Academic Regulations
Programme Structure
&
Detailed Syllabus

Bachelor of Technology
(B. Tech)
(Four Year Regular Programme)
(Applicable for Batches admitted from 2018)

Department of Computer Science and Engineering

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

ACADEMIC REGULATIONS

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY, HYDERABAD
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING (B. Tech)
GR18 REGULATIONS

Gokaraju Rangaraju Institute of Engineering and Technology 2018 Regulations (GR18 Regulations) are given here under. These regulations govern the programmes offered by the Department of Computer Science and Engineering with effect from the students admitted to the programmes in 2018- 19 academic year.

1. **Programme Offered:** The programme offered by the Department is B. Tech in Computer Science and Engineering, a four-year regularprogramme.

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 totime.

4. **Programme Pattern:**
   a) Each Academic year of study is divided in to twosemesters.
   b) Minimum number of instruction days in each semester is 90.
   c) 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 PointAverage).
   d) The total credits for the Programme is160.
   e) Student is introduced to "Choice Based Credit System(CBCS)".
   f) A student has a choice to register for all courses in a semester/ one less or one additional course from other semesters provided the student satisfiesprerequisites.
   g) All the registered credits will be considered for the calculation of finalCGPA.
   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 asfollows.

S. No.	Broad Course Classification	Course Group/ Category	CourseDescription
1	BSC	Basic Science Courses	Basic Science Courses
2	ESC	Engineering Science Courses	Includes Engineering subjects
3	HSMC	Humanities and Social sciences	Includes Management courses
4	PCC	Professional Core Courses	Includes core subjects related to the parent discipline/department/ branch of Engineering
5	PEC	Professional Elective Courses	Includes elective subjects related to the parent discipline/ department/ branch of Engineering
6	OEC	Open Elective Courses	Electives from other technical and/or emerging subjects
7	LC	Laboratory Courses	Laboratory Courses
8	MC	Mandatory Courses	Environmental Sciences, Induction training, Indian Constitution, Essence of Indian Traditional Knowledge
9	PROJ	Project Work	Project work, seminar and internship in industry or elsewhere

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 academicrequirements:
   a) He/She pursues the course of study and completes it successfully in not less than four academic years and not more than eight academicyears.
   b) A student has to register for all the 160 credits and secure allcredits.
   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. Techcourse.
   d) The Degree of B. Tech in Computer Science and Engineering shall be conferred by Jawaharlal Nehru Technological University Hyderabad (JNTUH), Hyderabad, on the students who are admitted to the programme and fulfill all the requirements for the award of thedegree.

6. AttendanceRequirements

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

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

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 becondoned.

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 reregistration for that semester when offered next with the academic regulations of the batch into which he/she getsre-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 totime.

b) Distribution and Weightage ofmarks

S. No	Components	Internal	External	Total
1	Theory	30	70	100
2	Practical	30	70	100
3	Engineering Graphics	30	70	100
4	Mini Project	30	70	100
5	Project Work	30	70	100

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 followingTable.

Assessment Procedure:

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

d) **Mini Project with Seminar:** The Mini Project is to be taken up with relevance to Industry and is evaluated for 100 marks. Out of 100 marks, 30 marks are for internal evaluation and 70 marks are for external evaluation. The supervisor continuously assesses the students for 20 marks (Continuous Assessment – 15 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 70 marks. Mini Project Review Committee consists of HOD, Mini Project Coordinator andSupervisor.

e) **Summer Internship:** Summer Internship shall be done by the student in the summer break after III B. Tech II Semester and shall be evaluated in IV B. Tech I Semester along with the Project Work (PhaseI).

f) **Project Work (Phase–I and Phase-II):** The project work is evaluated for 100 marks. Out of 100, 30 marks shall be for internal evaluation and 70 marks for the external evaluation. The supervisor assesses the student for 20 marks (Continuous Assessment – 15 marks, Report –5 marks). At the end of the semester, projects shall be displayed inthe

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 10 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 70 marks, Project Review Committee consists of HOD, Project Coordinator and Supervisor. These rules are applicable for both Phase I and PhaseII.

g) EngineeringGraphics:

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

8. **Recounting of Marks in the End Examination Answer Books:** A student can request for recounting 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 prescribedfee.
10. **Supplementary Examinations:** A student who has failed to secure the required creditscan appear for a supplementary examination, as per the schedule announced by theCollege.
11. **Malpractices in Examinations:** Disciplinary action shall be taken in case ofmalpractices during Mid / End-examinations as per the rules framed by the AcademicCouncil.
12. **Academic Requirements and PromotionRules:**
    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 takentogether.
    b) A student shall be promoted to the next year only when he/she satisfies the requirements of all the previous semesters.

	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	(i) Regular course of study of first year secondsemester. (ii) Must have secured at least 50% credits up to first year second semester from all the relevant regular and supplementary examinations, whether thestudent 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	(i) Regular course of study of second year secondsemester (ii) Must have secured at least 60% credits up to second year second semester from all the relevant regular and supplementary examinations, whether thestudent 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 yearsecond semester. (ii) Must have secured at least 60% credits up to third year second semester fromall the relevant regular and supplementary examinations, whether the student takes those examinations ornot.
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 gradesand percentage of marks, as given below, isfollowed

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-P. Letter grade 'F' in any Course implies failure of the student in that course and no credits earned.

Computation of SGPA and CGPA:

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

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

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

Where C_i is the number of credits of the i^{th} course and G_i is the grade point scored by the student in the i^{th} course and n is the number of courses registered in that semester. ii) The CGPA is calculated in the same manner taking into account all the courses m, registered by student over all the semesters of a programme, i.e., upto and inclusive of S_k, where $k \geq 2$.

$$\text{CGPA} = \sum_{i=1}^{m} (C_i * G_i) \,/\, \sum_{i=1}^{m} C_i$$

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 beplacedinoneof thefollowingfourclassesbasedonCGPAsecuredfromthe160credits.

	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 suchcases.

16. **Transfer of students from the Constituent Colleges of JNTUH or from other Colleges/ Universities:** Transfer of students from the Constituent Colleges ofJNTUH

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 areoffered.

18. GeneralRules

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 isfinal.
c) In case of any error in the above rules and regulations, the decision of the Academic Council isfinal.
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 thecollege.

Academic Regulations for B.Tech (Lateral Entry) under GR18

(Applicable for Batches Admitted from 2019-2020)

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 followingrules

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

b) A student should register for all 123 credits and secure all credits. The marks obtained in all 123 credits shall be considered for the calculation of the finalCGPA.

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 takentogether.

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

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 secondsemester.** **(ii) Must have secured at least 50% credits up to second year second semester from all the relevant regular and supplementary examinations, whether the student takes those examinations ornot.**
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 secondsemester.** **(ii) Must have secured at least 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 123credits.

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

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COMPUTER SCIENCE AND ENGINEERING

I YEAR I SEMESTER

S.No.	Course Code	COURSE	Hours			Total Hours	Total Credits	Int	Ext	Marks
			L	T	P					
1	GR18A1001	Linear Algebra and Differential Calculus	3	1	0	4	4	30	70	100
2	GR18A1003	Applied Physics	3	1	0	4	4	30	70	100
3	GR18A1007	Programming for Problem Solving	3	1	0	4	4	30	70	100
4	GR18A1010	Engineering Graphics	1	0	4	5	3	30	70	100
5	GR18A1011	Applied Physics Lab	0	0	3	3	1.5	30	70	100
6	GR18A1015	Programming for Problem Solving Lab	0	0	3	3	1.5	30	70	100
		Induction Programme					-			
Total			**10**	**3**	**10**	**23**	**18**	**180**	**420**	**600**

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I YEAR II SEMSTER

S.No.	Course Codes	COURSE	Hours			Total Hours	Total Credits	Int	Ext	Marks
			L	T	P					
1	GR18A1002	Differential Equations and Vector Calculus	3	1	0	4	4	30	70	100
2	GR18A1005	Engineering Chemistry	3	1	0	4	4	30	70	100
3	GR18A1008	Basic Electrical Engineering	3	0	0	3	3	30	70	100
4	GR18A1006	English	2	0	0	2	2	30	70	100
5	GR18A1013	Engineering Chemistry Lab	0	0	3	3	1.5	30	70	100
6	GR18A1016	Basic Electrical Engineering Lab	0	0	2	2	1	30	70	100
7	GR18A1014	English Language and Communication Skills Lab	0	0	2	2	1	30	70	100
8	GR18A1017	Engineering Workshop	1	0	3	4	2.5	30	70	100
Total			**12**	**2**	**10**	**24**	**19**	**240**	**560**	**800**

II YEAR I SEMESTER

S.NO.	Course Code	COURSE	Hours			Total Hours	Total Credits	Int	Ext	Marks
			L	T	P					
1	GR18A2065	Digital Logic Design	3	0	0	3	3	30	70	100
2	GR18A2066	Data Structures	3	0	0	3	3	30	70	100
3	GR18A2005	Probability and Statistics	3	0	0	3	3	30	70	100
4	GR18A2067	Discrete Mathematics	3	1	0	4	4	30	70	100
5	GR18A2068	Database Management Systems	3	0	0	3	3	30	70	100
6	GR18A2069	Open Source Lab	0	0	3	3	1.5	30	70	100
7	GR18A2070	Digital Logic Design Lab	0	0	3	3	1.5	30	70	100
8	GR18A2071	Data Structures Lab	0	0	3	3	1.5	30	70	100
9	GR18A2072	Database Management Systems Lab	0	0	4	4	2	30	70	100
Total			**15**	**1**	**13**	**29**	**22.5**	**270**	**630**	**900**
10	GR18A2002	Value Ethics and Gender Culture	2	0	0	2	2	30	70	100

II YEAR II SEMESTER

S.NO.	Course Code	COURSE	Hours			Total Hours	Total Credits	Int	Ext	Marks
			L	T	P					
1	GR18A2073	Computer Organization	3	0	0	3	3	30	70	100
2	GR18A2004	Economics and Accounting for Engineers	3	0	0	3	3	30	70	100
3	GR18A2074	Operating Systems	3	0	0	3	3	30	70	100
4	GR18A2075	Java Programming	3	0	0	3	3	30	70	100
5	GR18A2076	Design and Analysis of Algorithms	3	0	0	3	3	30	70	100
6	GR18A2077	Scripting Languages Lab	0	0	3	3	1.5	30	70	100
7	GR18A2078	Operating Systems Lab	0	0	3	3	1.5	30	70	100
8	GR18A2079	Java Programming Lab	0	0	3	3	1.5	30	70	100
Total			**15**	**0**	**09**	**24**	**19.5**	**240**	**560**	**800**
9	GR18A2001	Environmental Science	2	0	0	2	2	30	70	100
10	GR18A2083	Design Thinking	2	0	0	2	1	30	70	100

III YEAR I SEMESTER

S.NO.	Course Code	COURSE	Hours			Total Hours	Total Credits	Int	Ext	Marks
			L	T	P					
1	GR18A3043	Object Oriented Software Engineering	3	0	0	3	3	30	70	100
2	GR18A3044	Computer Networks	3	0	0	3	3	30	70	100
3	GR18A3045	Formal Languages and Automata Theory	3	0	0	3	3	30	70	100
4	GR18A3046	Web Technologies	3	0	0	3	3	30	70	100
5	GR18A3047	Micro Controller and Internet of Things	3	0	0	3	3	30	70	100
6		Professional Elective I	3	0	0	3	3	30	70	100
7	GR18A3052	Object Oriented Software Engineering Lab	0	0	3	3	1.5	30	70	100
8	GR18A3053	Computer Networks and Web Technologies Lab	0	0	3	3	1.5	30	70	100
9	GR18A3054	Micro Controller and Internet of Things Lab	0	0	2	2	1	30	70	100
Total			**18**	**0**	**08**	**26**	**22**	**270**	**630**	**900**

PROFESSIONAL ELECTIVE - 1		
S. No.	**Course Code**	**COURSE**
1.	GR18A3048	Graph Theory
2.	GR18A3049	Principles of Programming Languages
3.	GR18A3050	Artificial Intelligence
4.	GR18A3051	Software Testing Methodologies

III YEAR II SEMESTER

S.NO.	Course Code	COURSE	Hours			Total Hours	Total Credits	Int	Ext	Marks
			L	T	P					
1	GR18A3099	Data Warehousing and Data Mining	3	0	0	3	3	30	70	100
2	GR18A3100	Compiler Design	3	0	0	3	3	30	70	100
3	GR18A3115	Fundamentals of Management and Entrepreneurship	3	0	0	3	3	30	70	100
4		Professional Elective II	3	0	0	3	3	30	70	100
5		Open Elective I	3	0	0	3	3	30	70	100
6	GR18A3105	Data Warehousing and Data Mining Lab	0	0	2	2	1	30	70	100
7	GR18A3106	Compiler Design Lab	0	0	2	2	1	30	70	100
8	GR18A3116	Mini Project with Seminar	0	0	6	6	3	30	70	100
		Summer Internship	-	-	-		-			
Total			**15**	**0**	**10**	**25**	**20**	**240**	**560**	**800**
9	GR18A2003	Constitution of India	2	0	0	2	2	30	70	100

PROFESSIONAL ELECTIVE - 2		
S. No.	**Course Code**	**COURSE**
1	GR18A3101	Advanced Algorithms
2	GR18A3102	Cloud Computing
3	GR18A3103	Neural Networks and Deep Learning
4	GR18A3104	Software Architecture

IV YEAR I SEMESTER

S.NO.	Course Code	COURSE	Hours			Total Hours	Total Credits	Int	Ext	Marks
			L	T	P					
1	GR18A4043	Cryptography and Network Security	3	0	0	3	3	30	70	100
2	GR18A4044	Machine Learning	3	0	0	3	3	30	70	100
3		Professional Elective III	3	0	0	3	3	30	70	100
4		Professional Elective IV	3	0	0	3	3	30	70	100
5		Open Elective II	3	0	0	3	3	30	70	100
6	GR18A4053	Cryptography and Network Security Lab	0	0	3	3	1.5	30	70	100
7	GR18A4054	Machine Learning Lab	0	0	3	3	1.5	30	70	100
8	GR18A4061	Project work (Phase I)	0	0	12	12	6	30	70	100
Total			**15**	**0**	**18**	**33**	**24**	**240**	**560**	**800**

PROFESSIONAL ELECTIVE - 3		
S. No.	**Course Code**	**COURSE**
1.	GR18A4045	Parallel and Distributed Algorithms
2.	GR18A3112	Image and Video Processing
3.	GR18A4047	Natural Language Processing
4.	GR18A4048	Agile Software Process

PROFESSIONAL ELECTIVE - 4		
S. No.	**Course Code**	**COURSE**
1	GR18A4055	Information Storage and Retrieval
2	GR18A4050	Multi Media Applications
3	GR18A4051	Data Science
4	GR18A4052	Software Project Management

IV YEAR II SEMESTER

S.NO.	Course Code	COURSE	Hours			Total Hours	Total Credits	Int	Ext	Marks
			L	T	P					
1		Professional Elective V	3	0	0	3	3	30	70	100
2		Professional Elective VI	3	0	0	3	3	30	70	100
3		Open Elective III	3	0	0	3	3	30	70	100
4	GR18A4108	Project work (Phase II)	0	0	12	12	6	30	70	100
Total			**9**	**0**	**12**	**21**	**15**	**120**	**280**	**400**

PROFESSIONAL ELECTIVE - 5		
S. No.	**Course Code**	**COURSE**
1	GR18A4096	Real Time Operating Systems
2	GR18A4097	Cyber Security
3	GR18A4059	Soft Computing
4	GR18A4098	Design Patterns

PROFESSIONAL ELECTIVE - 6		
S. No.	**Course Code**	**COURSE**
1	GR18A4099	Human Computer Interaction
2	GR18A3060	Computer Graphics
3	GR18A4100	Big Data Analytics
4	GR18A4101	Software Measurements and Metrics

PROFESSIONAL ELECTIVES – 4 THREADS

S. No.	Theory and Algorithms	Applications	Data Science and Machine Intelligence	Software and Technology
1	Graph Theory	Principles of Programming Languages	Artificial Intelligence	Software Testing Methodologies
2	Advanced Algorithms	Cloud Computing	Neural Networks and Deep Learning	Software Architecture
3	Parallel and Distributed Algorithms	Image & Video Processing	Natural Language Processing	Agile Software Process
4	Information Storage and Retrieval	Multi Media Applications	Data Science	Software Project Management
5	Real Time Operating System	Cyber Security	Soft Computing	Design Patterns
6	Human Computer Interaction	Computer Graphics	Big Data Analytics	Software Measurements and Metrics

OPEN ELECTIVES – THREADS

S. No.	THREAD 1	THREAD 2
1	Soft Skills and Interpersonal Skills (GR18A3117)	CSE: 1. Principles of E-Commerce (GR18A3129) 2. Database Management Systems (GR18A2068) 3. Java Programming (GR18A2075)
2	Human Resource Development and Organizational Behaviour (GR18A3118)	IT: 1. Multimedia and Application Development (GR18A3123) 2. Web Programming (GR18A3057) 3. Operating Systems (GR18A2074)
3	Cyber Law and Ethics (GR18A3119)	EEE: 1.Embedded Systems (GR18A4102) 2. Control Systems (GR18A2032) 3. Artificial Intelligence Techniques (GR18A3016)
4	History of Science (GR18A3120)	ECE:1.Artificial Neural Networks (GR18A3124) 2.Software Defined Radio and Cognitive Radio (GR18A3125) 3.Cloud Computing (GR18A3102)
5	Introduction to Art and Aesthetics (GR18A3121)	ME: 1.Operations Research (GR18A3126) 2. Automobile Engineering (GR18A3127) 3. Robotics (GR18A4079)
6	Economic Policies in India (GR18A3122)	CE: 1. Green Building Technology (GR18A3128) 2.Building Materials and Construction Planning (GR18A2007) 3. Introduction to Fluid Mechanics (GR18A2010)

Syllabus
I -Year

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

LINEAR ALGEBRA AND DIFFERENTIAL CALCULUS

Coursecode: GR18A1001 **L/T/P/C: 3/1/0/4**

Course Objectives: To provide the student with

- The ideas of linearity and linear systems, which lie at the core of many engineering concepts
- The concept of latent values of a matrix which is critical in many engineeringapplications
- The ideas of function approximation using the tools of mean valuetheorems
- The skill of using a definite integral for various geometricalapplications
- The skill of finding the optimal values of multi-variablefunctions

Course Outcomes: After learning the contents of this paper the student must be able to

- Compute the rank of a matrix to determine the existence of solutions of a linear algebraicsystem
- Determine the eigenvalues and eigenvectors of a square matrix which arise in several engineeringapplications
- Determine approximate solution of over determined systems using the pseudoinverse
- Apply the definite integral for various computational problems in geometry and Evaluate some improper integrals using specialfunctions
- Develop the skill of determining optimal values of multivariable functions using classicalmethods

Unit I: VECTOR AND MATRIX ALGEBRA

Vector space (definition and examples), linear independence of vectors, orthogonality of vectors, projection of vectors, Gram-Schmidt orthonormalization of vectors, Symmetric, Hermitian, skew-symmetric, skew-Hermitian, orthogonal and UNIT-ary matrices; Rank of a matrix by echelon reduction, Solution of a linear algebraic system of equations (homogeneous andnon-homogeneous).

Unit II: MATRIX EIGENVALUE PROBLEM AND QUADRATIC FORMS

Determination of eigenvalues and eigenvectors of a matrix, properties of eigenvalues and eigenvectors (without proof), diagonalization of a matrix, orthogonal diagonalization of symmetric matrices, Similarity of matrices,Quadratic Forms: Definiteness and nature of a quadratic form, reduction of quadratic form to canonical forms by orthogonal transformation.

Unit III: MATRIX DECOMPOSITION AND PSEUDO INVERSE OF A MATRIX

Spectral decomposition of a symmetric matrix, L-U decomposition, Q-R factorization, Singular value decomposition ,Moore-Penrose pseudo inverse of a matrix, least squares solution of an over determined system of equations using pseudo inverse.

Unit IV: SINGLE VARIABLE CALCULUS

Mean value theorems: Rolle's theorem, Lagrange's Mean value theorem and Taylor's theorem (without proof), their geometrical interpretation and applications, approximation of a function by Taylor's series, Applications of definite integrals to evaluate surface areas and

volumes of revolutions of curves (only in Cartesian coordinates), Evaluation of improper integral using Beta and Gamma functions.

Unit V: MULTIVARIABLE DIFFERENTIAL CALCULUS AND FUNCTION OPTIMIZATION

Partial Differentiation: Total derivative; Jacobian; Functional dependence, unconstrained optimization of functions using the Hessian matrix, constrained optimization using Lagrange multiplier method

Text/Reference Books:

1. R.K.Jain and S.R.K.Iyengar, Advanced Engineering Mathematics, Narosa publishing house,
2. Fourth edition2014
3. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010
4. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th edition,Pearson, Reprint,

5.2002.

6. Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006
7. GRIET referencemanual.
8. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint,2008.
9. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11thReprint,2010.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

APPLIED PHYSICS

CourseCode:GR18A1003 **L/T/P/C:3/1/0/4**

Course Objectives: At the end of the course the student is expected to

- Identify the role of quantum mechanics and its applications on physicalsystem.
- Interpret the properties of semiconductingmaterials.
- Summarize the use of optoelectronicsdevices.
- Explain the properties of Laser light and its uses in optical fibercommunication.
- Outline the properties of dielectric and magneticmaterials.

Course Outcomes: At the completion of this course, students will be able to:

- Outline the development of quantum mechanics and solve Schrodinger equation for simplepotentials.
- Demonstrate the operation mechanism of electronic devices such as transistors and diodes.
- Explain the development and applications of optoelectronicdevices.
- Analyze the properties of Laser and its propagation in opticalfibers.
- Evaluate the properties of dielectric and magnetic materials for variousapplications.

Unit I: QUANTUM MECHANICS

Introduction to quantum physics, Black body radiation, Planck's law, photoelectric effect Compton effect, wave-particle duality, de Broglie hypothesis, Davisson and Germer experiment, Heisenberg's uncertainty principle, Born's interpretation of the wave function, Schrodinger's time independent wave equation, particle in one dimensional box, potential barrier.

Unit II: SEMICONDUCTOR PHYSICS

Intrinsic and extrinsic semiconductors: Estimation of carrier-concentration, Dependence of Fermi level on carrier-concentration and variation with temperature, Carrier generation and recombination, Carrier transport: diffusion and drift, Hall Effect, p-n junction diode: I-V Characteristics, Zener diode: I-V Characteristics, Bipolar Junction Transistor (BJT): Construction, Principle of operation and characteristics.

Unit III: OPTOELECTRONICS

Radiative, Non-radiative transitions and recombination mechanism in semiconductors, LED and Semiconductor lasers: Device structure, materials, Characteristics, Semiconductor photo-detectors: PIN and Avalanche detectors and their structure, Materials, Working principle and Characteristics, Solar cell: structure and Characteristics.

Unit IV: LASERS AND FIBER OPTICS

Lasers: Introduction, Interaction of radiation with matter: Absorption, Spontaneous and Stimulated emission, Einstein coefficients, Characterizes of lasers: Resonating cavity, Active medium, pumping, population inversion, Construction and working of laser: Ruby laser, He-Ne laser, application of lasers. Fiber Optics: Introduction, Principle and Construction of an optical fiber, Acceptance angle, Numerical aperture, Types of Fibers, losses associated with optical fibers, Basic components in optical fiber communication system, Application of optical fibers.

Unit V: DIELECTRIC AND MAGNETIC PROPERTIES OF MATERIALS

Dielectrics: Introduction, Types of polarizations (Electronic, Ionic and Orientation Polarizations) and calculation of Electronic, Ionic polarizability, internal fields in a solid, Clausius-Mossotti relation. Magnetism: Introduction, Bohr magnetron, classification of dia, para and ferro magnetic materials on the basis of magnetic moment, Hysteresis curve based on domain theory, Soft and hard magnetic materials, Properties of anti-ferro and ferri magneticmaterials.

Text/ References Books:

1. Engineering Physics, B.K. Pandey, S. Chaturvedi - Cengage Learing.
2. Halliday and Resnick, Physics -Wiley.
3. Engineering Physics, P.K Palanisamy, ScitechPublishers.
4. A textbook of Engineering Physics, Dr. M. N. Avadhanulu, Dr. P.G. Kshirsagar - S. Chand.
5. Applied Physics, T. Bhīma Sankaram, BSPPublishers.
6. Richard Robinett, QuantumMechanics
7. Fundamentals of Semiconductor Devices, Second Edition, Anderson and Anderson, McGraw Hill.
8. J. Singh, Semiconductor Optoelectronics: Physics and Technology, McGraw- Hill Inc.(1995)
9. Semiconductor Physics and Devices, 4e, Neamen and Biswas, McGrawHill.
10. Online Course: “Optoelectronic Materials and Devices” by Monica Katiyar andDeepak Gupthaon NPTEL

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

PROGRAMMING FOR PROBLEM SOLVING

CourseCode:GR18A1007 **L/T/P/C: 3/1/0/4**

Prerequisite: Knowledge of Mathematics required.

Course Objectives:

- To learn the fundamentals ofcomputers.
- To understand the various steps in programdevelopment.
- To learn the syntax and semantics of C programminglanguage.
- To learn the usage of structured programming approach in solvingproblems.

Course Outcomes:

The Student will learn:

- To write algorithms and to draw flowcharts for solvingproblems.
- To convert the algorithms/flowcharts to C programs.
- To code and test a given logic in C programminglanguage.
- To decompose a problem into functions and to develop modular reusablecode.
- To use arrays, pointers, strings and structures to write Cprograms.

Unit I: INTRODUCTION TO PROGRAMMING

Introduction to components of a computer system: disks, primary and secondary memory, processor, operating system, compilers, creating, compiling and executing a program, Number systems

Introduction to Algorithms: steps to solve logical and numerical problems. Representation of Algorithm, Flowchart/Pseudo code with examples, Program design and structured programming

Introduction to C Programming Language: variables (with data types and space requirements), Syntax and Logical Errors in compilation, object and executable code , Operators, expressions and precedence, Expression evaluation, Storage classes (auto, extern, static and register), type conversion, The main method and command line arguments Bitwise operations: Bitwise AND, OR, XOR and NOToperators

Conditional Branching and Loops: Writing and evaluation of conditionals and consequent branching with if, if-else, switch-case, ternary operator, goto, Iteration with for, while, do-while loops

I/O: Simple input and output with scanf and printf, formatted I/O.

Unit II: ARRAYS, STRINGS, STRUCTURES AND POINTERS

Arrays: one and two dimensional arrays, creating, accessing and manipulating elements of arrays

Strings: Introduction to strings, handling strings as array of characters, basic string functions available in C (strlen, strcat, strcpy, strstr), arrays ofstrings

Structures: Defining structures, initializing structures, unions, Array of structures.

Pointers: Idea of pointers, Defining pointers, Pointers to Arrays and Structures, Use of Pointers in self-referential structures, usage of self referential structures in linked list (no implementation)Enumeration data type

Unit III: PREPROCESSOR AND FILE HANDLING IN C

Preprocessor: Commonly used Preprocessor commands like include, define, undef, if, ifdef, ifndef **Files:** Text and Binary files, Creating and Reading and writing text and binary files, Appending data to existing files, Writing and reading structures using binary files, Random access using fseek, ftell and rewind functions. Introduction to stdin,stdout and stderr.

Unit IV: FUNCTION AND DYNAMIC MEMORY ALLOCATION

Functions: Designing structured programs, Declaring a function, Signature of a function, Parameters and return type of a function, passing parameters to functions, call by value, Passing arrays to functions, passing pointers to functions, idea of call by reference, Some C standard functions and libraries

Recursion: Simple programs, such as Finding Factorial, Fibonacci series , Limitations of Recursive functions

Dynamic memory allocation: Allocating and freeing memory, Allocating memory for arrays of different datatypes

Unit V: INTRODUCTION TO ALGORITHMS

Algorithms for finding roots of a quadratic equations, finding minimum and maximum numbers of a given set, finding if a number is prime number,Basic searching in an array of elements (linear and binary search techniques),Basic algorithms to sort array of elements (Bubble, Insertion and Selection sort algorithms), Basic concept of order of complexity through the example programs

Text/ Reference Books:

1. Byron Gottfried, Schaum's Outline of Programming with C,McGraw-Hill
2. B.A. Forouzan and R.F. Gilberg C Programming and Data Structures, Cengage Learning, (3^{rd}Edition)**:**
3. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language,Prentice
4. Hall of India
5. R.G. Dromey, How to solve it by Computer, Pearson (16^{th}Impression)
6. Programming in C, Stephen G. Kochan, Fourth Edition, PearsonEducation.
7. Herbert Schildt, C: The Complete Reference, Mc Graw Hill, 4^{th}Edition

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

ENGINEERING GRAPHICS

CourseCode:GR18A1010 **L/T/P/C : 1/0/4/3**

Course Objectives:

- Provide basic conventions and standards used in EngineeringGraphics
- Impart knowledge on various Engineering curves and theirsignificance
- To draw orthographic, sectional and pictorial views of a givensolid.
- To develop skills in three dimensional visualization of engineeringcomponents
- To inculcate CAD packages on modelling anddrafting

Course Outcomes:

- Familiarize with BIS standards and conventions used in engineeringgraphics.
- Draw various engineering curves e.g ellipse, parabola, cycloids and involutes etc and construct various reduced scales e.g plain, diagonal and vernierscales
- Differentiate between first angle and third angle methods of projection and distinguish parallel and perspective projection.
- Visualize different views like elevation and plan for a given line, plane figures or solidobjects.
- Apply drafting techniques and use 2D software e.g AutoCAD to sketch 2D plane figures.

Unit I: INTRODUCTION TO ENGINEERING DRAWING

Principles of Engineering Graphics and their Significance, Conic Sections including the Rectangular Hyperbola – General method only. Cycloid, Epicycloid and Hypocycloid, Scales – Plain andDiagonal.

Unit II: ORTHOGRAPHIC PROJECTIONS

Principles of Orthographic Projections – Conventions – Projections of Points and Lines, Projections of Plane regular geometric figures-Auxiliary Planes.

Unit III: PROJECTIONS OF REGULARSOLIDS

Auxiliary Views - Sections or Sectional views of Right Regular Solids – Prism, Cylinder, Pyramid, Cone – Auxiliary views – Sections ofSphere

Unit IV: DEVELOPMENT OF SURFACES OF RIGHT REGULAR SOLIDS

Prism, Cylinder, Pyramid and Cone, Intersection of Solids: Intersection of – Prism vs Prism- Cylinder Vs Cylinder

Unit V: ISOMETRIC PROJECTIONS

Principles of Isometric Projection – Isometric Scale – Isometric Views –Conventions – Isometric Views of Lines, Plane Figures, Simple and Compound Solids – Isometric Projection of objects having non- isometric lines. Isometric Projection of Spherical Parts. Conversion of Isometric Views to Orthographic Views and Vice-versa – Conventions **Introduction to CAD:** (**For Internal Evaluation Weightage only**): Introduction to CAD Software Package Commands.- Free Hand Sketches of 2D- Creation of 2D Sketches by CAD Package

Text /Reference Books:

1. Engineering Drawing by N.D.Bhatt/Charotar
2. Engineering Drawing/ N.S.Parthasarathy and VelaMurali/Oxford
3. Engineering Graphics. By Basanth Agrawal/CM Agrawal/McGraw HillEducation
4. Engineering Drawing by K.Venu Gopal/New AgePublications.
5. Computer Aided Engineering Drawing / K Balaveerareddy et al-CBSpublishers
6. Engineering Graphics and Design by Kaushik Kumar / Apurba kumar Roy / Chikesh Ranjan

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

APPLIED PHYSICS LAB

CourseCode:GR18A1011 **L/T/P/C: 0/0/3/1.5**

Course Objectives: At the end of the course the student is expected to

- Compare and tabulate the characteristics of Solar cells, LED and Lasersources.
- Analyze the behavior of semiconductors in variousaspects.
- Apply the theoretical concepts of optical fibers in practicalapplications.
- Recall the basic concepts of LCR and RC circuits through hands onexperience.
- Analyze the behavioral aspects of electric and magneticfields.

Course Outcomes: At the completion of this course, students will be able to:

- Compare the behavior of p-n junction diode, Solar cells andLED.
- Analyze the behavior of magnetic and electric fields with the help ofgraphs.
- Determine the work function of a material through photoelectriceffect.
- Asses the characteristics of Lasers and infer the losses in opticalfibers.
- Estimate the time constant of RC circuit and resonance phenomenon in LCRcircuit.

TASK1: Energy gap of P-N junction diode: To determine the energy gap of a semiconductor diode.

TASK 2: Solar Cell: To study the V-I Characteristics of solar cell.

TASK3: Light emitting diode: Plot V-I and P-I characteristics of light emitting diode.

TASK4: Stewart – Gee's experiment: Determination of magnetic field along the axis of a current carrying coil.

TASK5: Hall effect: To determine Hall co-efficient of a given semiconductor.

TASK6: Photoelectric effect: To determine work function of a given material.

TASK7: LASER: To study the characteristics of LASER sources.

TASK 8: Optical fiber: To determine the bending losses of Optical fibers.

TASK 9: LCR Circuit: To determine the Quality factor of LCR Circuit.

TASK10: R-C Circuit: To determine the time constant of R-C circuit.

Note: Any 8 experiments are to be performed

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

PROGRAMMING FOR PROBLEM SOLVING LAB

CourseCode:GR18A1015 **L/T/P/C: 0/0/3/1.5**

Prerequisite: Basic operations of computer and knowledge of mathematics

Laboratory Objectives: The students will learn the following:

- To work with an IDE to create, edit, compile, run and debugprograms
- To analyze the various steps in programdevelopment.
- To develop programs to solve basic problems by understanding basic concepts inC like operators, control statementsetc.
- To develop modular, reusable and readable C Programs using the concepts like functions, arraysetc.
- To Write programs using the Dynamic Memory Allocation concept and to create, read from and write to text and binaryfiles.

Laboratory Outcomes The candidate is expected to be able to:

- Formulate the algorithms for simple problems and translate given algorithms to a working and correctprogram.
- Correct syntax errors as reported by thecompilers
- Identify and correct logical errors encountered duringexecution
- Represent and manipulate data with arrays, strings and structures and use pointers of differenttypes
- Create, read and write to and from simple text and binary files and modularize the code with functions so that they can bereused

Task 1: (Practice sessions)

a. Write a simple program that prints the results of all the operators available in C (including pre/ post increment , bitwise and/or/not , etc.). Read required operand values from standardinput.
b. Write a simple program that converts one given data type to another using auto conversion and casting. Take the values form standard input.

Task 2: (Simple numeric problems)

a. Write a program for fiend the max and min from the threenumbers.
b. Write the program for the simple, compoundinterest.
c. Write program that declares Class awarded for a given percentage of marks, where mark <40%= Failed, 40% to <60% = Second class, 60% to <70%=First class, >= 70% = Distinction. Read percentage from standardinput.

Task 3: (Simple numeric problems)

a. Write a program that prints a multiplication table for a given number and the number of rows in the table. For example, for a number 5 and rows = 3, the output shouldbe:

i. 5 x 1 = 5
ii. 5 x 2 =10
iii. 5 x 3 =15

b. Write a program that shows the binary equivalent of a given positive number between 0 to 255.

Task 4: (Expression Evaluation)

a. A building has 10 floors with a floor height of 3 meters each. A ball is dropped from the top of the building. Find the time taken by the ball to reach each floor. (Use the formula s = ut+(1/2)at^2 where u and a are the initial velocity in m/sec (= 0) and acceleration in m/sec^2 (= 9.8m/s^2)).
b. Write a C program, which takes two integer operands and one operator from the user, performs the operation and then prints the result. (Consider the operators +,-,*, /, % and use SwitchStatement)
c. Write a program that finds if a given number is a primenumber

Task 5: (Expression Evaluation)

a. Write a C program to find the sum of individual digits of a positive integer and test given number ispalindrome.
b. A Fibonacci sequence is defined as follows: the first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence. Write a C program to generate the first n terms of thesequence.
c. Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by theuser.

Task 6: (Expression Evaluation)

a. Write a C program to find the roots of a Quadraticequation.
b. Write a C program to calculate the following, where x is a fractionalvalue.
   1-x/2 +x^2/4-x^3/6
c. Write a C program to read in two numbers, x and n, and then compute the sum of this geometricprogression: 1+x+x^2+x^3+ ..... +x^n. For example: if n is 3 and xis 5, then the program computes 1+5+25+125.

Task 7: (Arrays and Pointers and Functions)

a. Write a C program to find the minimum, maximum and average in an array of integers.
b. Write a functions to compute mean, variance, Standard Deviation, sorting of n elements in single dimensionarray.
c. Write a C program that uses functions to perform thefollowing:
   i. Addition of TwoMatrices
   ii. Multiplication of TwoMatrices
   iii. Transpose of amatrix

   with memory dynamically allocated for the new matrix as row and column counts may not besame.

Task 8: (Arrays and Pointers and Functions)

a. Write C programs that use both recursive and non-recursivefunctions
   i. To find the factorial of a giveninteger.
   ii. To find the GCD (greatest common divisor) of two givenintegers.
   iii. To find x^n

b. Write a program for reading elements using pointer into array and display the values usingarray.
c. Write a program for display values reverse order from array usingpointer.
d. Write a program through pointer variable to sum of n elements fromarray.

Task 9:(Files)

a. Write a C program to display the contents of a file to standard outputdevice.
b. Write a C program which copies one file to another, replacing all lowercase characters with their uppercaseequivalents.
c. Write a C program to count the number of times a character occurs in a text file. The file name and the character are supplied as command linearguments.

Task 10:(Files)

a. Write a C program that does the following:It should first create a binary file and store 10 integers, where the file name and 10 values are given in the command line. (hint: convert the strings using atoi function) Now the program asks for an index and a value from the user and the value at that index should be changed to the new value in the file. (hint: use fseek function).The program should then read all 10 values and print themback.
b. Write a C program to merge two files into a third file (i.e., the contents of the firs t file followed by those of the second are put in the thirdfile).

Task 11:(Strings)

a. Write a C program to convert a Roman numeral ranging from I to L to its decimal equivalent.
b. Write a C program that converts a number ranging from 1 to 50 to Romanequivalent
c. Write a C program that uses functions to perform the followingoperations:
   i. To insert a sub-string in to a given main string from a givenposition.
   ii. To delete n Characters from a given position in a givenstring.

Task 12:(Strings)

a. Write a C program to determine if the given string is a palindrome or not (Spelled same in both directions with or without a meaning like madam, civic, noon, abcba, etc.)
b. Write a C program that displays the position of a character ch in the string S or – 1 if S doesn‘t containch.
c. Write a C program to count the lines, words and characters in a giventext.

Task 13:(Miscellaneous)

a. Write a menu driven C program that allows a user to enter n numbers and then choose between finding the smallest, largest, sum, or average. The menu and all the choices are to be functions. Use a switch statement to determine what action totake. Display an error message if an invalid choice isentered.
b. Write a C program to construct a pyramid of numbers asfollows:

```
1          *          1          1          *
1 2        * *        2 3        2 2        * *
1 2 3      * * *      4 5 6      3 3 3      * * *
                                 4 4 4 4    * *
                                            *
```

Task 14: (Sorting and Searching)

a. Write a C program that uses non recursive function to search for a Key value in a given listofintegers using linear searchmethod.
b. Write a C program that uses non recursive function to search for a Key value in a given sorted list of integers using binary searchmethod.
c. Write a C program that implements the Bubble sort method to sort a given list of integers in ascendingorder.

Task 15: (Sorting and Searching)

a. Write a C program that sorts the given array of integers using selection sort in descendingorder.
b. Write a C program that sorts the given array of integers using insertion sort in ascending order.
c. Write a C program that sorts a given array ofnames.

Text/ Reference Books:

1. Byron Gottfried, Schaum's Outline of Programming with C,McGraw-Hill
2. B.A. Forouzan and R.F. Gilberg C Programming and Data Structures,Cengage Learning, (3rdEdition)
3. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice Hall of India
4. R.G. Dromey, How to solve it by Computer, Pearson (16thImpression)
5. Programming in C, Stephen G. Kochan, Fourth Edition, PearsonEducation.
6. Herbert Schildt, C: The Complete Reference, Mc Graw Hill, 4thEdition

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS

Course Code:GR18A1002 **L/ T/P/C :3/1/0/4**

Course Objectives: To provide the student with

- The knowledge to visualize solutions to engineering problems governed by differentialequations
- The skill of evaluating multiple integrals needed for applications in mechanics and electro-magnetic fieldtheory
- The knowledge to visualize the functions arising in vector field theory and use mathematical tools for somecomputations
- The skill of calculating work done by a field and flux across asurface
- The skill of using specialized theorems for fast computation of work andflux

Course Outcomes: After learning the contents of this paper the student must be able to

- Classify the differential equations of first order and solve them analytically by suggested methods
- Solve linear differential equations of higher order under various forcingfunctions
- Evaluate double and triple integrals and apply them to some problems in geometry and mechanics
- Perform vector differential operations on scalar and vector fields and apply them to solve some field relatedproblems
- Apply classical vector integral theorems for fast computation of work done around closed curves and flux across closedsurfaces

Unit I: FIRST ORDER ODE

LDE of the first order: Solution of Exact, linear and Bernoulli equations, modeling of Newton's law of cooling, growth and decay models, modeling an R-L circuit.Non - linear differential equations of the first order: Equations solvable for *p*, equations solvable for *x*, equations solvable for *y*.

Unit II: ORDINARY DIFFERENTIAL EQUATIONS OF HIGHER ORDER

LDE with constant coefficients: Complementary function, over damping, under damping and critical damping of a system,Particular integrals for *f(x)* of the form
e^{ax}, x^n, $cosax$, $sinax$, (x) and x (x) where $V(x) \equiv cosax\ and\ sinax$, the method of variation of parameters

LDE with variable coefficients: Cauchy's homogeneous equation, Legendre's homogeneousequations

Unit III: MULTIPLE INTEGRALS

Double integrals: Evaluation of Double Integrals, change of order of integration (only Cartesian form), change of variables (Cartesian and polar coordinates)

Triple Integrals: Evaluation of triple integrals, Change of variables (Cartesian to Spherical and Cylindrical polarcoordinates)

Applications: Areas (by double integrals) and volumes (by double integrals and triple integrals), Centre of mass and Gravity (constant and variable densities) by double and triple integrals (applications involving cubes, sphere and rectangular parallelepipeds

Unit IV: VECTOR DIFFERENTIATION AND LINE INTEGRATION

Vector differentiation:Scalar and vector point functions, Concepts of gradient, divergence and curl of functions in cartesian framework, solenoidal fields, irrotational fields,potentials

Vectorlineintegration: Evaluation of the line integral, concept of work done by a force field, Conservativefields

Unit V: SURFACE INTEGRATION AND VECTOR INTEGRALTHEOREMS

Surface integration: Evaluation of surface and volume integrals, flux across asurface

Vector integral theorems: Green's, Gauss and Stokes theorems (without proofs) and their applications

Text/Reference Books:

1. R.K.Jain and S.R.K.Iyengar, Advanced Engineering Mathematics, Narosa publishing house,
2. Fourth edition2014
3. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010
4. Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons,2006
5. 4.. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9thEdition, Pearson, Reprint,2002.
6. GRIET referencemanual
7. Paras Ram, Engineering Mathematics, 2nd Edition, CBSPublishes
8. S. L. Ross, Differential Equations, 3rd Ed., Wiley India,1984.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

ENGINEERING CHEMISTRY

CourseCode:GR18A1005 **L/T/P/C: 3/1/0/4**

Course Objectives:

- To relate how the basic concepts and principles of chemistry can be applied to practical utility in a broader perspective of thesociety.
- To distinguish the ranges of electromagnetic spectrum and its interaction with matter and to develop knowledge of various spectroscopic techniques at atomic and molecularlevels.
- To identify and apply various principles of electrochemistry, corrosion and water treatment which are essential for an engineer inindustry
- To acquire knowledge of existence of different organic molecules in different stereo chemical orientations useful for understanding reaction pathways.
- To bring adaptability to the concepts of chemistry and to acquire the required skills to become a perfectengineer.

Course Outcomes:

- Analyze microscopic chemistry in terms of atomic and molecular orbitals and intermolecularforces.
- Relate electromagnetic spectra used for exciting different molecular energy levels in various spectroscopic techniques and their application in medicine and otherfields.
- Recognise various problems related to electro chemistry and corrosion in industry and is able to explain different prevention techniques and apply concepts of chemistry inEngineering.
- Know the origin of different types of engineering materials used in modern technology and Interpret different problems involved in industrial utilization ofwater.
- Understand the processing of fossil fuels for the effective utilization of chemical energy.

Unit I: ATOMIC AND MOLECULAR STRUCTURE

Atomic and molecular orbitals, Linear Combination of Atomic Orbitals (LCAO), Molecular orbitals of homo-nuclear diatomic molecules, MO energy diagrams of N_2, and O_2.

Metallic bonding, Valence Bond Theory, Crystal Field Theory, Crystal Field Splitting of transition metal ion d-orbitals in tetrahedral, octahedral, and square planar geometries.

Unit II: SPECTROSCOPIC TECHNIQUES AND APPLICATIONS

Regions of electromagnetic spectrum, Molecular spectroscopy Rotational Spectroscopy: Rotation of molecules, rotational spectra of rigid diatomic molecules, selection rules. Vibrational Spectroscopy: The vibrating diatomic molecule, simple and anharmonic oscillators of a diatomic molecule, selection rules, applications of IR spectroscopy.

Nuclear Magnetic Resonance: Basic concepts of NMR, Chemical shift. Magnetic resonance Imaging.

Unit III: ELECTROCHEMISTRY AND CORROSION

Electrochemistry**:** Electrode potential, types of electrodes: calomel and glass electrodes-construction and working, electrochemical series and applications, electrochemical cells: Galvanic & electrolytic cells, Nernst equation- applications, numerical problems, Batteries: primary and secondary types, lithium metal, lithium ion and lead acid batteries. Fuel cells: hydrogen-oxygen fuel cell - applications and advantages.

Corrosion: Definition, causes and effects of corrosion, Theories of chemical and electro chemical corrosion with mechanism, Types of corrosion - Galvanic, concentration cell and pitting corrosions, factors affecting corrosion (Nature of metal & Nature of Environment), corrosion control methods: Proper designing, cathodic protection (sacrificial anodic and impressed current cathodic protection), Metallic coatings: Hot dipping- Galvanization and tinning, electroplating, electroless plating of nickel.

Unit IV: ENGINEERING MATERIALS AND WATER TECHNOLOGY

Semiconductors: Si and Ge, preparation, purification and crystal growth by zone refining and Czochralski pulling methods, doping.

Polymeric Materials: plastics-classification, types of polymerization, properties of polymers-crystallinity, melting and boiling points, glass transition temperature, viscoelasticity. Compounding and fabrication by compression moulding and injection moulding, conducting polymers – definition, classification, application.

Water: impurities, hardness- causes of hardness, types, Units. Boiler troubles- scales and sludges, caustic embrittlement, water purification by reverse osmosis (RO) method.

Unit V: STEREOCHEMISTRY AND ENERGY RESOURCES

Stereo chemistry: Structural isomers and stereoisomers, representations of 3D structures, configurations and symmetry, chirality, enantiomers, diastereomers, optical activity, conformational analysis of n-butane. Structure, synthesis and pharmaceutical applications of paracetamol and aspirin.

Energy sources: Fossil Fuels: Coal –types, analysis of coal- proximate and ultimate analysis and their significance, Petroleum-its composition-synthetic petrol – Fischer Tropsch's process, cracking - Definition and its significance, knocking and its mechanism in Internal Combustion engines, Octane rating and cetane number. Composition and Uses of Natural gas, LPG andCNG.

Text/Reference Books:

1. Engineering Chemistry by P.C. Jain and M. Jain; Dhanpat RaiPublishing Company (P) Ltd., New Delhi.
2. Engineering Chemistry by Prasanta Rath, B. Rama Devi, Ch. Venkata Ramanareddy, S. Chakroborty. Cengage Publications, 2018.
3. University Chemistry, by B.H.Mahan.
4. Engineering Chemistry by B. Siva Sankar, Mc Graw HillPublication.
5. Fundamentals of Molecular Spectroscopy, by C.N. Banwell. Mc Graw Hill Publication.
6. A Text book of Engineering Chemistry by Shashi Chawla, Dhanpat Rai Publishing Company (P) Ltd., NewDelhi.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

BASIC ELECTRICAL ENGINEERING

CourseCode: GR18A1008 **L/ T/ P/ C:3/0/0/3**

Course Objectives:

- To introduce the fundamentals of ElectricalEngineering.
- To solve problems in ACcircuits.
- To provide foundation in theory and applications of Transformers and DCmachines
- Understand the basic principles of AC Electrical machinery and theirapplications.
- To import the knowledge of ElectricalInstallations.

Course Outcomes:

- To understand and analyze basic electric circuits with suitable theorems.
- To solve 1-phase and 3-phase balanced sinusoidal systems.
- To interpret the working principle of Electricalmachines.
- To appraise the applications of Induction motors and synchronous generators used in Industries.
- To identify the components of Low Voltage ElectricalInstallations.

Unit I: D.C. CIRCUITS

Electrical circuit elements (R, L and C), voltage and current sources, KVL&KCL, analysis of simple circuits with dc excitation.Superposition, Thevenin and Norton Theorems.
Time-domain analysis of first-order RL and RC circuits.

Unit II: A.C. CIRCUITS

Representation of sinusoidal waveforms, peak and rms values, phasor representation, real power, reactive power, apparent power, power factor, Analysis of single-phase ac circuits consisting of R, L, C, RL, RC, RLC combinations (series and parallel), resonance in series RL-C circuit.
Three-phase balanced circuits, voltage and current relations in star and delta connections.

Unit III: TRANSFORMERS

Ideal and practical transformer, equivalent circuit, losses in transformers, regulation and efficiency.Auto-transformer and three-phase transformer connections.

Unit IV: ELECTRICALMACHINES

Generation of rotating magnetic fields, Construction and working of a three-phase induction motor, Significance of torque-slip characteristic. Loss components and efficiency, starting and speed control of induction motor. Single-phase induction motor. Construction, working, torque-speed characteristic and speed control of separately excited dc motor. Construction and working of synchronousgenerators.

Unit V: ELECTRICAL INSTALLATIONS

Components of LT Switchgear: Switch Fuse Unit (SFU), MCB, ELCB, MCCB, Types of Wires and Cables, Earthing. Types of Batteries, Important Characteristics for Batteries. Elementary calculations for energy consumption, power factor improvement and battery backup.

Text/Reference Books:

1. Basic Electrical Engineering - D.P. Kothari and I.J. Nagrath, 3rd edition 2010, Tata McGraw Hill.
2. D.C. Kulshreshtha, "Basic Electrical Engineering", McGraw Hill,2009.
3. L.S. Bobrow, Fundamentals of Electrical Engineering", Oxford University Press, 2011
4. Electrical and Electronics Technology, E. Hughes, 10th Edition, Pearson,2010
5. Electrical Engineering Fundamentals, Vincent Deltoro, Second Edition, PrenticeHall India,1989

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

ENGLISH

CourseCode:GR18A1006 **L/T/P/C: 2/0/0/2**

INTRODUCTION

In view of the growing importance of English as a tool for global communication and the consequent emphasis on training students to acquire language skills, the syllabus of English has been designed to develop linguistic, communicative and critical thinking competencies of Engineering students.

In English classes, the focus should be on the skills development in the areas of vocabulary, grammar, reading and writing. For this, the teachers should use the prescribed text for detailed study. The students should be encouraged to read the texts leading to reading comprehension and different passages may be given for practice in the class. The time should be utilized for working out the exercises given after each excerpt, and also for supplementing the exercises with authentic materials of a similar kind, for example, newspaper articles, advertisements, promotional material etc. *The focus in this syllabus is on skill development, fostering ideas and practice of language skills in various contexts and cultures.*

Course Objectives: The course will help to

- Improve the language proficiency of students in English with an emphasis on Vocabulary, Grammar, Reading and Writingskills.
- Equip students to study academic subjects more effectively and critically using the theoretical and practical components of English syllabus.
- Develop study skills and communication skills in formal and informalsituations.
- Understand the importance of defining, classifying and practice the unique qualities of professional writingstyle.
- Employ the acquired knowledge in classroom with reference to various social and professional spheres thus leading to a life-long learningprocess.

Course Outcomes: Students should be able to

- Use English Language effectively in spoken and writtenforms.
- Comprehend the given texts and respond appropriately.
- Communicate confidently in various contexts and differentcultures.
- Acquire basic proficiency in English including reading and listening comprehension, writing and speakingskills.
- Demonstrate the skills needed to participate in a conversation that builds knowledge collaboratively by listening carefully and respect others point ofview.

Unit I

'The Raman Effect' from the prescribed textbook 'English for Engineers' published by Cambridge University Press.

Vocabulary Building: The Concept of Word Formation --The Use of Prefixes and Suffixes. **Grammar:** Identifying Common Errors in Writing with Reference to Articles and Prepositions.

Reading: Reading and Its Importance- Techniques for Effective Reading.

Basic Writing Skills: Sentence Structures - Use of Phrases and Clauses in Sentences- Importance of Proper Punctuation- Techniques for writing precisely – **Paragraph writing** – Types, Structures and Features of a Paragraph - Creating Coherence-Organizing Principles of Paragraphs in Documents.

Unit II

Letter Writing

Vocabulary: Synonyms and Antonyms. Use of phrases for formal and informal letter writing. Eg.., I would like to apply, I regret to inform, This is to bring to your kind notice... etc.

Grammar: Identifying Common Errors in Writing with Reference to Noun-pronoun Agreement and Subject-verb Agreement.

Reading: Improving Comprehension Skills – Techniques for Good Comprehension, Read a letter

Writing: Format of a Formal Letter-**Writing Formal Letters** E.g.., Letter of Complaint, Letter of Requisition, Job Application with Resume. Reorganising of sentences /paragraphs in aletter.

Unit III

'Blue Jeans' from the prescribed textbook 'English for Engineers' published by Cambridge University Press.

Vocabulary: Acquaintance with Prefixes and Suffixes from Foreign Languages in English to form Derivatives-Words from Foreign Languages and their Use inEnglish.

Grammar: Identifying Common Errors in Writing with Reference to Misplaced Modifiers andTenses.

Reading: Sub-skills of Reading- Skimming and Scanning

Writing: Nature and Style of Sensible Writing- **Defining- Describing** Objects, Places and Events – **Classifying**- Providing Examples orEvidence.

Unit IV

'What Should You Be Eating' from the prescribed textbook 'English for Engineers' published by Cambridge University Press.

Vocabulary: Standard Abbreviations in English

Grammar: Redundancies and Clichés in Oral and Written Communication.

Reading: Comprehension- Intensive Reading and Extensive Reading

Writing: Writing Practices--Writing Introduction and Conclusion - Essay Writing-PrécisWriting.

Unit V

'How a Chinese Billionaire Built Her Fortune' from the prescribed textbook 'English for Engineers' published by Cambridge University Press. Vocabulary: Technical Vocabulary and theirusage

Grammar: Common Errors inEnglish

Reading: Reading Comprehension-Exercises forPractice

Writing: **Technical Reports**- Introduction – Characteristics of a Report – Categories of Reports

Formats- Structure of Reports (Manuscript Format) -Types of Reports - Writing a Report.

Text/ReferenceBooks:

1. Sudarshana, N.P. and Savitha, C. (2018). English for Engineers. Cambridge University Press**.**
2. Swan, M. (2016). Practical English Usage. Oxford UniversityPress.
3. Kumar, S and Lata, P.(2018). Communication Skills. Oxford UniversityPress.
4. Wood, F.T. (2007).Remedial English Grammar. Macmillan.
5. Zinsser, William. (2001). On Writing Well. Harper Resource Book.
6. Hamp-Lyons, L. (2006).Study Writing. Cambridge UniversityPress.
7. Exercises in Spoken English. Parts I –III. CIEFL, Hyderabad. Oxford UniversityPress.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

ENGINEERING CHEMISTRY LAB

Coursecode:GR18A1013 **L/T/P/C: 0/0/3/1.5**

Course Objectives:

- Introduce practical applications of chemistry concepts to engineeringproblems.
- To determine the rate constant of reactions from concentrations as a function oftime.
- Measure the molecular or ionic properties such as conductance, redoxpotentials
- Synthesize a drug molecule to learn how organic compounds are prepared inindustry.
- Know the laboratory practices implemented in a research and industrial chemistry laboratorysetting.

Course Outcomes:

- Ability to perform experiments illustrating the principles of chemistry relevant to the study of science andengineering.
- Determination of parameters like hardness and chloride content inwater.
- Understand the kinetics of a reactions from a change in concentrations of reactantsor products as a function oftime.
- Synthesize a drug molecule as an example of organic synthesis methods widelyused inindustry.
- Determination of physical properties like adsorption andviscosity.

TASK 1: Determination total hardness of water by complexometric method using EDTA.

TASK 2: Determination of chloride content of water by

Argentometry.**TASK 3:** Redox titration: Estimation of ferrous iron using

standard $KMnO_4$ **TASK 4:** Estimation of HCl by Conductometric titrations

TASK 5: Estimation of Acetic acid by Conductometric titrations

TASK 6: Estimation of Ferrous iron by Potentiometry using dichromate

TASK 7: Determination of rate constant of acid catalyzed reaction of methyl acetate

TASK 8: Determination of acid value of coconut oil.

TASK 9: Adsorption of acetic acid by charcoal

TASK 10: Determination of surface tension of liquid by using stalagmometer

TASK 11: Determination of viscosity of liquid by using Ostwald's viscometer.

TASK 12: Determination of partition coefficient of acetic acid between n-butanol and water.

TASK 13: Synthesis of Aspirin

TASK 14: Synthesis of Paracetamol.

Text/Reference Books:

1. Vogel's text book of Practical Organic Chemistry, 5thEdition.
2. Senior Practical Physical Chemistry, B.D. Khosala, A. Gulati and V. Garg (R. Chand & Co.,Delhi)
3. Text book on Experiments and Calculations in Engineering Chemistry-S.S.Dara.
4. An Introduction to Practical Chemistry, K.K. Sharma and D.S. Sharma (Vikas Publications, NewDelhi)

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

BASIC ELECTRICAL ENGINEERING LAB

CourseCode:GR18A1016 **L /T/ P/ C: 0/ 0/2/1**

Course Objectives:

- To introduce the use of measuringinstruments.
- To analyze a given network by applying various electricallaws
- To calculate, measure and know the relation between basic electricalparameters.
- To know the response of electrical circuits for differentexcitations
- To summarize the performance characteristics of electricalmachines.

Course Outcomes:

- Get an exposure to common electrical components and theirratings.
- Get an exposure to basic electricallaws.
- Understand the measurement, calculation and relation between the basic electrical parameters
- Understand the response of different types of electrical circuits to different excitations.
- Compare the basic characteristics of Electricalmachines

TASK 1: Verification of Ohms Law
TASK 2: Verification of KVL and KCL
TASK 3: Transient Response of Series RL and RC circuits using DC excitation
TASK 4: Transient Response of RLC Series circuit using DC excitation
TASK 5: Resonance in series RLC circuit
TASK 6: Calculations and Verification of Impedance and Current of RL, RC and RLC series circuits
TASK 7: Measurement of Voltage, Current and Real Power in primary and Secondary Circuits of a Single Phase Transformer
TASK 8: Load Test on Single Phase Transformer (Calculate Efficiency and Regulation)
TASK 9: Three Phase Transformer: Verification of Relationship between Voltages and Currents (Star-Delta, Delta-Delta, Delta-star, Star-Star)
TASK 10: Measurement of Active and Reactive Power in a balanced Three-phase circuit
TASK 11: Performance Characteristics of a Separately/Self Excited DC Shunt/Compound Motor
TASK 1**2:** Torque-Speed Characteristics of a Separately/Self Excited DC Shunt/Compound Motor
TASK 13: Performance Characteristics of a Three-phase Induction Motor
TASK 14: Torque-Speed Characteristics of a Three-phase Induction Motor
TASK 15: No-Load Characteristics of a Three-phase Alternator

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

ENGLISH LANGUAGE AND COMMUNICATION SKILLS LAB

Coursecode:GR18A1014 **L/T/P/C:0/0/2/1**

The **Language Lab** focuses on the production and practice of sounds of language and familiarizes the students with the use of English in everyday situations both in formal and informal contexts.

Course Objectives:

- To facilitate computer-assisted multi-media instruction enabling individualized and independent languagelearning.
- To sensitize students to the nuances of English speech sounds, word accent, intonation rhythm and Neutralization of accent forintelligibility
- To bring about a consistent accent and intelligibility in students' pronunciation of English by providing an opportunity for practice inspeaking
- To improve the fluency of students in spoken English and neutralize their mother tongueinfluence
- To train students to use language appropriately for public speaking and interviews

Course Outcomes:

- Interpret the role and importance of various forms of communicationskills.
- Demonstrate the skills needed to participate in a conversation that builds knowledge collaboratively by listening carefully and respect others point ofview.
- Utilize various media of verbal and non-verbal communication with reference to various professionalcontexts.
- Recognise the need to work in teams with appropriate ethical, social and professional responsibilities.
- Evaluate and use a neutral and correct form ofEnglish.

English Language and Communication Skills Lab (ELCS) shall have two parts:

a. Computer Assisted Language Learning (CALL) Lab
b. Interactive Communication Skills (ICS) Lab

Listening Skills Objectives:

1. To enable students, develop their listening skills so that they may appreciate its role in the LSRW skills approach to language and improve their pronunciation

2. To equip students with necessary training in listening so that they can comprehend the speech of people of different backgrounds and regions

- Listening for general content
- Listening for specific information

Speaking SkillsObjectives:

- To involve students in speaking activities in variouscontexts
- To enable students express themselves fluently and appropriately in social and professionalcontexts
- Oral practice: Just A Minute (JAM)Sessions

- Describingobjects/situations/people
- Role play – Individual/Groupactivities

Exercise – I

CALL Lab:

Understand: Listening Skill- Its importance – Purpose- Process- Types- Barriers of Listening.

Practice: Introduction to Phonetics – Speech Sounds – Vowels and Consonants.

ICS Lab:

Understand: Communication at Work Place- Spoken vs. Written language.

Practice: Ice-Breaking Activity and JAM Session- Situational Dialogues – Greetings – Taking Leave – Introducing Oneself and Others.

Exercise – II

CALL Lab:

Understand: Structure of Syllables – Word Stress and Rhythm– Weak Forms and Strong Forms in Context.*Practice:* Basic Rules of Word Accent - Stress Shift - Weak Forms and Strong Forms in Context.

ICS Lab:

Understand: Features of Good Conversation – Non-verbal Communication.

Practice: Situational Dialogues – Role-Play- Expressions in Various Situations –Making Requests and Seeking Permissions - Telephone Etiquette.

Exercise-III:

CALL Lab:

Understand: Intonation-Errors in Pronunciation-the Influence of Mother Tongue (MTI).

Practice: Common Indian Variants in Pronunciation – Differences in British and American Pronunciation.

ICS Lab:

Understand: How to make Formal Presentations.

Practice: Formal Presentations.

Exercise – IV:

CALL Lab:

Understand: Listening for General Details.

Practice: Listening Comprehension Tests.

ICS Lab:

Understand: Public Speaking – Exposure to Structured Talks.

Practice: Making a Short Speech – Extempore.

Exercise – V:

CALL Lab:

Understand: Listening for Specific Details.

Practice: Listening Comprehension Tests.

ICS Lab:

Understand: Interview Skills.

Practice: Mock Interviews.

Minimum Requirement of infrastructural facilities for ELCS Lab:

1. **Computer Assisted Language Learning** (CALL) Lab

Computer systems, headphones and English language learning software for self- study by students.

2. Interactive Communication Skills (ICS) Lab:

The Interactive Communication Skills Lab: A Spacious room with movable chairs, audio-visual aids with a Podium, LCD and a projector

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

ENGINEERING WORKSHOP

CourseCode: GR18A1017 **L/T/P/C: 1/0/3/2.5**

Course Objectives :

- To prepare and practice of scientific principles underlying the art of manufacturingin Workshop / manufacturingpractices.
- To demonstrate basic knowledge of various tools and their use in differentsections.
- To make students to execute applications of various tools incarpentry.
- To make students recognize applications of manufacturing methods casting, forming machining, joining and advanced manufacturingmethods.
- To develop generate safety rules, safe practices and workshop dresscode.

Course Outcomes:

- Develop various trades applicable to industries / Manufacturingpractices.
- Create Hands on experience for commontrades.
- Improve to fabricate components with their ownhands.
- Develop practical knowledge on the dimensional accuracies and dimensional tolerances possible with various manufacturingprocesses
- To build the requirement of quality of work life on safety and organizationalneeds.

1. TRADES FOR EXERCISES: At least two exercises from eachtrade:

i. Carpentry
ii. FittingShop
iii. Tin-Smithy
iv. Casting
v. WeldingPractice
vi. House-wiring
vii. Black Smithy

2. VIDEO LECTURES: Carpentry, Fitting operations, Tin-Smithy, Casting, Welding, Electrical and Electronics, Black Smithy, Plumbing, Power tools in construction and Wood Working, ManufacturingMethods,

Text/ ReferenceBooks:

1. Workshop Practice /B. L. Juneja / Cengage
2. Workshop Manual / K. Venugopal /Anuradha.
3. Work shop Manual - P. Kannaiah/ K. L. Narayana/SciTech
4. Workshop Manual / Venkat Reddy/BSP

Syllabus
II -Year

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

DIGITAL LOGIC DESIGN

CourseCode:GR18A2065 **L/T/P/C:3/0/0/3**

II Year I Semester

Prerequisites

- Fundamentals ofMathematics.
- Knowledge of Problem Solving with Algorithms andFlowcharts.

Course Objectives: The Objectives of this course is to provide the student:

- Comprehend different number systems including the binary system and Boolean algebraicprinciples.
- Create minimal realizations of single and multiple output Booleanfunctions;
- Design and analyze combinational circuits using medium scale integrated (MSI) components, including arithmetic logicunits;
- Apply strategies for state minimization, state assignment, for the implementation of synchronous Finite State Machines
- Design of Combinational Programmable Logic Devices (CPLDs) like PROM, PAL, and PLA and develop HDL Models for LogicCircuits.

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

- Apply knowledge of fundamental Boolean principles and manipulation todesign LogicCircuits.
- Apply various techniques of Boolean function simplification to create minimal expressions.
- Create combinational circuits for a specified behavior with minimalspecification.
- Synthesise Sequential circuits with minimalstates.
- Realize combinational circuitry using Combinational PLDs and develop & test HDL models of LogicCircuits.

Unit I: BinarySystems

Digital Systems, Binary Numbers, Number Base Conversions, Octal and Hexadecimal Numbers, Complements, Signed Binary Numbers, Binary Codes, Binary Storage and Registers, BinaryLogic.

Boolean Algebra And Logic Gates: Basic Definitions, Axiomatic definition of Boolean Algebra, Basic theorems and properties of Boolean Algebra, Boolean Functions, Canonical and Standard Forms, Other Logic Operations, Digital Logic Gates, Integrated Circuits.

Unit II: Gate-Level Minimization

The Map method, Four-variable map, Five-Variable map, Product of Sum's simplifications, Don't care conditions, NAND and NOR implementation, other two level implementations, Exclusive-OR Function.

Unit III: Combinational Logic

Combinational Circuits, Analysis Procedure, Design Procedure, Binary Adder - Subtractor, Decimal Adder, Binary Multiplier, Magnitude Comparator, Decoders, Encoders, Multiplexers.

Unit IV: Synchronous Sequential Logic

Sequential Circuits, Latches, Flip-Flops, Analysis of clocked sequential circuits, State Reduction and Assignment, Design Procedure.

Registers and Counters: Registers, shift registers, Ripple Counters, Synchronous Counters, other counters.

Unit V: Memory and Programmable Logic

Introduction, Random Access Memory, Memory Decoding, Error Detection and Correction, Read Only Memory, Programmable Logic Array, Programmable Array Logic, Sequential Programmable Devices.

Hardware Description Language: Hardware Description Language, Definition, Structural Definition of HDL, HDL Models for Combinational circuits, HDL for Models for Sequential circuits.

Text/Reference Books:

1. Digital Design – Fourth Edition, M. Morris Mano, PearsonEducation.
2. Fundamentals of Logic Design – Roth, 5th Edition,Thomson.
3. Switching and Finite Automata Theory by ZviKohavi, Tata McGrawHill.
4. Fundamentals of Digital Logic with VHDL Design, Stephen Brown, Zvonko Vranesic, Tata McGraw Hill, Indianedition.
5. Switching and Logic Design – CVS Rao, Pearson Education
6. Digital Principles and Design – Donald D.Givone, Tata McGraw Hill.
7. Fundamentals of Digital Logic and Micro Computer Design, 5th Edition, M.Rafiquzzaman (JohnWilley)

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

DATA STRUCTURES

CourseCode:GR18A2066 **L/T/P/C:3/0/0/3**

II Year I Semester

Course Objectives: The students will learn

- The basic concepts of Datastructures.
- The techniques used to analyze the performance of various Searching and Sorting techniques.
- The various types of Linked lists overarrays.
- Basic concepts about stacks, queues, lists, trees andgraphs.
- To write algorithms for solving problems with the help of fundamental data structures

Course outcomes: Upon the successful completion of the course the students will be able to

- Implement searching techniques for a givenproblem.
- Write pseudo code for various sortingtechniques.
- Implement various linear data structures and determine the timecomplexity.
- Understand the non-linear data structures like trees,graphs.
- Choose appropriate data structures to represent data items in real worldproblems

Unit I

Introduction: Basic Terminologies: Elementary Data Organizations, Data Structures, Operations: Insertion, Deletion, Traversal.

Searching: Linear Search and Binary Search Techniques and their complexity analysis.

Sorting: Quick Sort, Merge Sort.

Unit II

Stacks and Queues: Stack ADT, operations, Applications of Stacks: Expression Conversion and Evaluation– corresponding algorithms and complexity analysis.

Queue ADT, Types of Queues: Simple Queue, Circular Queue, Priority Queue; Operations on each type of Queues: Algorithms and theiranalysis.

Unit III

Linked Lists: Singly linked lists: Representation in memory, Algorithms of several operations: Traversing, Searching, Insertion, Deletion; Linked representation of Stack and Queue.

Doubly linked list: operations and algorithmic analysis;

Circular Linked Lists: operations and algorithmic analysis.

Unit IV

Trees: Basic Tree Terminologies, Different types of Trees: Binary Tree, Threaded Binary Tree, Binary Search Tree, AVL Tree; Tree operations on each of the trees and their algorithms with complexity analysis. Applications of BinaryTrees.

Unit V

B Tree: Definition, Operations: Insertion, Searching and Deletion.

Graph: Basic Terminologies and Representations, Graph traversal algorithms: BFS and DFS

Text/Reference Books:

1. Data Structures and Algorithm Analysis , 2nd edition, Mark Allen Weiss,Pearson
2. Data Structures using C, 1st Edition, Aaron M. Tenenbaum,Pearson
3. Data Structures using C, 2nd Edition, Reema Thareja,Oxford.
4. Data Structures and Algorithms Using C, 5th Edition, R. S. Salaria, Khanna Book PublishingEdition.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

PROBABILITY AND STATISTICS

CourseCode:GR18A2005 **L/T/P/C : 3/0/0/3**
II Year ISemester

Course objectives
On completion of this Course, the student shall be able to:

- State the fundamentals of Probability and Statistics.
- Describe the properties of random variables and distributions.
- Interpret the measures of central tendency, dispersion, and association
- Distinguish between explanatory and response variables and analyze multi variable data using correlation and regression.
- Apply the tests of hypothesis.

Course Outcomes
The expected outcomes of the Course are:

- Estimate the chance of occurrence of various uncertain events in different random experiments with strong basics of probability.
- Compute and interpret descriptive statistics.
- Evaluate random processes which occur in engineering applications governed by the Binomial, Poisson, Multinomial, Exponential, Normal and Gamma distributions.
- Forecast the models using Regression Analysis.
- Apply Inferential Statistics to make predictions or judgments about the population from which the sample data is drawn.

Module 1: Basic Probability and Random Variables
Probability spaces, conditional probability, independence, Bayes' rule ; Discrete random variables, Continuous random variables and their properties,Distribution functions and densities, Independent random variables, Sums of independent random variables; Expectation of Discrete and Continuous Random Variables, Moments, Variance of a sum, Chebyshev's Inequality.

Module 2: Basic Statistics and Discrete Probability Distributions
Measures of Central tendency, Moments, Skewness and Kurtosis.
Probability distributions: Infinite sequences of Bernoulli trials, Binomial, Poisson, Poisson approximation to the binomial distribution, multinomial distributionand evaluation of statistical parameters for Binomial and Poisson distributions.

Module 3: Continuous Probability Distributions and Bivariate Distributions
Bivariate distributions and their properties, Distribution of sums and quotients, Conditional densities. Normal, Exponential and Gamma density functions,Evaluation of statistical parameters for Normal distribution.

Module 4: Curve fitting and Correlation
Curve fitting by the method of least squares- fitting of straight line, Second degree parabola, Exponential and Power curves.
Correlation(Karl Pearson’s Correlation coefficient and Spearman’s Rank correlation (Statements of their properties and problems)),Regression (including Multiple regression with two independent random variables), (Statements of their properties and problems only).

Module 5: Applied Statistics

Test of significance: Large sample test for single proportion, difference of proportions, single mean, difference of means, and difference of standard deviations.

Test for single mean, difference of means and correlation coefficient, test for ratio ofvariances in small samples, Chi-square test for goodness of fit and independence of attributes.

Text / References:

1. E. Kreyszig, "Advanced Engineering Mathematics", John Wiley & Sons, 2006.
2. P. G. Hoel, S. C. Port and C. J. Stone, "Introduction to Probability Theory", UniversalBook Stall, 2003.
3. S. Ross, "A First Course in Probability", Pearson Education India, 2002.
4. W. Feller, "An Introduction to Probability Theory and its Applications", Vol. 1, Wiley,1968.
5. N.P. Bali and M. Goyal, "A text book of Engineering Mathematics", Laxmi Publications,2010.
6. B.S. Grewal, "Higher Engineering Mathematics", Khanna Publishers, 2000.
7. T. Veerarajan, "Engineering Mathematics", Tata McGraw-Hill, New Delhi, 2010.
8. S.C.Gupta and V.K.Kapoor , "Fundamentals of Mathematical Statistics",Sultan Chand &sons,2014

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

DISCRETE MATHEMATICS

CourseCode:GR18A2067 **L/T/P/C: 3/1/0/4**

II Year I Semester

Course Objectives: The Objectives of this course is to provide the student:

- Use mathematically correct terminology andnotation.
- Construct correct direct and indirectproofs.
- Use division into cases in aproof.
- Usecounterexamples.
- Apply logical reasoning to solve a variety ofproblems.

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

- For a given logic sentence express it in terms of predicates, quantifiers, and logical connectives.
- For a given a problem, derive the solution using deductive logic and prove the solution based on logicalinference.
- For a given a mathematical problem, classify its algebraicstructure..
- Evaluate Boolean functions and simplify expressions using the properties ofBoolean algebra.
- Develop the given problem as graph networks and solve with techniques of graph theory.

Unit I: MATHEMATICAL LOGIC

Statements and notations, Connectives, Well formed formulas, Truth Tables, tautology, equivalence implication, Normal forms.
Predicates: Predicative logic, Free & Bound variables, Rules of inference, Consistency, proof ofcontradiction.

Unit II: SET THEORY

Properties of binary Relations, equivalence, compatibility and partial ordering relations, Hassediagram.
Functions: Inverse Function Composite of functions, recursive Functions, Lattice and its Properties, Pigeon hole principles and its application.
Algebraic structures: Algebraic systems Examples and general properties, Semi groups and monads, groups sub groups' homomorphism, Isomorphism.

Unit III: ELEMENTARY COMBINATORICS

Basis of counting, Combinations & Permutations, with repetitions, Constrained repetitions, Binomial Coefficients, Binomial Multinomial theorems, the principles of Inclusion – Exclusion.

Unit IV: RECURRENCE RELATION: Generating Functions, Function of Sequences Calculating Coefficient of generating function, Recurrence relations, Solving recurrence relation by substitution and Generating funds. Characteristics roots solution of In homogeneous Recurrence Relation.

Unit V: GRAPH THEORY

Representation of Graph, DFS, BFS, Spanning Trees, planar Graphs
Graph Theory and Applications, Basic Concepts Isomorphism and Sub graphs, Multi graphs and Euler circuits, Hamiltonian graphs, Chromatic Numbers.

Text /Reference Books:

1. Discrete and Combinational Mathematics- An Applied Introduction-5th Edition– Ralph. P.Grimaldi.PearsonEducation
2. Discrete Mathematical Structures with applications to computer science Trembly J.P. &Manohar .P,TMH
3. Mathematical Foundations for Computer Science Engineers,JayantGanguly,Pearson Education
4. Discrete Mathematics and its Applications, Kenneth H. Rosen, FifthEdition.TMH.
5. Discrete Mathematics with Applications, Thomas Koshy,Elsevier
6. Discrete Mathematical Structures, BernandKolman, Roberty C. Busby, Sharn Cutter Ross, Pearson

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

DATABASE MANAGEMENT SYSTEMS

CourseCode: GR18A2068 **L/T/P/C: 3/0/0/3**

II Year I Semester

Course Objectives:

- To understand the different issues involved in the design and implementation of a databasesystem.
- To understand Structured Query Language for manipulating theData.
- To study the physical, conceptual and logical databasedesigns
- To provide concepts of Transaction, Concurrency and Recovery Management Strategies of aDBMS
-
- To design and build a simple database system and demonstrate competence with the fundamental tasks involved with modelling, designing, and implementing aDBMS.

Course Outcomes:

- Identify the role of Database System Applications and the design issuesrelated.
- Design the logical model for the applications and apply indexingtechniques.
- Construct a Database Schema, Manipulate data using aSQL.
- Can apply the Schema Refinement techniques for a database design for optimized access.
- For a given transaction-processing system, determine the transaction atomicity, consistency, isolation, anddurability.

Unit I

Introduction to Database and System Architecture: Database Systems and their Applications, Database Vs File System, View of Data, Data Models, Database Languages-DDL and DML, Transaction Management, Database users and Administrators, Database System Structure.

Introduction to Database Design: ER Diagrams, Entities, Attributes and Entity sets, Relationships and Relationship set, Extended ER Features, Conceptual Design with the ER Model, Logical database Design.

UnitII:

SQL: Queries and Constraints: Form of Basic SQL Query, SQL Operators, Set Operators, Nested Queries, Aggregate Operators, NULL values, Integrity Constraints Over Relations, Joins, Introduction to View, Destroying / Altering Tables and Views, Cursors, Triggers and Active Databases.

Unit III

Relational Model: Introduction to Relational Model, Basic Structure, Database Schema, Keys, Relational Algebra and Relational Calculus.

Storage and Indexing: File Organizations and Indexing-Overview of Indexes, Types of Indexes, Index Data Structures, Tree structured Indexing, Hash based Indexing.

Unit IV

Schema Refinement and Normal Forms: Introduction to Schema Refinement, Functional Dependencies, Reasoning about FD, Normal Forms, Properties of Decomposition.

Unit V

Transaction Management: Transactions: Transaction Concept, Transaction State, Implementation of Atomicity and Durability, Concurrent Executions, Serializability, Recoverability, Implementation of Isolation, Testing for Serializability.

Concurrency Control: Lock based Protocols, Timestamp based protocols

Recovery System: Recovery and Atomicity, Log based recovery, Shadow Paging, Recovery with concurrent Transactions, Buffer Management.

Text/Reference Books

1. "Data base Management Systems", Raghurama Krishnan, Johannes Gehrke, TATA McGraw Hill 3rd Edition
2. "Data base System Concepts", Silberschatz, Korth, McGraw hill, Vedition.
3. "Introduction to Database Systems", C.J.Date PearsonEducation.
4. "Database Systems design, Implementation, and Management", Rob & Coronel 5th Edition.
5. "Database Management Systems", P. Radha Krishna HI-TECH Publications2005.
6. "Database Management System", ElmasriNavate PearsonEducation.
7. "Database Management System", Mathew Leon,Leo.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

OPEN SOURCE LAB

CourseCode: GR18A2069 **L/T/P/C: 0/0/3/1.5**

II Year I Semester

Course Objectives:

- To expose students to FOSS environment and introduce them to use open source Packages
- To expose the students installation of open sourcesoftware's
- To explore features of openCV
- To explore the features of LIST processinglanguages
- To explore the featuresScilab

Course Outcomes:

- Students are able to install open sourcepackages
- Students understand Kernel Configuration of Linux
- Students are able to use GUI programs with OpenCV
- Students are able to develop the programs for PERL,LISP
- Students are able to useLATEX

1. **Kernel configuration, compilation and installation :** Download / access the latest kernel source code from kernel.org,compile the kernel and install it in the local system.Try to view the source code of thekernel

2. **Virtualisation environment** (e.g., xen, kqemu or lguest) to test an applications, new kernels and isolate applications. It could also be used to expose students to other alternate OSs like*BSD

3. **Compiling from source** : learn about the various build systems used like the auto* family, cmake, ant etc. instead of just running the commands. This could involve the full process like fetching from a cvs and also include autoconf, automakeetc.,

4. **Introduction to scilab: Installation of scilab, basic programs usingscilab**

5. **Installing various software packages :**Either the package is yet to be installed or an older version is existing. The student can practice installing the latest version. Of course, this might need internetaccess.
   - Install samba and share files towindows
   - Install Common Unix PrintingSystem(CUPS)

6. **Write userspace drivers using fuse** -- easier to debug and less dangerous to the system (Writing full-fledged drivers is difficult at studentlevel)

7. **Installation of Open CV and GUI programming : a sample programme** – using Gambas since the students have VB knowledge. However, one should try using GTK orQT

8. **Version Control System setup and usage** using RCS, CVS,SVN

9. **Text processing with Perl:** simple programs, connecting with database e.g., MYSQL

10. **Running PHP** : simple applications like login forms after setting up a LAMP stack

11. **Running Python** : some simple exercise – e.g. Connecting with MySql database

12. **Set up the complete network interface** usinf ifconfig command liek setting gateway, DNS, IP tables,etc.,

Resources:

An environment like **FOSS Lab Server** (developed by NRCFOSS containing the various packages)

OR

Equivalent system with Linux distro supplemented with relevant packages

Note:
Once the list of experiments are finalised, NRCFOSS can generate full lab manuals complete with exercises, necessary downloads, etc. These could be made available on NRCFOSS web portal.

LIST OF EQUIPMENTS:

Hardware:

Minimum Requirements:

- 700 Mhz X86 Processor
- 384 MB of system memory(RAM)
- 40 GB of diskspace
- Graphics card capable of 1024*768resolution
- Sound Card
- Network or InternetConnection

Software:

Latest distribution of Linux

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

DIGITAL LOGIC DESIGN LAB

CourseCode: GR18A2070 **L/T/P/C: 0/0/3/1.5**

II Year I Semester

Prerequisites

- Exposure to basic electronics, knowledge about transistor operation and skills of logicalthinking.

Course Objectives: The objective of this course is to provide

- Exposure to the hardware interaction for the Computer Science Engineeringstudents.
- Strengthens the logical thinkingskills
- Explaining the different combinationalcircuits
- Explaining the different sequentialcircuits
- Introducing simulatingenvironment.

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

- Identify the logic gates to solve the real worldproblems.
- Validate and check the various combinational circuits like adders, comparators, multiplexers andcheckers.
- Verify various sequential circuits like flip flops, registers, counters. Translate the Boolean expressions using hardware descriptionlanguage.
- Implement the sequential and combinational circuits over hardware description language.
- Analyze and synthesize logic circuits. Design any Boolean function using universal gates such as NAND andNOR.

A. COMBINATIONALCIRCUITS

1. Realization of Gates (AND, OR, NOT, NAND,NOR)
   Exercise: Realize an XOR and XNORgates
2. Design half adder and full adder usingGates
   Exercise: Design half subtractor circuit
3. Verification of four bit magnitudecomparator
   Exercise: Verify an 8bit magnitude comparator
4. Design a 2 to 1 Multiplexer
   Exercise: Implement a 4 to 1 Multiplexer.
5. Design a 2 to 4 Decoder and 1 to 4Demultiplexer
   Exercise: Implement a 3 to 8 decoder and design a 1 to 4 demultiplexer using 1 to 2 demultiplexer.
6. Design a 4 bit ParityChecker
   Exercise: Design a 4 bit Parity Generator.

B. SEQUENTIALCIRCUITS

1. Verification of truth tables of D and TFlip-Flops
   Exercise: Verify JK Flip-Flop
2. Conversion of JK Flip-Flop to DFlip-Flop
   Exercise: Convert JK Flip-Flop to T Flip-Flop
3. Design of 8 bit left ShiftRegister
   Exercise: Design a 4 bit right shift Register
4. Design a BinaryCounter
   Exercise: Design of Decade Counter
5. Design of Asynchronous UpCounter
   Exercise: Design an Asynchronous mod Counter
6. Design of Synchronous DownCounter
   Exercise: Design an Synchronous Up/Down Counter

C. HARDWARE DESCRIPTIONLANGUAGE

1. Simulation of LogicGates
2. Simulation of any given Boolean Expression.
   Example: Y = A'B +AB'C'
3. Simulation of Multiplexers, Comparators andDecoders.
4. Simulation of SequentialCounter.

Note: A minimum of 12 experiments are to be performed and recorded by the candidate to attain eligibility for practical examination.

Text/Reference Books:

1. Digital Design-Fourth Edition,M.Morris Mano,PearsonEducation.
2. Fundamentals of Logic Design-Roth, 5th Edition,Thomson.
3. Switching and Finite Automata Theory by ZviKohavi, Tata McGrawHill.
4. Fundamentals of Digital Logic with VHDL Design, Stephen Brown, Zvonko Vranesic, Tata McGraw Hill, Indianedition.
5. Switching and Logic Design – CVS Rao, Pearson Education
6. Digital Principles and Design – Donald D.Givone, Tata McGraw Hill.
7. Fundamentals of Digital Logic and Micro Computer Design, 5th Edition, M.Rafiquzzaman (JohnWilley)

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

DATA STRUCTURES LAB

CourseCode: GR18A2071 **L/T/P/C: 0/0/3/1.5**

II Year I Semester

Course Objectives: The students will learn

- Efficient Searching and sortingtechniques.
- To assess how the choice of data structures and algorithm design methods impacts the performance ofprograms.
- To choose the appropriate data structure like Single, Double and Circular Linked list for a specificapplication.
- To introduce various techniques for representation of the data in the real world and to develop application using datastructures.
- To solve problems using data structures such as linear lists, stacks, queues, binary trees, binary search trees, and graphs and writing programs for thesesolutions.

Course Outcomes:

After completion of course student will be able to:

- Analyze run-time execution of various sorting ,searchingmethods.
- Apply the knowledge of various Linked lists in real timeproblems.
- To choose appropriate data structure as applied to specified problemdefinition
- Understand the applications of Stacks and Queues.
- To handle operations like searching, insertion, deletion, traversing mechanism etc. on various datastructures.

Task- 1: Write a C Program for implementing the following searching methods

a. LinearSearch b. BinarySearch

Task- 2: Write a C Program for implementing the following Sorting Algorithms

a. Selection sort b.Bubblesort c. Insertionsort

Task- 3: Write a C Program for implementing the following Sorting Algorithms

a. Quicksort b. Mergesort

Task- 4: Write a C Program for implementing the following using an array

a. Stack ADT b. QueueADT

Task- 5: Write a C Program that reads an Infix expression and converts the expression to Postfix form (use Stack ADT).

Task- 6: Write a C Program to implement Circular Queue ADT using an array

Task-7: Write a C Program for implementing the following using a SinglyLinked List.

a. Stack ADT b. QueueADT

Task- 8: Write a C Program to implement the DoublyLinked List.

Task- 9: Write a C Program to implement the Circular Linked List.

Task- 10: Write a C Program to perform the following operations.

a. Construct a Binary search tree ofelements
b. Search for a key element in the above Binary searchtree
c. Delete an element from the above Binary searchtree

Task- 11: Write a C Program to perform the following operations.

a. Construct a AVLtree
b. Search for a key element in the above AVLtree
c. Delete an element from the above AVLtree

Task- 12: Write a C Program for implementing BFS and DFS for a given graph

Text /Reference Books:

1. Data Structures and AlgorithmAnalysis, 2nd edition, Mark Allen Weiss,Pearson
2. Data Structures using C, 1st Edition, Aaron M. Tenenbau,m,Pearson
3. Data Structures using C, 2nd Edition, Reema Thareja,Oxford.
4. Data Structures and Algorithms Using C, 5th Edition, R. S. Salaria, Khanna Book PublishingEdition.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

DATABASE MANAGEMENT SYSTEMS LAB

CourseCode: GR18A2072 **L/T/P/C: 0/0/4/2**

II Year I Semester

Course Objectives: The Objectives of this course is to provide the student:

- Develop the logical design of the database using data modeling concepts such as Relational model
- Infer the data models and use of queries in retrieving thedata.
- Create a relational database using a relational databasepackage.
- Manipulate a database usingSQL.
- Render the concepts of database systemstructure.

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

- Construct the schema of the database and modifyit.
- Compile a query to obtain the aggregated result from thedatabase.
- Speculate the concepts of various databaseobjects.
- Compare the use of procedure and function indatabase.
- Use triggers and packages to create applications in thedatabase.

Task- 1:

DDL commands (Create, Alter, Drop, Truncate)

1. Create a table EMP with the following structure.

Name	Type
EMPNO	NUMBER(6)
ENAME	VARCHAR2(20)
JOB	VARCHAR2(10)
MGR	NUMBER(4)
DEPTNO	NUMBER(3)
SAL	NUMBER(7,2)

2. Add a column commission to the emp table. Commission should be numeric with null valuesallowed.
3. Modify the column width of the job field of emptable.
4. Create dept table with the following structure.

Name	Type
DEPTNO	NUMBER(2)
DNAME	VARCHAR2(10)
LOC	VARCHAR2(10)

DEPTNO as the primary key

5. Add constraints to the emp table that is empno as the primary key and deptno as the foreignkey.
6. Addconstraintstotheemptabletochecktheempnovaluewhileentering(i.e)empno>
100. Salary value by default is 5000, otherwise it should accept the values from the user.
7. Add columns DOB to the emp table. Add and drop a column DOJ to the emp table.

Task- 2: DML COMMANDS (Insert, Update, Delete)

1. Insert 5 records into dept Insert few rows and truncate those from the emp1 table and also dropit.
2. Insert 11 records into emptable.
3. Update the emp table to set the value of commission of all employees to Rs1000/- who are working asmanagers.
4. Delete only those who are working assupervisors.
5. Delete the rows whose empno is7599.

Task- 3: DQL COMMAND (Select)- SQL Operators and Order by Clause

1. List the records in the emp table order by salary in descendingorder.
2. Display only those employees whose deptno is30.
3. Display deptno from the table employee avoiding the duplicatedvalues.
4. List all employee names, salary and 15% rise in salary. Label the column as payhike.
5. Display the rows whose salary ranges from 15000 to30000.
6. Display all the employees in dept 10 and 20 in alphabetical order ofnames.
7. List the employee names who do not earn commission.
8. Display all the details of the records with 5 character names with 'S' as startingcharacter.
9. Display joining date of all employees in the year of1998.
10. List out the employee names whose salary is greater than 5000 and less than6000

Task- 4: SQL Aggregate Functions, Group By clause, Having clause

1. Count the total records in the emp table.
2. Calculate the total and average salary of theemployee.
3. Determinethe maxandmin salaryandrename the column as max-salaryand min_salary.
4. Find number of departments in employeetable.
5. Display job wise sum, average, max, minsalaries.
6. Display maximum salaries of all the departments having maximum salary >2000
7. Display job wise sum, avg, max, min salaries in department 10 having average salary is greater than 1000 and the result is ordered by sum of salary in descendingorder.

Task- 5: SQL Functions

1. Display the employee name concatenate with employeenumber.
2. Display half of employee name in upper case and half in lowercase.
3. Display the month name of date "14-jul-09" infull.
4. Display the Date of joining of all employees in the format"dd-mm-yy".
5. Display the date two months after the Date of joining ofemployees.
6. Display the last date of that month in"05-Oct-09".
7. Display the rounded date in the year format, month format, day format in theemployee
8. Display the commissions earned by employees. If they do not earn commission, display it as "NoCommission".

Task- 6: Nested Queries

1. Find the third highest salary of anemployee.
2. Display all employee names and salary whose salary is greater than minimum salary of the company and job title starts with'M'.
4. Write a query to display information about employees who earn more than any employee in dept 30.
5. Display the employees who have the same job as Jones and whose salary is greater than or equal to the salary ofFord.

6. List out the employee names who get the salary greater than the maximum salaries of dept with dept no 20, 30.
7. Display the maximum salaries of the departments whose maximum salary is greater than 9000.
8. Create a table employee with the same structure as the table emp and insert rows into the table using selectclauses.
9. Create a manager table from the emp table which should hold details only about the managers.

Task- 7:

Joins, Set Operators.

1. Display all the employees and the departments implementing a left outerjoin.
2. Display the employee name and department name in which they are working implementing a full outerjoin.
3. Write a query to display their employee names and their managers' name and salary for everyemployee.
4. Write a query to output the name, job, empno, deptname and location for each dept, even if there are noemployees.
5. Display the details of those who draw the samesalary.

Task- 8$_1$**:** Views

1. Createaviewthatdisplaystheemployeeid,nameandsalaryofemployeeswhobelongto 10^{th} department.
2. Create a view with read only option that displays the employee name and their department name.
3. Display all the viewsgenerated.
4. Execute the DML commands on views created and drop them.

Task- 9: Practices on DCL commands, Sequence and indexes.

Task-10:

1. Write a PL/SQL code to retrieve the employee name, join date and designation of an employee whose number is given as input by theuser.
2. Write a PL/SQL code to calculate tax ofemployee.
3. Write a PL/SQL program to display top ten employee details based on salary usingcursors.
4. Write a PL/SQL program to update the commission values for all the employees' with salary less than 2000, by adding 1000 to the existingvalues.

Task- 11:

1. Write a trigger on employee table that shows the old and new values of employee name after updating on employeename.
2. Write a PL/SQL procedure for inserting, deleting and updating the employeetable.
3. Write a PL/SQL function that accepts the department number and returns the total salary of thatdepartment.

Task- 12:

1. Write PL/SQL program to handle predefinedexceptions.
2. Write PL/SQL program to handle user definedexception.
3. Write a PL/SQL code tocreate

a. Packagespecification

b. Package body to insert ,update, delete and retrieve data on emptable.

Text/Reference Books

1. The Complete Reference,3rd edition by James R.Groff, Paul N.Weinberg, Andrew J. Oppel
2. SQL & PL/SQL for Oracle10g, Black Book,Dr.P.S.Deshpande.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

VALUE ETHICS AND GENDER CULTURE

CourseCode:GR18A2002 **L/T/P/C : 2/0/0/2**

Course objectives

- To understand about the importance of ethicalvalues
- To understand the significance of human conduct andself-development
- To enable students to imbibe and internalize the value and Ethical behaviourin personal and professionallives.
- To provide a critical perspective on the socialization of men andwomen.
- To create an awareness on gender violence and condemnit.

Course Outcomes

- To enable the student to understand the core values that shapes the ethicalbehaviour.
- Student will be able to realize the significance of ethical human conduct and self-development
- Students will be able to inculcate positive thinking, dignity of labour and religious tolerance.
- Students will attain a finger grasp of how gender discrimination works in our society and how to counterit.
- Students will develop a better understanding on issues related to gender and Empowering students to understand and respond to genderviolence.

Unit-I-Values and Self Development –social values and individual attitudes, Importance of cultivation of values, Sense of duty, Devotion, Self-reliance, Confidence, Concentration, Truthfulness, Cleanliness, Honesty, Humanity, Power of faith, National unity, Patriotism, Love for nature, Discipline.

Unit-II Personality and Behaviour Development-positive thinking, punctuality, avoiding fault finding, Free from anger, Dignity of labour, religious tolerance, Aware of self- destructive habits.

Unit- III Introduction to Professional Ethics: Basic Concepts, Governing Ethics, Personal & Professional Ethics, Ethical Dilemmas, Life Skills, Emotional Intelligence, Thoughts of Ethics, Value Education, Dimensions of Ethics, Profession and professionalism, Professional Associations, Professional Risks, Professional Accountabilities, Professional Success, Ethics and Profession.

Unit–IV Introduction to Gender - Definition of Gender, Basic Gender Concepts and Terminology, Attitudes towards Gender, Social Construction of Gender.

Unit-V Gender-based Violence -The concept of violence, Types of Gender-based violence, the relationship between gender, development and violence, Gender-based violence from a human rights perspective.

Text Books

1. Professional Ethics: R. Subramanian, Oxford University Press,2015.

2. Ethics in Engineering Practice & Research, Caroline Whit beck, 2e, Cambridge University Press2015.

3. A Bilingual Textbook on Gender" written by A. Suneetha, Uma Bhrugubanda, Duggirala Vasanta, Rama Melkote, Vasudha Nagaraj, Asma Rasheed, Gogu Shyamala, Deepa Sreenivas and Susie Tharu and published by Telugu Akademi, Hyderabad,Telangana State in the year2015.

Reference Books

1. Menon, Nivedita. Seeing like a Feminist. New Delhi: Zubaan-Penguin Books,2012

2. Abdulali Sohaila. "I Fought For My Life…and Won."Available online at:http://www.thealternative.in/lifestyle/i-fought-for-my-lifeand-won-sohaila-abdulal/

3. Engineering Ethics, Concepts Cases: Charles E Harris Jr., Michael S Pritchard, Michael J Rabins, 4e , Cengage learning,2015.

4. Business Ethics concepts & Cases: Manuel G Velasquez, 6e, PHI,2008

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

COMPUTER ORGANIZATION

CourseCode: GR18A2073 **L/T/P/C: 3/0/3/3**

II Year II Semester

Prerequisites: Knowledge of Digital Logic Design.

Course Objectives: The Objectives of this course is to provide the student

- Comprehend operational concepts and understand register organization within a basic computersystem
- Analyze the basic computer organization and understand the concepts of Micro programmedcontrol
- Understand the design aspects of Central processing unitorganization
- Understand various algorithms for arithmetic operations within a computer system and communication with I/O devices and standard I/Ointerfaces..
- Study the hierarchical memory system including cache memory and virtual memory along with the design of Multiprocessor systems using various interconnection structures.

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

- Demonstrate knowledge of register organization of a basic computersystem
- Incorporate In-depth understanding of control unit organization and micro programmedcontrol.
- Understand the performance of central processing unit of a basic computersystem.
- Apply various algorithms to perform arithmetic operations and propose suitable hardware forthem.
- Analyze and emphasize various communication media in the basic computer system using design of various memory structures and Multiprocessorsystems.

UNIT-I:

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

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

UNIT-II:

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

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

UNIT-III:

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

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

UNIT-IV:

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

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

UNIT-V:

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

Text/Reference Books:

1. Computer Systems Architecture – M.Moris Mano, IIIrd Edition,Pearson/PHI
2. Computer Organization – Carl Hamacher, Zvonks Vranesic, SafeaZaky, Vth Edition, McGraw Hill.
3. Computer Organization and Architecture – William Stallings Sixth Edition, Pearson/PHI
4. Structured Computer Organization – Andrew S. Tanenbaum, 4th EditionPHI/Pearson
5. Fundamentals or Computer Organization and Design, - Sivaraama Dandamudi Springer Int.Edition.
6. Computer Architecture a quantitative approach, John L. Hennessy and David A. Patterson, Fourth EditionElsevier
7. Computer Architecture: Fundamentals and principles of Computer Design, Joseph D. Dumas II, BSPublications.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

ECONOMICS AND ACCOUNTING FOR ENGINEERS

CourseCode:GR18A2004 **L/T/P/C : 3/0/0/3**

Course Objectives:

- To provide the student with a clear understanding of demand analysis, elasticity of demand and demandforecasting;
- To provide the insight on theory of production and costanalysis.
- To describe different types of markets and competition, forms of organization and methods ofpricing.
- To make the students understand various capital budgetingtechniques.
- To describe fundamentals ofaccounting.

Course Outcomes:

After studying this course, students will be in a position to:

- The student will be able to scan the economic environment and forecast demand of products through demand forecastingtechniques.
- The student will be able to plan the production levels in tune with maximum utilization of organizational resources and with maximum profitability and list out various costs associated with production and able to compute breakevenpoint.
- To outline the different types markets and competition, forms of business organization and methods ofpricing.
- To analyze the profitability of various projects using capital budgetingtechniques
- The students will be able prepare the financialstatements.

Unit I

Introduction & Demand Analysis

Definition and Scope: Introduction to Economics, Nature and Scope of Managerial Economics. Demand Analysis: Demand Determinants, Law of Demand and its exceptions. Elasticity of Demand: Definition, Types, Measurement and Significance of Elasticity of Demand. Demand Forecasting, Factors governing demand forecasting, methods of demand forecasting.

Unit II

Production & Cost Analysis

Production Function – Isoquants and Isocosts, MRTS, Least Cost Combination of Inputs, Laws of Returns, Internal and External Economies of Scale.Cost Analysis: Cost concepts. Break-even Analysis (BEA)-Determination of Break-Even Point (simple problems) - Managerial Significance.

UnitIII

Markets and Forms of Business organizations

Types of competition and Markets, Features of Perfect competition, Monopoly and Monopolistic Competition.Pricing: Objectives and Policies of Pricing.Methods of Pricing.Business: Features and evaluation of different forms of Business Organisation: Sole Proprietorship, Partnership, Joint Stock Company, Public Enterprises and their types.

Unit IV

Capital Budgeting

Capital and its significance, Types of Capital, Methods of Capital Budgeting: Payback Method, Accounting Rate of Return (ARR) and Net Present Value (NPV) Method and Internal Rate of Return (IRR) (simple problems) and Profitability Index (PI)

Unit V

Introduction to Financial Accounting

Accounting Concepts and Conventions - Double-Entry Book Keeping. Accounting Cycle: Journal, Ledger, Trial Balance, Final Accounts (Trading Account, Profit and Loss Account and Balance Sheet with simple adjustments).

Text Books

1. Aryasri: Managerial Economics and Financial Analysis, TMH,2009.
2. Managerial Economics: Analysis, Problems and Cases - P. L. Mehta, Edition, 13. Publisher, Sultan Chand, 2007.
3. Financial Accounting -1: S P Jain and K. L. Narang, KalyaniPublishers,2005.

Reference Books

1. Peterson, Lewis and Jain: Managerial Economics, Pearson,2009
2. Mithani : Managerial Economics , HPH,2009
3. Lipsey&Chrystel, Economics, Oxford University Press,2009
4. Ambrish Gupta, Financial Accounting for Management, Pearson Education, New Delhi.2009
5. Horngren : Financial Accounting, Pearson,2009.
6. Dr. S. N. Maheswari and Dr. S.K. Maheshwari: Financial Accounting, Vikas, 2009.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

OPERATING SYSTEMS

CourseCode: GR18A2074 **L/T/P/C: 3/0/0/3**

II Year II Semester

Course Objectives: The Objectives of this course is to provide the student:

- To learn the mechanisms of OS to handle processes and threads and their communication
- To learn the mechanisms involved in memory management in contemporaryOS
- To gain knowledge on distributed operating system concepts that includes architecture, Mutual exclusion algorithms, deadlock detection algorithms and agreementprotocols
- To know the components and management aspects of concurrencymanagement
- To understand the concepts of Input/Output, storage and filemanagement.

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

- Explain functions, structures of operatingsystem
- Determine various process management concepts including scheduling and synchronization.
- Demonstrate the concepts of memory management and I/Osystems.
- Solve issues related to file system interface and implementation of diskmanagement.
- Classify protection and securitymechanisms.

UNIT I

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

UNIT II

Process Management: Process concepts, threads, scheduling-criteria, algorithms with evaluation, Thread scheduling, case studies: Linux, Windows .

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

UNIT III

Memory Management: Swapping, contiguous memory allocation, paging, structure of the page table, segmentation, virtual memory, demand paging, page replacement algorithms, Case studies: Linux, Windows.

Deadlocks: Principles of deadlock – system model, deadlock characterization, deadlock prevention, detection and avoidance, recovery from deadlock.

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

UNIT IV

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

Mass-storage structure: Overview of Mass-storage structure, Disk structure, disk attachment,

disk scheduling, swap-space management, RAID structure, stable-storage implementation, Tertiary storage structure.

UNIT V

Protection: Protection, Goals of Protection, Principles of Protection, Domain of protection, Access Matrix, Implementation of Access Matrix, Access control, Revocation of Access Rights, Capability-Based systems, Language – Based Protection.

Security: The Security problem, program threats, system and network threats, cryptography as a security tool, user authentication, implementing security defenses, firewalling to protect systems and networks, computer – security classifications.

Text/Reference Books:

1. Operating System Concepts Essentials, 9th Edition by AviSilberschatz, Peter Galvin, Greg Gagne, Wiley Asia StudentEdition.
2. Operating Systems: Internals and Design Principles, 5th Edition, William Stallings, Prentice Hall ofIndia.
3. Operating System: A Design-oriented Approach, 1st Edition by Charles Crowley, IrwinPublishing
4. Operating Systems: A Modern Perspective, 2nd Edition by Gary J. Nutt, Addison-Wesley
5. DesignoftheUnixOperatingSystems,8thEditionbyMauriceBach,Prentice-Hall of India
6. Understanding the Linux Kernel, 3rd Edition, Daniel P. Bovet, Marco Cesati, O'Reilly andAssociates

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

JAVA PROGRAMMING

CourseCode: GR18A2075 **L/T/P/C: 3/0/0/3**

II Year II Semester

Pre-requisites: Computer Programming through C

Course Objectives: The students will learn the following:

- The Java programming language: its syntax, idioms, patterns, andstyles.
- Object oriented concepts in Java and apply for solving theproblems.
- How exception handling and multithreading makes Javarobust
- Explore java Standard API library such as io, util, applet,swing.
- Building of applications using applet andswing

Course Outcomes: Upon the successful completion of the course, the student will be able:

- Write java programs and differentiate between object-oriented programming and procedure-orientedprogramming.
- Apply object-oriented programming features for solving a givenproblem.
- Incorporate exception handlingmechanism.
- Implement Use java standard API library to write complexprograms.
- Develop interactive programs using applet andswing.

Unit I

Introduction to OOP: Introduction, Need of object-oriented programming, principles of object-oriented languages, C++ vs JAVA, Applications of OOP, history of JAVA, Java Virtual Machine, Java features, Program structures, Installation of JDK.

Unit II

Programming Constructs: Variables, Primitive data types, Identifiers- Naming Conventions, Keywords, Literals, Operators- Binary, Unary and Ternary, Expressions, Primitive Type conversion and casting, flow of control- branching, conditional,loops.

Classes and Objects- Classes, Objects, Creating objects, methods, constructors- constructor overloading, cleaning up unused objects- Garbage collector, class variable and methods- static keyword, this keyword, arrays, Command linearguments.

Unit III

Inheritance: Types of Inheritance, Deriving classes using extends keyword, method overloading, super keyword, final keyword, abstract class.

Interfaces: Interface, Extending interface, interface Vs Abstract classes.

Packages- Creating Packages, using Packages, Access protection, java I/O package.

Exceptions - Introduction, Exception handling techniques - try, catch, throw, throws, finally block, user defined Exception.

Unit IV

Multithreading: java.lang.Thread, the main Thread, creation of new Threads, Thread priority, multiThreading- using isalive() and join(), Synchronization, suspending and resuming Threads, Communication between Threads. **Exploring java.io, Exploring java.util**

Unit V

Applets- Applet class, Applet structure, an example Applet program, Applet life cycle.

Event Handling- Introduction, Event Delegation Model, Java.awt.event Description, Adapter classes, Innerclasses.

Abstract Window Toolkit: Why AWT?,java.awt package, components and containers, Button, Label, Checkbox, Radio buttons, List boxes, choice boxes, Text field and Text area, container classes.

Swing: Introduction, JFrame, JApplet, JPanel, Components in swings, Layout Managers, JList and JScrollPane, JTabbedPane.

Text/Reference Books:

1. Java: The Complete Reference, 10th edition, Herbert Schildt, McgrawHill.
2. Java Fundamentals: A Comprehensive Introduction, Herbert Schildt and Dale Skrien, TMH.
3. Java for Programming, P.J.Dietel PearsonEducation
4. Object Oriented Programming through Java, P.Radha Krishna, UniversitiesPress.
5. Thinking in Java, Bruce Eckel, PearsonEducation
6. Programming in Java, S.Malhotra and S.Choudhary, Oxford UniversityPress.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

DESIGN AND ANALYSIS OF ALGORITHMS

CourseCode: GR18A2076 **L/T/ P/C:3/0/0/3**

II Year IISemester

CourseObjectives:

The objective of this course is to provide the student:

- To train the students in exploring the knowledge of estimating the efficiency of an algorithm.
- To provide mathematical foundations and methods for dynamic programming that is an essential part in the research and development in almost all areas of modern technology.
- To provide the ability to analyze and simplify a given algorithm using different methods ofsimplification.
- To provide knowledge about various techniques in solvingproblems.
- Provides knowledge about performances of varioustechniques.

Course Outcomes:

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

- Express algorithms in a language independent manner (as pseudocodes).
- Applying various searching and sorting algorithms for differentapplications.
- Illustrating various techniques like greedy and dynamic approach in solvingproblems.
- Explain different backtracking applications and can also solve problems using fundamental graphalgorithms.
- Differentiate between deterministic and non-deterministic problems.

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 - I: 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 IV

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, 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 classproblems.

TEXT BOOKS

1. Ellis Horowitz, SatrajSahni and S Rajasekharam, Fundamentals of Computer Algorithms, Galgotiapublishers
2. T H Cormen, C E Leiserson, and R L Rivest, Introduction to Algorithms, 3rd 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

SCRIPTING LANGUAGES LAB

CourseCode: GR18A2077 **L/T/P/C: 0/0/3/1.5**

II Year I Semester

Course Objectives: The objective of the course is to provide the student

- Understand how server-side programming works on theweb.
- Ability to use scripting languages like PHP, Python to developapplications
- Understanding POST and GET in form submission and know how to receive and process form submissiondata..
- Read and process data in a MySQLdatabase.
- To learn how to use lists, tuples dictionaries and modules for reusability in Python programs.

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

- Evaluate the process of executing a PHP-based script on a webserver
- Design, debug and run complete web applications using PHP andMYSQL
- Adequately use Python programming in selection, functions, modules, aggregated data (arrays, lists,etc.)
- Develop substantial Python scripts by appropriate reusing previously createdscripts.
- Ability to develop Python scripts for usingdatabases.

Task -1: Write a PHP script for the following.

1. Find the factorial of a number (whileloop)
2. To reverse the digit (Use dowhile)
3. Find the sum of the digits (Use forloop)
4. 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 explodefunction.)
5. Assume an array with different values. Print only unique values from thearray.
6. 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 productsentered.

Task -2:

1. 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 awarning
2. Write a PHP script to store, retrieve and delete data cookiesvalues.

3. 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 errormessage.

Task-3:

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 inserver.

Task-4:

a. Design a php application where we connect with the database in one page but access the database in all the pages instead of establishing connection in everypage.
b. Write a PHP script to store, retrieve and delete data using sessionvariables.

Task-5: Design a PHP application for

a. Create a database table with user information like username, password and other requiredinformation.
b. Write PHP script for designing a page to allow both registration and loginfacility.

Task-6:

a. Write a PHP script for updating required user information in thedatabase.
b. Write a PHP script for deleting a specified user from thedatabase

Task-7:

a. Design a PHP application to displaying user name across all the pages from the time user login till user logout from the application.(usingsessions)
b. Design a PHP application to create home page with different menu list based upon the type of user login.(Admin user and normal user)

Task-8:

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

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

Task-9: Write a Python script using basic data types.

a. Find the biggest of 3numbers.
b. To check whether a number is positive ornegative.
c. Find the factorial of anumber
d. To reverse thedigit
e. Find the sum of thedigits
f. Fibonacci series for a particularlimit.

Task-10:

a. Write a python script to test the using ofmodules.
b. Write a Python script to test various functions ofDictionary.
c. Write a Python script to define a function and calling the function by passing arguments. (using pass by value & pass byreference).

Task-11:

1. Write a Python script to test built in methods ofStrings.
2. Write a Python script to test various functions of List andTuple.

Task-12:

Write a python script to perform MYSQL database operations like select, update and delete.

Text/Reference Books:

1. Beginning.PHP.and.MySQL.3rd.Edition W. Jason Gilmoren - Third Edition Apress publications
2. Python- Standard Library by Frederik Luth-O'Relly
3. Practical Programming in Python by JefferyElkener.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

OPERATING SYSTEMS LAB

CourseCode: GR18A2078 **L/T/P/C:0/0/3/1.5**

II Year II Semester

Course Objectives: The Objectives of this course is to provide the student:

- Learn different types of CPU schedulingalgorithms
- Demonstrate the usage of semaphores for solving synchronizationproblem
- Understand memory management techniques and different types of fragmentation that occur in them and various page replacementpolicies
- Understand Banker's algorithm used for deadlockavoidance
- Learn different file organization methods various disk schedulingalgorithms.

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

- Evaluate the performance of different types of CPU schedulingalgorithms
- Implement producer-consumer problem, reader-writers problem, Dining philosophers problem usingsemaphore
- Implement MVT, MFT, paging techniques and page replacement policies, memory allocation techniques in memory management and types of fragmentation that encounter in suchtechniques.
- Simulate Banker's algorithm for deadlockavoidance
- Implement file allocation strategies, file organization techniques and disk schedulingtechniques.

Task 1:

Simulate the following CPU scheduling algorithms
a)Round Robin b)SJF c)FCFS d)Priority

Task 2:
Simulate the Producer-Consumer Problem

Task 3:
Simulate the Readers-Writers Problem using Semaphore.

Task 4:
Simulate the Dinning Philosophers Problem.

Task 5:
Simulate MVT and MFT.

Task 6:
Simulate First Fit and Best Fit algorithms for memory management.

Task 7:
Simulate Paging Technique of memory management.

Task 8:
Simulate all page replacement algorithms
a)FIFO b)LRU c)LFU

Task 9:
Simulate Bankers Algorithm for Dead Lock Avoidance.

Task 10:
Simulate all file allocation strategies
a)Sequential b) Indexed c)Linked

Task 11:
Simulate all File Organization Techniques
a) Singlelevel directory b) Two level directory

Task 12:
Simulate the following Disk Scheduling Algorithms
(a) First Come-First Serve (FCFS)
(b)Shortest Seek Time First
(SSTF) (c)Elevator (SCAN)
(d)Circular SCAN (C-
SCAN) (e)LOOK
(f)C-LOOK

Text /Reference Books:
1. Operating System Concepts- Abraham Silberchatz , Peter B. Galvin, Greg Gagne 7th Edition, JohnWiley.
2. Operating Systems– Internal and Design Principles Stallings, Fifth Edition–2005, Pearsoneducation/PHI

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

JAVA PROGRAMMING LAB

CourseCode: GR18A2079 **L/T/P/C:0/0/3/1.5**

II Year II Semester

Course Objectives: The students will learn the following

- Working with java compiler and eclipseplatform.
- Writing of java programs using object orientedconcepts.
- Developing java applications and handle theexceptions.
- Building java GUI based applications usingswing.
- To handle theevents.

Course OutComes: Upon the successful completion of the course, the student will be able to:

- Implement object-oriented programmingconcepts.
- Analyze a problem, identify and define the computing requirements appropriate to its solution.
- Explore the java standard API library to write complexprograms.
- Implement and managemultithreading.
- Develop graphical user interface in Javaprograms.

Recommended Systems/Software Requirements:

1. Dual core CPU, 4 GB ofRam.
2. Windows/linux OS, JDK1.8.

Task-1: Write java programs that implement the following

a) Constructor
b) Parameterizedconstructor
c) Method overloading
d) Constructoroverloading.

Task-2:

a) Write a Java program that checks whether a given string is a palindrome or not. Ex: MADAM is apalindrome.
b) Write a Java program for sorting a given list of names in ascendingorder.
c) Write a Java Program that reads a line of integers, and then displays each integer and the sum of all the integers (Use StringTokenizer class ofjava.util)

Task-3: Write java programs that uses the following keywords

a) this b)super c)static d) final

Task-4:

a) Write a java program to implement methodoverriding
b) Write a java program to implement dynamic methoddispatch.
c) Write a Java program to implement multipleinheritance.
d) Write a java program that uses accessspecifiers.

Task-5:

a) Write a Java program that reads a file name from the user, then displays information about whether the file exists, whether the file is readable, whether the file is writable, the type of file and the length of the file inbytes.
b) Write a Java program that reads a file and displays the file on the screen, with a line number before eachline.
c) Write a Java program that displays the number of characters, lines and words in a text file

Task-6:

a) Write a Java program for handling CheckedExceptions.
b) Write a Java program for handling UncheckedExceptions.

Task- 7:

a) Write a Java program that creates three threads. First thread displays "GoodMorning" every one second, the second thread displays "Hello" every two seconds and the third thread displays "Welcome" every threeseconds.
b) Write a Java program that correctly implements producer consumer problem using the concept of inter threadcommunication.

Task-8:

a) Develop an applet that displays a simplemessage.
b) Develop an applet that receives an integer in one text field and compute its factorial value and return it in another text field, when the button named "Compute" isclicked.

Task-9:

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

Task-10:

a) Write a Java program for handling mouseevents.
b) Write a Java program for handling keyevents.

Task-11:

a) Write a program that creates a user interface to perform integer divisions. The user enters two numbers in the text fields Num1 and Num2.
b) The division of Num1 and Num2 is displayed in the Result field when the Divide button is clicked. If Num1or Num2 were not an integer, the program wouldthrow

Number Format Exception. If Num2 were Zero, the program would throw an Arithmetic Exception and display the exeption in a message dialog box.

Task -12:

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

Task -13:

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

Text/ Reference books:

1. Java: The Complete Reference, 10th edition, Herbert Schildt, McgrawHill.
2. Java Fundamentals- A Comprehensive introduction, Herbert schildtand Dale skrien, TMH.
3. Java for programming, P.J.Dietel Pearson education (OR) Java: How to Program P.J.Dietel and H.M.Dietel,PHI
4. Object Oriented Programming through java, P.Radha Krishna, UniversitiesPress.
5. Thinking in Java, Bruce Eckel, PearsonEducation
6. Programming in Java, S.Malhotra and S.Choudhary, Oxford UniversityPress.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

ENVIRONMENTAL SCIENCE

CourseCode: GR18A2001 **L/T/P/C:2/0/0/2**

II Year II Semester

Course Objectives:

- Understanding the importance of ecological balance for sustainabledevelopment.
- Understanding the impacts of developmental activities and mitigationmeasures.
- Understanding the environmental policies andregulations
- Integrate human ecology and science of environmentalproblems.
- The effect of human activities on atmosphericpollution

Course Outcomes:

Based on this course, the Engineering graduate will

- Understand the harmonious co-existence in between nature and humanbeing
- Recognize various problems related to environmentdegradation.
- Develop relevant research questions for environmentalinvestigation.
- Generate ideas and solutions to solve environmental problems due to soil, airand waterpollution.
- Evaluate and develop technologies based on ecological principles and environmental regulations which in turn helps in sustainabledevelopment.

Unit I

Ecosystems: Definition, Scope, and Importance of ecosystem. Classification, structure, and function of an ecosystem, Food chains, food webs, and ecological pyramids. Flow of energy, Biogeochemical cycles, Bioaccumulation, Bio magnification, ecosystem value, services and carrying capacity.

Unit II

Natural Resources: Classification of Resources: Living and Non-Living resources, water resources: use and over utilization of surface and ground water, floods and droughts, Dams: benefits and problems. Mineral resources: use and exploitation, environmental effects of extracting and using mineral resources, Land resources: Forest resources, Energy resources: growing energy needs, renewable and non-renewable energy sources, use of alternate energy source, case studies.

Unit III

Biodiversity and Biotic Resources: Introduction, Definition, genetic, species and ecosystem diversity. Value of biodiversity; consumptive use, productive use, social, ethical, aesthetic and optional values. India as a mega diversity nation, Hot spots of biodiversity. Field visit. Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts; conservation of biodiversity: In-Situ and Ex-situ conservation. National Biodiversity act.

Unit IV

Environmental Pollution and Control Technologies: Environmental Pollution: Classification of pollution, Air Pollution: Primary and secondary pollutants, Automobile and Industrial pollution, Ambient air quality standards. Water pollution: Sources and types of pollution, drinking water quality standards. Soil Pollution: Sources and types, Impacts of modern agriculture, degradation of soil. Noise Pollution: Sources and Health hazards, standards, Solid waste: Municipal Solid Waste management, composition and characteristics of e-Waste and its management. Pollution control technologies: Waste water Treatment methods: Primary, secondary and Tertiary.

Global Environmental Issues and Global Efforts: Climate change and impacts on human environment. Ozone depletion and Ozone depleting substances (ODS).Deforestation and desertification. International conventions / Protocols: Earth summit, Kyoto protocol, and Montréal Protocol.

Unit V

Environmental Policy, Legislation & EIA: Environmental Protection act, Legal aspects Air Act-1981, Water Act, Forest Act, Wild life Act, Municipal solid waste management and handling rules, biomedical waste management and handling rules, hazardous waste management and handling rules. EIA: EIA structure, methods of baseline data acquisition. Towards Sustainable Future: Concept of Sustainable Development Goals, Population and its explosion, Crazy Consumerism, Environmental Education, Environmental Ethics, Concept of Green Building.

TEXT BOOKS:

1. Text book of Environmental Science and Technology - Dr. M. Anji Reddy 2007, BS. Publications.
2. Textbook of Environmental Studies for Undergraduate Courses by Erach Bharucha for University GrantsCommission.

REFERENCE BOOKS:

1. Environmental Science: towards a sustainable future by Richard T. Wright. 2008 PHL Learning Private Ltd. NewDelhi.
2. Environmental Engineering and science by Gilbert M. Masters and Wendell P. Ela.2008 PHI Learning Pvt.Ltd.
3. Environmental Science by Daniel B. Botkin & Edward A. Keller, WileyINDIA edition.
4. Environmental Studies by Anubha, Kaushik, 4th Edition, New age international publishers.
5. Introduction to Environmental Science by Y. Anjaneyulu, BSPublications.
6. Environmental Studies by R. Rajagopalan, Oxford UniversityPress.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
DESIGN THINKING

II Year II Semester **L/T/P/C:2/0/0/1**

CourseCode:GR18A2083

Course Objectives and Outcomes:

- Study a problem from multiple perspectives.
- Learn how to frame the design challenge properly.
- Ideate, prototype and Iterate solutions.
- Learn from the overall design process how to create value as entrepreneurs.
- Students will be equipped with all the skills in the design mindset.

UNIT-I

Introduction to Design Thinking: LRI Assessment, Introduction to Design Thinking, Understanding the Mindsets-Empathy, Optimism, Embrace Ambiguity, Make it, Learn from Failure, Iterate, Create Confidence, Creativity Convergent & Divergent Thinking

UNIT-II

Design Thinking Methodology: The 5 Stages of the Design Thinking Process-Empathise, Define (the problem), Ideate, Prototype, and Test, Ideation tools & exercises. Sample Design Challenge, Introduction to the Design Challenge Themes

UNIT-III

Story telling and Tools for Innovation: Empathize-Understand customers, Empathy Maps, Empathise-Step into customers shoes- Customer Journey Maps, Define- Analysis & Drawing Inferences from Research

UNIT-IV

The Design Challenge: Define the Design Challenge, Prototyping & Iteration- Feasibility Study, Testing-Documentation and the Pitch

References:

- Designkit.org
- Ideo.org
- Adobe Kickbox

Syllabus
III -Year

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
OBJECT ORIENTED SOFTWARE ENGINEERING

CourseCode:GR18A3043 **L T PC**
III Year I Semester **3 0 0 3**

Course Objectives:

The objective of this course is to

1. Understand the object-oriented process from requirements throughtesting.
2. Identify the importance of modeling and object orientedtesting.
3. Model real word applications using various object orientedmodels.
4. Understand the different types of testingmechanisms.
5. Practice case studies and modeling using object orientedtechnology.

Course Outcomes:

At the end of this course student will be able to

1. Apply software development life cycle to provide Object-Oriented solutions for Real-World Problems.
2. Identify domain objects, their properties and relationships amongthem.
3. Design solutions for the Real-WorldProblems..
4. Identify types of testing techniques to test object orientedsystem.
5. Implement design solutions for userrequirements.

UNIT -I:

Introduction: System development, A Useful Analogy, System Development Characteristics, The System Life Cycle, System Development as a Process Change, System Development as a Process of Change, System Development and Reuse, System Development and Methodology, Objectory.

UNIT -II:

Object Oriented Concepts and Modeling: Introduction to Object Orientation. Model, Importance of Modeling, Object Oriented Modeling.

Object Oriented System Development: Function/Data Methods, Object Oriented Analysis, Object Oriented Construction and Object Oriented Testing.

UNIT -III:

Introduction to UML: Overview of UML, Conceptual Model of UML, Architecture.

Object Oriented Architecture: System Development, Model Building, Model Architecture, Requirement Model, Analysis Model, Design Model, Implementation Model, Test Model.

Database Specialization: Introduction, Relational DBMS, Object DBMS.

UNIT –IV:

Components: Introduction, Use of Components, Component Management.

Object Oriented Testing: Introduction, Testing, Unit Testing, Integration Testing, System Testing, Testing Process.

UNIT-V:

Object Oriented Software Engineering Applications,

Case study: Warehouse Management System, Telcom

Text Books:

1. Object-Oriented Software Engineering : A Use Case Driven Approach, Ivar Jacobson, Magnus cristerson, Jonsson, PearsonEducation.
2. The Unified Modeling Language User Guide, Grady Booch, James Rumbaugh, Ivar Jacobson, Pearson Education.

References:

1. Fundamentals of Software Engineering, Rajib Mall, Prentice-Hall of India, 3rd Edition, 2009.
2. Software Engineering: A Practioner's Approach, Roger S. Pressman, McGraw Hills, 7th Edition,2009.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
COMPUTER NETWORKS

CourseCode:GR18A3044 **L T PC**
III Year I Semester **3 0 0 3**

Prerequisites:

Students are expected to have knowledge in

- Basic computer hardware
- Multi user Operating systems
- Types of Ports and their purpose

Course Objectives:

The objective of this course is to

1. Learn various Network topologies and Networkmodels.
2. Identify guided and unguided transmission media used in different networks for communication.
3. Understand different Routing technologies involved to routepackets
4. Distinguish the standard Internet Protocol (IP), Transport Control Protocol (TCP) andUser Datagram Protocol forInternet.
5. Analyze and understand the basic securityalgorithms.

Course Outcomes:

At the end of this course student will be able to

1. Define basic terminologies of Computer Networks and to apply variousnetworking configurations and transmission media to build a network for anorganization.
2. Develop error correction and detection techniques and MAC Protocols for specificnetworks.
3. Develop various routing algorithms and give solutions to various transmissionproblems.
4. Apply the application of TCP or UDPprotocols.
5. Develop some protocols at Application Layer and to deal with security problems related to Web Applications.

UNIT -I:

Computer Networks: Uses of Computer Networks, Network Hardware, Network Software, Types of networks, Network topologies, Layered architecture. Reference Models: OSI, TCP/IP, ARPANET, Internet, ATM: Reference model, QoS in ATM.

Physical Layer: Guided Transmission Media, Wireless Transmission Media, Communication Satellites. Switching and Multiplexing, Mobile Telephone Network.

UNIT -II:

Data link layer: Design Issues, Framing, Error Detection, Elementary Data Link Protocol, and Sliding Window Protocols.

Medium Access sub layer: Static vs Dynamic, Multiple Access Protocols: ALOHA, CSMA and Collision Free Protocols. Ethernet (IEEE 802.3), HDLC protocols, wireless LANS (IEEE 802.11), Bluetooth (IEEE 802.15), The Network and internetwork devices, ATM Header.

UNIT -III:

Network Layer: Routing Algorithms, Flooding, Broadcasting and Multicasting. **Congestion Control Algorithms:** General Principles of Congestion Control, Prevention Policies, Congestion Control in Virtual and Datagram Subnets, Quality of ServiceTechniques.

The Network Layer in the Internet: IPv4 Addressing Scheme, Subnetting and Masking, CIDR, NAT, Intra and Inter domain routing protocols. Mobile IP, IPv6 Header Format and Transmission Methods.

UNIT –IV:

Transport Layer: Transport Services, Elements of Transport Protocols.

Transport Layer Protocols: TCP & UDP protocols, TCP Connection Establishment and Release, TCP Congestion Control, TCP Fast Retransmit and Recovery, Slow start Mechanism in TCP, Transaction Oriented TCP.

UNIT-V

Application Layer: DNS, Electronic Mail, the World Wide Web, FTP, HTTP, TELNET, SNMP.**Multi Media:** Audio and video compression techniques, streaming audio and video, VOIP.

Text Books:

1. Computer Networks - Andrew S Tanenbaum, 4th Edition, PearsonEducation/PHI
2. Data Communications and Networking-Behrouz A. Forouzan,Third EditionTMH.

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
3. Computer Networks – Dr.G.S.Bapiraju, 2nd Edition GRIETPublications.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
FORMAL LANGUAGES AND AUTOMATA THEORY

CourseCode:GR18A3045 **L T PC**
III Year I Semester **3 0 0 3**

Prerequisites:

Students are expected to have knowledge in

- Mathematical Foundation and Computer Science
- Data Structures

Course Objectives:

The objective of this course is to

1. Understand mathematical models finiteautomata.
2. Explain Regular Expressions and Finite Automata Conversions.
3. Understand Grammars for Regular and Context FreeLanguages.
4. Learn Context Free Grammar Normal Forms and Push DownAutomata.
5. Explain Computational theory andmodels.

Course Outcomes:

At the end of this course, student will be able to

1. Design Finite Automatamodels.
2. Construct Regular Expressions and equivalent automatamodels.
3. Formulate Grammars for Formallanguages.
4. Represent Normal Forms and Push DownAutomata.
5. Experiment with Computationalmodels.

UNIT -I:

Fundamentals: Strings, Alphabet, Language, Operations, Finite state machine, definitions, finite automaton model, acceptance of strings and languages, deterministic finite automaton and non-deterministic finite automaton, transition diagrams and languagerecognizers.

Finite Automata: NFA with ϵ transitions - significance, acceptance oflanguages.

Conversions and Equivalence: Equivalence between NFA with and without ϵ transitions, NFA to DFA conversion, minimization of FSM, equivalence between two FSM's, Finite Automata with output- Moore and Mealymachines.

UNIT -II:

Regular Languages: Regular sets, regular expressions, identity rules, Constructing finite automata for a given regular expressions, Conversion of finite automata to Regular expressions, Pumping lemma of regular sets, closure properties of regular sets.

UNIT -III:

Grammar Formalism: Regular grammars-right linear and left linear grammars, equivalence between regular linear grammar and FA,inter conversion, Contextfreegrammar,derivationtrees, sentential forms, Right most and leftmost derivation ofstrings.

UNIT –IV:

Context Free Grammars: Ambiguity in context free grammars, Minimization of context free grammars, Chomsky normal form, Greibach normal form, Pumping Lemma for Context Free Languages, Enumeration of properties of CFL.

Push Down Automata: Push down automata, definition, model, acceptance of CFL, Acceptance by final state and acceptance by empty state and its equivalence, equivalence of CFL and PDA, inter conversion, Introduction to DCFL andDPDA.

UNIT-V:

Turing Machine: Turing Machine, definition, model, design of TM, computable functions, recursively enumerable languages, Church's hypothesis, counter machine, types of Turing machines.

Computability Theory: Chomsky hierarchy of languages, linear bounded automata and context sensitive language, LR(0) grammar, decidability of problems, Universal Turing Machine, un decidability of posts correspondence problem, Turing reducibility, definition of P and NP problems, NP complete and NP hardproblems.

Text Books:

1. Introduction to Automata Theory Languages and Computation, Hopcroft H.E. and Ullman J. D, Pearson Education.
2. Introduction to Theory of Computation–Michael Sipser 2nd editionThomson.

References:

1. Introduction to Computer Theory, Daniel I.A. Cohen, JohnWiley.
2. Introduction to languages and the Theory of Computation, John C Martin,TMH.
3. Theory of Computer Science - Automata languages and computation - Mishra and Chandra shekaran, 2nd edition,PHI.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
WEB TECHNOLOGIES

CourseCode:GR18A3046 **L T PC**
III Year I Semester **3 0 0 3**

Prerequisites:

Basic Programming knowledge
Basics of Java Programming and MYSQL

Course Objectives:

The objective of this course is to

1. Design syntactically correct web pages using HTML and JavaScripting
2. Build XML applications with DTD and schema that span multipledomains
3. Develop single page applications usingAngularJS
4. Describe server side programming for sessions and learn the concept to implement using cookies and urlrewriting
5. Develop skills in students in developing applications using concepts like JDBC, Servlets, JSP and JavaBeans

Course Outcomes:

At the end of this course student will be able to

1. Make interactive web sites through the DOM API and to change the CSS styles through java script
2. Build single-page web applications using AngularJS
3. Understand Core technologies of modern Java web programming like servlets andJSP
4. Create web application usingJSP
5. Write JSP code without scriptlets tag and access thedatabase.

UNIT -I:

HTML Common tags- List, Tables, images, forms, Cascading Style sheets.
Introduction to Java Scripts, Objects and Functions in java script, Manipulating DOM, HTML DOM Events

UNIT -II:

XML: Document type definition (DTD), XML Schemas, XML Document Object model (XML DOM), eXtensible Style sheet Language Transformations (XSLT).
Angular JS: Introduction, Expressions, Modules, directives, AngularJS HTML DOM, Events, Forms.

UNIT -III:

Web Servers and Servlets: Tomcat web server, **Introduction to Servlets:** Lifecycle of a Servlet, Deployment descriptor (web.xml), Servlet API, 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: Advantages of JSP over servlets, Scripting Elements, Implicit Objects of JSP, Error Handling and Debugging, Sharing Application and Session Data, JSP Directive Elements, Action Elements - Sharing Data Between JSP pages, Requests, Users Passing Control and Data between Pages, Deploying java beans in a JSP page, 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, Model/View/Controller Architecture, JSP Application design with MVC, JSP Standard Tag Library(JSLT)- Core tags, Function tags, SQL tags, Introduction to struts framework.

Text Books:

1. Web Programming, building internet applications, Chris Bates 2nd edition,WILEY
2. Dreamtech
3. Learning AngularJS: A Guide to AngularJS Development, Ken Williamson,O'Reilly
4. The complete Reference Java2 Fifth Edition by Patrick Naughton and Herbert Schildt.TMH.
5. Java Server Pages –Hans Bergsten, SPDO'Reilly

References:

1. Programming world wideweb-Sebesta,Pearson
2. Core SERVLETS AND JAVASERVER PAGES VOLUME 1: CORE TECHNOLOGIES by Marty Hall and Larry BrownPearson
3. Internet and World Wide Web – How to program by Dietel and NietoPHI/Pearson Education, Asia.
4. Jakarta Struts Cookbook, Bill Siggelkow, SPDO'Reilly forchap8.
5. Murach's Beginning JAVA JDK5, Murach,SPD
6. An Introduction to web Design and Programming–Wang-Thomson
7. Web Applications Technologies Concepts-Knuckles,JohnWiley
8. Programming world wide web-Sebesta,Pearson
9. Web Warrior Guide to WebProgrammming-Bai/Ekedaw-Thomas
10. Beginning Web Programming-Jon Duckett,WROX.
11. Java Server Pages, Pekowsky,Pearson

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
MICRO CONTROLLER AND INTERNET OF THINGS

CourseCode:GR18A3047 **L T PC**
III Year I Semester **3 0 0 3**

Course Objectives:

The objective of this course is to

1. Expose to 8 bit/16 bit microcontrollers.
2. Understand ATMEGA 328 Controllerarchitecture.
3. Learn sensors and their controllingoperations.
4. Understand raspberry piarchitecture.
5. Understand Python web application frame work forIoT.

Course Outcomes:

At the end of this course student will be able to

1. Use AVR Controllers.
2. Explore architecture of ATMEGA 328 controllers forprogramming.
3. Explore programming the sensordevices.
4. Develop IoTProjects.
5. Explore python web application framework for cloud IoTservices.

UNIT -I:

Introduction: Introduction to microprocessors and micro controllers, differences between micro processor and micro controllers, **AVR ATMEGA 328Controller:** architecture of ATMEGA 328. **ARDUINO:** Introduction, Arduino Functions Libraries: Input and output functions, operators, control statements, loops, arrays, strings.

UNIT -II:

Integration of Sensors and Actuators with Arduino:
Sensors: Temperature, Compass, Light, Sound, Accelerometer, DHT, Distance Sensor
Actuators: Servomotor, Stepper Motor, Solenoid, Relay, DC Motor
Communication Devices: Bluetooth, RF433, Wi Fi Module

UNIT -III:

Introduction To Internet of Things: Introduction, Physical Design of IoT, Logical Design of IoT, IoT enabling Technologies, IoT Levels and Deployment Templates
Domain Specific IoTs: Introduction, Home Automation, Smart Cities, Environment, Energy, Retail, Logistics, Agriculture, Industry, Health and LifeStyle

UNIT –IV:

IoT Systems- Logical Design Using Python: Introduction, Installing python, Python data types and data structures, Control Flow, Functions, Modules, Packages, File Handling, Date/ Time operations, Classes, Python Packages of Interest for IoT.

IoT Physical Devices And End Points: IoT Device, Exemplary Device: Raspberry Pi, About the board, Linux on Raspberry Pi, Raspberry Pi Interfaces, Programming Raspberry Pi with Python

UNIT-V

IoT Physical Server and Cloud Offerings: Introduction to cloud storage models and communication APIs, WAMP-AutoBahn for IoT, Xively Cloud for IoT, Python web application framework, Designing a RESTful Web API

Case Studies Illustrating IoT Design: Home Automation, Cities, Environment, Agriculture

Text Books:

1. ArshdeepBahga, Vijay Madisetti " Internet of Things(A hands on approach)" 1ST edition, VPIpublications,2014
2. Embedded Controllers using C and Arduino/2E by Jmes M.Fiore

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

GRAPH THEORY

(PROFESSIONAL ELECTIVE – I)

CourseCode:GR18A3048 **L T PC**

III Year I Semester **3 0 0 3**

Prerequisites:

Students are expected to have knowledge in Discrete Mathematics, Design and Analysis of Algorithms

Course Objectives:

The objective of this course is to

1. Fundamentals of graph theory andTrees.
2. Knowledge on different types ofgraphs.
3. The concepts of cut-sets, cut-vertices, coloring, covering andpartitioning
4. Different ways of representing agraph.
5. Algorithms for graph related problems in different domains of engineering andscience.

Course Outcomes:

At the end of this course student will be able to

1. Learn the fundamentals of graphtheory
2. Determine cut-sets andcut-vertices
3. Represent a graph in matrixform
4. Understand planar graphs, dual graphs, coloring, covering and partitioning ofgraphs.
5. Solve graph related problems and writealgorithms

UNIT -I:

Introduction: Graph, Applications, Finite and Infinite graphs, Incidence and Degree, Isolated Vertex, Pendant Vertex, Null Graph.

Paths And Circuits: Isomorphism, Sub-graphs, Walks, Paths and Circuits, Connected Graphs, Disconnected Graphs, Components, Euler Graphs, Hamiltonian Paths and Circuits, Travelling Salesman Problem.

UNIT -II:

Trees: Properties, Pendant Vertex, Distance and Centers, Rooted and Binary Tree, Counting Trees, Spanning Trees, Finding all Spanning Tress of a Graph, Spanning Trees in a Weighted Graph.

Cut-Sets and Cut-Vertices: Properties, All Cut-sets in a Graph, Fundamental Circuits and Cut- Sets, Connectivity and Separability, Network Flows, 1-Isomorphisn,2-Isomorphism.

UNIT -III:

Planar and Dual Graphs: Planar graphs, Different representation of planar graphs, Detection of Planarity, Geometric dual, Combinatorial dual.

Matrix Representation of Graphs: Incidence Matrix, Circuit Matrix, Fundamental Circuit Matrix and Rank, Cut-Set Matrix, Path Matrix, AdjacencyMatrix

UNIT –IV:

Coloring, Covering and Partitioning: Chromatic Number, Chromatic Partitioning, Chromatic Polynomial, Matching, Coverings, The Four Color Problem.

Directed Graphs: Directed Graph, Types of Digraphs, Digraphs and Binary Relations, Directed Paths and Connectedness, Euler Digraphs, Trees with Directed Edges, Fundamental Circuits in Digraphs, Matrices Digraphs, Adjacency Matrix of a Digraph.

UNIT-V

Graphs Theoretic Algorithms: Computer Representation of a Graph, Algorithm for- Connectedness and Components, Spanning tree, Cut-Vertices and Separability, Planarity Testing, Isomorphism, Shortest Path.

Text Books:

1. Narasingh Deo, Graph Theory with Applications to Engineering and Computer Science, PHI.

References:

1. Douglas B. West, Introduction to Graph Theory, Prentice Hall IndiaLtd.
2. Robin J. Wilson, Introduction to Graph Theory, LongmanGroupLtd.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
PRINCIPLES OF PROGRAMMING LANGUAGES
(PROFESSIONAL ELECTIVE – I)

CourseCode:GR18A3049 **L T PC**
III Year I Semester **3 0 0 3**

Course Objectives:

The objective of this course is to

1. Understand the language constructs in different programminglanguages.
2. Compare and contrast syntax and semantics of a programminglanguage.
3. Articulate different data types and control structures in different programminglanguage.
4. Outline abstract data types, concurrency and exceptionhandling
5. Summarize the logic programming language and functional programminglanguage.

Course Outcomes:

At the end of this course student will be able to

1. Discuss the criteria for evaluating programming languages and language constructs including programmingparadigms.
2. Describe formal methods of syntax.
3. Illustrate the data types and control structures in different programming languages
4. Construct abstract data types, concurrency andexceptions
5. Compare functional and imperativelanguages.

UNIT -I:

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, denotation 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 and 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, Introduction to data abstraction, design issues, language examples, C++ parameterized ADT, object oriented programming in C++, Java, C#,Python

Concurrency: Subprogram level concurrency, semaphores, monitors, message passing, Java threads, Examples: Java RMI, Parallel Java, Parallel C

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

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.

Lambda Calculus: Lambda expressions, Variables, Substitutions, Arithmetic, Conditionals, Recursion, Lambda Reduction, Type Assignment, Polymorphism, Lambda Calculus and Computability.

Text Books:

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

References:

1. Programming languages –Ghezzi, 3/e, JohnWiley
2. Programming Languages Design and Implementation – Pratt and Zelkowitz, Fourth Edition PHI/PearsonEducation

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
ARTIFICIAL INTELLIGENCE
(PROFESSIONAL ELECTIVE – I)

CourseCode:GR18A3050 **L T PC**
III Year I Semester **3 0 0 3**

Prerequisites:

A course in Artificial Intelligence would require the knowledge of following concepts:

- Logic Theory
- Probability Theory
- Numerical Analysis
- Operations on Matrices

Course Objectives:

The objective of this course is to

1. Understand both the achievements of AI and the theory underlying those achievements. Infer different searching strategies that are suitable for the problem to besolved
2. Recognize the ways to represent knowledge and infer resolution using prepositional and first orderlogic.
3. Understand the representation of uncertain knowledge and conditional distributions using Bayesiannetworks.
4. Comprehend the principles of temporal models, hidden markov models, decisiontrees.
5. Enable the student to apply artificial intelligence techniques in applications which involve perception, reasoning andlearning.

Course Outcomes:

At the end of this course student will be able to

1. Select an appropriate searching strategy for developing intelligent agents to find solution in optimized way using building blocks ofAI.
2. Apply prepositional and first order logic methods to resolve decisions for knowledge based agents.
3. Practice uncertain knowledge and reasoning handling using Bayesiannetworks
4. Analyze the working of temporal models, hidden markov models, decisiontrees.
5. Write AI programs and construct small robots capable of performing perception and movement based on techniques learnt in thecourse.

UNIT -I:

Introduction to AI: Introduction, Foundation of AI, History of Intelligent Agents, Agents and environments, Concept of Rationality, Nature of environments & Structure of Agents, Problem solving agents and formulation, Searching For Solutions and Strategies, Uninformed search strategies BFS, DFS, Heuristic approach, Greedy best search, A* Search, Game Playing: Adversal search, Games, Min-Max algorithm, Optimal decisions in multiplayer games, Alpha Beta pruning, Evaluation functions, cutting of search.

UNIT -II:

Knowledge Representation & Reasons: Logical agents, Knowledge based agents, The Wumpus world, Logic: Proportional logic, Resolution patterns in proportional logics, Resolution: Forward and Backward chaining, First order logic: Inference in First order logic, Proportional vs first order inference, Unification & Lifting, forward chaining, Resolution, Practiceproblems.

UNIT -III:

Uncertain Knowledge and Reasoning: Uncertainty-Acting under uncertainty ,Basic probability notion, the axioms of probability, inference using full joint distribution, Independence, Bayes' rule and its rule, The Wumpus world revisited.

Probabilistic Reasoning: Representing Knowledge in uncertain domain, the semantics of Bayesian networks, efficient representations of conditional distributions, exact inference in Bayesian networks, approximate inference in Bayesian networks, extending probability to first order representation.

UNIT –IV:

Probabilistic reasoning over time: Time and uncertainty, inference in temporal model, Hidden Markov models.

Learning: Learning from observations: Forms of learning, inductive learning, learning decision trees, ensemble learning, why learning works.

UNIT-V

Perception: Image formation, Early Image Processing operations- Edge detection, image segmentation. Extracting three-dimensional information, Object recognition, Using vision for manipulation and navigation.

Robotics: Introduction, Robot hardware, robotic perception, planning to move, planning uncertain movements, moving, robotic software architectures, application domains.

Text Books:

1. Artificial Intelligence-A modern approach-by StaurtRussel, Peter Norvig, 2nd edition, PHI/Pearson

References:

1. Artificial Intelligence – Riche &K.Night , 2nd editionTMH.
2. Paradigms of Artificial intelligence programming, case studies in common lisp-Peter. Norvig, Morgan Kaufmann.**ISBN-13:**978-1558601918.
3. Robotics: Fundamental Concepts and Analysis –AshitavaGoshal,oxford.
4. A Textbook of Robotics 1-Basic Concepts-M. Shoham-Springer US.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
SOFTWARE TESTING METHODOLOGIES
(PROFESSIONAL ELECTIVE – I)

CourseCode:GR18A3051 **L T PC**
III Year I Semester **3 0 0 3**

Prerequisites:

- Software Engineering course

Course Objectives:

The objective of this course is to provide the student:

1. Identify types of bugs and adopt a model for testing variousbugs.
2. Apply path testing strategies various applicationssoftwares
3. Techniques to test a given application using various dataflow and transaction flowtesting techniques.
4. Design of decision tables for the given logic of a programsubsystem.
5. Realization of graph matrices for given statediagrams.

Course Outcomes:

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

- Create a model for testing and criticize various consequences ofbugs.
- Apply a path testing technique for a givensoftware.
- Apply various Data flow testing techniques for exploring Data Bugs and DomainBugs.
- Design test cases based on decision tables for a given logicalconstruct.
- Attribute graph matrices techniques for the simplification of graphs and simplifytesting process.

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, domain and interface testing, domains and testability.

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 Reductionalgorithm.

TEXT BOOKS:

1. Software Testing techniques - BarisBeizer, Dreamtech, secondedition.
2. Software Testing Tools – Dr.K.V.K.K.Prasad,Dreamtech.

REFERENCE BOOKS:

1. The craft of software testing - Brian Marick, PearsonEducation.
2. Software Testing Techniques –SPD(Oreille)
3. Software Testing in the Real World – Edward Kit,Pearson.
4. Effective methods of Software Testing, Perry, JohnWiley.
5. Art of Software Testing – Meyers, JohnWiley.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
OBJECT ORIENTED SOFTWARE ENGINEERING LAB

CourseCode:GR18A3052 **L T PC**
III Year I Semester **0 0 3 1.5**

Software Used: StarUML /Umbrello & JUNIT

Course Objectives:

The objective of this course is to

1. Impart state-of-the-art knowledge on Object oriented Software Engineering andUML.
2. Practice object oriented software engineering principles for real timeproblems.
3. Design various types of diagrams for real timeproblems.
4. Learn test casegeneration.
5. Demonstrate object oriented software engineering methodologies for various real timeproblems.

Course Outcomes:

At the end of this course student will be able to

1. Analyze and identify requirements for real timeproblems.
2. Design and implement various software designmodels.
3. Use modern engineering tools for specification, design andimplementation.
4. Provide appropriate solutions for the real time problems using object oriented software engineering methodology.
5. Design test cases for various real timeproblems.

Develop the following applications using object oriented software engineering methodologies.

1. Unified LibrarySystem
2. Online Railway ReservationSystem
3. Data Warehouse ManagementSystem.

TASK 1

Prepare the problem statement for above applications.

TASK 2

Develop Software Requirement Specification (SRS) for above applications.

TASK 3

Design the class and object diagrams for above applications.

TASK 4

Design the Use-case diagrams for the above applications.

TASK 5

Design the interaction diagrams for the above applications.

TASK 6

Design the activity diagrams for the above applications.

TASK 7

Design the State-chart diagrams for the above applications.

TASK 8

Perform forward and Reverse Engineering, and generate documentation of the project.

TASK 9

Design the component diagrams for the above applications.

TASK 10

Design the behavioral diagrams for a case study of student's choice.

TASK 11

Implement a Junit Test program and design test cases to find the maximum of an array of numbers.

TASK 12

Implement a Junit Test program and design test cases to count the number of elements in array of numbers.

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, WILEYDreamtech India Pvt.Ltd.

References:

1. Bernd Bruegge& Allen H. Dutoit, "Object-Oriented Software Engineering",2009.
2. Ivar Jacobson, "Object-Oriented Software Engineering", Pearson Education,2009.
3. Shekhar Gulati, Rahul Sharma "Java Unit Testing with JUnit 5: Test Driven Development with JUnit 5", Apress, 2017.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
COMPUTER NETWORKS AND WEB TECHNOLOGIES LAB

CourseCode:GR18A3053 **L T PC**
III Year I Semester **0 0 3 1.5**

Prerequisites:

- Knowledge in computer networks
- Basic Programming knowledge
- Basics of Java Programming and MYSQL

Course Objectives:

The objective of this course is to

1. Understand the functionalities of various layers of OSImodel
2. Understand the operating Systemfunctionalities
3. Understand AngularJS and develop single page applications usingAngularJS
4. Describe server side programming for developing webapplications
5. Develop skills in students in developing applications using concepts like JDBC, Servlets, JSP and JavaBeans.

Course Outcomes:

At the end of this course student will be able to

1. Ability to understand the encryption and decryption concepts in Linuxenvironment
2. Ability to apply appropriate algorithm for the finding of shortestroute.
3. Ability to configure the routingtable.
4. To build single-page web applications usingAngularJS
5. To create web application usingJSP

TASK 1

Implement bit stuffing and byte (character) stuffing using C language.

a. Write a Program for bitstuffing.
b. Write a Program for Characterstuffing.

TASK 2

Implement CRC using C language.

TASK 3

Implement Dijkstra algorithm using C language.

TASK 4

Implement Distance vector routing using C language.

TASK 5

Implement RSA security algorithm using C language.

TASK 6

a. Create a HTML page of your present classtimetable.
b. Write JavaScript code to change the HTML contents andattributes.

Ex: Change the text of html page on a button click and program to switch on and off the light on the button click.

TASK 7

a. Consider an XML for library. Create XSLT for library XML to display the values in tabularformat.
b. Create a Single page Application (SPA) where navigation between the pages is performed without refreshing the whole page usingAngularJS.

TASK 8

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

1. Create a Cookie and add these four user ids and passwords to thisCookie.
2. Read the user id and passwords entered in the Login form (week1) and authenticate with the values (user id and passwords) available in thecookies.

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 web.xml and access them in the servlet by using the getInitParameters()method.

TASK 9

Create a JSP application for performing basic arithmetic operations using Java Beans.
Ex: Use jsp:useBean action tag.

TASK 10

a. 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.
b. Write a Servlet/JSP to connect to that database and extract data from the tables and display them. Experiment with various SQL queries.
c. Insert the details of the users who register with the web site, whenever a new user clicks the submit button in the registration page. (RegistrationPage).

TASK 11

Write a JSP which does the following job:

Insert the details of the 3 or 4 users who register with the web site (Task 9) by using registration form. Authenticate the user when he submits the login form using the username and password from the database. (Login Page)

TASK 12

Write a JSP code to display all registered users (TASK 9) in a table with Name, Email and Phone number using JSTL SQL Tags. (Display Page)

References:

1. Programming world wideweb-Sebesta,Pearson
2. Core SERVLETS AND JAVASERVER PAGES VOLUME 1: CORE TECHNOLOGIES
3. By Marty Hall and Larry BrownPearson
4. Internet and World Wide Web – How to program by Dietel and Nieto PHI/Pearson Education
5. Asia.
6. Jakarta Struts Cookbook, Bill Siggelkow, SPDO'Reilly forchap8.
7. Murach's Beginning JAVA JDK5, Murach,SPD

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

MICRO CONTROLLER AND INTERNET OF THINGS LAB

CourseCode:GR18A3054 **L T PC**

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

Course Objectives:

The objective of this course is to

1. Understand the principles of LED, LCD and DCMotor.
2. Understand the working principles ofsensors.
3. Explore communication devices andinterfacing.
4. Understand the installation of Arduino IDE and RaspberryPi.
5. Understand IoT Principles.

Course Outcomes:

At the end of this course student will be able to

1. Develop the programs for controlling DC Motor using Arduino/ RaspberryPi.
2. Develop the programs on Arduino usingsensors.
3. Develop the programs using communication devices.
4. Implement IoT programs using RaspberryPi.
5. Explore IoT Projects using Arduino/RaspberryPi.

TASK 1

Write an ARDUINO Program for

a) Blinking ofLED
b) SerialLights
c) LED Interface throughSwitch

TASK 2

Write an ARDUINO Program for

a) Printing character and string onLCD
b) Display digital clock onLCD
c) Scrolling content on LCD

TASK 3

Write an ARDUINO Program for

a) Take command from PC and glow correspondingLED.
b) Reading analog values from potentiometer and display it on serialmonitor.
c) Display data received from PC onLCD.

TASK 4

Write an ARDUINO Program for Measuring Distance using Ultrasonic sensor.

TASK 5

Write an ARDUINO Program for Controlling LED using LDR.

TASK 6

Write an ARDUINO Program for Measuring Wetness of soil using soil Moisture sensor.

TASK 7

Write an ARDUINO Program for rotating Motor in Clockwise and Anti clockwise Directions.

TASK 8

Installation of Raspberry Pi and develop program for controlling LED.

TASK 9

Remote control of blinking of LED using Raspberry Pi /Node MCU.

TASK 10

Text to speech using Raspberry Pi /Node MCU.

TASK 11

DHT Sensor implementation using Raspberry Pi /Node MCU.

TASK 12

Remote relay operation using Raspberry Pi/ Node MCU(ESP8266).

Text Books:

1) Embedded Controllers using C and Arduino/2E by Jmes M.Fiore
2) **Web references:** https://www.arduino.cc/en/Tutorial/HomePage, https://www.w3schools.com/python/andhttps://pythonprogramming.net/introduction-raspberry-pi-tutorials/

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
DATAWAREHOUSING AND DATA MINING

CourseCode:GR18A3099 **L T PC**
III Year II Semester **3 0 0 3**

Prerequisites:

Students are expected to have knowledge in transactional and relational data bases, probability and statistics.

Course Objectives:

The objective of this course is to

1. Understand the basic principles, concepts and applications of data warehousing and datamining
2. Obtain an idea of designing a data warehouse or data mart to present information needed by enduser
3. Acquire knowledge on various data mining functionalities and pre-processingtechniques.
4. Implement various data miningalgorithms
5. Identify appropriate data mining algorithm for solving practicalproblems.

Course Outcomes:

At the end of this course student will be able to

1. Learn the concepts of database technology evolutionary path which has led to the need for data mining and itsapplications.
2. Design a data mart or data warehouse for anyorganization
3. Apply pre-processing statistical methods for any given rawdata.
4. Extract knowledge and implementation of data miningtechniques
5. Explore recent trends in data mining such as web mining, spatial-temporalmining.

UNIT -I:

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.

UNIT -II:

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.

UNIT -III:

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 AssociationMining.

UNIT –IV:

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, 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-V

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.

Text Books:

1. Data Mining– ConceptsandTechniques - Jiawei Han &MichelineKamber, Morgan Kaufmann Publishers, Elsevier, Second Edition,2006.
2. Introduction to Data Mining – Pang-Ning Tan, Michael Steinbach and Vipin Kumar, Pearsoneducation.

References:

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

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
COMPILER DESIGN

CourseCode:GR18A3100 **L T PC**
III Year II Semester **3 0 0 3**

Course Objectives:

The objective of this course is to

1. Understand the fundamental principles in compiler design and to provide the skills needed for building compilers for various situations that one may encounter in a career in Computer Science.
2. Explore the algorithms and data structures involved in the design and construction ofcompilers.
3. Introduce the major concept in the areas of language translation and compilerdesign.
4. Develop an awareness of the function and complexity of moderncompilers.
5. Enrich the knowledge in various phases of compiler ant its use, code optimization techniques, machine code generation, and use of symboltable.

Course Outcomes:

At the end of this course student will be able to

1. Understand the basic concepts of compiler design, and its differentphases.
2. Understand the different types of parsing techniques and should be in a position to solve the problem.
3. Analyze the program and minimize the code by using optimizing techniques which helps in reducing the number of instructions in a program and also utilization of registers in an effectiveway.
4. Learn the process of translating a modern high-level language to executablecode.
5. Construct new tools for compilation for small programminglanguages.

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 – LEXlexical 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 parsergenerator.

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 constructsinto 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 registerallocation.

Text Books:

1. Principles of compiler design -A.V. Aho , J.D.Ullman, PearsonEducation.
2. Modern Compiler Implementation in C- Andrew N. Appel, Cambridge UniversityPress.

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, Wileydreamtech.
3. Engineering a Compiler-Cooper & Linda,Elsevier.
4. Compiler Construction- Louden,Thomson.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

FUNDAMENTALS OF MANAGEMENT AND ENTREPRENEURSHIP

CourseCode:GR18A3115	**L T PC**
III Year II Semester	**3 0 0 3**

Course Objective:

The objective of this course is to

1. To provide engineering and science students with an accelerated introduction to the basics of management.
2. The course provides a framework that will enhance a person's effectiveness in the business world and make familiarize management language.
3. To understand the management concepts and applications of concepts in practical aspects of business and development of managerial skills.
4. To provide the student with a clear understanding of Entrepreneurship.
5. To give hands on experience on how to generate ideas, evaluate business model.

Course Outcome:

At the end of this course student will be able to

1. The students understand the significance of Management in their Profession.
2. The various Management Functions like Planning, Organizing, Staffing, Leading, Motivation and Control aspects are learnt in this course.
3. To know and adopt motivational theories and leadership styles and apply controlling techniques at right time for better decision making.
4. The student will be exposed to the basic concepts of entrepreneurship and its development process.
5. The student will acquire the ability of developing a business plan / model.

UNIT–I: Introduction to Management: Definition, Nature and Scope, Functions, Managerial Roles, Levels of Management, Managerial Skills; **Evolution of Management Thought**- Classical Approach- Scientific and Administrative Management; The Behavioural approach; The Systems Approach; Contingency Approach, IT Approach.

UNIT– II: Planning and Organizing: Planning – Planning Process, Types of Plans, Decision making andSteps in Decision Making; Principles of Organization: Span of control, organizational Design & Organizational Structures; Departmentalization, Delegation; Centralization, Decentralization.

UNIT–III: Leading, Motivation and Controlling: Leadership, Power and Authority, Leadership Styles; Behavioral Leadership, Situational Leadership, Leadership Skills. Motivation – Types; Motivational Theories – Needs Hierarchy Theory, Two Factor Theory, Theory X and Theory Y. - **controlling**– basic control process– control techniques.

UNIT–IV: Nature of Entrepreneurship: Characteristics and skillsof an entrepreneur, Entrepreneur scenario in India and abroad. Types of entrepreneur, types of ownership, Small business in Indian economy. The entrepreneur and the law (Trademarks, patents, copy rights) Financial aspects: sources of rising capital, schemes of Department of Industries (DIC), KVIC, SIDBI, NABARD, NSIC, APSFC, IFCI and IDBI.

UNIT–V: Creating and Starting the venture: Creativity and the business idea (Self-discovery,

Opportunity discovery); Developing the business plan (Business model –Lean canvas by Alexander Osterwalder); Marketing plan (Customer & Solution- Value proposition, Marketing & Sales); Financial plan (Validation, money), Human Resource Plan (Team).

TEXT BOOKS:

1. Management Fundamentals, Robert N Lussier, 5e, Cengage Learning, 2013.
2. Fundamentals of Management, Stephen P. Robbins, Pearson Education, 2009.
3. Principles and Practice of Management, L. M. Prasad, Sultan Chand & Sons, 2012
4. Entrepreneurship- Robert D Hisrich, Michael P Peters, Dean A Shepherd, TMH.2009

REFERENCES:

1. Essentials of Management, Koontz Kleihrich, Tata Mc – Graw Hill.
2. Management Essentials, Andrew DuBrin, 9e, Cengage Learning, 2012.
3. Entrepreneurship- Rajeev Roy, Oxford, 2011
4. Intellectual Property- Deborah E.Bouchoux,Cengage, 2012

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
ADVANCED ALGORITHMS
(PROFESSIONAL ELECTIVE – II)

CourseCode:GR18A3101 **L T PC**
III Year II Semester **3 0 0 3**

Prerequisites:

Students are expected to have knowledge in Basic Programming, Algorithm concepts

Course Objectives:

The objective of this course is to

1. Understand advanced methods of designing and analyzingalgorithms.
2. Learn appropriate algorithms and use it for a specificproblem.
3. Solve advanced algorithmic problems with basic paradigms and datastructures.
4. Identify different classes of problems concerning their computationdifficulties.
5. Understand recent developments in the area of algorithmicdesign.

Course Outcomes:

At the end of this course student will be able to

1. Learn various sorting and graphimplementation.
2. Find the connected components in a graph and compute thepath.
3. Identify algorithm design technique and perform matrixoperations.
4. Analyze the Modulo representation and Discrete fouriertransformation.
5. Distinguish the NP-hard,NP-complete problems and understandrandomized

UNIT -I:

Sorting: Review of various sorting algorithms, topological sorting

Graph: Definitions and Elementary Algorithms, Shortest path by BFS, shortest path in edge-weighted case (Dijkastra's), depth-first search and computation of strongly connected components, emphasis on correctness proof of the algorithm and time/space analysis, example of amortized analysis.

UNIT -II:

Matroids: Introduction to greedy paradigm, algorithm to compute a maximum weight maximal independent set, Application to MST.

Graph Matching: Algorithm to compute maximum matching, Characterization of maximum matching by augmenting paths, Edmond's Blossom algorithm to compute augmenting path.

UNIT -III:

Flow-Networks: Maxflow-mincut theorem, Ford-Fulkerson Method to compute maximum flow, Edmond-Karp maximum-flow algorithm.

Matrix Computations: Strassen's algorithm and introduction to divide and conquer paradigm, inverse of a triangular matrix, relation between the time complexities of basic matrixoperations, LUP-decomposition.

UNIT –IV:

Shortest Path in Graphs: Floyd-Warshall algorithm and Introduction to dynamic programming paradigm, more examples of dynamic programming.

Modulo Representation of integers/polynomials: Chinese Remainder Theorem, Conversion between base-representation and modulo-representation, Extension to polynomials, Application: Interpolation problem.

Discrete Fourier Transform (DFT): In complex field DFT in modulo ring, Fast Fourier Transform algorithm, Schonhage-Strassen Integer Multiplicationalgorithm.

UNIT-V:

Linear Programming: Geometry of the feasibility region and Simplex algorithm.

NP-completeness: Examples, proof of NP-hardness and NP-completeness, Approximation algorithms, Randomized Algorithms.

Text Books:

1. "Algorithm Design" by Kleinberg and Tardos.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
CLOUD COMPUTING
(PROFESSIONAL ELECTIVE – II)

CourseCode:GR18A3102 **L T PC**
III Year II Semester **3 0 0 3**

Prerequisites:

Students are expected to have knowledge on Operating systems, Virtualization and Networking

Course Objectives:

The objective of this course is to

1. Understand the current trend and basics of cloudcomputing.
2. Learn cloud services from differentproviders.
3. Understand the architecture and concept of different cloud models: IaaS, PaaS,SaaS
4. Understand the underlying principle of cloud virtualization, cloud storage, data management and data visualization
5. Learn basic concepts of MapReduce programming models for big data analysis oncloud.

Course Outcomes:

At the end of this course student will be able to

1. Understand thefeatures, advantages and challenges of cloud computing, compare their operation ,implementation andperformance
2. Understand, Analyze and compare different types of clouds and cloudservices.
3. Understanding and validating the financial and technological implications in selecting cloud computing paradigm for anorganization.
4. Understand and Analyze the security challenges and risks involved in thecloud.
5. Create/Deploying of an application incloud.

UNIT -I:

Understanding Cloud Computing: Cloud Computing , Introduction to Cloud Computing ,Cloud Architecture and Cloud Services(IaaS, PaaS, SaaS) , Cloud models– Public vs Private, Cloud Technologies for Network-Based System , System Models for Distributed and Cloud Computing , NIST Cloud Computing Reference Architecture

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, Open Stack, 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
NEURAL NETWORKS AND DEEP LEARNING
(PROFESSIONAL ELECTIVE – II)

CourseCode:GR18A3103 **L T PC**
III Year II Semester **3 0 0 3**

Prerequisites:

The subject of Neural Networks & Deep Learning requires strong mathematical concepts of probability, statistics, matrices and a course on Artificial Intelligence is expected to be completed by the student.

Course Objectives:

The Objective of this course is to

1. Comprehend the math required for building deep learningnetworks.
2. Understand the basic building blocks of artificial neural networks(ANNs).
3. Acquire knowledge of supervised/unsupervised learning in neuralnetworks.
4. Explore the methods to develop optimized deep learning networks considering hyper parameters of convolution networks ,recurrent neuralnetworks.
5. Model solutions for real life problems using optimized deep learningnetworks.

Course Outcomes:

At the end of this course student will be able to

1. Understand the basic math required for neuralnetwork.
2. Explain working of artificial neuralnetworks.
3. Categorize between supervised and unsupervised learningmechanisms.
4. Analyze the real world problem and identify required hyper parameters to be considered for a deep learningnetwork.
5. Design optimized deep learning applications for small problems using algorithms learnt in the course.

UNIT -I:

Applied Math and Deep Learning basics: Historical trends in deep learning,Scalars, Vectors, Matrices and Tensors, Multiplying matrices and vectors, identity and inverse matrices, Linear dependence and span, Norms, Eigen Decomposition, Singular Value Decomposition, Moore- penrose pseudo inverse, Trace operator.

Probability and Information Theory: Why probability, Random variables, Probability distributions, marginal probability, conditional probability, the chain rule of conditional probability, Independence and conditional independence, expectation, variance, Covariance, Bayes' Rule.

UNIT -II:

Introduction to Neural Network: A Neural Network, Human Brain, Models of a Neuron, Neural Networks viewed as Directed Graphs, Network Architectures, Knowledge Representation, Artificial Intelligence and Neural Networks Learning Process: Error Correction Learning, Memory Based Learning, Hebbian Learning, Competitive, Boltzmann Learning, Credit Assignment Problem, Memory, Adaption, Statistical Nature of the Learning Process.

Single Layer Perceptron: Adaptive Filtering Problem, Unconstrained Organization Techniques, Linear Least Square Filters, Least Mean Square Algorithm, Learning Curves, Learning Rate Annealing Techniques, Perceptron —Convergence Theorem.

UNIT -III:

Basics of Deep Learning: learning algorithms, Capacity, over fitting and under fitting ,Hyper parameters and validation sets, Estimators, Bias and Variance, Maximum likelihood Estimation, Bayesian statistics, Supervised learning algorithms, unsupervised learning algorithms, Stochastic Gradient Descent, Building a machine learning algorithm, Challenges motivating deep learning.

Deep Feed forward networks : Example: XOR, Gradient-based learning, Hidden units, architecture design, Back –propagation algorithm.

Regularization for deep learning: Parameter norm penalties, norm penalties as constrained optimization, Data set augmentation, Noise robustness, semi-supervised learning, Multi-task learning, early stopping, parameter tying and sharing, Dropout**.**

UNIT –IV:

ConvolutionalNetworks: The convolution operation, motivation, pooling, convolution and pooling as an infinitely strong prior, variants of basic convolution function, structured outputs, data types, Efficient convolution algorithms, random or unsupervised features, the neuro-scientific basis for convolution networks

UNIT-V

Recurrent and recursive nets: Unfolding computational graphs, recurrent neural networks, bidirectional RNNs, Encoder-Decoder sequence-to-sequence architectures, deep recurrent networks.

Text Books:

1. Deep Learning –IanGoodfellow, YoshuaBengio, AaronCourville—MIT Press book-ISBN-13: 978-0262035613,
2. Neural Networks a Comprehensive Foundations, Simon Haykin, PHIedition.

References:

1. Artificial Neural Networks – B. Vegnanarayana Prentice Hall of India P Ltd2005
2. Neural Networks in Computer Intelligence, Li Mm Fu TMH2003
3. Deep Learning Fundamentals: An Introduction for Beginners by Chao Pan , AI Sciences Publisher.
4. Pattern Recognition and Machine Learning - Christopher M. Bishop -Information Science and Statistics. ISBN-13:978-1493938438.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
SOFTWARE ARCHITECTURE
(PROFESSIONAL ELECTIVE – II)

CourseCode:GR18A3104 **L T PC**
III Year II Semester **3 0 0 3**

Prerequisites:

Students are expected to have knowledge in Operating Systems, Object Oriented Programming.

Course Objectives:

The objective of this course is to

1. To understand interrelationships, principles and guidelines governing architecture and evolution overtime.
2. To understand architectural styles, design patterns and their underlying object orientedconcepts.
3. Software architecture and quality requirements of evaluation processes in softwaresystem
4. Fundamental principles and guidelines for software architecture design, architectural styles, patterns, andframeworks.
5. Methods, techniques, and tools for describing software architecture and documenting design rationale.

Course Outcomes:

At the end of this course student will be able to

1. Design and motivate software architecture for large scale software systems
2. Recognize major software architectural styles, design patterns, andframeworks
3. Describe a software architecture using various documentation approaches and architectural descriptionlanguages
4. Generate architectural alternatives for a problem and select amongthem
5. Use well-understood paradigms for designing newsystem

UNIT -I:

Introduction To Software Architecture: An Engineering Discipline for Software, Status of S/W Architecture, Architecture Business Cycle, Where do Architectures Come from. Software Processes and the Architecture Business Cycle, Features of Good Architecture.

UNIT -II:

Designing the Architecture with Styles: Architecture in the Life Cycle, Designing the Architecture, Formatting the Team Structure, Creating a SkeletalSystem.

Architecture Styles: Pipes and Filters, Data Abstraction and Object Oriented Organization, Event-Based, Implicit Invocation, Layered Systems, Repositories, Interpreters.

UNIT -III:

Creating an Architecture-I: Functionality and Architecture, Architecture and Quality Attributes, System Quality Attributes, Quality Attribute, Scenarios in Practice, Other System Quality Attributes, Business Qualities, Architecture Qualities.

Achieving Qualities: Introducing Tactics, Availability Tactics, Modifiability Tactics, Performance Tactics, Security Tactics, Testability Tactics and Usability Tactics.

UNIT –IV:

Creating an Architecture-II: Documenting Software Architectures, Use of Architectural Documentation, Views, Choosing the Relevant Views, Documenting a view, Documentation across Views.

Reconstructing Software Architecture: Introduction, Information Extraction, Database Construction, View Fusion, and Reconstruction.

UNIT-V:

Analyzing Architectures: The ATAM-Participants in the ATAM, Outputs of The ATAM, Phases Of the ATAM. The CBAM: Decision-Making Context, the Basis for the CBAM, Implementing the CBAM. A Case study in Interoperability- Relationship to the Architecture Business Cycle, Requirements and Qualities, Architecture Solution, Achieving Quality Goals.

Text Books:

1. Software Architectures in Practice, Len Bass, Paul Clements, Rick Kazman, 2ndEdition, PearsonPublication.
2. Software Architecture, Mary Shaw and David Garlan, First Edition, PHI Publication, 1996.

References:

1. Software Design: From Programming to Architecture, Eric Braude, Wiley,2004.
2. N. Domains of Concern in Software Architectures and Architecture Description Languages, Medvidovic and D. S. Rosenblum.USENIX

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
PRINCIPLES OF E-COMMERCE
(OPEN ELECTIVE – I)

CourseCode:GR18A3129 **L T PC**
III Year II Semester **3 0 0 3**

Prerequisites:

Computer Network course, Web Technology course and Internet terminologies.

Course Objectives:

The objective of this course is to

1. Comprehend the fundamental e-commerce terminologies; recognize the business models and potential ofe-Commerce.
2. Recognize the business models and potential of e-Commerce.
3. Choose better software, hardware and e-com tools for developing a fool proof webapplication.
4. Build and deploy a safe and secure online paymentsystem.
5. Discuss the trends in e-Commerce, online content, media and the use of theinternet.

Course Outcomes:

At the end of this course student will be able to

1. Comprehend and identify the nature and types ofe-commerce.
2. Distinguish all types of businessmodels.
3. Choose and pick the suitable software, hardware and e-com tools for developing a better web application.
4. Implement a robust, safe and secured online paymentsystem.
5. Interpret about the current e-commerce development and usage of effective internet and rearticulate about the online content andmanagement.

UNIT -I:

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

UNIT -II:

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

UNIT -III:

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

UNIT –IV:

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

UNIT-V:

Online Content and Media: Online Content, Online Publishing Industry, Online Entertainment Industry.

Text Books:

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

References:

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

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECCHNOLOGY

SOFT SKILLS AND INTERPERSONAL SKILLS

(Open Elective-I)

Coursecode: GR18A3117

III B.Tech II SEM

L T P C

3 0 0 3

Course Objectives:

The learner will be able to:

- Know the importance of soft skills.
- Identify good leadership skills /qualities.
- Recognize the importance of interpersonal skills.
- Demonstrate the significance of confidence building.
- Define and differentiate between a report and a proposal.

Course Outcomes:

After the end of the course the learners will be able to:

- Develop soft skills communication skills, leadership skills etc.
- Implement goal setting techniques to build a promising career.
- Design formal report and proposals with appropriate formal expressions.
- Analyse their own experiences of leading and participating in teams with suitable examples.
- Describe team dynamics and exchange ideas about the elements of positive teamwork.
- Create healthy workplace environment by treating others with respect and dignity.
- Evaluate the power of confidence building and self-esteem with examples.

Unit 1: Soft Skills

- Introduction to soft skills, Definition of Soft skills, Importance of soft skills
- Communication skills, Usage of English in Business/Corporate scenario
- Nonverbal communication
- Presentation skills

Unit 2: Leadership development

- Qualities of a good leader
- Decision making and problem solving skills
- Strategic management
- Crisis management

Unit3: Confidence building

- Motivation
- Goal setting
- Self-esteem
- Team skills

Unit 4: Developing reports and proposals

- Understanding reports and proposals
- Planning reports and proposals
- Writing beginning, body and ending
- Formats of reports and proposals

Unit5: Interpersonal skills

- Understanding professional relationships
- Networking professionally
- Showing basic office courtesies
- Interview skills

Text Books:

1. Soft Skills-Key to success in workplace and life
   Meenakshi Raman, Raman Upadhyay, CENAGE

Reference books:

2. Soft skills for Everyone
   Jeff Butterfield, CENAGE Learning

3. Soft skills for Interpersonal Communication
   S.Balasubramaniam,ORIENT BLACKSWAN

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECCHNOLOGY

HUMAN RESOURCE DEVELOPMENT AND ORGANIZATIONAL BEHAVIOUR

(Open Elective-I)

Coursecode: GR18A3118 L T P C

III B.Tech II SEM 3 0 0 3

Course Objectives

1. To make student aware of the concepts, techniques and practices of human resource development.
2. This course is intended to make students capable of applying the principles and techniques as professionals for developing human resources in an organization.
3. OB provides perspectives and skills that enhance understanding of our own behaviour and our ability to influence the behaviour of others in organizational settings
4. OB and HRM together can instill sustainability deep within an organizations' culture.
5. To equip them with behavioural skills in managing people at work.

Course Outcomes

1. To familiarize the concepts, techniques and practices of human resource development in the current organizational view and to impart and apprise the capable of applying the principles and techniques as professionals for developing human resources in an organization.
2. Develop, implement, and evaluate organizational human resource development strategies aimed at promoting organizational effectiveness in different organizational environments.
3. To acquaint the student with the determinants of intra -individual, inter-personnel and inter-group behaviour in organisational setting.
4. To Understand individual behavior in organizations, including diversity, attitudes, job satisfaction, emotions, moods, personality, values, perception, decision making, and motivational theories and apply in the organizational context.
5. To assess the group behavior in organizations, including communication, leadership, power and politics, conflict, and negotiations in the frame work of organization.

Unit I -Introduction to Human Resource Development: Concept; Relationship between human resource management and human resource development; HRD mechanisms, processes and outcomes; HRD matrix;Roles and competencies of HRD professionals; Challenges in HRD, steps in HRD Process.
Unit II-HRD Applications and Trends: Coaching and mentoring; Career management and development; Competency mapping; Balanced Score Card. HRD in Organisations: Selected cases covering HRD practices in government organisations, manufacturing and service industries and MNCs.

Unit III - Introduction to OB : Organisational Behaviour- Concept and Emergence of OB Concept; Nature and Theoretical frameworks; Models of Organisational Behaviour, Challenges and Opportunities for Organisational Behavior;
Unit IV- Individual Behaviour: Individual Behaviour: Personality, Learning, Values and Attitudes, Perception, Stress at work. Management's assumptions about people- McGregor's Theory X and Theory Y. Motivation - Maslow's Need Hierarchy, Herzberg's Two Factors Theory, Vroom's Expectancy Theory.

Unit V-Inter-personal and Group Behaviour: Interpersonal communication and Feedback; Transactional Analysis (TA); Johari Window.Group Behaviour: Group Dynamics, Cohesiveness and Productivity; Management ofDysfunctional groups; Group Decision Making. Leadership- Concept and Styles.

Text Books:

1. Robbins, Stephen P. and Timothy A. Judge, Organisational Behaviour, Prentice -Hall, New Delhi.
2. Werner J. M., DeSimone, R.L., Human resource development, South Western.

Reference Books:

1. Luthans, Fred, Organizational Behaviour, McGraw-Hill, New York.
2. Gregory, Moorhead and Ricky W. Griffin, Managing Organizational Behaviour, Thomson South Western Publication.
3. Pareek, Udai and V. Sisodia, "HRD in the New Millennium, Tata McGraw - Hill Publishing Co. Ltd., New Delhi, 1999.
4. Haldar, U. K., Human resource development, Oxford University Press India.
5. Rao, T.V., Future of HRD, Macmillan Publishers India.
6. Rao, T.V., HRD Score Card 2500: Based on HRD audit, Response Books, SAGE Publications.
7. Mankin, D., Human resource development, Oxford University Press India.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
DATA WAREHOUSING AND DATA MINING LAB

CourseCode:GR18A3105 **L T PC**
III Year II Semester **0 0 2 1**

Course Objectives:

The objective of this course is to

1. Understand the basic concepts of creating tables in attribute relation fileformat
2. Identify the use of attribute relation file format table for dataanalysis.
3. Acquire knowledge on various pre-processing techniques.
4. Obtain the skill in implementing various data miningfunctionalities.
5. Implement appropriate mining algorithm using Weka tool to solve real timeproblems.

Course Outcomes:

At the end of this course student will be able to

1. Learn the concept of creating database tables in attribute relation file format(.arff).
2. Design a database tables in .arff format and insert, modify thedata.
3. Apply pre-processing statistical methods for any given rawdata.
4. Extract knowledge and implementation of various data miningtechniques.
5. Implement data mining algorithms in real time problem solving using wekatool.

Implement the following Tasks using Weka Tool:

(Solve the tasks 1 to 6by taking given German credit data as case study)

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 aquarter).
- 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 orbad.

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 aftertraining.

TASK 2

Suppose you use your above model (task1) 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? Check to see if the data shows a bias against "foreign workers" (attribute 20),or "personal-status" (attribute 9). Did removing these attributes have any significant effect? Discuss.

TASK 3

Describe what cross-validation is briefly. Train a Decision Tree again using cross-validation and report your results. Does your accuracy increase/decrease? Why?

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. Train your Decision Tree again and report the Decision Tree and cross-validationresults.

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

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? Report the rule obtained by training a one R classifier. Rank the performance of j48, PART and one R.

TASK 7

(a) Create a data set Student.arff with required data.

(b) Demonstrate preprocessing techniques on dataset Student.arff

TASK 8

(a) Create a data set Employee.arff by adding required data fields.

(b) Apply Association rule mining on dataset Employee.arff (Use Apriori Algorithm)

TASK 9

(a) Create a data set Weather.arff with required fields.

(b) Apply preprocessing techniques on dataset Weather.arff and normalize Weather Table data using Knowledge Flow.

TASK 10

(a) Demonstrate classification algorithm on dataset student.arff using j48algorithm

(b) Demonstration of classification rule process on dataset employee.arff using naïve bayes algorithm

TASK11

(a) Create a data set customer.arff with requiredfields.

(b) Write a procedure for Clustering Customer data using Simple KMeansAlgorithm.

TASK 12

Demonstration of clustering rule process on dataset student.arff using simple k-means

Text Books:

1. Data Mining– Conceptsand Techniques - Jiawei Han &MichelineKamber, Morgan Kaufmann Publishers, Elsevier, Second Edition,2006.
2. Introduction to Data Mining – Pang-Ning Tan, Michael Steinbach and Vipin Kumar, Pearson education.

References:

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

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
COMPILER DESIGN LAB

CourseCode:GR18A3106 **L T PC**
III Year II Semester **0 0 2 1**

Course Objectives:

The objective of this course is to

1. Introduce the major concept areas of language translation and compilerdesign.
2. Understand practical programming skills necessary for constructing acompiler.
3. Learn parsing techniques and to parse givenstring.
4. Learn lex & yacc tool to develop a scanner &parser.
5. Provide deeper insights into the concept of codegeneration.

Course Outcomes:

At the end of this course student will be able to

1. Demonstrate different phases of compiler through programminglanguage.
2. Define the role of lexical analyser and use of regularexpressions.
3. Develop program for implementing parsingtechniques.
4. Understand the working of lex and yacc compiler and develop simpleapplications.
5. Design programs that execute faster by using code optimizationtechniques.

TASK 1

Design a lexical analyser for given language (ignore redundant spaces, tabs, comments new lines etc.)

TASK 2

Write a program to recognize strings under 'a*', 'a*b+', 'abb'.

TASK 3

Implement symbol table formation.

TASK 4

Write a program to implement predictive parser table.

TASK 5

Convert the BNF rules into Yacc form and write code to generate abstract syntax tree.

TASK 6

Construct operator precedence parser.

TASK 7

Write a program to parse a string using Shift Reduce Parser.

TASK 8

Solve the given string using LALR parser.

TASK 9

Write a program to implement lexical analyzer functionalities using LEX tool.

TASK 10

Design a simple arithmetic calculator using LEX .

TASK 11

Lex program to count no of characters, words, lines and special characters in a file.

TASK 12

Implement code optimization technique.

Text Books:

1. Principles of compiler design -A.V. Aho , J.D.Ullman, PearsonEducation.
2. Modern Compiler Implementation in C- Andrew N. Appel, Cambridge UniversityPress.

References:

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

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

CONSTITUTION OF INDIA

CourseCode:GR18A2003	**L T PC**
III Year II Semester	**2 0 0 2**

Course Objectives:

The objective of this course is to

1. To create an awareness about the Constitution of India, Fundamental Rights and Duties, Directive Principles
2. To Learn the role of Prime Minister, President and the Council of Ministers and the State Legislature
3. To learn the divisions of executive, legislative and judiciary and so on.
4. To know how a municipal office, panchayat office etc. works
5. To understand the importance and role of Election Commission Functions.

Course Outcomes:

At the end of this course student will be able to

1. Students will be able to know the importance of Constitution and Government
2. Students will be able to become Good Citizens and know their fundamental rights, duties and principles.
3. Students will learn about the role of PM, President, Council of Ministers and Local Administration.
4. The Students understand the importance of Election Commission.
5. They will know about Secularism, Federalism, Democracy, Liberty, Freedom of Expression, Special Status of States etc.,

Unit I

Introduction

'Constitution' meaning of the term, Indian Constitution: Sources and constitutional history, Features: Citizenship, Preamble, Fundamental Rights and Duties, Directive Principles of State Policy

Unit II

Union Government and its Administration

Structure of the Indian Union: Federalism, Centre - State relationship, President: Role, power and position, PM and Council of ministers, Cabinet and Central Secretariat, Lok Sabha, Rajya Sabha

Unit III

State Government and its Administration

Governor: Role and Position, CM and Council of ministers, State Secretariat: Organization, Structure and Functions

Unit IV

Local Administration

District's Administration head: Role and Importance, Municipalities: Introduction, Mayor and role of Elected Representative, CEO of Municipal Corporation, Pachayati raj: Introduction, PRI: ZilaPachayat, Elected officials and their roles, CEO ZilaPachayat: Position and role, Block level: Organizational Hierarchy (Different departments), Village level: Role of Elected and Appointed officials, Importance of grass root democracy

Unit V

Election Commission
Election Commission: Role and Functioning, Chief Election Commissioner and Election Commissioners, State Election Commission: Role and Functioning, Institute and Bodies for the welfare of SC/ST/OBC and women

Books Recommended:

1. 'Indian Polity' by Laxmikanth 5th Edition, McGraw Hill Edition.
2. Indian Constitution by Subhash C. Kashyap, Vision Books Publisher
3. 'Introduction to Indian Constitution' by D.D. Basu, 21st Edition, LexisNexis Publisher
4. *'Indian Administration by avasthi and avasthi-by lakshminarainagarwal publication*

Syllabus
IV -Year

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

CRYPTOGRAPHY AND NETWORK SECURITY

CourseCode:GR18A4043	**L T PC**
IV Year I Semester	**3 0 0 3**

CourseObjectives:

The objective of this course is to

1. Importance and applications of confidentiality, integrity, authentication,availability.
2. Develop various cryptographic algorithms, related to conventional and Asymmetric Encryption.
3. Familiarize how to generate and distribute PGP key pair and use the PGP package to send an encrypted e-mailmessage.
4. Understand public-key cryptosystem and enhancements made to IPV4 byIPSec.
5. Understand with intrusions and intrusion detection, web security andfirewalls.

Course Outcomes:

At the end of this course student will be able to

1. Work and check the applications defined with confidentiality, integrity, andAuthentication.
2. Work with various public key and private key cryptographicalgorithms.
3. Examine the issues and structure of Authentication Service and Electronic MailSecurity.
4. Understand the IP Security Architecture ,Web Security and Key Managementtechniques.
5. Understand intrusion and intrusion detection, Web security andfirewalls.

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 encryptionalgorithms (DES, Blowfish, Idea), cipher block modes of operation, location of encryption devices, keydistribution, Approaches of Message Authentication, Secure Hash Functions(MD-5,SHA-1) andHMAC.

UNIT-II:

Public key cryptography principles, Public key cryptography algorithms (RSA, Diffie-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 DetectionSystems.

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 Forest Puppy, Joe Grand, David Ahmad, Hal Flynn Ido Dubrawsky, Steve W.Manzuik and RyanPermeh, wileyDreamtech

References

1. Fundamentals of Network Security by Eric Maiwald (Dreamtechpress)
2. Network Security - Private Communication in a Public World by Charlie Kaufman, 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, MarkRhodes,TMH
6. Introduction to Cryptography, Buchmann,Springer.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
MACHINE LEARNING

CourseCode:GR18A4044 **L T PC**

IV Year I Semester **3 0 0 3**

Prerequisites:

- Mastery of introduction-level algebra , statistics and probabilitytheory
- Data Modeling andEvaluation

Course Objectives:

The objective of this course is to

1. Recognize the basic terminology and fundamental concepts of machinelearning.
2. Understand the concepts of Supervised Learning models with a focus on recent advancements.
3. Relate the Concepts of Neural Networks Models of supervisedLearning
4. Discover Unsupervised learning paradigms of machinelearning
5. Understand the concepts of Reinforcement learning and Ensemblemethods

Course Outcomes:

At the end of this course student will be able to

1. Explain the concepts and able to Compare different machine learningmodels.
2. Apply Supervised Learningmodels
3. Design Neural Network models for the givendata.
4. Devise un-supervised model with optimizedfeatures.
5. Perform Evaluation of Machine Learning algorithms and ModelSelection

UNIT-I:

Introduction: Introduction to Machine learning, Supervised learning, Unsupervised learning, Reinforcement learning. Deep learning.

Terminology: Regularization, overfitting, underfitting, bias-variance trade off, feature selection, feature normalization, confusion matrix, cross-validation, learning curves, gradient descent.

UNIT-II:

Supervised Learning – I (Regression/Classification)

Basic methods: Distance-based methods, Nearest-Neighbours, Decision Trees, NaiveBayes

Linear models: Linear Regression, Logistic Regression, Generalized Linear Models, Support Vector Machines, Nonlinearity and Kernel Methods,

Beyond Binary Classification: Multi-class/Structured Outputs, Ranking

UNIT-III:

Supervised Learning – II (Neural Networks)

Neural Network Representation – Problems – Perceptrons – Multilayer Networks and Back Propagation Algorithms.

Foundations of Convolutional Neural Networks - Convolution and Pooling, the basics of ConvNets, Recurrent Neural Networks (RNN).

UNIT-IV:

Unsupervised Learning

Clustering: K-means/Kernel K-means, Gaussian Mixture Models, Expectation Maximization

Dimensionality Reduction: PCA and kernel PCA Matrix Factorization and Matrix Completion - Generative Models (mixture models and latent factor models)

UNIT-V:

Reinforcement Learning: Exploration and exploitation tradeoffs, non-associative learning, Markov decision processes,Q-learning.

Evaluating Machine Learning algorithms and Model Selection, Introduction to Statistical Learning Theory.

Ensemble Methods: Boosting, Bagging, Random Forests

Text Books:

1. Machine Learning – Tom M. Mitchell, -MGH
2. Kevin Murphy, Machine Learning: A Probabilistic Perspective, MIT Press,2012
3. R. S. Sutton and A. G. Barto. Reinforcement Learning - An Introduction. MIT Press.1998.

References:

1. Trevor Hastie, Robert Tibshirani, Jerome Friedman, The Elements of Statistical Learning, Springer2009
2. Christopher Bishop, Pattern Recognition and Machine Learning, Springer,2007.
3. Machine Learning Yearning, AndrewNg.
4. DataMining–Conceptsand Techniques -Jiawei Han and Micheline Kamber,Morgan Kaufmann

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
PARALLEL AND DISTRIBUTED ALGORITHMS
(PROFESSIONAL ELECTIVE-III)

CourseCode:GR18A4045 **L T PC**
IV Year I Semester **3 0 0 3**

Prerequisites:

- Students are expected to have knowledgein
- Basic Programming, Algorithm concepts, computernetworks

Course Objectives:

The Objective of the course is to

1. Acquaint students with the basic concepts of parallel and distributedcomputing.
2. Expose general principles of parallel and distributed algorithms and their time complexity.
3. Make students to learn basic principles and possibilities of algorithm parallelization of complex problems.
4. Make students tolearn basic aspects MPI- programming environment for distributedsystem
5. Make students tobe explored to the parallel computingapplications

Course Outcomes:

At the end of this course student will be able to

1. Explain the range of requirements that modern parallel/distributed systems have toaddress.
2. Articulate design tradeoffs inherent in large scale parallel and distributed systemdesign.
3. Describe how the resources in a parallel and distributed system are managed bysoftware.
4. Justify the presence of concurrency within the framework of a parallel and distributed system.
5. Demonstrate the potential runtime problems arising from the concurrent operation of many (possibly a dynamic number of) tasks in a parallel and distributedsystem.

UNIT-I:

Fundamentals: Models of parallel and distributed computation, complexity measures. Parallel programming models. Multi-Core architecture and performance measure architectures.

UNIT-II:

The PRAM Model: Balancing, divide and conquer, parallel prefix computation, pointer jumping, symmetry breaking, list ranking, sorting and searching, graph algorithms, parallel complexity and complexity classes, lower bounds.

UNIT-III:

Interconnection Networks: topologies (arrays and mesh networks, trees, systolic networks, hyper cubes, butterfly) and fundamental algorithms, matrix algorithms, sorting, graph algorithms, routing, and relationship with PRAM models, Asynchronous Parallel Computation, Distributed Models and Algorithms

UNIT-IV:

Distributed Search: Distributed BFS, Random walks; Introduction to Markov processes; Random walks (hitting time, cover time); (s.t) -connectivity.

UNIT-V:

Distributed Networks: Broadcasting; Robust distributed networks. MPI programming for distributed system, Point-Point, Communication Protocols of MPI.

Text Books:

1. Akl, S.: The Design and Analysis of Parallel Algorithms, Prentice-Hall International, ISBN 0-13-200073-3
2. Joseph Jaja, An Introduction to Parallel Algorithms, AddisonWesley

References:

1. MukeshSinghal and Nianjan G. Shivaratri, Advanced Concepts in Operating Systems,TMH
2. Parallel Programming in C with MPI and OpenMP Hardcover – Import, 1 Jul 2003 by Michael J. Quinn, McGraw-Hill Higher Education (1 July2003)

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
IMAGE AND VIDEO PROCESSING
(PROFESSIONAL ELECTIVE-III)

CourseCode:GR18A3112 **L T PC**
IV Year I Semester **3 0 0 3**

Pre requisites:
Students are expected to have knowledge in

- Analysis of algorithms and linearalgebra.
- Programmingexperience.

Course Objectives:
The objective of this course is to

1. Describe and explain basic principles of digital imageprocessing.
2. Cover the basic analytical methods such as image enhancement,restoration,segmentation
3. Learn Image compressiontechniques
4. Learn and explain basic principles of digital image and videoprocessing.
5. Cover the basic motion estimations used in videoprocessing.

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

1. Describe the basic principles ofImaging.
2. Learn the knowledge of the images in transform domains andsegmentation.
3. Apply Image compression onimages.
4. Understand and develop algorithms videoprocessing.
5. Implement various video motiontechniques.

UNIT-I:
Fundamentals of Image Processing and Image Transforms: Basic steps of Image Processing System Sampling and Quantization of an image, Basic relationship between pixels.

UNIT-II:
Image Enhancement: Spatial domain methods: Histogram processing, Fundamentals of Spatial filtering, Smoothing spatial filters, Sharpening spatial filters. Frequency domain methods: Basics of filtering in frequency domain, Image smoothing, Image sharpening, Selective filtering.
Image Segmentation: Segmentation concepts, Point, Line and Edge Detection, Thresholding, Region based segmentation.

UNIT-III:
Image Compression: Image compression fundamentals - Coding Redundancy, Spatial and Temporal redundancy, Compression models: Lossy & Lossless, Huffman coding, Bit plane coding, Transform coding, Predictive coding, Wavelet coding, Lossy Predictive coding, JPEG Standards.

UNIT-IV:

Basic Steps of Video Processing: Analog Video, Digital Video. Time-Varying Image Formation models: Three Dimensional Motion Models, Geometric Image Formation, Photometric Image Formation, Sampling of Video signals, filtering operations.

UNIT-V:

2-D Motion Estimation: Optical flow, General Methodologies, Pixel Based Motion Estimation, Block- Matching Algorithm, Mesh based Motion Estimation, Global Motion Estimation, Region based Motion Estimation, Multi resolution motion estimation, Waveform based coding, Block based transform coding, Predictive coding, Application of motion estimation in Videocoding.

Text Books:

1. Digital Image Processing – Gonzalez and Woods, 3rd Ed., Pearson.
2. Video Processing and Communication – Yao Wang, JoemOysterman and Ya–quin Zhang. 1st Ed., PHInt.

References:

1. Digital Image Processing and Analysis-Human and Computer Vision Application with CVIP Tools – ScotteUmbaugh, 2nd Ed, CRCPress,2011.
2. Digital Video Processing – M. Tekalp, Prentice HallInternational
3. Digital Image Processing with MATLAB and Lab view – Vipula Singh,Elsevier
4. Video Demystified – A Hand Book for the Digital Engineer – Keith Jack, 5th Ed.,Elsevier

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
NATURAL LANGUAGE PROCESSING
(PROFESSIONAL ELECTIVE-III)

CourseCode:GR18A4047 **L T PC**
IV Year I Semester **3 0 0 3**

Prerequisites:
Students are expected to have knowledge in Formal Languages and Automata Theory, Compiler Design.

Course Objectives:
The objective of this course is to
1. Role of natural language processing and languagemodelling.
2. The analysis of text at word level, syntactic level and semanticlevel
3. Discourse processing of thetext
4. Knowledge in automated natural language generation and machinetranslation
5. Explanation of information retrieval systems and usage of Lexicalresources

Course Outcomes:
At the end of this course student will be able to
1. Summarize the role of natural language processing in various applications and explain languagemodeling
2. Apply word level analysis, syntactic analysis and semantic analysis on natural language processing.
3. Discuss discourse processing oftext.
4. Illustrate the automation of natural language generation and machine translation of Indian languages.
5. Infer information retrieval systems and utilize lexical resources for processing natural language text

UNIT –I:
Overview: Origins and challenges of NLP, Language and Grammar, Processing Indian Languages, NLP Applications, Information Retrieval.
Language Modeling: Introduction, Various Grammar-based LanguageModels, Statistical Language Model.

UNIT-II:
Word Level Analysis: Introduction, Regular Expressions, Finite StateAutomata, Morphological Parsing, Spelling Error Detection and correction, Words and Word classes, Part of Speech Tagging.
Syntactic Analysis: Introduction, Context-free Grammar, Constituency,Parsing, Probabilistic Parsing.

UNIT-III:
Semantic Analysis: Introduction, Meaning Representation, Lexical Semantics, Ambiguity, Word Sense Disambiguation.

Discourse Processing: Introduction, Cohesion, Reference Resolution, Discourse Coherence and Structure

UNIT-IV:

Natural Language Generation: Introduction, Architecture of NLG Systems, Generation Tasks and Representations, Application of NLG.

Machine Translation: Introduction, Problems in Machine Translation, Characteristics of Indian Languages, Machine Translation Approaches, Translation involving Indian Languages

UNIT-V:

Information Retrieval: Introduction, Design features of Information Retrieval Systems, Classical, Non-classical, Alternative Models of Information Retrieval, Evaluation

Lexical Resources: Introduction, WordNet, Frame Net, Stemmers, POS Tagger, Research Corpora

Text Books:

1. Tanveer Siddiqui, U.S. Tiwary, "Natural Language Processing and Information Retrieval", Oxford University Press, 2008.

References:

1. Daniel Jurafsky and James H Martin, "Speech and Language Processing: An introduction to Natural Language Processing, Computational Linguistics and Speech Recognition",Prentice Hall, 2nd Edition,2008.
2. James Allen, Bejamin/cummings, "Natural Language Understanding", 2nd edition,1995.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
AGILE SOFTWARE PROCESS
(PROFESSIONAL ELECTIVE-III)

CourseCode:GR18A4048 **L T PC**
IV Year I Semester **3 0 0 3**

Prerequisites:

Students are expected to have knowledge in Basics of C Programming, Java and software engineering.

Course Objectives:

The objective of this course is to

1. To understand the benefits and pitfalls of agilemodel.
2. To understanding of agile software development practices and how small teams can apply them to create high-qualitysoftware.
3. To do a detailed examination and demonstration of agile development.
4. To understanding of software design and a set of softwaretechnologies.
5. To understand agile development andtesting.

Course Outcomes:

At the end of this course student will be able to

1. Realize the importance of interacting with business stakeholders in determining the requirements for a softwaresystem
2. Perform iterative software development processes: how to plan them, how to executethem.
3. Point out the impact of social aspects on software developmentsuccess.
4. Develop techniques and tools for improving team collaboration and softwarequality.
5. Show how agile approaches can be scaled up to the enterpriselevel.

UNIT-I:

Agile Definition , How to be Agile, Understanding XP, Values and Principles, Improve the Process, Eliminate Waste, Deliver Value.

UNIT-II:

Practicing XP:Thinking, Pair Programming, Energized Work, Informative Workspace, Root-Cause Analysis, Retrospectives, Collaborating, Sit Together, Real Customer Involvement, Ubiquitous Language, Stand-Up Meetings, Coding Standards, Iteration Demo, Reporting.

UNIT-III:

Releasing: Done Done, No Bugs, Version Control, Ten-Minute Build, Continuous Integration, Collective Code Ownership, Documentation.

UNIT-IV:

Planning:Vision, Release Planning, Risk Management, Iteration Planning, Stories, Estimating.

UNIT-V:

Developing: Incremental Requirements, Customer Tests, Test- Driven Development, Refactoring, Incremental Design and Architecture, Spike Solutions, Performance Optimization.

Text Books:

1. James Shore and Shane Warden, “The Art of Agile Development”, O’REILLY,2007.
2. Robert C. Martin, “Agile Software Development, Principles, Patterns, and Practices” , PHI,2002.

References:

1. Angel Medinilla, “Agile Management: Leadership in an Agile Environment”, Springer, 2012.
2. Bhuvan Unhelkar, “The Art of Agile Practice: A Composite Approach for Projects and Organizations”, CRCPress.
3. Jim Highsmith, “Agile Project Management”, Pearson education,2004.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
INFORMATION STORAGE AND RETRIEVAL
(PROFESSIONAL ELECTIVE-IV)

CourseCode:GR18A4055 **L T PC**
3 0 0 3

IV Year I Semester

Course Objectives:

The objective of this course is to

1. To outline basic terminology and components in information storage and retrievalsystems
2. To compare and contrast information retrieval models and internalmechanisms
3. To articulate fundamental functions used in information retrieval such as data structures, searching, automatic indexing andclustering
4. To comprehend the unique features of Internet-based informationretrieval
5. To study multimedia retrieval system effectiveness and improvementtechnique

Course Outcomes:

At the end of this course student will be able to

1. Distinguish IRS capabilities and to demonstrate the use of cataloguing andindexing
2. Illustrate the data structures used in IRS and study the accuracy for various clustering and indexing
3. Differentiate software text search algorithms and hardware text searchsystems
4. Use search techniques and information visualizationtechnologies
5. Construct multimedia retrievalsystems

UNIT – I:

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

Information Retrieval System Capabilities: Search, Browse, Miscellaneous.

UNIT – II:

Cataloguing 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, Hypertextlinkages

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.

Text Books:

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 Retrieval, Yates PearsonEducation.
3. Information Storage &Retrieval, Robert Korfhage – John Wiley &Sons

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

MULTIMEDIA APPLICATIONS
(PROFESSIONAL ELECTIVE-IV)

CourseCode:GR18A4050 **L T PC**
IV Year I Semester **3 0 0 3**

Course Objectives:

The objective of this course is to

1. To Understand about Multimedia and Hyper media and video, audio and textapplications.
2. To Learn Multimedia ActionScripts
3. To Understand Multimedia application Development and Multimedia Data Compression techniques.
4. To learn various Video CompressionTechniques.
5. To understand various network aspects used for multimediaapplications.

Course Outcomes:

At the end of this course student will be able to

1. Identify and categorize various file formats like text ,audio and video and imagemodels
2. Implement Action Script features in Multimediaapplications
3. Implement multimedia animation movies using actionscripts
4. Implement multimedia audio, video and data compressiontechniques.
5. Apply various networking protocols for multimediaapplications.

UNIT-I:

Fundamental concepts in Text and Image: Multimedia and hypermedia, World Wide Web, overview of multimedia software tools, Graphics and image data representation, graphics/image data types, file formats, **Color in image and video:** color science, color models in images, color models in video.

Fundamental concepts in video and digital audio: Types of video signals, analog video, digital video, digitization of sound, MIDI, quantization and transmission of audio.

UNIT-II:

Action Script I: Action Script Features, Object-Oriented Action Script, Data types and Type Checking, Classes, Authoring an Action Script Class.

Action Script II: Inheritance, Authoring an Action Script 2.0 Subclass, Interfaces, Packages, Exceptions.

UNIT-III:

Application Development: An OOP Application Frame work, Using Components with Action Script Movie Clip Subclasses.

Multimedia Data Compression: Lossless compression algorithm: Run-Length Coding, Variable Length Coding, Dictionary Based Coding, Arithmetic Coding, Lossless Image Compression, Lossy compression algorithm: Quantization, Transform Coding, Wavelet- Based Coding, Embedded Zero tree of Wavelet Coefficients Set Partitioning in Hierarchical Trees (SPIHT).

UNIT-IV:

Basic Video Compression Techniques: Introduction to video compression, video compression based on motion compensation, search for motion vectors, MPEG, Basic Audio Compression Techniques.

UNIT-V:

Multimedia Networks: Basics of Multimedia Networks, Multimedia Network Communications and Applications: Quality of Multimedia Data Transmission, Multimedia over IP, Multimedia over ATM Networks, Transport of MPEG-4,Media-on-Demand(MOD).

Text Books:

1. Fundamentals of Multimedia By ZeNian Li and mark S Drew PHI/PearsonEducation
2. Essentials Action Script 2.0,Colin Moock,SPDO,REILLY

References:

1. DigitalMultimedi,Nigel Chapman and JennyChapman,WileyDreantech
2. Macromedia Flash MX Professional 2004Unleashed,Pearson.
3. Multimedia and Communications Technology,SteveHeath,Elevier(FocalPress)
4. MultimediaApplications,Steinmetz,Nahrstedt,Springer

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
DATA SCIENCE
(PROFESSIONAL ELECTIVE-IV)

CourseCode:GR18A4051 **L T PC**
IV Year I Semester **3 0 0 3**

Course Objectives:

The objective of this course is to

1. Understand the Data Science process andapplications.
2. Learn how to collect, store and manage data from multiple datasources.
3. Identify different Machine Learning algorithms for dataanalysis.
4. List the types and technologies of datavisualization.
5. Discuss the recent trends and ethics of Data Science.

Course Outcomes:

At the end of this course student will be able to

1. Examine Data Science process and its applications.
2. Interpret how data is collected, stored and managed from multiplesources.
3. Apply various Machine Learning algorithms for real time problems.
4. Practice different data visualizationtechniques.
5. Summarize the recent trends and ethics of datascience.

UNIT- I:

Introduction to core concepts and technologies: Introduction, Terminology, data science process, data science toolkit, Types of data, Role of Data Scientist, Example applications.

UNIT- II:

Data collection and management: Introduction, Sources of data, Data collection and APIs, Exploring and fixing data, Data storage and management.

Feature Generation and Feature Selection: Introduction, Motivating application - user (customer) retention, Feature Selection algorithms-Filters, Wrappers, Embedded Methods, Decision Trees, Random Forests.

UNIT-III:

Exploratory Data analysis: Terminology and concepts, Basic Tools, Introduction to statistics, Central tendencies and distributions, Variance,Population &Samples, Statistical Modeling.

Motivating application in Machine Learning: Introduction to SpamFiltering, Why Linear Regression and KNN are poor choices for Filtering Spam, why Naive Bayes works for Filtering Spam
Data Wrangling: Introduction, Web Scrapping, APIs and other tools for scrapping the Web

UNIT- IV:

Data visualization: Introduction,Data Visualization techniques and tools, Data encodings, Retinal variables, Mapping variables to encodings, Visual encodings.

UNIT- V:

Data Science Ethical Issues& Recent Trends: Discussions on privacy, security, ethics, Next-generation data scientists, Recent trends in data collection, analysis and Visualization techniques, application development methods used in data science.

Text Books:

1. Cathy O'Neil and Rachel Schutt. Doing Data Science, Straight Talk From TheFrontline.O'Reilly.
2. Jure Leskovek, AnandRajaraman and Jeffrey Ullman. Mining of MassiveDatasets. v2.1, Cambridge UniversityPress.
3. Murphy , K. Machine Learning : A Probabilistic Perspective – MIT Press , 2012

References:

1. James G ,Witten D ,Hastle T, Tibshirani R. An Introduction to statistical learning with applications in R Springer , 2013
   Han J ,Kamber M, Pei J Data Mining Concepts and Techniques, Second Edition.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING ANDTECHNOLOGY
SOFTWARE PROJECT MANAGEMENT
(PROFESSIONAL ELECTIVE –IV)

CourseCode:GR18A4052 **L T PC**
IV Year I Semester **3 0 0 3**

Course Objectives:

The objective of this course is to

1. Understand the fundamental principles of Software Projectmanagement.
2. To provide the students on conventional management, economicssoftware.
3. Acquire Plan and manage projects at each stage of the software development life cycle (SDLC)
4. To prepare organizational needs to the most effective software developmentmodel.
5. To assists the student with an academic environment aware of excellence, guidelines and lifelong Learning needed for a successful professionalcarrier.

Course Outcomes:

At the end of this course student will be able to

1. To take responsibility of project team and projectorganization
2. Apply problem solving skills, core IT concepts, best practices and standards to information technologies
3. Work with high level and lowlevel Displays of mobile and storing data by using record managementsystem
4. Design, implement and deploy mobile applications using an appropriate software development environment withdatabase
5. Understands how different management and development practices affect software and process quality

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, peerinspections.

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.

Work Flows of the Process: Software process work flows, Iteration workflows

UNIT-III:

Checkpoints of the Process: Major milestones, Minor Milestones, Periodic status assessments.
Iterative Process Planning: Work break down structures, planning guidelines, cost and schedule estimating, Iteration planning process, Pragmatic planning.

UNIT-IV:

Project Organizations and Responsibilities: Line-of-Business Organizations, Project Organizations, evolution ofOrganizations.
Process Automation: Automation Building blocks, The Project Environment.

UNIT-V:

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

TextBooks

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

References

1. Software Project Management, Bob Hughes and Mike Cotterell: Tata McGraw-HillEdition.
2. Software Project Management, Joel Henry, PearsonEducation.
3. Software Project Management in practice, Pankaj Jalote, PearsonEducation.2005.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING ANDTECHNOLOGY
CYBER LAW AND ETHICS
(OPEN ELECTIVE –II)

CourseCode:GR18A3119	**L T PC**
IV Year I Semester	**3 0 0 3**

Course Objectives

1. The course objective is to provide the fundamental skill to understand cyber laws.
2. It enable to understand the legal frameworks
3. It helps the student understand different cyber crimes
4. It provides overview on Intellectual Property, copy rights, patents rights etc.
5. Given rapid changes in technology and the corresponding changes in crime and the law

Courseoutcomes.

1. Students identify and analyze statutory, regulatory, constitutional, and organizational laws that affect the information technology professional.
2. Students locate and apply case law and common law to current legal dilemmas in the technology field.
3. Students apply diverse viewpoints to ethical dilemmas in the information technology field and recommend appropriate actions.
4. Students will be able understand cybercrime and ethical practices.
5. The student will be able to know and learn web technologies and related issues.
6. The student will be in position to interface with various issues pertaining to Intellectual Property, copy rights, patents rights etc.
7. Overview of cybercrime and framework.

Unit I - The Legal System: Sources of Law and The Court Structure

Enacted law -Acts of Parliament are of primary legislation, Common Law or Case law-
Principles taken from decisions of judges constitute binding legal rules.The Court System in India and Foreign Courtiers. (District Court, District ConsumerForum, Tribunals, High Courts, Supreme Court) Arbitration: As an alternative to resolving disputes in the normal courts, parties who are indispute can agree that this will instead be referred to arbitration.

Unit II - Introduction cyber law

Computers and its Impact in Society, Overview of Computer and Web Technology,Need for Cyber Law, Cyber Jurisprudence at International and Indian Level.

Unit –III -Constitutional & Human Rights Issues in Cyberspace

Freedom of Speech and Expression in Cyberspace, Right to Access Cyberspace, Access to Internet, Right to Privacy, Right to Data Protection.

Unit –IVCyber Crimes & Legal Framework

Cyber Crimes against Individuals, Institution and State, Hacking, Digital Forgery, Cyber Stalking/Harassment, Cyber Pornography, Identity Theft& Fraud, Cyber terrorism, Cyber Defamation, Different offences under IT Act

Unit –V Intellectual Property Issues in Cyber Space

Interface with Copyright Law, Interface with Patent Law, Trademarks& Domain Names Related issues.

References

1. Chris Reed& John Angel, Computer Law, OUP, New York, (2007).
2. Justice Yatindra Singh, Cyber Laws, Universal Law Publishing Co, New Delhi, (2012)
3. Verma S, K, Mittal Raman, Legal Dimensions of Cyber Space, Indian Law Institute, New Delhi, (2004)

4. JonthanRosenoer, Cyber Law, Springer, New York, (1997).
5. Sudhir Naib, The Information Technology Act, 2005: A Handbook.
6. S. R. Bhansali, Information Technology Act, 2000
7. University Book House Pvt. Ltd. Jaipur (2003).
8. Vasu Deva, Cyber Crimes and Law Enforcement, Commonwealth Publishers, New Delhi.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

CRYPTOGRAPHY AND NETWORK SECURITY LAB

CourseCode:GR18A4053 **L T P C**
IV Year I Semester **0 0 3 1.5**

Course Objectives:

The objective of this course is to

1. Explain different types of ciphers used for encryption anddecryption.
2. Demonstrate on symmetric encryptionalgorithms.
3. Demonstrate on asymmetric encryptionalgorithms.
4. Experiment on Hash algorithms.
5. Illustrate programs related to digital certificates and digitalsignatures.

Course Outcomes:

At the end of this course student will be able to

1. Use the concepts of different ciphers for encryption anddecryption.
2. Implement symmetric encryptionalgorithms.
3. Examine asymmetric encryptionalgorithms.
4. Interpret hash algorithms and theirfunctionalities.
5. Solve the problems on digital signatures and digitalcertificates.

TASK 1:

Write a Java program to perform encryption and decryption using the following algorithms.
a. Ceaser cipher b. Substitution cipher c. Hill Cipher

TASK 2:

Write a C/ JAVA program to implement the DES algorithm.

TASK 3:

Write a C/JAVA program to implement the Blowfish algorithm.

TASK 4:

Write a C/JAVA program to implement the AES algorithm .

TASK 5:

Write the RC4 logic in Java.

TASK 6:

Implement DES-2 and DES-3 using Java cryptography package.

TASK 7:

Write a Java program to implement RSA algorithm.

TASK 8:

Implement the Diffie-Hellman Key Exchange mechanism

TASK 9:

Calculate the message digest of a text using the SHA-1 algorithm in JAVA.

TASK 10:

Calculate the message digest of a text using the MD5 algorithm in JAVA.

TASK 11:

Explore the Java classes related to digital certificates.

TASK 12:

Write a program in java, which performs a digital signature on a given text.

Text Books:

1. Network Security Essentials (Applications and Standards) William StallingsPearson Education.
2. Fundamentals of Network security by Eric Maiwald (Dreamtechpress)

References:

1. Introduction to Cryptography, Buchmann,Springer.
2. Cryptography and network security, ThirdEdition,

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
MACHINE LEARNING LAB

CourseCode:GR18A4054 **L T PC**

IV Year I Semester **0 0 3 1.5**

Prerequisites:

- Mastery of introduction-level algebra , statistics and probabilitytheory.
- Proficiency in programming basics, and some experience coding in Python orR-Tool.

Course Objectives:

The objective of this course is to

1. Learn the basic concepts of python /R-Tool.
2. Understand Python scripts using Numpy& Pandaslibraries.
3. Describe various supervised learningalgorithms.
4. Discuss different unsupervised learningalgorithms.
5. Explore back propagation algorithm and ensemblemethods.

Course Outcomes:

At the end of this course student will be able to

1. Illustrate various basic features of python orR-Tool.
2. Implement Python script for simple problems and apply pandas for creation ofdatabases.
3. Design and analyze various supervised learningmechanisms.
4. Design and analyze various unsupervised learningalgorithms.
5. Illustrate back propagation algorithm and Random Forest Ensemblemethod.

Note: Implement the following Machine Learning Tasks using Python / R-Tool

Task 1:

Implement a Python script for importing and exporting data using python Pandas.

Task 2:

Write a program to demonstrate various visualization techniques.

Task 3:

Plot the graphs for employee database using Matplotlib.

Task 4:

Implement KNN algorithm to classify the Iris data set.

Task 5:

Implement Simple Linear Regression.

Task 6:

Implement Logistic Regression.

Task 7:

Design non-linear model using Support Vector Machines.

Task 8:

Implement K-means Clustering Algorithm.

Task 9:

Implement Random Forest ensemble method.

Task 10:

Build an Artificial Neural Network by implementing the Back propagation algorithm andtest the same using appropriate data sets.

Task 11:

Sentiment analysis on tweets – a case study.

Task 12:

Object Detection in an image – a case study.

References:

1. Machine Learning – Tom M. Mitchell, -MGH.
2. Christopher Bishop, Pattern Recognition and Machine Learning, Springer,2007.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
REAL TIME OPERATING SYSTEMS
(PROFESSIONAL ELECTIVE-V)

CourseCode:GR18A4096 **L T PC**
IV Year II Semester **3 0 0 3**

Course Objectives:

The objective of this course is to

1. Know the overview of the Operatingsystems.
2. Know the distributed Operatingsystem.
3. Know the real time models andLanguages
4. Know the RTOS Kernel Principles andStandards
5. Know the RTOS domainApplications

Course Outcomes:

At the end of this course student will be able to

1. Understand the concepts of Operating system Principles, System Calls andFiles.
2. Understand the concepts of Operating system Process, Communication andstructures.
3. Understand the Network topologies and Distributed Operating system.
4. Understand the Real-time Languages, Models and KernelPrinciples.
5. Understand the RTOS DomainApplications.

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, Graph models,Petrinet models Real-time Languages, RTOS tasks,RTscheduling, Interrupt processing, Synchronization, Control blocks, Memory requirements.

UNIT- IV:

Real Time Kernel: Principles, Polled loop systems, RTOS porting to a target, Comparison and Study of RTOS, VxWorks and mCoS, case studies.

UNIT- V:

RTOS And 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
2. Tenenbum, “Distributed Operating Systems”PHI,1999
3. CM Krishna,Kang G. Shin, “Real time Systems”, Mc Graw Hill,1997
4. Raymond J.A., Donald L Baily, “An introduction to real time operating systems” PHI,1999

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
CYBER SECURITY
(PROFESSIONAL ELECTIVE-V)

CourseCode:GR18A4097 **L T PC**
IV Year II Semester **3 0 0 3**

Pre-requisites:

Students are expected to have knowledge in

- Basic communicationmethods
- Knowledge about cyber crimes
- Securityprimitives

Course Objectives:

The objective of this course is to

1. Learn about cybercrimes andclassifications
2. Identify cyber offences and legalperspectives.
3. Understand the cybercrimes related to mobile and wirelessdevices.
4. Study the tools and methods used in cybercrimes
5. Know the Security Risks and threats forOrganizations.

Course Outcomes:

At the end of the course, the student will be able to

1. Obtain firm understanding on basic terminology and concepts of cybercrimes andsecurity.
2. Analyze the plans ofattacks.
3. Deal with the security challenges posed by mobiledevices.
4. Implement the tools to handle securitychallenges.
5. Evaluate the associated challenges and the cost of cybercrimes inOrganizations.

UNIT- I:

Introduction to Cybercrime: Introduction, Cybercrime and Information Security, Cybercriminals, Classifications of Cybercrimes and Cybercrime: The legal Perspectives and Indian Perspective, Cybercrime and the Indian ITA 2000, A Global Perspective onCybercrimes.

UNIT– II :

Cyber Offenses: Introduction, How Criminals plan the Attacks, Social Engineering, Cyber stalking, Cyber cafe and Cybercrimes, Botnets: The Fuel for Cybercrime, Attack Vector, CloudComputing.

UNIT– III:

Cybercrime: Mobile and Wireless Devices: Introduction, Proliferation of Mobile and Wireless Devices, Trends in Mobility, Credit card Frauds in Mobile and Wireless Computing Era, Security Challenges Posed by Mobile Devices, Registry Settings for Mobile Devices, Authentication service Security, Attacks on Mobile/Cell Phones, **Mobile Devices:** Security Implications for Organizations, Organizational Measures for Handling Mobile, Organizational Security Policies an Measures in Mobile Computing Era, Laptops.

UNIT- IV:

Tools and Methods Used in Cybercrime: Introduction, Proxy Servers and Anonymizers, Phishing, Password Cracking, Key loggers and Spywares, Virus and Worms, Trojan Horse and Backdoors, Steganography, DoS and DDoS attacks, SQL Injection, Buffer Overflow.

UNIT- V:

Cyber Security: Organizational Implications Introduction, Cost of Cybercrimes and IPR issues, Web threats for Organizations, Security and Privacy Implications, **Social media marketing:** Security Risks and Perils for Organizations, Social Computing and the associated challenges for Organizations.

Text Books:

1. Cyber Security: Understanding Cyber Crimes, Computer Forensics and LegalPerspectives, Nina Godbole and Sunil Belapure, WileyINDIA.

References:

1. Cyber Security Essentials, James Graham, Richard Howard and Ryan Otson, CRCPress.
2. Introduction to Cyber Security , Chwan-Hwa(john) Wu,J.DavidIrwin.CRC Press T&FGroup

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

SOFT COMPUTING

(PROFESSIONAL ELECTIVE-V)

CourseCode:GR18A4059 **L T PC**

IV Year II Semester **3 0 0 3**

Prerequisites:

- Basic understanding of problem solving, Design and Analysis ofAlgorithms and Computer Programming.
- Basic Knowledge of ArtificialIntelligence

Course Objectives:

The objective of this course is to

1. Understand soft computing techniques and apply these techniques to solve real-world problems
2. Understand the complete structure of Neurons and its applicability in differentdomains.
3. Differentiate between the Neural Networks and GeneticAlgorithms
4. To know the fundamental things about fuzzy systems, fuzzy logic and itsapplications.
5. To analyze the Fuzzy Inference technique with differentvariables

Course Outcomes:

At the end of this course student will be able to

1. Apply all the Soft Computing Techniques to solve real worldproblems
2. Identify the problems, where Supervised and (Neural Networks)Unsupervised Learning Techniques can beapplied
3. To know how to evaluate the Fitness function in GeneticAlgorithm
4. Apply Genetic Algorithm to design New Algorithms/Protocols in anydomain
5. Differentiate between Fuzzy Model w.r.t Probabilistic Model and Apply Fuzzy Inference Techniques to solve problems in differentdomain

UNIT –I:

Introduction to Soft Computing and Neural Networks: Neural Networks: I(Introduction and Architecture) Neuron, Nerve Structure and synapse, Artificial Neuron and It's Model, Activations functions.

Neural Network Architectures: Single Layer and Multi-Layer feed forward Networks, Recurrent Networks, Various learning techniques, Perception and Convergence Rules, Auto Associative and hetero Associative Memory.

UNIT- II:

Neural Networks-II (Back Propagation Networks) Architecture: perception 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 and Applications.

UNIT-III:

Genetic Algorithms: Introduction to Genetic Algorithms (GA), Working Principle, Procedures of GA, Flow Chart of GA, Genetic Representation, (Encoding) Initialization and Selection, Genetic Operators, Mutation, Generational Cycle, Applications.

UNIT-IV:

Fuzzy Logic: I(Introduction): Fuzzy Logic Basic concepts, Fuzzy Sets and Crisp Sets, Fuzzy Set Theory and Operations, Properties of Fuzzy Sets, Fuzzy and Crisp Relations, Fuzzy to Crisp Conversation.

UNIT-V:

Fuzzy Logic: II (Fuzzy Membership, Rules): Membership Functions, Interference in Fuzzy Logic, Fuzzy if then else Rules, Fuzzy Implications and Fuzzy Algorithms, Fuzzifications and Defuzzifications, Fuzzy Controller, Industrial Applications.

Text Books:

1. S.Rajsekaran and G.A. VijaylakshmiPai, "Neural Networks, Fuzzy Logic andGenetic Algorithm: Synthesis and Applications" Prentice Hall ofIndia.
2. Introduction to Artificial Neural Systems- Jacek M. Zuarda, Jaico Publishing House,1997
3. N. P. Padhy, "Artificial Intelligence and Intelligent Systems" Oxford UniversityPress

References:

1. Mitchell Melanie, "An Introduction to Genetic Algorithm", Prentice Hall,1998.
2. David E. Goldberg, "Genetic Algorithms in Search, Optimization and MachineLearning", Addison Wesley,1997.
3. Timothy J. Ross, "Fuzzy Logic with Engineering Applications" WileyIndia
4. S. N. Sivanandam, S. Sumathi and S. N. Deepa, "Introduction to FuzzyLogicusing MATLAB", Springer,2007.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
DESIGN PATTERNS
(PROFESSIONAL ELECTIVE-V)

CourseCode:GR18A4098 **L T PC**
IV Year II Semester **3 0 0 3**

Prerequisites:

Students are expected to have knowledge in Basics of Object Oriented Programming and Software Engineering.

Course Objectives:

The objective of this course is to

1. Understand the concept of Design patterns and itsimportance.
2. Understanding the design patterns that are common in softwareapplications.
3. Understand the behavioural knowledge of the problem andsolutions.
4. Relate the Creational, Structural, behavioural Designpatterns.
5. Apply the suitable design patterns to refine the basic design for givencontext.

Course Outcomes:

At the end of the course, the students will be able to:

1. Identify categories of designpatterns.
2. Identify the appropriate design patterns to solve object oriented designproblems.
3. Develop design solutions using creationalpatterns.
4. Apply structural patterns to solve designproblems.
5. Construct design solutions by using behaviouralpatterns.

UNIT-I:

Introduction to Design Patterns, 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 andHyphenation.

UNIT-III:

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

UNIT- IV:

Structural Patterns: Adapter, Bridge, Composite, Decorator, Façade, Flyweight, Proxy.

UNIT- V:

Behavioral Patterns: Chain of Responsibility, Command, Interpreter, Iterator, Mediator, Memento, Observer, Strategy, Template Method, Visitor.

Text Books:

1. Design Patterns By Erich Gamma, PearsonEducation
2. Design Patterns Explained By Alan Shalloway,PearsonEducation.
3. Meta Patterns designed by Wolf gang,Pearson.

References:

1. Head First Design Patterns By EricFreeman-Oreilly-spd
2. JAVA Enterprise Design Patterns Vol-III By Mark Grand ,WileyDreamTech.
3. Pattern‟s in JAVA Vol-I By Mark Grand ,WileyDreamTech.
4. Pattern‟s in JAVA Vol-II By Mark Grand ,WileyDreamTech.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
HUMAN COMPUTER INTERACTION
(PROFESSIONAL ELECTIVE-VI)

CourseCode:GR18A4099 **L T PC**
IV Year II Semester **3 0 0 3**

Course Objectives:

The Objective of this course is to

1. The basic understanding of guidelines, principles, and theories influencing humancomputer interaction.
2. The knowledge of how a computer system may be modified to include humandiversity.
3. The appropriate evaluation of human computer interactionsystem.
4. Select an effective style for a specificapplication.
5. The basic concepts of User Experience Design and the factors that influence theuser experience.

Course Outcomes:

At the end of this course student will be able to

1. Learn the concepts of interaction design and how it relates to human computer interaction and otherfields.
2. Design how technologies can be to change peoples attitudes andbehavior.
3. Apply the difference between qualitative and quantitative data andanalysis.
4. Extract the social Mechanisms that are used by people to communicate andcollaborate.
5. Explore the user Experience design and analyze the factors involved indesign.

UNIT-I:

Introduction: Importance of user Interface, definition, importance of good design. Benefits of good design, A brief history of Screendesign.

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 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

Interaction Devices: Keyboard and function keys , speech recognition digitization and generation, Image and video displays, drivers

UNIT-V:

A Brief Introduction to User Experience (UX) Design: Complexity and perception, What is User Experience (UX), What is a UX Designer

What is Design Thinking and Why is it so Popular: What is Design Thinking, Design Thinking's Phases

The 7 factors that influence user experience: Useful,Usable,An introduction to usability,Why does usability matter,The 5 Characteristics of usable products How to conduct user interviews,What is User Interview,Preparing for user interview,How to conduct a user interview,Reporting on user interview What is interaction design?-Understanding of Interaction design,The 5 Dimensions of interaction design

Text Books:

1. The essential guide to user interface design, Wilbert O Galitz, WileyDreamaTech.
2. Designing the user interface. 3rd Edition Ben Shneidermann, Pearson EducationAsia.
3. The basics of User Experience design, Interaction designfoundation2002.

References:

1. Human Computer Interaction. Alan Dix, Janet Fincay, GreGoryd, Abowd, Russell Bealg, Pearson.
2. Interaction Design PRECE, ROGERS, SHARPS. WileyDreamtech,
3. User Interface Design, SorenLauesen, PearsonEducation.
4. User Experience for Beginners, JoelMarsh

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
COMPUTER GRAPHICS
(PROFESSIONAL ELECTIVE-VI)

CourseCode:GR18A3060 **L T PC**
IV Year II Semester **3 0 0 3**

Prerequisites:

Student should have knowledge of the following mathematical topics

- Vectors, vector operations, and vectorspacesMatrices
- Basic linear algebra such as solving a system of linearequations
- Polynomials
- Elementary signal processing (Fourier transform andfiltering)

Course Objectives:

The objective of this course is to

1. To introduce the use of the components ofa graphics system and become familiar with building approach of graphics system components and algorithms related withthem.
2. To learn the basic principles of 3- dimensional computergraphics.
3. Provideanunderstandingofhowto scanand convertthebasicgeometricalprimitives,how to transform the shapes to fit them as per the picturedefinition.
4. Provideanunderstanding ofmappingfromaworldcoordinatestodevicecoordinates, clipping andprojections.
5. To be able to discuss the application of computer graphics concepts in the development of computer games, information visualization and businessapplications.

Course Outcomes:

At the end of this course student will be able to

1. To list the basic concepts used in computergraphics.
2. To implement various algorithms to draw line, circle, scan and convert the basic geometrical primitives.
3. Understand the basics of different algorithms for drawing 2D primitives suchas transformations, area filling andclipping.
4. To describe the importance of viewing andprojections.
5. To define the fundamentals of animation, virtual reality and its relatedtechnologies.

UNIT-I:

Introduction to Computer Graphics: Introduction, Non interactive/interactive Graphics, Uses of computer graphics, classification of Applications, Programming Language, Graphics system configuration.

Graphic Systems: Introduction, Cathode Ray Tube(CRT)basics, Refresh Display, Raster Display, Computer Graphic Software, Integration of Graphics Standard.

UNIT-II:

Output Primitives: Introduction, Representing Image, Straight Line, Line drawing algorithms, Differential Digital Analyser (DDA)algorithm, Bresenham's Line Algorithm, Circle generating Algorithm, Bresenham's circle Algorithm, Midpoint circle Algorithm, Polygon filling Algorithms, Character or Text Generation, Aliasing and Antialising.

UNIT-III:

Two Dimensional Transformations: Introduction, Representation of points, Matrix Algebra and Transformation, Transformation of points, Transformation of straight line, Midpoint Transformation, Transformation of Parallel Lines, Transformation of Intersecting Lines, Rotation.**Window Clipping:** Introduction, Viewing Transformation, Clipping, Point Clipping, Line Clipping, Cohen-Sutherland Line clipping, Polygon Clipping, Sutherland-Hodgman Algorithm, Curve Clipping.

UNIT-IV:

3D Concepts and Techniques: Introduction, 3D Transformations, Rotation about an axis Parallel to a Coordinate Axis, Rotation about an Arbitrary Axis in Space, Reflection through an Arbitrary Plane, 3D Modeling Schemes, Projection, Orthographic Projection, Isometric Projection, Oblique Projection, perspective projection.

Curves: Introduction, Parametric cubic polynomial curves, Solution of cubic polynomial curves, Bezier curves, Spline representation, Parametric and geometric continuity condition, Spline as piece wise polynomials, Spline as blending function, Closed curves based Spline, Changing knot spacing, Basis function for Spline curves, B-Spline basis functions, B-Spline with multipleknots.

UNIT-V:

Introduction To Multimedia: Pc specification, visual elements, wav and mp3 format, sound elements, multimedia storage, flash animation.

Text Books:

1. Computer Graphics, Amarendra N Sinha, Arun DUdai,TataMcGrawHill.
2. Fundamentals of Multimedia,Ze-Nian Li, Mark S. Drew,PearsonPrenticeHall.

References:

1. Multimedia and communications technology,Steve Heath,Elsevier.
2. Mathematical Elements for Computer Graphics,2nd Edition, David F. Rogers, J.AlanAdams.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
BIG DATA ANALYTICS
(PROFESSIONAL ELECTIVE-VI)

CourseCode:GR18A4100 **L T PC**
IV Year II Semester **3 0 0 3**

Pre- Requisites:

Students should have knowledge of one Programming Language (Java preferably), Practice of SQL (queries and sub queries), exposure to Linux Environment.

Course Objectives:

The objective of this course is to

1. Understand the Big Data Platform and its Usecases.
2. Provide an overview of ApacheHadoop.
3. Provide an overview ofHDFS.
4. Understand Map ReduceJobs.
5. Provide hands on Hadoop EcoSystems.

Course Outcomes:

At the end of this course student will be able to

1. Apply the Big Data Analytic techniques for BusinessApplications
2. List the capabilities of Hadoop andHDFS
3. Describe the use of MapReduce
4. Examine Job Execution in HadoopEnvironment
5. Explore data stores onHadoop

UNIT- I:

Introduction To Big Data And Hadoop: Introduction to Big Data, Classification of Digital Data, Big Data Analytics, History of Hadoop, RDBMS VsHadoop, Analysing Data with Unix tools, Analysing Data with Hadoop, Hadoop Streaming, Hadoop Eco Systems.

UNIT- II:

HDFS(Hadoop Distributed File System): The Design of HDFS, HDFS Concepts, HDFS Architecture, Command Line Interface, Data flow, Hadoop I/O - Data Integrity, Compression, File-Based Data structures, Data ingest with Sqoop and Flume.

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, Map Reduce Formats-Input Formats, Output Formats, Map Reduce Features.

UNIT- IV:

PIG: Introduction to PIG, Execution Modes of Pig, Grunt, Pig Latin Editors, Comparison of Pig with Databases, Pig Latin, User Defined Functions, Data Processingoperators.

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 Vs RDBMS, Introduction to Zookeeper.

Text Books:

1. Tom White "Hadoop: The Definitive Guide" 4th edition, O'reily Media,2012.
2. Seema Acharya, SubhasiniChellappan, "Big Data Analytics" Wiley2015.

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
SOFTWARE MEASUREMENTS AND METRICS
(PROFESSIONAL ELECTIVE-VI)

CourseCode:GR18A4101 **L T PC**
IV Year II Semester **3 0 0 3**

Pre- requisites: Software Engineering course

Course Objectives:

The Objective of this course is to

1. Familiarize with different metrics used in different processlevels.
2. Apply metrics knowledge to measure engineeringproblems.
3. Improve their ability in making decisions via continuous practice like assessment andusage ofmetrics.
4. Design, implement and change metrics based on industrypractice.
5. **U**nderstand basic financial measurements that relate to softwareprojects.

Course Outcomes:

At the end of this course student will be able to

1. Identify and apply various software metrics, which determines the quality level ofsoftware.
2. Compare and Pick out the right reliability model for evaluating thesoftware.
3. Develop correct and robust softwareproducts.
4. Evaluate the reliability of any given softwareproduct.
5. Designnewmetricsandreliabilitymodelsforevaluatingthequalitylevelofthesoftware based on therequirement.

UNIT- I:

Software Sizing Metrics: Fundamentals in measurement –basic measures, Evolution of software measurements, **Size Metrics:** Lines of Code, Functional Size Measurements, Software measures and metrics not based on function points, Future Technical Developments in Functional Metrics, Case Study to Measure software size using various size Metrics.

UNIT-II:

Complexity And Testing Metrics: Complexity Metrics and Models, Halstead's Software Science, Cyclomatic Complexity, Syntactic Constructs, Structure Metrics.

Case Study for the usage of complexity metrics with tools

Testing Metrics: Test Progress S Curve, Testing Defect Arrivals overTime , Product Size Over Time , CPU Utilization, Effort/Outcome Model.

Case Study to apply Testing metrics

UNIT- III:

Customer Satisfaction Analysis and Object Oriented Metrics: Customer Satisfaction Surveys: Methods of survey data collection, Sampling Methods, Analyzing Satisfaction with practice, Metrics for Object-Oriented Projects with tools, Lorenz Metrics, CKOO Metrics Suite.

UNIT- IV:

Software Quality Metrics: Software Quality, Five steps to software quality control, Product Quality Metrics with practice, In-Process Quality Metrics with practice, Metrics for Software Maintenance, Ishikawa's Seven Basic Tools with practice, Defect Removal Effectiveness with practice.

UNIT-V:

Assessments and Process Improvement: Conducting In-Process Quality Assessments, Conducting Software Project Assessments, Measures and metrics of industry leaders, Software Process Improvement Sequences.

Text Books:

1. Stephen H. Kan, "Metrics and Models in Software Quality Engineering", Addison Wesley, 2011.
2. Caper Jones, "Applied Software Measurement: Global Analysis of Productivity and Quality", Third Edition, McGraw Hill Companies,2008

References:

1. Mark Lorenz, Jeff Kidd, "Object-Oriented Software Metrics", Prentice Hall,2000
2. Naresh Chauhan, "Software Testing Principles and Practices", Oxford University Press, 2010.
3. RavindranathPandian C, "Software Metrics A Guide to planning, Analysis, and Application", Auerbach, First Indian Reprint,2011

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

ECONOMIC POLICIES IN INDIA
(OPEN ELECTIVE-III)

CourseCode:GR18A3122	**L T PC**
IV Year II Semester	**3 0 0 3**

Course Objective:

1. To analyse the overall business environment and evaluate its various components in business decision making.
2. To Provide an analysis and examination of significant contemporary ethical issues and challenges.
3. To Emphasesthe manager's social and environmental responsibilities to a wide variety of stakeholders.
4. To know the various Government policies governing industry.
5. To know economic terms and its scope.

Course Outcomes:

1. Familiarize with the nature of business environment and its components.
2. The students will be able to demonstrate and develop conceptual framework of business environment.
3. Understand the definition of ethics and the importance and role of ethical behaviour in the business world today.
4. Explain the effects of government policy on the economic environment.
5. Outline how an entity operates in a business environment.

Unit 1: Business environment-factors effecting Business Environment-need for industrial policies-Overview of Indian Economy, Trends towards market economy, problems of underdevelopment – meaning, Main problems, reasons, of underdevelopment. Development-

Unit :2 Factors and measure, Meaning of Economic development, National income, Per capital income, Quality of life, Capital Formation – Savings, Investment.

Unit 3: Planning in India, Meaning, Importance, Main reasons of adopting, planning in India, Objectives of planning, Economic development, moderation, stability, self-sufficiency, employment etc, foreign aid, Employment. Allocation of Resources,

Unit 4: Private and Public Sector, Public Sector – role and growth, Achievements of the public sector, Private Sector – Importance Problems, New foreign Trade Policy.

Unit 5: Present Economic Policy, Main feature, Globalization, Expansion of Private sector, more market orient approach. Public distribution system, Industrial policy – 1948, 1956, 1977, 1980, 1990, 1991, 2000-2001 Industrial Licensing, Monetary and Fiscal Policy.

References:

Indian Economy- A. N. Agarwal
Indian Economy – Mishra &Puri
Indian Development and planning – M. L. Jhingan
Indian Economy – R. S. Rastogi Yozna and Kurukshetra Magazines