2. Read the user id and passwords entered in the Login form (week1) and authenticate with the values (user id and passwords) available in the cookies.

   If he is a valid user(i.e., user-name and password match) you should welcome him by name(user-name) else you should display " You are not an authenticated user ".

   Use init-parameters to do this. Store the user-names and passwords in the webinf.xml and access them in the servlet by using the getInitParameters() method.

Task 9:

   Install a database(Mysql or Oracle).

   Create a table which should contain at least the following fields: name, password, email-id, phone number(these should hold the data from the registration form).

Practice 'JDBC' connectivity.

Write a java program/servlet/JSP to connect to that database and extract data from the tables and display them. Experiment with various SQL queries.

Insert the details of the users who register with the web site, whenever a new user clicks the submit button in the registration page (week2).

Task 10:

Write a JSP which does the following job:

Insert the details of the 3 or 4 users who register with the web site (week9) by using

registration form. Authenticate the user when he submits the login form using the user name

and password from the database (similar to week8 instead of cookies).

Task 11:

Create tables in the database which contain the details of items (books in our case like Book name , Price, Quantity, Amount)) of each category. Modify your catalogue page (week 2)in such a way that you should connect to the database and extract data from the tables and display them in the catalogue page using JDBC.

Task 12:

HTTP is a stateless protocol. Session is required to maintain the state.

The user may add some items to cart from the catalog page. He can check the cart page for the selected items. He may visit the catalogue again and select some more items. Here our interest is the selected items should be added to the old cart rather than a new cart. Multiple users can do the same thing at a time(i.e., from different systems in the LAN using the ip-address instead of localhost). This can be achieved through the use of sessions. Every user will have his own session which will be created after his successful login to the website. When the user logs out his session should get invalidated (by using the method session.invalidate()).

Modify your catalogue and cart JSP pages to achieve the above mentioned functionality using sessions.

ADVANCED ENGLISH COMMUNICATION SKILLS LAB

Course Code:GR17A3100   **L   T   PC**

III Year II Semester   **0   0   2   2**

Unit-I

Functional English

Introduction to public speaking, analyzing and assimilating ideasrole play, formal and informal expressions and conversations

Unit-II

Vocabulary

Synonyms and Antonyms**,** Word Roots**,** One word substitutes**,** Prefixes and Suffixes**,** Idiomatic expressions and Phrasal verbs**,** Analogy.

Unit- III

Group Discussion

Assimilation of ideas, analysis, sharing of ideas, initiation, leadership skill, team spirit and conclusion.

Unit-IV

Presentation Skills

Scope, features, sources to be explored, role of non-verbal communication, audience perspective, feedback .

Unit-V

Résumé Writing and Letter Writing

Types and formats, tips to draft resume manual and emailing, types and formats for letter writing, content and body of the letter, email etiquette.

Unit-VI

Interview Skills

Introduction, types of interviews, model questions and answering strategies, mock-interviews, check list for preparing for an interview.

Unit-VII

Reading comprehension

Types of reading, techniquesqualities of a good reader.

Unit-VIII

Report Writing

Introduction, importance, structure, formats and types of reports.

Reference Books:

1. Effective Technical Communication, M. Ashraf Rizvi, Tata McGraw Hill.
2. Business Communication; HorySankarMukerjee;OUP.
3. Business Communication; Meenakshi Raman, Praksh Sing; Oxfor University Press.
4. English and Soft Skills; SP Dhanavel; Orient Black Swan.
5. Soft Skills for everyone; Jeff Butterfield; Cengage Learning.
6. Communication Skills;Viva Careers Skills Library.
7. Personality Development and Soft Skills; Barun K Mitra; Oxford University Press.
8. English for Engineers Made Easy, AedaAbidi, Ritu Chaudhry, Cengage Learning.
9. Communication Skills, Sanjay Kumar, PushpLatha, Oxford Higher Education.
10. Professional Presentations; Malcom Goodale; Cambridge University Press.

TRANSPORTATION ENGINEERING
(Open Elective – II)

Course Code: GR17A3161   **LTPC**
III Year II Semester   **2 1 03**

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.
5. Railway Engineering-A Textbook of railway engineering-Subhash C.Saxena, Satyapal Arora-Dhanpatrai S Sons-(2012)

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 – Prabha & Co., 15th edition-August 1994
4. Air Transportation Planning & design – Virendhra Kumar and Satish Chandhra-Gal Gotia Publishers (1999)

SENSORS AND TRANSDUCERS
(Open Elective – II)

Course Code: GR17A3162   **LTPC**
III Year II Semester   **2**103

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

TEXT BOOK:
1.Sensors& Transducers By D. Patranabis , PHI Publications

AUTOMOBILE ENGINEERING
(Open Elective-II)

Course code:GR17A3163　　　　　　　　　　　　　　**LTPC**
III B. Tech II Semester　　　　　　　　　　　　　　　**2　1　03**

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.
.
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:
1. Automobile Engineering -R B Gupta
2. Automotive Mechanics – William Crouse
3. 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.

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

ESSENTIALS OF BIG DATA ANALYTICS
(Open Elective – II)

Course Code: GR17A3165   **L T PC**
III Year II Semester   **2 1 0 3**

UNIT I :INTRODUCTION TO BIG DATA AND HADOOP

Types of Digital Data, Introduction to Big Data, Big Data Analytics, History of Hadoop, Apache Hadoop, Analysing Data with Unix tools, Analysing Data with Hadoop, Hadoop Streaming, Hadoop Echo System, IBM Big Data Strategy, Introduction to InfosphereBigInsights.

UNIT II :HDFS(Hadoop Distributed File System)

The Design of HDFS, HDFS Concepts, Command Line Interface, Hadoop file system interfaces, Data flow, Data Ingest with Flume and Sqoop and Hadoop archives, Hadoop I/O, Compression, Serialization, Avro and File-Based Data structures.

UNIT III :Map Reduce

Map Reduce programming Model, Anatomy of a Map Reduce Job Run, Failures, Job Scheduling, Shuffle and Sort, Task Execution, Map Reduce Types and Formats, Map Reduce Features.
Introduction to Oozie.Overview of Managing job Execution
Pig : Introduction to PIG, Execution Modes of Pig, Comparison of Pig with Databases, Pig Latin : Structure, statements, Expressions, Types, Schemas, Functions and Macros. Pig User Defined Functions, Data Processing operators.

UNIT IV :Data Stores on Hadoop

Hive : Hive Shell, Hive Services, Hive Metastore, Comparison with Traditional Databases, HiveQL, Tables, Querying Data and User Defined Functions
Hbase :HBasics, Concepts, Schemas, Loading Data, Web queries, Hbase Versus RDBMS.
Introduction to Zookeeper

UNIT V: IBM 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.
2. Seema Acharya, SubhasiniChellappan, "Big Data Analytics" Wiley 2015

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, "BigDataAnalytics: Disruptive Technologies for Changing the Game",MC Press, 2012
10. Paul Zikopoulos ,Dirk DeRoos , 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   **2   1 0   3**

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, McGraw Hill.
8. Operating Systems in depth, T. W. Doeppner, Wiley.

HUMAN COMPUTER INTERACTION
(Open Elective-II)

Course Code: GR17A3164   **LTPC**
III Year II Semester   **2 1 03**

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 –Visually pleasing composition –amount of information –focus and emphasis –presentation information simply and meaningfully –information retrieval on web –statistical graphics –Technological consideration in interface design.

UNIT IV

Develop System Menus and Navigation Schemes, -Select the proper kinds of Windows, -Select the proper Device based Controls, Choose the proper screen based controls.

UNIT V

Mobile Ecosystem: Platforms, Application frameworks- Types of Mobile Applications: Widgets, Applications, Games- Mobile Information Architecture, Mobile 2.0, Mobile Design: Elements of Mobile Design, Tools.

Interaction Devices – Keyboard and Function Keys – Pointing Devices – Speech Recognition Digitization and Generation – Image and Video Display – Drivers.

TEXT BOOKS

1. The essential guide to user interface design, Wilbert O Galitz, Wiley Dreamtech.

2. Designing the user interface. 3rd Edition Ben Shneidermann, Pearson Education Asia

3. Brian Fling, "Mobile Design and Development", First Edition, O"Reilly Media Inc., 2009

REFERENCES

1. Human – Computer Interaction. Alan Dix, Janet Fincay, GreGoryd, Abowd, Russell Bealg, Pearson Education

2. Interaction Design Prece, Rogers, Sharps. Wiley Dreamtech.

3. User Interface Design, Soren Lauesen, Pearson Education.

COMPUTER NETWORKS

Course Code: GR17A2077

IV Year I Semester

L T PC

3 1 0 4

Unit I

Introduction: Uses of Computer Networks, Network Hardware, Network Software, ReferenceModels: OSI, TCP/IP, Examples Networks: Arpanet, Internet, ATM.

Physical Layer: Guided Transmission media, Wireless Transmission Media, CommunicationSatellites. The public Switched Telephone Network: Switching and multiplexing, the Mobile Telephone Network.

Unit II

Data link layer: Design issues, framing, error detection and correction, Elementary Data LinkProtocol, Sliding Window Protocols. Medium Access sub layer: The Channel Allocation Problem, Multiple Access Protocols, Ethernet, wireless LANS, Bluetooth, Data Link Layer Switching.

Unit III

Network Layer: Network Layer Design Issues, Routing Algorithms, Congestion ControlAlgorithms, QoS, & the Network Layer in the Internet.

Unit IV

Transport Layer: Transport Services, Elements of Transport Protocols. The Internet TransportProtocols: UDP & TCP.

Unit V

Application Layer: DNS, Electronic Mail, the World Wide Web, Multi Media, Cryptography.

Teaching methodologies

- White board
- Power Point presentations
- Tutorials
- Assignments

TEXT BOOKS

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

REFERENCES

1. An Engineering Approach to Computer Networks-S.Keshav, 2nd Edition, Pearson Education

2. Understanding communications and Networks- 3rd Edition, W.A. Shay, Thomson A

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

DATAWAREHOUSING AND DATA MINING

Course Code: GR17A3067   L   T   P   C

IV Year I Semester   2   1   0   3

UNITI

Introduction: Fundamentals of data mining, Data Mining Functionalities, Classification of Data Mining systems, Data Mining Task Primitives, Integration of a Data Mining System with a Database or a Data Warehouse System, Major issues in Data Mining. **Data Preprocessing**: Need for Preprocessing the Data, Data Cleaning, Data Integration and Transformation, Data Reduction.

UNITII

Data Warehouse and OLAP Technology for Data Mining: Data Warehouse, Multidimensional Data Model, Data Warehouse Architecture, Data Warehouse Implementation, Further Development of Data Cube Technology, From Data Warehousing to Data Mining Data Cube Computation and Data Generalization, Attribute-Oriented Induction.

UNITIII

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

UNITIV

Classification and Prediction: Issues Regarding Classification and Prediction, Classification by Decision Tree Induction, Bayesian Classification, Rule-Based Classification, Classification by Back propagation, 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.

UNITV

Mining Streams, Time Series and Sequence Data: Mining Data Streams, Mining Time Series Data, Mining Sequence Patterns in Transactional Databases Mining Object, Spatial, Multimedia, Text and Web Data: Multidimensional Analysis and Descriptive Mining of Complex Data Objects, Spatial Data Mining, Multimedia Data Mining, Text Mining, Mining the World Wide Web.

TEXTBOOKS

1. Data Mining– Concepts and Techniques –Jiawei Han and Micheline Kamber, Morgan Kaufmann Publishers, Elsevier, Second Edition, 2006.
2. Introduction to Data Mining–Pang-NingTan, Michael Steinbach and Vipin Kumar,Pearson education.

REFERENCES

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

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

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

Unit II

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

Unit III

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

Unit IV

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

Unit V

Strategic Management and Contemporary Strategic Issues: Mission, Goals, Objectives, Policy, Strategy, Programmes, Elements of Corporate Planning Process, Environmental Scanning, Value Chain Analysis, SWOT Analysis, Steps in Strategy Formulation and Implementation, Generic Strategy alternatives. Contemporary Management Practices: Basic concepts of MIS, End User Computing, Materials Requirement Planning (MRP), Just-In-Time (JIT) System, Total

Quality Management (TQM), Six Sigma and Capability Maturity Model (CMM) Levels, Supply Chain Management, Enterprise Resource Planning (ERP), Performance Management, Business Process Outsourcing (BPO), Business Process Re-engineering and Bench Marking, Balanced Score Card.

Teaching Methodologies:

a) Lecture Method
b) Use of OHP
c) Power Point Presentation
d) Tutorials and Assignments

TEXT BOOK

1. Aryasri: *Management Science*, TMH, 2009.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

CLOUD COMPUTING

(Professional Elective III)

Course Code: GR17A4079   **L   T   P   C**

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

UNIT I

Cloud Architecture and Models: Technologies for Network-Based System – System Models for Distributed and Cloud Computing – NIST Cloud Computing Reference Architecture. Cloud Models:- Characteristics – Cloud Services – Cloud models (IaaS, PaaS, SaaS) – Public vs Private Cloud –Cloud Solutions - Cloud ecosystem – Service management – Computing on demand.

UNIT II

Virtualization: Basics of Virtualization - Types of Virtualization - Implementation Levels of Virtualization - Virtualization Structures - Tools and Mechanisms - Virtualization of CPU, Memory, I/O Devices - Virtual Clusters and Resource management – Virtualization for Data-center Automation.

UNIT III

Cloud Infrastructure: Architectural Design of Compute and Storage Clouds – Layered Cloud Architecture Development – Design Challenges - Inter Cloud Resource Management – Resource Provisioning and Platform Deployment – Global Exchange of Cloud Resources.

UNIT IV

Programming Model: Parallel and Distributed Programming Paradigms – Map Reduce, Twister and Iterative Map Reduce – Hadoop Library from Apache – Mapping Applications - Programming Support - Google App Engine,
Amazon AWS - Cloud Software Environments -Eucalyptus, Open Nebula, OpenStack, Aneka, CloudSim

UNIT V

Security in the Cloud: Security Overview – Cloud Security Challenges and Risks – Software-as-a-Service Security – Security Governance – Risk Management – Security Monitoring – Security

Architecture Design – Data Security – Application Security – Virtual Machine Security - Identity Management and Access Control – Autonomic Security.

TEXT BOOKS

1. George Reese, "Cloud Application Architectures: Building Applications and Infrastructure in the Cloud" O'Reilly
2. Kumar Saurabh, " Cloud Computing – insights into New-Era Infrastructure", Wiley India,2011
3. RajkumarBuyya, Christian Vecchiola, S.TamaraiSelvi, 'Mastering Cloud Computing", TMGH,2013.

REFERENCES

1. Kai Hwang, Geoffrey C Fox, Jack G Dongarra, "Distributed and Cloud Computing, From Parallel Processing to the Internet of Things", Morgan Kaufmann Publishers, 2012.
2. John W.Rittinghouse and James F.Ransome, "Cloud Computing: Implementation, Management, and Security", CRC Press, 2010.
3. Toby Velte, Anthony Velte, Robert Elsenpeter, "Cloud Computing, A Practical Approach", TMH, 2009.
4. Ronald L. Krutz, Russell Dean Vines, "Cloud Security – A comprehensive Guide to Secure Cloud Computing", Wiley – India, 2010.
5. Nick Antonopoulos, Cloud computing, Springer Publications, 2010

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

COMPUTER GRAPHICS

(Professional Elective III)

Course Code: GR17A3069	**L**	**T**	**P**	**C**
IV Year I Semester	**3**	**1**	**0**	**4**

UNIT I

Introduction: Application areas of Computer Graphics, overview of graphics systems, Graphics software and standards, video-display devices, raster-scan systems, random scan systems, graphics monitors and workstations and input devices.

Output Primitives: Points and lines, line drawing algorithms ,mid-point circle and ellipse algorithms. Pixel addressing and object geometry, Filled area primitives: Scan line polygon fill algorithm, boundary-fill and flood-fill algorithms

UNITII

2-D Geometrical Transforms: Translation, scaling, rotation, reflection and shear transformations, matrix representations and homogeneous coordinates, composite transforms, transformations between coordinate systems.

2-D Viewing: The viewing pipeline, viewing coordinate reference frame, window to view-port coordinate transformation, viewing functions, Cohen-Sutherland and Cyrus-beck line clipping algorithms, Sutherland –Hodgeman polygon clipping algorithm

UNITIII

3-D Geometric Transformations: Translation, rotation, scaling, reflection and shear transformations, composite transformations.

3-D Viewing: Viewing pipeline, viewing coordinates, view volume and general projection transforms and clipping.

3-D Object Representation: Polygon surfaces, quadric surfaces, spline representation, Hermite curve, Bezier curve and B-Spline curves, Bezier and B-Spline surfaces. Basic illumination

models, polygon rendering methods.

UNIT IV

Visible surface detection methods: Classification, back-face detection, depth- buffer, scan-line, depth sorting, BSP-tree methods, area sub-division and octree methods. Illumination, light sources, illumination methods (ambient, diffuse reflection, specular reflection),

UNIT V

Computer Animation: Animation principles and History, Design of animation sequence, general computer animation functions, raster animation, computer animation languages, key frame systems, motion specifications.

CASE STUDY of advanced open source software: BLENDER software features and basics overview.

TEXT BOOKS

1. "Computer Graphics C version", Donald Hearn and M.Pauline Baker, Pearson Education.

2. "Computer Graphics Principles & practice", second edition in C, Foley, Van Dam, Feiner and Hughes, Pearson Education.

REFERENCES

1. "Computer Graphics", second Edition, Donald Hearn and M.Pauline Baker, PHI/Pearson Education.

2. "Computer Graphics Second edition",Zhig and xiang, Roy Plastock, Schaum's outlines, Tata Mc-Grawhill edition.

3. Procedural elements for Computer Graphics, David FRogers, Tata McGraw hill, 2nd edition.

4. "Principles of Interactive Computer Graphics", Neuman and Sproul, TMH.
5. Principles of Computer Graphics, Shalini Govil, Pai, 2005, Springer.
6. Computer Graphics, Steven Harrington, TMH.

7. www.spokentutorials.org/ for BLENDER course.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

SOFTWARE TESTING METHODOLOGIES

(Professional Elective III)

Course Code: GR17A4077   **L   T   PC**

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

UNIT I

Introduction: Purpose of testing, Dichotomies, Model for testing, Consequences of bugs, Taxonomy of Bugs

UNIT II

Flow Graphs and Path Testing: Basics concepts of Path Testing, Predicates, Path Predicates and Achievable Paths, Path Sensitizing, Path Instrumentation, Application of Path Testing.

Transaction Flow Testing: Transaction flows, transaction flow testing techniques.

UNIT III

Dataflow Testing: Basics of dataflow testing, strategies in dataflow testing, application of dataflow testing.

Domain Testing: Domains and paths, Nice & ugly domains, Domain Testing, domains and interfaces testing, Distribution, domains and testability tips.

UNIT IV

Paths, Path products and Regular expressions: Path products & path expression, reduction procedure, applications, regular expressions & flow anomaly detection.

Logic Based Testing: Overview, decision tables, path expressions, KV charts, specifications.

UNIT V

State, State Graphs and Transition testing: State graphs, good & bad state graphs, state testing, Testability tips.

Graph Matrices and Application: Motivational overview, matrix of graph, relations, power of a matrix, Node Reduction algorithm.

TEXT BOOKS

1. Software Testing techniques – Baris Beizer, Dreamtech, second edition.

2. Software Testing Tools – Dr K.V.K.K.Prasad, Dreamtech.

REFERENCES

1. The craft of software testing - Brian Marick, Pearson Education.

2. Software Testing Techniques – SPD (Oreille)

3. Software Testing in the Real World – Edward Kit, Pearson.

4. Effective methods of Software Testing, Perry, John Wiley.

5. Art of Software Testing – Meyers, John Wiley.

Course Code: GR17A4084   **L T   P C**
IV Year I Semester   **0 0 2 2**

PHP

Task 1

Write a PHP script for the following.
a. Find the biggest of 3 numbers.
b. Find the factorial of a number (while loop)
c. To reverse the digit (Use do while)
d. Find the sum of the digits (Use for loop)
e. Write a PHP script for the following: Design a form to accept the details of 5 different items, such as item code, item name, units sold, rate. Display the bill in the tabular format. Use only 4 text boxes. (Hint: Use of explode function.)
f. Create a form to accept customer information (name, address, ph-no).Once the customer information is accepted, accept product information in the next form(Product name, qty, rate). Display the bill for the customer in the next form. Bill should contain the customer information and the information of the products entered.

Task 2

a. Write a PHP script for the following: Design a form to accept two strings from the user. Find the first occurrence and the last occurrence of the small string in the large string. Also count the total number of occurrences of small string in the large string. Provide a text box to accept a string, which will replace the small string in the large string. (Use built-in functions)
b. Write a menu driven program to perform the following operations on an associative array:

i.   Display the elements of an array along with the keys.
ii.   Display the size of an array
iii. Delete an element from an array from the given index
iv.   Reverse the order of each element's key-value pair [Hint: use array_flip()]
v.   Traverse the elements in an array in random order [[Hint: use shuffle()].

Task 3

a. Create a login form with a username and password. Once the user logs in,
the second form should be displayed to accept user details (name, city, phoneno). If the user doesn't enter information within a specified time limit, expire his session and give a warning.

b. Write a PHP script to store, retrieve and delete data using session variables.

c. Write a PHP script to accept user name and password . If in the first three chances, username and password entered is correct, then display second form, otherwise display error message.

Task 4

a. Write a PHP program to display the contents of a file using fgets, fgetc, fread functions.
b. Write a PHP program to upload a file and display the contents in server.

Task 5

Write a PHP script for the following: Design a form to accept a string. Write a function to count the total number of vowels (a,e,i,o,u) from the string. Show the occurrences of each vowel from the string. Check whether the given string is a palindrome or not, without using built-in function.(Use radio buttons and the concept of function. Use 'include' construct.)

Task 6

a. Design a database in MYSQL using PHP. Create table in database. Store, Update, Delete and Retrieve data from the table. Display the data from the table.
b. Design a PHP application that will provide a form containing fields to fill book detail (Book title, Author, Publication, ISBN, Price and category). Display filled details to the user.

Task 7

Write a PHP script that will demonstrate POSIX regular expressions for validating

i)Name ii) Pin Code iii) Date iv)Email-id.

Task 8

Using PHP and MySQL, develop a program to accept book information viz. Accession number, title, authors, edition and publisher from a web page and store the information in a database and to search for a book with the title specified by the user and to display the search results with proper headings.

Task 9

Write a PHP script for the following: Design a form to accept two strings from the user. Find whether the small string appears at the start of the large string. Provide a text box to accept the string that will replace all occurrences of small string present in the large string. Also split the large string into separate words. (Use regular expressions).

PYTHON

Task 10

Write a Python script using basic data types.
a. Find the biggest of 3 numbers.
b. To check whether a number is positive or negative.
c. Find the factorial of a number
d. To reverse the digit
e. Find the sum of the digits
f. Fibonacci series for a particular limit.

Task 11

a. Write a Python script to test built in methods of Strings.
b. Write a Python script to test various functions of List and Tuple.

Task 12

a. Write a Python script to test various functions of Dictionary.
b. Write a Python script to define a function and calling the function by passing arguments.
      (using pass by value & pass by reference).

TEXT BOOKS

1. Beginning.PHP.and.MySQL.3rd.Edition W. Jason Gilmore-Third Edition Apress publications
2. Python-Standard Library by FrederikLuth- O'Relly
3.Practical Programming in Python by Jeffery Elkener

Course Code: GR17A4146   **L   T   PC**

IV Year I Semester   **0   02   2**

Check to see if the data shows a bias against "foreign workers" (attribute 20),or "personal-status" (attribute 9). One way to do this (perhaps rather simple minded) is to remove these attributes from the dataset and see if the decision tree created in those cases is significantly different from the full dataset case which you have already done. To remove an attribute you can use the preprocess tab in Weka's GUI Explorer. Did removing these attributes have any significant effect? Discuss.

The German Credit Data:

Actual historical credit data is not always easy to come by because of confidentiality rules. Here is one such dataset, consisting of 1000 actual cases collected in Germany. Credit dataset (original) Excel Spreadsheet version of the German credit data. (Download from web)

In spite of the fact that the data is German, you should probably make use of it for this assignment. (Unless you really can consult a real loan officer).

A few notes on the German dataset:

- DM stands for Deutsche Mark, the unit of currency, worth about 90 cents Canadian (but looks and acts like a quarter).
- Own_telephone: German phone rates are much higher than in Canada, so fewer people own telephones.
- Foreign_worker: There are millions of these in Germany (many from Turkey). It is very hard to get German citizenship if you were not born of German parents.
- There are 20 attributes in judging a loan applicant. The goal is to classify the applicant into two categories: good or bad.

Task 1: List all the categorical (or nominal) attributes and the real-valued attributes separately. What attributes do you think might be crucial in making the credit assessment? Come up with some simple rules in plain English using your selected attributes.

One type of model that you can create is a Decision Tree - train a Decision Tree using the complete dataset as the training data. Report the model obtained after training.

Task 2: Suppose you use your above model trained on the complete dataset, and classify credit good/bad for each of the examples in the dataset. What % of examples can you classify correctly? (This is also called testing on the training set) Why do you think you cannot get 100 % training accuracy? Why or Why not?

Task 3: One approach for solving the problem encountered in the previous question is using cross-validation? Describe what is cross-validation briefly. Train a Decision Tree again using cross-validation and report your results. Does your accuracy increase/decrease? Why? (10marks)

Task 4: Another question might be, do you really need to input so many attributes to get good results? Maybe only a few would do. For example, you could try just having attributes 2, 3, 5, 7, 10, 17 (and 21, the class attribute (naturally)). Try out some combinations. (You had removed two attributes in problem 7. Remember to reload the arff data file to get all the attributes initially before you start selecting the ones you want.)
Sometimes, the cost of rejecting an applicant who actually has a good credit (case 1) might be higher than accepting an applicant who has bad credit (case 2). Instead of counting the misclassifications equally in both cases, give a higher cost to the first case (say cost 5) and lower cost to the second case. You can do this by using a cost matrix in Weka. Train your Decision Tree again and report the Decision Tree and cross-validation results. Are they significantly different from results obtained in problem 6 (using equal cost)?

Task 5: Do you think it is a good idea to prefer simple decision trees instead of having long complex decision trees? How does the complexity of a Decision Tree relate to the bias of the model?

You can make your Decision Trees simpler by pruning the nodes. One approach is to use Reduced Error Pruning - Explain this idea briefly. Try reduced error pruning for training your Decision Trees using cross-validation (you can do this in Weka) and report the Decision Tree you obtain? Also, report your accuracy using the pruned model. Does your accuracy increase?

Task 6: (Extra Credit): How can you convert a Decision Trees into "if-then-else rules". Make up your own small Decision Tree consisting of 2-3 levels and convert it into a set of rules. There also exist different classifiers that output the model in the form of rules - one such classifier in Weka is rules. PART, train this model and report the set of rules obtained. Sometimes just one attribute can be good enough in making the decision, yes, just one! Can you predict what attribute that might be in this dataset? One R classifier uses a single attribute to make decisions (it chooses the attribute based on minimum error). Report the rule obtained by training a one R classifier. Rank the performance of j48, PART and one R.

BI LAB:

Task 7:
a) Create a workspace in IBM Cognos Insight.
b) Create a report in Cognos Workspace Advanced using a dimensional source.
c) Create a report in Cognos Workspace Advanced using a relational source.

Task 8:
 Create a baseline project

Task 9:
a) Create a simple report using Report Studio.
b) Create a report from a dimensionally modeled relational data source.

Task 10:
a) Create a list report.
b) Apply filters to list report.

Task 11:
a) Create a simple crosstab report.
b) Create a complex crosstab report.

Task 12:
a) Create and format chart reports.
b) Create gauge report and a pie chart report.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

ADVANCED NETWORK PROGRAMMING LAB

Subject Code: GR17A4083   **LTPC**

IV Year I Semester   **0 0 22**

Task 1: Implement the following forms of IPC.

    a)Pipes   b)FIFO

Task 2: Implement file transfer using Message Queue form of IPC.

Task 3: Write a programmed to create an integer variable using shared memory concept and increment the variable simultaneously by two processes. Use semaphores to avoid race conditions.

Task 4: Design a Client and server application to transfer the given input file. (without using transport layer protocols)

Task 5: Design TCP iterative Client and server application to reverse the given input sentence.

Task 6: Design TCP client and server application to transfer file.

Task 7: Design a TCP concurrent server to convert a given text into upper case using multiplexing system call "select".

Task 8: Design a TCP concurrent server to echo given set of sentences using poll functions.

Task 9: Design UDP Client and server application to reverse the given input sentence.

Task 10: Design UDP Client server to transfer a file.

Task 11: Design using poll client server application to multiplex TCP and UDP requests for converting a given text into upper case.

Task 12: Design any one internet application to add and subtract a given pair of integers using TCP, UDP or RPC Methods.

REFERENCES

1.Advance Unix Programming Richard Stevens, Second Edition Pearson Education

2. Advance Unix Programming, N.B. Venkateswarlu, BS Publication.

GREEN BUILDING TECHNOLOGY

(Open Elective-III)

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

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

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, <u>Green Strategies for Building Systems,</u> 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:

SOFT COMPUTING TECHNIQUES

(Open Elective-III)

Course Code: GR17A4162 LTPC

IV Year I Semester 210 3

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, Fuzzy fications & Defuzzi ficataions, 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

OPERATIONS RESEARCH
(Open Elective-III)

Course Code: GR17A4163   **LTPC**

IV B. Tech I Semester   **2 1   0 3**

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

Teaching Methodology:

Power point Presentations, Working models, white board & marker

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

MOBILE COMPUTING AND APPLICATIONS

(Open Elective- III)

Course Code: GR17A4164   **LTPC**

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

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.

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.

BUSINESS INTELLIGENCE

(Open Elective – III)

Course Code: GR17A4165   **LTPC**

IV Year I Semester   **2103**

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: GR17A4166   **L   T   P   C**

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

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.

Course Code: GR17A4155   **L T P C**

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

UNIT - I:

Introduction to UML: History of UML**,** Importance of modeling, Principles of modeling, Building blocks in UML, Extensibility Mechanisms in UML,Rules in UML, Emphasizing Inception,Elaboration,Construction,Transition in Architecture, Software Development Life Cycle.

Basic Structural Modeling: Introduction to Classes, Terms and Concepts, Relationships, Common Mechanisms, Common Modeling Techniques of Class and UML diagrams.

UNIT - II:

Advanced Structural Modeling: Advanced classes, Terms and Concepts, modeling a Semantic class, advanced relationships, modeling webs of relationships, Interfaces, Types and Roles, Packages, importing and exporting packages .

Class & Object Diagrams: Terms, concepts, Common modeling techniques for Class & Object Diagrams. Forward and Reverse Engineering of Class and Object Diagrams.

UNIT - III:

Basic Behavioral Modeling-I: Interactions, modeling a flow of control, Interaction diagrams. terms and concepts, Sequence Diagram and Collaboration Diagram, Modeling Flows of Control by Time Ordering, Modeling Flows of Control by Organization. Forward and Reverse Engineering of Interaction Diagrams

Basic Behavioral Modeling-II: Use cases, Actors, Use cases and flow of Events ,use cases and collaborations, organizing use cases, modeling the behavior of an element. Use case Diagrams, terms and concepts, common uses common modeling techniques of use case diagramActivity Diagrams. Terms and concepts, Action States and Activity States, Transitions, Branching, forking and joining, Swim lanes, Common uses of activity diagram. Forward and Reverse Engineering of Use case and Activity Diagrams.

UNIT - IV:

Advanced BehavioralModeling: Events and signals, state machines, advanced states and Transitions, processes and Threads, time and space, state chart diagrams, modeling techniques of state chart diagrams, Forward and Reverse Engineering of State Chart Diagram.

UNIT - V:

Architectural Modeling: Component, Deployment, Component diagrams and Deployment diagrams, common uses of component and deployment diagrams,Forward and Reverse Engineering of Component and Deployment Diagrams.

Case Study: The Unified Library application, Online Railway Reservation System, ATM Transaction

TEXT BOOKS:
1. The Unified Modeling Language User Guide, Grady Booch, James Rumbaugh, Ivar Jacobson, Pearson Education.
2. UML 2 Toolkit, Hans-Erik Eriksson, Magnus Penker, Brian Lyons, David Fado, WILEY-Dreamtech India Pvt. Ltd.

REFERENCE BOOKS:
1. Fundamentals of Object Oriented Design in UML, Meilir Page-Jones,
Pearson Education.
2. Modeling Software Systems Using UML2, Pascal Roques, WILEY-Dreamtech India Pvt. Ltd.
3. Object Oriented Analysis & Design, AtulKahate, The McGraw-Hill Companies.
4. Practical Object-Oriented Design with UML, Mark Priestley, TATA McGrawHill.
5.Appling UML and Patterns: An introduction to Object – Oriented Analysis and Design and Unified Process, Craig Larman, Pearson Education.

FUNDAMENTALS OF IMAGE PROCESSING

(Professional Elective IV)

Course Code: GR17A4088   **L   T   P   C**

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

UNIT – I

Fundamental steps of Image Processing, Components of an Image Processing of System. Image Model and Image acquisition, Sampling and Quantization, relationship between pixels, distance functions, Scanner.

UNIT – II

Statistical and Spatial operations, Intensity functions transformations, Histogram processing, Smoothing &Sharpening – Spatial Filters Frequency Domain filters, Homomorphic filtering, Image filtering & restoration. Inverse and weiner filtering, FIR weiner filter, Filtering using image Transforms, Smoothing Splines and Interpolation.

Morphological and other area operations, basic morphological operations, Opening and Closing operations, Dilation Erosion, Hit or Miss transform, morphological algorithms, extension to grey scale images.

UNIT- III

Segmentation and Edge detection region operations, basic edge detection, second order detection, crack edge detection, gradient operators, Compass and Laplace operators, edge linking and boundary detection, thresholding, region based segmentation, segmentation by Morphological Watersheds.

Image compression: Types and requirements, Statistical Compression, Spatial Compression, Contour Coding, Quantizing Compression, Image data Compression-Predictive technique, Pixel coding, Transfer coding theory, Lossy and Lossless Predictive type coding, Digital Image Water marking.

UNIT –IV

Representation and Description: Chain codes, Polygonal approximation, Signature Boundary Segments, Skeltons, Boundary Descriptors, Regional Descriptors, Relational Descriptors, Principal components for Description, Relational Descriptors

UNIT V

Pattern Recognition Fundamentals: Basic Concepts of pattern recognition, Fundamental problems in pattern recognition system, design concepts and methodologies, example of automatic pattern recognition systems, a simple automatic pattern recognition model

Pattern classification: Pattern classification by distance function: Measures of similarity, Clustering criteria, K-means algorithm, and Pattern classification by likelihood function: Pattern classification as a Statistical decision problem, Bayes classifier for normal patterns.

TEACHING METHODOLOGIES:
1. Power Point presentations
2. Tutorial Sheets
3. Assignments

TEXT BOOKS:

1. Digital Image Processing Third edition, Pearson Education, Rafael C. Gonzalez, Richard E. Woods
2. Pattern recognition Principles: Julus T. Tou, and Rafel C. Gonzalez, Addision-Wesly Publishing Company

REFERENCE BOOKS:

1. Image Processing, Analysis and Machine Vision, Second Edition, Milan Sonka, Vaclav Hlavac and Roger Boyle. Thomson learning.
2. Digital Image Processing – Williamk. Pratl –John wiley edition
3. Fundamentals of digital image processing – by A.K. Jain. PH
4. Pattern classification, Richard Duda, Hart and David strok John Weily publishers.
5. Digital Image Processing, S. Jayaraman, S. Esakkirajan, T. Veerakumar, TMH.
6. Pattern Recognition, R. Shinghal, Oxford University Press.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

SOFTWARE PROJECT MANAGEMENT

(Professional Elective IV)

Subject Code: GR17A4101   **L   T   PC**

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

UNIT I

Conventional Software Management: The waterfall model, conventional software Management performance.

Evolution of Software Economics: Software Economics, pragmatic software cost estimation.

Improving Software Economics: Reducing Software product size, improving software processes, improving team effectiveness, improving automation, Achieving required quality, peer inspections.

UNIT II

Life cycle phases: Engineering and production stages, inception, Elaboration, construction, transition phases.

Artifacts of the process: The artifact sets, Management artifacts, Engineering artifacts, programmatic artifacts.

Model based software architectures:A Management perspective and technical perspective.

UNIT III

Work Flows of the process: Software process workflows, Iteration workflows,

Checkpoints of the process: Major mile stones, Minor Milestones, Periodic status assessments.

UNIT IV

Iterative Process Planning: Work breakdown structures, planning guidelines, cost and schedule estimating, Iteration planning process, Pragmatic planning.

Project Organizations and Responsibilities: Line-of-Business Organizations, Project Organizations, evolution of Organizations.

UNIT V

Process Automation: Automation Building blocks, The Project Environment.

Project Control and Process instrumentation: The seven core Metrics, Management indicators, quality indicators, life cycle expectations, pragmatic Software Metrics, Metrics automation.

TEXT BOOKS

1. Software Project Management, Walker Royce: Pearson Education, 2005.

REFERENCES

1. Software Project Management, Bob Hughes and Mike Cotterell: Tata McGraw-

Hill Edition.

2. Software Project Management, Joel Henry, Pearson Education.

3. Software Project Management in practice, PankajJalote, Pearson

Education.2005.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

CYBER SECURITY

(Professional Elective IV)

Course Code: GR17A4089   L   T   P   C

IV Year II Semester   3   1   0   4

UNIT I

Introduction to Cyber Crime

Challenges of cybercrime, Classifications of Cybercrimes: E-Mail Spoofing, Spamming, Internet Time Theft, Salami attack/Salami Technique, Data Diddling, Web jacking, Online Frauds, Software Piracy, Computer Network Intrusions, Password Sniffing, Identity Theft, cyber terrorism, Virtual Crime , Perception of cyber criminals: hackers, insurgents and extremist group etc. Web servers hacking, session hijacking.

UNIT II

Cybercrime on Mobile and Wireless Device

Proliferation of Mobile and Wireless Devices, trends in Mobility Credit Card Frauds in Wireless Computing, Types and techniques of Credit Card Frauds, Attacks on Mobiles: Mobile Viruses, Mishing, Vishing, Smishing& Hacking Bluetooth. Web server hacking, session hijacking.

UNIT III

Tools and Methods in Cybercrime

Proxy Servers and Anonymizers, Password Cracking, Keyloggers and Spyware, virus and worms, Trojan Horses, Backdoors, DoS and DDoS Attacks , Buffer and Overflow, Attack on Wireless Networks, Phishing : Method of Phishing, Phishing Techniques.

UNIT IV

Cyber Crime and Criminal justice

Concept of Cyber Crime and the IT Act, 2000, Hacking, Teenage Web Vandals, Cyber Fraud and Cheating, Defamation, Harassment and E-mail Abuse, Other IT Act Offences, Monetary Penalties, jurisdiction and Cyber Crimes, Nature of Criminality, Strategies to tackle Cyber Crime and Trends. The Indian Evidence Act of 1872 v. Information Technology Act, 2000: Status of Electronic Records as Evidence, Proof and Management of Electronic Records; Relevancy, Admissibility and Probative Value of E-Evidence, Proving Digital Signatures, Proof of Electronic Agreements, Proving Electronic Messages.

UNIT V

Introduction to Cyber Forensics

Information Security Investigations, Corporate Cyber Forensics, Scientific Method in Forensic analysis, investigating large scale Data breach cases.AnalyzingMalicious software. Types of Computer Forensics Technology, Types of Business Computer Forensic Technology, Specialized Forensics Techniques.

TEXT BOOKS

1. Principles of Cyber crime, Jonathan Clough Cambridge University Press
2. Cyber Security by Nina Godbole, SunitBelapure, Willey-India
3. Cyber Law Simplified, VivekSood, TMH.

REFERENCES

1. John R. Vacca, Computer Forensics:Computer Crime Scene Investigation, 2nd Edition, CharlesRiver Media, 2005
2. Cyber Laws and IT Protection, Harish Chander, PHI.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

INFORMATION RETRIEVAL SYSTEMS

(Professional Elective-V)

Course Code: GR17A4095   **L TPC**

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

UNIT I

Introduction: Definition, Objectives, Functional Overview, Relationship to DBMS, Digital libraries and Data Warehouses.

Information Retrieval System Capabilities: Search, Browse, Miscellaneous

UNIT II

Cataloging and Indexing: Objectives, Indexing Process, Automatic Indexing, Information Extraction.

Data Structures: Introduction, Stemming Algorithms, Inverted file structures, N-gram data structure, PAT data structure, Signature file structure, Hypertext data structure.

UNIT III

Automatic Indexing: Classes of automatic indexing, Statistical indexing, Natural language, Concept indexing, Hypertext linkages

Document and Term Clustering: Introduction, Thesaurus generation, Item clustering, Hierarchy of clusters.

UNIT IV

User Search Techniques: Search statements and binding, Similarity measures and ranking, Relevance feedback, Selective dissemination of information search,Weighted searches of Boolean systems, Searching the Internet and hypertext.

Information Visualization: Introduction, Cognition and perception, Information visualization technologies.

UNIT V

Text Search Algorithms: Introduction, Software text search algorithms, Hardware text search systems.

Information System Evaluation: Introduction, Measures used in system evaluation, Measurement example – TREC results.

TEXTBOOKS

1. Kowalski, Gerald, Mark T Maybury: Information Retrieval Systems: Theory and

Implementation, Kluwer Academic Press, 1997.

REFERENCES:

1. Frakes, W.B., Ricardo Baeza-Yates: Information Retrieval Data Structures and Algorithms, Prentice Hall, 1992.

2. Modern Information RetrivalBy Yates Pearson Education.

3. nformation Storage &RetievalBy Robert Korfhage – John Wiley & Sons.

REAL TIME OPERATING SYSTEMS

(Professional Elective-V)

Course Code: GR17A4086   **L T PC**

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

UNIT I

REVIEW OF OPERATING SYSTEMS

Basic Principles, System Calls, Files, Processes, Design and Implementation of processes, Communication between processes, Operating System structures.

UNIT II

DISTRIBUTED OPERATING SYSTEMS

Topology, Network types, Communication, RPC, Client server model, Distributed file systems and Design strategies.

UNIT III

REAL TIME MODELS AND LANGUAGES

Event Based – Process Based and Graph based Models, Petrinet Models, Real Time Languages, RTOS Tasks, RT scheduling , Interrupt processing, Synchronization, Control Blocks, Memory Requirements.

UNIT IV

REAL TIME KERNEL

Principles, Design issues, Polled Loop Systems, RTOS Porting to a Target, Comparison and study of RTOS VX works and COS, Case studies.

UNIT V

RTOS APPLICATION DOMAINS

RTOS for Image Processing, Embedded RTOS for voice over IP, RTOS for fault Tolerant Applications, RTOS for Control Systems

TEXT BOOKS:

1.Charles Crowley, "Operating Systems-A Design Oriented approach", McGraw Hill 1997.

2.C.M. Krishna, Kang, G.Shin, "Real Time Systems", McGraw Hill, 1997.

3.Tanenbaum, "Distributed Operating Systems", Pearson Education.

4.RaymondJ.A.Bhur, Donald L.Bailey, "An Introduction to Real Time Systems", PHI 1999.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

DESIGN PATTERNS

(Professional Elective-V)

Course Code: GR17A4090   **L T P C**

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

UNIT I

Introduction : What Is a Design Pattern?, Design Patterns in Smalltalk MVC, Describing Design Patterns, The Catalog of Design Patterns, Organizing the Catalog, How Design Patterns solve Design Problems, How to Select a Design Pattern, How to Use a Design Pattern.

UNIT II

A Case Study: Designing a Document Editor: Design Problems, Document Structure, Formatting, Embellishing the User Interface, Supporting Multiple Look-and-Feel Standards, Supporting Multiple Window Systems, User Operations Spelling Checking and Hyphenation, Summary.

UNIT III

Creational Patterns: Abstract Factory, Builder, Factory Method, Prototype, Singleton, Discussion of Creational Patterns.

Structural Pattern Part-I: Adapter, Bridge, Composite.

UNIT IV

Structural Pattern Part-II: Decorator, Façade, Flyweight, Proxy.

Behavioral Patterns Part-I: Chain of Responsibility, Command, Interpreter, Iterator.

UNIT V

Behavioral Patterns Part-II: Mediator, Memento, Observer, State, Strategy, Template Method Visitor, Discussion of Behavioral Patterns. What to Expect from Design Patterns, A Brief History, The Pattern Community An Invitation, A Parting Thought.

TEXT BOOKS

1. Design Patterns by Erich Gamma, Pearson Education

REFERENCES

1. Pattern's in JAVA Vol-I by Mark Grand,Wiley DreamTech.

2. Pattern's in JAVA Vol-II by Mark Grand,Wiley DreamTech.

3. JAVA Enterprise Design Patterns Vol-III by Mark Grand,Wiley DreamTech.

Course Code: GR17A4156   **L T P C**

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

Task 1: Draw the class and object diagrams for below applications

   1. Unified Library System 2. Online Railway Reservation System 3.ATM

Transaction **Task 2**: Draw the Use-case diagrams for the above applications.

Task 3: Draw the sequence diagrams for the above applications.

Task 4: Draw the collaboration diagrams for the above applications.

Task 5: Draw the activity diagrams for the above applications.

Task 6: Draw the State-chart diagrams for the above applications.

Task 7: Draw the component diagrams for the above applications.

Task 8: Draw the deployment diagrams for the above applications.

Task 9: Student should perform forward and Reverse Engineering, and Generate documentation of the project.

Task 10: Student has to take up another case study of his/her own interest to draw the interaction diagrams.

Task 11: Student has to take up another case study of his/her own interest to draw the Behavioral diagrams.

Task 12: Perform forward and reverse engineering for the above case study and generate a report of the same.

TEXT BOOKS:

1. The Unified Modeling Language User Guide, Grady Booch, James Rumbaugh, Ivar Jacobson, Pearson Education.
2. UML 2 Toolkit, Hans-Erik Eriksson, Magnus Penker, Brian Lyons, David Fado, WILEY-Dreamtech India Pvt. Ltd.