Academic Regulations
Programme Structure
&
Detailed Syllabus

Bachelor of Technology
(B. Tech)
(Four Year Regular Programme)
(Applicable for Batches admitted from 2020)

Computer Science and Engineering
(Artificial Intelligence and Machine Learning)

Department of Computer Science and Engineering
GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING & TECHNOLOGY
Bachupally, Kukatpally, Hyderabad, Telangana, India
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ACADEMIC REGULATIONS

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY, HYDERABAD
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
PROGRAMME BACHELOR OF TECHNOLOGY IN COMPUTER SCIENCE AND ENGINEERING (Artificial Intelligence and Machine Learning)

GR20 REGULATIONS

Gokaraju Rangaraju Institute of Engineering and Technology 2020 Regulations (GR20 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 2020- 21 academic year.

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

2. **Medium of Instruction:** The medium of instruction (including examinations and reports) is English.

3. **Admissions:** Admission to the B. Tech in Computer Science and Engineering (AIML) Programme shall be made subject to the eligibility, qualifications and specialization prescribed by the State Government/University from time to time. Admissions shall be made either on the basis of the merit rank obtained by the student in the common entrance examination conducted by the Government/University or on the basis of any other order of merit approved by the Government/University, subject to reservations as prescribed by the Government/University from time to time.

4. **Programme Pattern:**
   a) Each Academic year of study is divided in to two semesters.
   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 Point Average).
   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 satisfies prerequisites.
   g) All the registered credits will be considered for the calculation of final CGPA.
   h) Each semester has - 'Continuous Internal Evaluation (CIE)' and 'Semester End Examination (SEE)'. Choice Based Credit System (CBCS) and Credit Based Semester System (CBSS) as indicated by UGC and course structure as suggested by AICTE are followed.
   i) **Subject / Course Classification:** All subjects/ courses offered for the under graduate programme in E & T (B.Tech. degree programmes) are broadly classified as follows.

S. No.	Broad Course Classification	Course Group/ Category	CourseDescription
1	BS	Basic Science Courses	Basic Science Courses
2	ES	Engineering Science Courses	Includes Engineering subjects
3	HS	Humanities and Social sciences	Includes Management courses
4	PC	Professional Core Courses	Includes core subjects related to the parent discipline/department/ branch of Engineering
5	PE	Professional Elective Courses	Includes elective subjects related to the parent discipline/ department/ branch of Engineering
6	OE	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	PW	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 academic requirements:
   a) He/She pursues the course of study and completes it successfully in not less than four academic years and not more than eight academic years.
   b) A student has to register for all the 160 credits and secure all credits.
   c) A student, who fails to fulfill all the academic requirements for the award of the degree within eight academic years from the date of admission, shall forfeit his/her seat in B. Tech course.
   d) The Degree of B. Tech in Computer Science and Engineering shall be conferred by Jawaharlal Nehru Technological University Hyderabad (JNTUH), Hyderabad, on the students who are admitted to the programme and fulfill all the requirements for the award of the degree.

6. **Attendance Requirements:**
    a) A student shall be eligible to appear for the semester-end examinations if he/she puts in a minimum of 75% of attendance in aggregate in all the courses concerned in the semester.
    b) Condonation of shortage of attendance in aggregate up to 10% (65% and above and below 75%) in a semester may be granted. A committee headed by Dean (Academic Affairs) shall be the deciding authority for granting the condonation.
    c) Students who have been granted condonation shall pay a fee as decided by the Academic Council.
    d) Shortage of Attendance more than 10% (attendance less than 65% in aggregate) shall in no case 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 gets re-registered.

7. **Paper Setting, Evaluation of Answer Scripts, Marks and Assessment:**
    a) Paper setting and evaluation of the answer scripts shall be done as per the procedures laid down by the Academic Council from time to time.

    b) **Distribution and Weightage of marks**

S. No	Components	Internal	External	Total
1	Theory	30	70	100
2	Practical	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 following Table.

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 and Supervisor. Plagiarism check is compulsory for mini project report as per the plagiarism policy of GRIET.

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 (Phase I).

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 in the road show at the department level for the benefit of all students and staff and the same is to be evaluated by the Project Review Committee for 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.

Plagiarism check is compulsory for project work report (Phase I and PhaseII) as per the plagiarism policy of GRIET.

g) **EngineeringGraphics:**
   - Two internal examinations, each is of 10 marks. The average of the two internal tests 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 prescribed fee.

10. **Supplementary Examinations:** A student who has failed to secure the required creditscan appear for a supplementary examination, as per the schedule announced by the College.

11. **Malpractices in Examinations:** Disciplinary action shall be taken in case ofmalpractices during Mid / End-examinations as per the rules framed by the Academic Council.

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 taken together.
    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, is followed**

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

Earning of Credit:
A student shall be considered to have completed a course successfully and earned the credits if he/she secures an acceptable letter grade in the range O-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 be placed in one of the following four classes based on CGPA secured from the160 credits.

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

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

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

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

18. **General Rules**

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

Academic Regulations for B.Tech (Lateral Entry) under GR20
(Applicable for Batches Admitted from 2021-2022)

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

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

b) A student should register for all 120 credits and secure all credits. The marks obtained in all 120 credits shall be considered for the calculation of the final CGPA.

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

2. Academic Requirements and Promotion Rules:

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

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

S. No.	Promotion	Conditions to be fulfilled
1	Second year first semester to second year second semester.	Regular course of study of second year first semester.
2	Second year second semester to third year first semester.	(i) Regular course of study of second year second semester. (ii) Must have secured at least 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 second semester. (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 120 credits.

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

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
(Artificial Intelligence and Machine Learning)
B.Tech – CSE (AIML) - GR20 SYLLABUS

I B.Tech – CSE (AIML) - I Semester

S.No	BOS	Group	Course Code	Course Name	Credits				Hours				Int.	Ext	Total Marks
					L	T	P	Total	L	T	P	Total			
1	Maths	BS	GR20A1001	Linear Algebra and Differential Calculus	3	1	0	4	3	1	0	4	30	70	100
2	Physics	BS	GR20A1003	Applied Physics	3	1	0	4	3	1	0	4	30	70	100
3	English	HS	GR20A1006	English	2	0	0	2	2	0	0	2	30	70	100
4	CSE	ES	GR20A1007	Programming for Problem Solving	2	1	0	3	2	1	0	3	30	70	100
5	ME	ES	GR20A1010	Engineering Graphics	1	0	2	3	1	0	4	5	30	70	100
6	Physics	BS	GR20A1012	Applied Physics Lab	0	0	1.5	1.5	0	0	3	3	30	70	100
7	CSE	ES	GR20A1016	Programming for Problem Solving Lab	0	0	1.5	1.5	0	0	3	3	30	70	100
8	English	HS	GR20A1015	English Language and Communication Skills Lab	0	0	1	1	0	0	2	2	30	70	100
		TOTAL			**11**	**3**	**6**	**20**	**11**	**3**	**12**	**26**	**240**	**560**	**800**
9	Humanities	BS	GR20A1020	Design Thinking	1	0	0	1	2	0	0	2	30	70	100

I B.Tech– CSE (AIML) - II Semester

S. No	BOS	Group	Course Code	Course Name	Credits				Hours				Int.	Ext	Total Marks
					L	T	P	Total	L	T	P	Total			
1	Maths	BS	GR20A1002	Differential Equations and Vector Calculus	3	1	0	4	3	1	0	4	30	70	100
2	Chemistry	BS	GR20A1005	Engineering Chemistry	3	1	0	4	3	1	0	4	30	70	100
3	EEE	ES	GR20A1008	Basic Electrical Engineering	2	1	0	3	2	1	0	3	30	70	100
4	CSE	ES	GR20A1011	Data Structures	2	1	0	3	2	1	0	3	30	70	100
5	Chemistry	BS	GR20A1014	Engineering Chemistry Lab	0	0	1.5	1.5	0	0	3	3	30	70	100
6	EEE	ES	GR20A1017	Basic Electrical Engineering Lab	0	0	1	1	0	0	2	2	30	70	100
7	CSE	ES	GR20A1018	Data Structures Lab	0	0	1	1	0	0	2	2	30	70	100
8	ME	ES	GR20A1019	Engineering Workshop	1	0	1.5	2.5	1	0	3	4	30	70	100
		TOTAL			**11**	**4**	**5**	**20**	**11**	**4**	**10**	**25**	**240**	**560**	**800**
9	Humanities	BS	GR20A1021	Life skills and Personality Development	1	**0**	0	1	**2**	**0**	0	2	30	70	100

II B.Tech- CSE (AIML) - I Semester

S.No	BOS	Group	Course Code	Course Name	Credits				Hours				Int.	Ext	Total Marks
					L	T	P	Total	L	T	P	Total			
1	IT	ES	GR20A2067	Digital Logic Design	3	0	0	3	3	0	0	3	30	70	100
2	IT	PC	GR20A2076	Java Programming	3	0	0	3	3	0	0	3	30	70	100
3	CSE	BS	GR20A2005	Probability and Statistics	3	0	0	3	3	0	0	3	30	70	100
4	CSE	BS	GR20A2069	Discrete Mathematics	2	1	0	3	2	1	0	3	30	70	100
5	IT	PC	GR20A2070	Database Management Systems	3	0	0	3	3	0	0	3	30	70	100
6	CSE	PC	GR20A2071	Scripting Languages Lab	0	0	2	2	0	0	4	4	30	70	100
7	IT	PC	GR20A2080	Java Programming Lab	0	0	2	2	0	0	4	4	30	70	100
8	IT	PC	GR20A2073	Database Management Systems Lab	0	0	1.5	1.5	0	0	3	3	30	70	100
					14	**1**	**5.5**	**20.5**	**14**	**1**	**10**	**25**	**240**	**560**	**800**
9	HS	MC	GR20A2002	Value Ethics and Gender Culture	2	0	0	2	2	0	0	2	30	70	100

II B.Tech - CSE (AIML) - II Semester

S.No	BOS	Group	Course Code	Course Name	Credits				Hours				Int.	Ext	Total Marks
					L	T	P	Total	L	T	P	Total			
1	IT	PC	GR20A2074	Computer Organization	3	0	0	3	3	0	0	3	30	70	100
2	CSE	PC	GR20A2075	Operating systems	2	1	0	3	2	1	0	3	30	70	100
3	Mgmt	BS	GR20A2004	Economics and Accounting for Engineers	3	0	0	3	3	0	0	3	30	70	100
4	CSE	PC	GR20A2068	Python Programming	3	0	0	3	3	0	0	3	30	70	100
5	IT	PC	GR20A2077	Design and Analysis of Algorithms	3	0	0	3	3	0	0	3	30	70	100
6	CSE	PC	GR20A2078	Python Programming Lab	0	0	1.5	1.5	0	0	3	3	30	70	100
7	CSE	PC	GR20A2079	Operating Systems Lab	0	0	1.5	1.5	0	0	3	3	30	70	100
8	CSE	PC	GR20A2072	Visual Programming using C# and .Net Lab	0	0	1.5	1.5	0	0	3	3	30	70	100
					14	**1**	**4.5**	**19.5**	**14**	**1**	**10**	**25**	**240**	**560**	**800**
9	HS	MC	GR20A2001	Environmental Science	2	0	0	2	2	0	0	2	30	70	100

III B.Tech. CSE (AIML) - I Semester

S.No	BOS	Group	Course Code	Course Name	Credits				Hours				Int	Ext	Total Marks
					L	T	P	Total	L	T	P	Total			
1	CSE	PC	GR20A3043	Computer Networks	3	0	0	3	3	0	0	3	30	70	100
2	CSE	PC	GR20A3044	Data Warehousing and Data Mining	3	0	0	3	3	0	0	3	30	70	100
3	CSE	PC	GR20A3046	Artificial Intelligence	2	1	0	3	2	1	0	3	30	70	100
4	CSE	PE		Professional Elective -I	3	0	0	3	3	0	0	3	30	70	100
5	CSE	OE		Open Elective - I	3	0	0	3	3	0	0	3	30	70	100
6	CSE	PC	GR20A3051	Data Warehousing and Data Mining Lab	0	0	1.5	1.5	0	0	3	3	30	70	100
7	CSE	PC	GR20A3052	Web Technologies Lab	0	0	1.5	1.5	0	0	3	3	30	70	100
8	CSE	PC	GR20A3064	R-Programming Lab	0	0	2	2	0	0	4	4	30	70	100
				TOTAL	**14**	**1**	**5**	**20**	**14**	**1**	**10**	**25**	**240**	**560**	**800**

PROFESSIONAL ELECTIVE – I				
S. No.	**BOS**	**Group**	**Course Code**	**COURSE**
1	CSE	PE	GR20A3061	Data Science with R-Programming
2	CSE	PE	GR20A3047	Principles of Programming Languages
3	CSE	PE	GR20A3062	Web Technologies
4	CSE	PE	GR20A3117	Formal Languages and Automata Theory

OPEN ELECTIVE – I				
S. No.	**BOS**	**Group**	**Course Code**	**Course**
1	CSE	OE	GR20A3063	Internet Of Things

III B.Tech. CSE (AIML) - II Semester

S.No	BOS	Group	Course Code	Course Name	Credits				Hours				Int	Ext	Total Marks
					L	T	P	Total	L	T	P	Total			
1	IT	PC	GR20A3123	Machine Learning	2	1	0	3	2	1	0	3	30	70	100
2	CSE	PC	GR20A3131	Big Data Analytics	3	0	0	3	3	0	0	3	30	70	100
3	IT	PC	GR20A3054	Software Engineering	3	0	0	3	3	0	0	3	30	70	100
4	CSE	PE		Professional Elective- II	3	0	0	3	3	0	0	3	30	70	100
5	CSE	OE		Open Elective-II	3	0	0	3	3	0	0	3	30	70	100
6	CSE	PC	GR20A3122	Machine Learning Lab	0	0	1.5	1.5	0	0	3	3	30	70	100
7	CSE	PC	GR20A3133	Big Data Analytics Lab	0	0	1.5	1.5	0	0	3	3	30	70	100
8	CSE	PW	GR20A3141	Mini Project with Seminar	0	0	2	2	0	0	6	6	30	70	100
				TOTAL	**14**	**1**	**5**	**20**	**14**	**1**	**12**	**27**	**240**	**560**	**800**
9	HS	MC	GR20A2003	Constitution of India	2	0	0	2	2	0	0	2	30	70	100

PROFESSIONAL ELECTIVE – II				
S. No.	BOS	Group	Course Code	COURSE
1	CSE	PE	GR20A3065	Data Visualization
2	CSE	PE	GR20A3118	Cloud Computing
3	CSE	PE	GR20A3132	Distributed Databases
4	CSE	PE	GR20A3120	Software Architecture

OPEN ELECTIVE – II				
S. No.	**BOS**	**Group**	**Course Code**	**Course**
1	CSE	OE	GR20A3067	Augmented Reality And Virtual Reality

IV B.Tech. CSE (AIML) - I Semester

S.No	BOS	Group	Course Code	Course Name	Credits				Hours				Int	Ext	Total Marks
					L	T	P	Total	L	T	P	Total			
1	CSE	PC	GR20A4047	Cryptography and Network Security	2	1	0	3	2	1	0	3	30	70	100
2	CSE	PC	GR20A3119	Neural Networks and Deep Learning	3	0	0	3	3	0	0	3	30	70	100
3	CSE	PE		Professional Elective – III	3	0	0	3	3	0	0	3	30	70	100
4	CSE	PE		Professional Elective – IV	3	0	0	3	3	0	0	3	30	70	100
5	CSE	OE		Open Elective - III	3	0	0	3	3	0	0	3	30	70	100
6	CSE	PC	GR20A4054	Cryptography and Network Security Lab	0	0	2	2	0	0	4	4	30	70	100
7	CSE	PC	GR20A4068	Deep Learning Lab	0	0	2	2	0	0	4	4	30	70	100
8	CSE	PW	GR20A4129	Project work - Phase I	0	0	6	6	0	0	12	12	30	70	100
		TOTAL			**14**	**1**	**10**	**25**	**14**	**1**	**20**	**35**	**240**	**560**	**800**

PROFESSIONAL ELECTIVE – III				
S. No.	**BOS**	**Group**	**Course Code**	**COURSE**
1	CSE	PE	GR20A4048	Compiler Design
2	CSE	PE	GR20A4050	Image and Video Processing
3	CSE	PE	GR20A4051	Natural Language Processing
4	IT	PE	GR20A3128	Agile Methodologies

PROFESSIONAL ELECTIVE – IV				
S. No.	**BOS**	**Group**	**Course Code**	**COURSE**
1	CSE	PE	GR20A4052	Information Storage and Management
2	CSE	PE	GR20A4053	Multi Media Applications
3	CSE	PE	GR20A3135	Block Chain Technology
4	IT	PE	GR20A4058	Software Testing Methodologies

OPEN ELECTIVE – III				
S. No.	**BOS**	**Group**	**Course Code**	**Course**
1	CSE	OE	GR20A4067	Human Computer Interaction

IV B.Tech. CSE(AIML)- II Semester

S.No	BOS	Group	Course Code	Course Name	Credits				Hours				Int	Ext	Total Marks
					L	T	P	Total	L	T	P	Total			
1	Mgmt	HS	GR20A3140	Fundamentals of Management and Entrepreneurship	3	0	0	3	3	0	0	3	30	70	100
2	CSE	PE		Professional Elective-V	3	0	0	3	3	0	0	3	30	70	100
3	CSE	PE		Professional Elective-VI	3	0	0	3	3	0	0	3	30	70	100
4	CSE	PW	GR20A4130	Project work - Phase II	0	0	6	6	0	0	12	12	30	70	100
		TOTAL			**9**	**0**	**6**	**15**	**9**	**0**	**12**	**21**	**120**	**280**	**400**

PROFESSIONAL ELECTIVE – V				
S. No.	**BOS**	**Group**	**Course Code**	**COURSE**
1	CSE	PE	GR20A4114	Real Time Operating Systems
2	CSE	PE	GR20A4125	Cyber Forensics
3	CSE	PE	GR20A4126	Fundamentals of Robotics
4	IT	PE	GR20A4124	Design Patterns

PROFESSIONAL ELECTIVE – VI				
S. No.	**BOS**	**Group**	**Course Code**	**COURSE**

1	CSE	PE	GR20A4127	Introduction to Drones
2	IT	PE	GR20A3057	Computer Graphics
3	CSE	PE	GR20A4062	Soft Computing
4	CSE	PE	GR20A4118	Software Product Development and Management

PROFESSIONAL ELECTIVES – 4 THREADS

S. No.	Theory and Algorithms	Applications	Data Science and Machine Intelligence	Software and Technology
1	Formal Languages and Automata Theory	Principles of Programming Languages	Data Science with R-Programming	Web Technologies
2	Distributed Databases	Cloud Computing	Data Visualization	Software Architecture
3	Compiler Design	Image & Video Processing	Natural Language Processing	Agile Methodologies
4	Information Storage And management	Multi Media Applications	Black Chain Technology	Software Testing Methodologies
5	Real Time operating System	Cyber forensics	Fundamentals of Robotics	Design Patterns
6	Soft Computing	Computer Graphics	Introduction to Drones	Software Product Development and Management

OPEN ELECTIVE- THREADS

THREAD 1	THREAD 2	OFFERED BY
1. Soft Skills and Interpersonal Communication 2. Human Resource Development and Organizational Behavior 3. Cyber Law andEthics 4. Economic Policiesin India	1. Principles of E-Commerce 2. Business Analytics 3. Augmented Reality and Virtual Reality	**CSE**
	1. Internet of Things 2. Augmented Reality and Virtual Reality 3. Human Computer Interaction	**CSE (AIML)**
	1. Augmented Reality and Virtual Reality 2. Internet of Things 3. Human Computer Interaction	**CSE (DS)**
	1. Services Science and Service Operational Management 2. IT Project Management 3. Marketing Research and Marketing Management	**CSBS**
	1. Artificial Intelligence 2. Introduction to Data Science 3. Human Computer Interaction	**IT**
	1. Non-Conventional Energy Sources 2. Machine Learning 3. Artificial Intelligence Techniques	**EEE**
	1. Principles of Communication 2. Sensor Technology 3. Cellular and Mobile Communications	**ECE**
	1. Robotics 2. Composite Materials 3. Operations Research	**ME**
	1. Engineering Materials for Sustainability 2. Geographic Information Systems and Science 3. Environmental Impact Assessment and Life CycleAnalyses	**CE**

I YEAR
I SEMESTER

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

LINEAR ALGEBRA AND DIFFERENTIAL CALCULUS

Course Code: GR20A1001 **L/T/P/C: 3/1/0/4**
I Year I Semester

Course Objectives

1. Apply ideas to solve linear systems, at the core of many engineering concepts.
2. Apply concept of latent values of a matrix which is critical in many engineering applications.
3. Take part in, function approximation using the tools of mean value theorems.
4. Compose optimal values of multi-variable functions.
5. Utilize definite integral concept for various geometrical applications.

Course Outcomes

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

1. Compile the rank of a matrix to determine the existence of solutions of a linear algebraic system
2. Determine the eigenvalues and eigenvectors of a square matrix which arise in several engineering applications
3. Determine approximate solution of over determined systems using the pseudo inverse.
4. Develop the skill of determining optimal values of multivariable functions using classical method**s.**
5. Apply the definite integral concept for various computational problems in geometry.

UNIT I
VECTOR AND MATRIX ALGEBRA

Vector space (definition and examples), linear independence of vectors, orthogonality of vectors, projection of vectors, Symmetric, Hermitian, skew-symmetric, skew-Hermitian, orthogonal and unitary matrices; Rank of a matrix by echelon reduction, Solution of a linear algebraic system of equations (homogeneous and non-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 form by orthogonal transformation.

UNIT III
MATRIX DECOMPOSITION AND PSEUDO INVERSE OF A MATRIX

Spectral decomposition of a symmetric matrix, L-U decomposition,Gram-Schmidt orthonormalization of vectors, 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
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.

UNIT V

SINGLE VARIABLE CALCULUS

Mean value theorems: Rolle's Theorem, Lagrange's Mean value theorem and Taylor's theorem (without proof), their geometrical interpretation, approximation of a function by Taylor's series Applications of definite integrals to evaluate surface areas and volumes of revolutions of curves (for Cartesian coordinates).

TEXT BOOKS

1. R.K.Jain and S.R.K.Iyengar, Advanced Engineering Mathematics, Narosa publishing house, Fourth edition 2014
2. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010
3. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9thedition,Pearson, Reprint.

REFERENCES:

1. GRIET reference manual
2. Paras Ram, Engineering Mathematics, 2nd Edition, CBS Publishes
3. S. L. Ross, Differential Equations, 3rd Ed., Wiley India, 1984

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
APPLIED PHYSICS

Course Code: GR20A1003 **L/T/P/C: 3/1/0/4**
I Year I Semester

Course Objectives:

1. Understand the dualistic nature of radiation and matter waves with experimental validation.
2. Outline the properties of semiconductor materials for specific applications.
3. Develop basic understanding of optoelectronic devices.
4. Discuss the use of lasers as light sources in optical fiber applications.
5. Study the properties of dielectric, magnetic and superconducting materials for various applications.

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

1. Solve engineering problems involving quantum nature of radiation and matter waves.
2. Comprehend the characteristics of semiconductor devices such as transistors and diodes.
3. Familiarize with operation of optoelectronic devices and its applications.
4. Analyze the properties of Laser and its propagation in different types of optical fibers.
5. Identify dielectric, magnetic and superconducting materials based on their properties for specific applications.

UNIT I

Quantum Mechanics: Introduction, Black body radiation, Planck's law, Photoelectric effect-Einstein's Photoelectric equation, Compton effect (Qualitative), 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 infinite potential box.

UNIT II

Semiconductor Physics: Intrinsic and extrinsic semiconductors, Estimation of carrier concentration, Dependence of Fermi level on carrier concentration and variation with temperature,Carrier transport: diffusion and drift, Hall Effect, p-n junction diode: I-V Characteristics, Zener diode: I-V Characteristics, Bipolar Junction Transistor (BJT): Construction and principle of operation (n-p-n and p-n-p) in common base configuration.

UNIT III

Optoelectronics: Radiative transitions: Absorption, Spontaneous and Stimulated emission, Non-radiative transitions: Auger recombination, Surface recombination and recombination at defects, Generation 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: Introduction, Characteristics of lasers, Einstein coefficients, Resonating cavity, Active medium-Meta stable state, Pumping, Population inversion, Construction and working of Ruby laser and He-Ne laser, Applications of lasers.

Fiber Optics: Introduction,Principle and Structure of an optical fiber, Basic components in optical fiber communication system, Comparison of optical fibers over conventional cables,Acceptance angle-Numerical aperture, Types of optical fibers, Losses associated with optical fibers, Applications of optical fibers.

UNIT V

Dielectric Materials: Introduction, Types of polarizations (Electronic, Ionic and Orientational Polarizations) and calculation of Electronic and Ionic polarizability.

Magnetic Materials: Introduction, Bohr magneton, 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 magnetic materials.

Superconducting materials: Introduction to superconductors, General properties, Meissner effect, Type I and Type II superconductors, Applications of superconducting materials.

Teaching methodologies:

- White board and marker
- Power Point Presentations
- Video lectures

Text books:

1. Engineering Physics, B.K. Pandey, S. Chaturvedi - CengageLearing.
2. Halliday and Resnick, Physics - Wiley.
3. Engineering Physics, P.K Palanisamy, Scitech Publishers.
4. A textbook of Engineering Physics, Dr. M. N. Avadhanulu, Dr. P.G. Kshirsagar - S. Chand.
5. Applied Physics, T. Bhīma Sankaram, BSP Publishers.

References;

1. Richard Robinett, Quantum Mechanics
2. Fundamentals of Semiconductor Devices, Second Edition, Anderson and Anderson, McGraw Hill.
3. J. Singh, Semiconductor Optoelectronics: Physics and Technology, McGraw- Hill Inc.(1995)
4. Semiconductor Physics and Devices, 4e, Neamen and Biswas, McGraw Hill.
5. Online Course: “Optoelectronic Materials and Devices” by Monica Katiyar and Deepak Gupthaon NPTEL.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
ENGLISH

Course Code: GR20A1006 **L/T/P/C: 2/0/0/2**
I Year I Semester

Course Objectives:

The course will help to

1. Improve the language proficiency of students in English with an emphasis on Vocabulary, Grammar, Reading and Writing skills.
2. Equip students to study academic subjects more effectively and critically using the theoretical and practical components of English syllabus.
3. Develop study skills and communication skills in formal and informal situations.
4. Understand the importance of defining, classifying and practice the unique qualities of professional writing style.
5. Employ the acquired knowledge in classroom with reference to various social and professional spheres thus leading to a life-long learning process.

Course Outcomes:

Students will be able to

1. Use English Language effectively in spoken and written forms.
2. Comprehend the given texts and respond appropriately.
3. Communicate confidently in various contexts and different cultures.
4. Acquire proficiency in English including reading and listening comprehension, writing and speaking skills.
5. Demonstrate the skills needed to participate in a conversation that builds knowledge collaboratively by listening carefully and respect others point of view.

UNIT I

Where the Mind is without Fear poem by Rabindranath Tagore

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

The Last Leaf by O. Henry

Vocabulary: Synonyms and Antonyms.

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

Reading: Sub-skills of Reading- Skimming and Scanning

Writing: Note Making, PrécisWriting, Writing an Abstract, Nature and Style of Sensible Writing- **Defining- Describing** Objects, Places and Events – **Classifying**- Providing Examples or Evidence

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 toform Derivatives-Words from Foreign Languages and their Use in English.

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

Verbs and Tenses.

Reading: Improving Comprehension Skills – Techniques for Good Comprehension

Writing: Format of a Formal Letter-Writing Formal LettersE.g. Letter of Complaint,Letter of Requisition, Use of phrases for formal and informal letter writing.

UNIT IV

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

Vocabulary: Standard Abbreviations in English and Phrasal Verbs

Grammar: Redundancies and Clichés in Oral and Written Communication.

Reading: Comprehension- Intensive Reading and Extensive Reading

Writing: Writing Introduction and Conclusion -Essay Writing-Types of Essays- Picture Composition

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 their usage

Vocabulary: One Word Substitutes, Technical vocabulary and their usage

Grammar: Common Errors in English

Reading: Reading Comprehension-Exercises for Practice

Writing: Technical Reports- Introduction – Characteristics of a Report – Categories of Reports Formats- Structure of Reports (Manuscript Format) -Types of Reports - Writing a Report.

Text Books:

1. Sudarshana, N.P. and Savitha, C. (2018). English for Engineers. Cambridge University Press.

References:

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

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

PROGRAMMING FOR PROBLEM SOLVING

Course Code: GR20A1007 **L/T/P/C: 2/1/0/3**

I Year I Semester

Course Objectives:

1. To interpret the various steps in program development.
2. To recall and recite the fundamentals, syntax and semantics of C programming language.
3. To illustrate problem solving using arrays, strings, structures and pointers.
4. To demonstrate using of structured and modular programming approach in solving problems.
5. To code, Interpret and debug the given program using files.

Course Outcomes:

1. To write algorithms and to draw flowcharts and remember and reuse the fundamentals of C language.
2. To apply decision making statements and arrays to solve problems.
3. To illustrate the need for strings and functions in problem solving.
4. To implement pointers and structures in writing programs.
5. To illustrate working with files and preprocessor directives in c.

UNIT I

Introduction to Programming: Introduction to Algorithms: Representation of Algorithm, Flowchart, Pseudo code with examples, Compiling &executing program, Syntax and logical errors.

Introduction to C Programming Language: Structure of c program,Variables, Data types, Constants,Operators, Expressions and precedence, Expression evaluation,Type conversion.

I/O: Simple input and output with formatted I/O and unformatted I/O.

UNIT II

Decision Making and Arrays: Conditional Branching and Loops: Conditional branching with if, if-else, nestedifelse, else if ladder, switch-case, Loops: for, while, do-while, Jumping statements: goto, break,continue.

Arrays: One and Two dimensional arrays, creating, Accessing and manipulating elements of arrays

Searching: Basic searching in an array of elements, Linear and Binary search.

UNIT III

Strings and Functions: Strings: Introduction to strings, Operations on characters, Basic string functions available in C (strlen, strcat, strcpy, strrev,strcmp), String operations without string handling functions, Arrays of strings.

Functions: Designing structured programs, declaring a function, Signature of a function, Parameters and return type of a function(categories of functions), call by value,call by reference,passing arrays to functions, recursion, merits and demerits of recursive functions, Storage classes.

UNIT IV

Pointers and Structures: Pointers: Idea of pointers, Defining pointers, Pointer to pointer, void pointer, Null pointer, Pointers to Arrays and Structures, Function pointer.

Structures and unions: Defining structures, Initializing Structures, Array of structures, Arrays within structures, Nested structures, Passing structures to functions, Unions, typedef.

UNIT V

File handling and Preprocessor in C:

Files: Text and Binary files, Creating and Reading and writing text and binary files, Random access to files, Error Handling in files, Command line arguments, Enumeration data type.

Preprocessor: Commonly used Preprocessor commands like include, define, undef, if, ifdef, ifndef,elif.

TEXT 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, (3rd Edition)

REFERENCE BOOKS:

1. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, PrenticeHall of India
2. R.G. Dromey, How to solve it by Computer, Pearson (16th Impression)
3. Programming in C, Stephen G. Kochan, Fourth Edition, Pearson Education.
4. Herbert Schildt, C: The Complete Reference, McGraw Hill, 4th Edition

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
ENGINEERING GRAPHICS

Course Code: GR20A1010 **L/T/P/C: 1/0/4/3**
I Year I Semester

Course Objectives:

1. Provide basic conventions and standards used in Engineering Graphics.
2. Impart knowledge on various Engineering curves and their significance.
3. To draw orthographic, sectional and pictorial views of a given solid.
4. To develop skills in three dimensional visualization of engineering components.
5. To inculcate CAD packages on modelling and drafting.

Course Outcomes:

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

UNIT I

Introduction to Engineering Graphics: Principles of Engineering Graphics and their Significance; **Conic Sections-** ellipse, parabola and hyperbola – General method only. **Cycloidal curves** –cycloid**,** epi-cycloid and hypo-cycloid; **Scales**– plain and diagonal.

UNIT II

Projections of Points, Lines and Planes: Introduction to principal planes of projections, **Projections of the points** located in same quadrant and different quadrants, **Projections of line** with its inclination to one reference plane and with two reference planes. True length and inclination with the reference planes. **Projections of regular planes** (polygons, circle and Square etc.,) with its inclination to one reference plane and with two reference planes, Concept of auxiliary plane method for projections of the plane.

UNIT III

Projections of solids (regular and right solids only) - Classification of solids, Projections of solids (Cylinder, Cone, Pyramid and Prism) **Intersection of solids** – concept of lines of intersection and curves of intersection, intersection of solids (Prism Vs Prism and Cylinder Vs Cylinder) with their axes perpendicular to each other.

UNIT IV

Section of solids – Sectional views of solids (Cylinder, Cone, Pyramid and Prism) and the true shape of the section, **Development of surfaces-** Development of surfaces of solids (Cylinder, Cone, Pyramid and Prism).

UNIT V

Orthographic Projections: Fundamental of projection along with classification, Projections from the pictorial view of the object on the principal planes for view from front, top and sides using first angle projection method and third angle projection method;

Isometric Projections and Isometric View: 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 PUBLISHING HOUSE PVT LTD
2. Engineering Drawing by Basanth Agrawal/ C M Agrawal/ McGraw Hill Education
3. Engineering Drawing by K.Venu Gopal/New Age Publications.
4. Engineering Graphics Essentials with AutoCAD 2018 Instruction by Kirstie Platenberg/SDC publications.
5. Computer Aided Engineering Drawing / K Balaveera reddy et al-CBS publishers
6. Engineering Graphics and Design by Kaushik Kumar / Apurba kumar Roy / Chikesh

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
APPLIED PHYSICS LAB

Course Code: GR20A1012 **L/T/P/C:0/0/3/1**
I Year I Semester

Course Objectives:

1. Outline the characteristics of various semiconducting devices.
2. Identify the behavioral aspects of magnetic and electric fields.
3. Demonstrate the quantum nature of radiation through photoelectric effect.
4. Apply the theoretical concepts of Lasers and optical fibers in practical applications.
5. Recall the basic concepts of LCR and RC circuits through hands on experience.

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

1. Compare the behavior of p-n junction diode, Solar cells and LED.
2. Analyze the behavior of magnetic and electric fields with the help of graphs.
3. Determine the work function of a material through photoelectric effect.
4. Asses the characteristics of Lasers and infer the losses in optical fibers.
5. Estimate the time constant of RC circuit and resonance phenomenon in LCR circuit.

LIST OF EXPERIMENTS:

1. Energy gap of P-N junction diode: To determine the energy gap of a semiconductor diode.
2. Solar Cell: To study the V-I Characteristics of solar cell.
3. Light emitting diode: Plot V-I and P-I characteristics of light emitting diode.
4. Stewart – Gee's experiment: Determination of magnetic field along the axis of a current carrying coil.
5. Hall effect: To determine Hall co-efficient of a given semiconductor.
6. Photoelectric effect: To determine work function of a given material and Planck's constant.
7. LASER: To study the V-I and P-I characteristics of LASER sources.
8. Optical fiber: To determine the bending losses of Optical fibers.
9. LCR Circuit: To determine the resonant frequency and Quality factor of LCR Circuit in series and parallel.
10. R-C Circuit: To determine the time constant of R-C circuit during charging and discharging.

Note: Any 8 experiments are to be performed.

GOKARAJURANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
PROGRAMMING FOR PROBLEM SOLVING LAB

Course Code: GR20A1016 **L/T/P/C: 0/0/3/1.5**
I Year I Semester

Course Objectives:

1. To work with an IDE to create, edit, compile, run and debug programs
2. To analyze the various steps in program development.
3. To develop programs to solve basic problems by understanding basic concepts in C like operators, control statements etc.
4. To develop modular, reusable and readable C Programs using the concepts like functions, arrays etc.
5. To write programs to create, read from and write to text and binary files.

Course Outcomes:

1. Formulate the algorithms for simple problems and translate algorithms to a working and correct program.
2. Identify, analyse and correct syntax and logical errors encountered during coding.
3. Interpret and implement programs using branching and looping statements.
4. Represent and manipulate data with arrays, strings and structures and use pointers.
5. Create, read and write to and from simple text and binary files and modularize the code with functions so that they can be reused

TASK 1

a. Write a C program to implement operators in c?
b. Write a C program to find greatest and smallest among three numbers using conditional operator.
c. Write a C program to implicit and explicit type conversion in c?

TASK 2

a. Write a C program to swap two numbers using the following .
    i. Using third variable
    ii. Without using third variable
    iii. Using bitwise operators
b. Write a C program to add two numbers without using arithmetic operators in c?

TASK 3

a. Write a C program to find the roots of a quadratic equation using if-else.
b. The program should request the user to input two numbers and display one of the following as per the desire of user. (a). Sum of numbers (b) difference of numbers (c) product of the numbers (d)division of the numbers. Write a C program using switch statement to accomplish the above task.

TASK 4

a. Write a C Program check whether a given number is perfect number or not.
b. Write a C Program check whether a given number is palindrome number or not.
c. Write a C Program check whether a given number is Armstrong numberor not.

TASK 5

a. Write a C program to display the following patterns.

i) 1
2 3
4 5 6
7 8 9 10

ii. 1
2 3
4 5 6
7 8 9 10

b. Write a C program to generate the prime numbers between x and y where x and y are starting and ending values to be supplied by the user.
c. Write a C program to calculate the following Sum:
    a. Sum=1+x/1!-x2/2!+x3/3!-x4/4!+…..xn/n!

TASK 6

1) Write a C program to find sum, average and minimum and maximum in a list of numbers.
2) Write a C program to implement linear search.
3) Write a C program to implement binary search.

TASK 7

a. Write a C program to implement matrix addition
b. Write a C program to implement matrix multiplication.

TASK 8

a. Write a C program to implement the following string handling functions.
    i.strlen() ii.strcpy() iii.strcmp() iv.strcat()
b. Write a C program to read first name , middle name and last name of a student and display a string full name without using string handling functions.

TASK 9

a. Write a C program to determine if a String is Palindrome or not.

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

TASK 10

a. Write a C program to implement the following using recursive and non-recursive functions to find the factorial of a given integer.
b. Write a C program to implement the following using recursive and non-recursive functions to find the GCD (greatest common divisor) of two given integers

TASK 11

a. Write a C program to implement transpose of a matrix using functions.
b. Write a C program to display binary equivalent of a given decimal number.

TASK 12

a. Create a structure student with name ,rollno,marks of 3 subjects as members . Write a c program to sort student details based on total using structures and functions .
b. Write a C program that uses structures and functions to perform the following operations:
    i. Addition of two complex numbers
    ii. Subtraction of two complex numbers
    iii. Multiplication of two complex numbers

TASK 13

a. Write a C program using functions and pointers that compares two strings to see whether they are identical. The function returns 1 if they are identical, 0 otherwise.
b. Write a C program to sort list of numbers using pointers.

TASK 14

a. Write a C program to implement following pre-processor directives.
   i. define ii. ifdef iii. undef iv. ifndef.
b. Write a C program to create a user defined header file to find sum, product and greatest of two numbers ?

TASK 15

a. Write a C program to merge two files into a third file.
b. Write a C program to find some of n numbers using command line arguments.

TEXT 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, (3rd Edition)

REFERENCE BOOKS:

1. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, PrenticeHall of India
2. R.G. Dromey, How to solve it by Computer, Pearson (16th Impression)
3. Programming in C, Stephen G. Kochan, Fourth Edition, Pearson Education.
4. HerbertSchildt, C: The Complete Reference, McGraw Hill, 4th Edition

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

Course Code: GR20A1015 **L/T/P/C: 0/0/2/1**
I Year I Semester

Course Objectives:
The course will help to

1. Facilitate computer-assisted multi-media instruction enabling individualized and independent language learning
2. Sensitize students to the nuances of English speech sounds, word accent, intonation rhythm and Neutralization of accent for intelligibility
3. Bring about a consistent accent and intelligibility in students' pronunciation of English by providing an opportunity for practice in speaking
4. Improve the fluency of students in spoken English and neutralize their mother tongue influence
5. Train students to use language appropriately for public speaking and interviews.

Course Outcomes:
Students will be able to

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

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

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

Exercise I
CALL Lab:
Understand: Introduction to Phonetics – Speech Sounds – Consonant and Vowel Sounds.
Practice: Introduction to Phonetics– Speech Sounds – Vowels and Consonants.
ICS Lab:
Understand: Ice Breaking and JAM.
Practice: Ice-Breaking Activity and JAM Session. 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: -Errors in Pronunciation-the Influence of Mother Tongue (MTI).
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: Debates- argumentative vs persuasive - Public Speaking – Exposure to Structured Talks.
Practice: Debates- Making a Short Speech – Extempore.

Exercise IV
CALL Lab:
Understand: Listening Skills and its importance-– Purpose- Process- Types- Barriers of Listening.
Practice: Listening Comprehension Tests.
ICS Lab:
Understand: How to make informal and Formal Presentations
Practice: Collages / Poster Presentations-Power point presentations

Exercise V
CALL Lab:
Understand: Listening for General/Specific Details.
Practice: Listening Comprehension Tests.
ICS Lab:
Understand: Story Telling – Narrating a story – Using appropriate language elements
Practice: Weaving Stories

Minimum Requirement of infrastructural facilities for ELCS Lab:

1. **Computer Assisted Language Learning (CALL) Lab**
2. **Interactive Communication Skills (ICS) Lab**

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

DESIGN THINKING

Course Code: GR20A1020 **L/T/P/C: 2/0/0/1**

I Year I Semester

Course Objectives

1. Study a problem from multiple perspectives
2. Learn how to frame the design challenge properly.
3. Learn how to ideate, prototype and Iterate solutions.
4. Learn from the overall design process how to create value as entrepreneurs
5. Learn how to design successful products or enterprises

Course Outcomes

1. Students will be able to identify an Opportunity from a Problem
2. Students will be able to frame a Product/Service Idea
3. Students will be able to empathize with the customers
4. Students will be able to design and develop a Prototype
5. Students will be able to pitch their idea

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.

UNIT-III: Ideation tools & exercises. Sample Design Challenge, Introduction to the Design Challenge Themes,Story telling and Tools for Innovation.

UNIT-IV: Empathize-Understand customers, Empathy Maps, Empathise-Step into customers shoes- Customer Journey Maps, Define- Analysis & Drawing Inferences from Research.

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

TEXT BOOK :

1. Design Thinking for Strategic Innovation: What They Can't Teach You at Business or Design School - Idris Mootee.

REFERENCE BOOKS:

1. Zero to One: Note on Start-Ups, or How to Build the Future
2. The Lean Startup: How Constant Innovation Creates Radically Successful Businesses
3. Start With Why: How Great Leaders Inspire Everyone To Take Action

I YEAR
II SEMESTER

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS

Course Code: GR20A1002 **L/T/P/C: 3/1/0/4**
I Year II Semester

Course Objectives:

1. Knowledge to solve engineering problems governed by differential equations
2. The skill of evaluating multiple integrals needed for applications in mechanics and electro-magnetic field theory
3. The knowledge to interpret the functions arising in vector field theory and utilize mathematical tools for some computations
4. The skill of evaluating work done by a field and flux across a surface
5. The skill of utilizing specialized theorems for fast evaluation of work and flux

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

1. Classify the differential equations of first order and solve them analytically by suggested methods
2. Solve linear differential equations of higher order under various forcing functions
3. Evaluate double and triple integrals and apply them to some problems in geometry and mechanics
4. Apply vector differential operators on scalar and vector fields and apply them to solve some field related problems
5. Apply classical vector integral theorems for fast evaluation of work done around closed curves and flux across closed surfaces

UNIT I
ORDINARY DIFFERENTIAL EQUATIONS OF THE FIRST ORDER
LDE of the first order: Solution of Exact, Linear and Bernoulli equations, modeling Newton's law of cooling, growth and decay models, modeling of R-L circuit

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 $e^{ax}, x^n, cosax, sinax, e^{ax}V(x)\ and\ x\ V(x)$where $V(x) \equiv\ cosax\ and\ sinax,$ the method of variation of parameters.
LDE with variable coefficients: Cauchy's homogeneous equation, Legendre's homogeneous equations

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 polar coordinates) .
Applications: Area using the double integral –Volume of a solid using the double and triple integral- Mass, Center of mass and Center of gravity using double and triple integrals.

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 field, irrotational field, scalar potential.
Vector line integration: Evaluation of the line integral, concept of work done by a force

field, Conservative fields.

UNIT V

SURFACE INTEGRATION AND VECTOR INTEGRAL THEOREMS

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

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

TEXT BOOKS

1. R.K.Jain and S.R.K.Iyengar, Advanced Engineering Mathematics, Narosa publishing house, Fourth edition 2014
2. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010
3. Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons,2006
4.. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9thEdition, Pearson, Reprint, 2002.

REFERENCES:

1. GRIET reference manual
2. Paras Ram, Engineering Mathematics, 2nd Edition, CBS Publishes
3. S. L. Ross, Differential Equations, 3rd Ed., Wiley India, 1984.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
ENGINEERING CHEMISTRY

Course Code: GR20A1005 **L/T/P/C: 3/1/0/4**
I Year II Semesters

Course Objectives:

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

Course Outcomes:

1. Analyze microscopic chemistry in terms of atomic and molecular orbitals and intermolecular forces.
2. Relate electromagnetic spectra used for exciting different molecular energy levels in various spectroscopic techniques and their application in medicine and other fields.
3. Recognize various problems related to electrochemistry and corrosion in industry and is able to explain different prevention techniques and apply concepts of chemistry in engineering.
4. Know the origin of different types of engineering materials used in modern technology and Interpret different problems involved in industrial utilization of water.
5. Understand the processing of fossil fuels for the effective utilization of chemical energy.

UNIT I

Atomic and Molecular Structure: (8 Lectures)

Atomic and molecularorbitals, Linear Combination of AtomicOrbitals (LCAO), Molecularorbitals 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: (10 Lectures)

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 an harmonic oscillators of a diatomic molecule, selection rules, applications of IR spectroscopy.

NMR Spectroscopy: criteria for NMR activity (Magnetic and nonmagnetic nuclei), basic concepts and principle of 1H NMR spectroscopy, Chemical shift, Magnetic Resonance Imaging.

UNIT III

Electrochemistry and Corrosion: (12 Lectures)

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. Types of Fuel cells: hydrogen-oxygen fuel cell - applications and advantages, microbial fuel cell.

Corrosion: Definition ,causes and effects of corrosion, The ories 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: (8 Lectures)

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, Compounding and fabrication by compression moulding and injection moulding, conducting polymers – definition, classification, applications of conducting polymers in mobile phones and displays.

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

UNIT V

Stereochemistry and Energy Resources (8 Lectures)

Stereo chemistry: Representations of 3D structures for organic molecules, stereo isomers: Conformational and Configurational isomers. Conformational isomers: conformational analysis of n-butane. Configurational isomers: geometrical isomers (E, Z isomers) and optical isomers. Optical isomers: symmetry, chirality, enantiomers, diastereomers, optical activity. Structure, synthesis and pharmaceutical applications of aspirin and ibuprofen.

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 engine, Octane rating, Composition and Uses of Natural gas, LPG and CNG, biodiesel synthesis, biogas.

Text Books:

1. Engineering chemistry by P.C. Jain and M. Jain; DhanpatRai Publishing Company (P) Ltd., NewDelhi.
2. Textbook of Engineering Chemistry by A. Jayashree, Wiley Publications

References:

1. Organic Chemistry by Morrison, Boyd &Bhattacharjee (Pearson Pubs)
2. Solomons' Organic Chemistry, Wiley pubs
3. Fundamentals of Molecular Spectroscopy, by C.N. Banwell. McGraw HillPublication
4. ATextbookofEngineeringChemistrybyShashiChawla,DhanpatRaiPublishingCompany (P) Ltd., New Delhi.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
BASIC ELECTRICAL ENGINEERING

Course Code: GR20A1008 **L/T/P/C: 2/1/0/3**
I Year II semester

Course Objectives:

1. Introduce the fundamentals of Electrical Engineering.
2. Understand magnetic circuits, DC circuits and AC single phase & three phase circuits
3. Provide foundation in theory and applications of Transformers and DC machines
4. Understand the basic principles of AC Electrical machinery and their applications.
5. Impart the knowledge of Electrical Installations.

Course Outcomes:

At the end of this course, students will able to

1. Understand and analyze basic electric circuits with suitable theorems.
2. Solve 1-phase and 3-phase balanced sinusoidal systems.
3. Interpret the working principle of Electrical machines.
4. Appraise the applications of Induction motors and synchronous generators used in Industries.
5. Identify the components of Low Voltage Electrical Installations.

UNIT I: D.C. CIRCUITS

DC Circuits: Electrical circuit elements (R, L and C), voltage and current sources, KVL&KCL, analysis of simple circuits with dc excitation. Thevenin's and Norton'stheorems, Superposition and Reciprocity theorems.Time-domain analysis of first-order RL and RC circuits.

UNIT II:A.C. CIRCUITS

Representation of sinusoidal waveforms, average 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 RLC circuit. Locus Diagram. Three-phase balanced circuits, voltage and current relations in star and delta connections.

UNIT III: DC MACHINES ANDTRANSFORMERS

DC Motor and Generator: Construction, Principle of operation and Applications.Ideal and practical transformer, equivalent circuit, losses in transformers and efficiency, regulation. Auto-transformer and three-phase transformer connections.

UNIT IV: AC MACHINES

Generation of rotating magnetic fields, Construction and working of a three-phase induction motor, Significance of torque-slip characteristic, Loss components and efficiency. Single-phase induction motor, Construction, working, torque-speed characteristics. Construction and working of synchronous generators.

UNIT V:ELECTRICAL INSTALLATIONS

Power system overview. 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 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, Prentice Hall India, 1989

Reference Books:

1. C. K. Alexander and M. N. O. Sadiku, “Electric Circuits”, McGraw Hill Education, 2004.
2. K. V. V. Murthy and M. S. Kamath, “Basic Circuit Analysis”, Jaico Publishers, 1999.
3. Circuit Theory (Analysis and Synthesis) by A.Chakrabarti-Dhanpat Rai & Co.
4. P. S. Bimbhra, “Electrical Machinery”, Khanna Publishers, 2011.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
DATA STRUCTURES

Course Code: GR20A1011 **L/T/P/C: 2/1/0/3**
I Year II Semester

Course Objectives:

1. To impart the basic concepts of data structures, algorithms and various searching and sorting techniques.
2. To demonstrate operations of linear data structures like stacks and queues.
3. To develop algorithms to implement operations on linked lists.
4. To demonstrate operations of non-linear data structures trees and graphs.
5. To realize the merits and demerits and applications of various data structures.

Course Outcomes:

1. Analyze basic concepts of data structures, computation complexity and implement various searching and sorting techniques.
2. Apply various operations on linear data structures Stack and Queue and their applications.
3. Develop algorithms for operations on linked lists and convert them to programs.
4. Apply various operations on non-linear data structure tree.
5. Implement various graph traversals techniques and idea of hashing.

UNIT I

Sorting: Bubble sort, Insertion Sort, Selection Sort, Quick Sort, Merge Sort (Algorithms and implementation)

Algorithms: Analysis of algorithms, Basic concept of order of complexity, Asymptotic Notations: Big Oh notation, Omega notation, Theta notation, Little oh notation and Little omega notation.

UNIT II

Stacks: Introduction to Data Structures: Basic Stack Operations-pop, push, display, delete. Representation of a Stack, Implementation of stack using Arrays, Stack Applications: Recursion, Infix to postfix Transformation, Evaluating Post-fix Expressions

Queues: Basic Queue Operations-enqueue, dequeue, Representation of a Queue using array, Implementation of Queue Operations using arrays, Applications of Queues, Circular Queue.

UNIT III

LIST: Introduction, Dynamic memory allocation, single linked list, Advantages and disadvantages of Single linked list ,Single linked list VS Arrays, Representation of a linked list in memory, Operations-insertion, deletion, display, search, Implementation of stack, queue using linked list. Circular linked list, Double linked list.

UNIT IV

TREES: Basic tree concepts, Binary Trees: Properties, Representation of Binary Trees using arrays and linked lists, Operations on a Binary Search Tree, Binary Search Tree Traversals (recursive), Creation of binary tree from traversals.

UNIT V

Graphs: Definition, Basic Terminology, Representation of Graphs, Graph Traversal Techniques –Breadth First Traversal, Depth First Traversal. Introduction to Hashing (no implementation).

TEXT BOOKS:

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

REFERENCE BOOKS:

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

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
ENGINEERING CHEMISTRY LAB

Course Code: GR20A1014 **L/T/P/C: 0/0/3/1.5**
I Year II Semesters

Course Objectives:

1. Introduce practical applications of chemistry concepts to solve engineering problems.
2. To determine the rate constant of reactions from concentrations as a function of time.
3. Measure the molecular or ionic properties such as conductance, redox potentials
4. Synthesize a drug molecule to learn how organic compounds are prepared in industry.
5. Know the laboratory practices implemented in a research and industrial chemistry laboratory setting.

Course Outcomes:

1. Ability to perform experiments illustrating the principles of chemistry relevant to the study of science and engineering.
2. Determination of parameters like hardness and chloride content in water, measurement of redox potentials and conductance.
3. Understand the kinetics of a reactions from a change in concentrations of reactants or products as a function of time.
4. Synthesize a drug molecule as an example of organic synthesis methods widely used in industry.
5. Determination of physical properties like adsorption and viscosity.

List of Experiments: (any 12 experiments out of 14)

1. Determination total hardness of water by complexometric method using EDTA.
2. Determination of chloride content of water by Argentometry.
3. Redox titration: Estimation of ferrous iron using standard KMnO4
4. Estimation of HCl by Conduct ometrictitrations
5. Estimation of Acetic acid by Conduct ometrictitrations
6. Estimation of Ferrous iron by Potentiometry using dichromate
7. Determination of rate constant of acid catalyzed reaction of methylacetate
8. Determination of acid value of coconutoil.
9. Adsorption of acetic acid by charcoal
10. Determination of surface tension of liquid by using stalagmometer
11. Determination of viscosity of liquid by using Ostwald'sviscometer.
12. Determinationofpartitioncoefficientofaceticacidbetweenn-butanolandwater.
13. Synthesis of Aspirin
14. Synthesis of Paracetamol.

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

Course Code: GR20A1017 **L/T/P/C: 0/0/2/1**
I Year II Semester

Course Objectives:

1. Introduce the use of measuring instruments.
2. Analyze a given network by applying various electrical laws
3. Measure and know the relation between basic electrical parameters.
4. Understand the response of electrical circuits for different excitations
5. Summarize the performance characteristics of electrical machines.

Course Outcomes:

At the end of this course, students will able to

1. Get an exposure to common electrical components and their ratings.
2. Get an exposure to basic electrical laws.
3. Understand the measurement and relation between the basic electrical parameters
4. Understand the response of different types of electrical circuits to different excitations.
5. Compare the basic characteristics of Electrical machines

TASK-1: Verification of Ohms Law , KVL and KCL.

TASK-2: Verification of Thevenin's and Norton's Theorems.

TASK-3: Verification of Superposition and Reciprocity Theorems.

TASK-4: Transient Response of Series RL, RC and RLC circuits 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: Load Test on Single Phase Transformer (Calculate Efficiency and Regulation)

TASK-8: Three Phase Transformer: Verification of Relationship between Voltages and Currents (Star-Delta, Delta-Delta, Delta-star, Star-Star)

TASK-9: Measurement of Active and Reactive Power in a balanced Three-phase circuit

TASK-10: Performance Characteristics of a Separately Excited DC Shunt Motor

TASK-11: Torque-Slip Characteristics of a Three-phase Induction Motor

TASK-12: No-Load Characteristics of a Three-phase Alternator

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
DATA STRUCTURES LAB

Course Code: GR20A1018 **L/T/P/C: 0/0/2/1**
I Year II Semester

Course Objectives:

1. To work with sorting techniques.
2. To translate algorithms to programs.
3. To develop programs to implement basic data structures.
4. To develop modular, reusable and readable C Programs.
5. To implement tree and graph traversals.

Course Outcomes:

1. Formulate the algorithms for sorting problems and translate algorithms to a working and correct program.
2. Implement stack and queue data structures and their applications.
3. Interpret linked list concept to produce executable codes.
4. Develop working procedure on trees using structures, pointers and recursion.
5. Implements graph traversal techniques

TASK 1

a. Implement Bubble sort using a C program.
b. Implement Selection sort using a C program.
c. Implement Insertion Sort using a C program.

TASK 2

a. Implement Quick sort using a C program.
b. Implement Merge sort using a C program.

TASK 3

a. Implementation of Stack operations using arrays in C.
b. Implementation of Queue operations using arrays in C.

TASK 4

a. Write a c program to convert Infix to Postfix expression.
b. Write a c program to evaluate a Postfix expression

TASK 5

a. Implement Circular Queue operations in C.

TASK6

a. Implement Single Linked List operations in C.

TASK 7

a. Implement Circular Linked List operations in C.

TASK 8

a. Implement Double Linked List operations in C.

TASK 9

a. Implement the following operations on Binary Search Tree.
   i. Create
   ii. Insert
   iii. Search

TASK 10

a. Implement Preorder, Inorder and Postorder traversals of Binary Search Tree using recursion in C.

TASK 11

a. Implement Depth First Traversal on graphs in C.

TASK 12

a. Implement Breadth First Traversal on graphs in C.

Teaching methodologies:

- Power Point Presentations
- Tutorial Sheets
- Assignments

Text Books:

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

References:

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

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
ENGINEERING WORKSHOP

Course Code: GR20A1019 **L/T/P/C: 1/0/ 3/2.5**
I Year II Semester

Course objectives:

1. To prepare and practice of scientific principles underlying the art of manufacturing in workshop/manufacturing practices.
2. To demonstrate basic knowledge of various tools and their use in different sections.
3. To make students to execute applications of various tools in carpentry.
4. To make students recognize applications of manufacturing methods casting, forming machining, joining and advanced manufacturing methods.
5. To develop generate safety rules, safe practices and workshop dress code.

Course Outcomes:

At the end of the course students will be able to

1. Develop various trades applicable to industries / Manufacturing practices.
2. Create Hands on experience for common trades.
3. Improve to fabricate components with their own hands.
4. Develop practical knowledge on the dimensional accuracies and dimensional tolerances possible with various manufacturing processes.
5. To build the requirement of quality of work life on safety and organizational needs.

TRADES FOR EXERCISES: At least two exercises from each trade:

1. Carpentry
2. Fitting Shop
3. Tin-Smithy
4. Casting
5. Welding Practice
6. House-wiring
7. Black Smithy
8. **VIDEO LECTURES:** Carpentry, Fitting operations, Tin-Smithy, Casting, Welding, Electrical and Electronics, Black Smithy, Plumbing, Power tools in construction and Wood Working, Manufacturing Methods

Text/ Reference Books:

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
5. Workshop Manual/K. Venugopal/Dr.V. Prabhu Raja/G.Sreekanjan.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
LIFE SKILLS AND PERSONALITY DEVELOPMENT (LSPD)

Course Code: GR20A1021 **L/T/P/C: 2/0/0/1**
I Year II Semester

Course Objectives:
Students undergoing the course are expected to
1. Understand the concepts such as "Time Management", "Managing Information Overload" and "How to cope with Peer pressure".
2. Become familiar with concepts like how to master "English Language Skills" and "Communication skills".
3. Be thorough with the '"science behind personal health management and addictions" and stress management.
4. Appreciate the importance of cultivating good hobbies, need for forming good habits and discarding bad habits and how to hold difficult conversations in crisis situations.
5. Understand the importance of creative thinking, continuous and lifelong learning and cross culture sensitization. They will know what is meant by collaboration and team working.

Course Outcomes:
At the end of the course, student should be able to
1. Apply the concept of Time Management to his own day to day life. They will also learn to cope with Information Overload, which has become a serious problem for the digital generation. They will be in a position to withstand harmful peer pressure, and steer themselves towards attaining their own objectives in the four years time they spend in the college.
2. Apart from understanding the importance of English language skills in a globalized world, they will leart the methodologies as to how they can master English Language skills. They will become familiar with the communication skills and etiquette, body language, non-verbal communication and they will start applying these concepts in their day to day life. This will help them to become thorough professionals in their career.
3. Large number of students are ignorant about the need for personal health management and the need to stay away from addictions. After this course, they will get a complete understanding of the biological basis behind these concepts. This will help them to maintain a robust health trough out their life and it will also keep them away from addictions like drug addiction, alcohol addiction & video games addiction. They will learn the techniques of stress management as well.
4. They would start cultivating some good hobbies which will help them to maintain ideal work-life balance throughout their life. The students would start discarding bad habits & will start picking up good habits. Further, they will learn the techniques of holding difficult conversations and negotiations, which is an important skill set in the 21st century world.
5. They will develop the aptitude for finding creative solutions to problems and they will come to realize the importance of continuous and lifelong learning in a fast changing technological landscape. They will appreciate why collaboration and team working skills are important for success in a modern world.

UNIT I

Introduction to life skills: Why life skills are important for students. Highly competitive job market; companies test not only Engineering knowledge but also life skills; Fast paced changes in technologies; proliferation of electronic gadgets and harmful online content; Even to perform well in B.Tech, students need basic life skills.

Time management: What is meant by time management; Impulsive behaviorVs goal directive behavior; The concept of time log; What are the usual time wasters for students; How to minimize time wasters.

Information overload and how to cope with it: ICT revolution; proliferation of electronic media; Exponential growth in online content; Impact of information overload on human brain; How information overload interferes with student learning.

UNIT II

How to master English Language Skills: Importance of English in a globalized world; For any engineer, the whole world is his job market; Companies conduct exams, interviews & group discussions in English; Interdependence of communication skills & language skills; Entrance exams to foreign universities test English language skills; What are the various language skills; Practical strategies to improve one's English language skills.

Communication Skills: What is communication; Various types of communication's; Why communication skills are important in the modern world; Importance given to communication by companies during recruitment; Barriers to effective communication; Practical strategies to improve one's communication skills.

Body language, Etiquette and Non-Verbal communication: What is etiquette, grooming, attire & body language? Why these are important in the modern world; What kind of etiquette is expected by companies; How success in career & life is interlinked to etiquette, grooming, attire & body language; practical steps to improve one's etiquette, grooming, attire & body language.

UNIT III

Science behind personal health management: Widespread ignorance in society on health issues; WHO definition of Health; Human evolution; Hunting & Gathering lifestyle; Importance of physical work for human body & mind; Dangers of sedentary lifestyle; Germ diseases Vs Lifestyle diseases; How to integrate physical exercise into daily life.

Science behind Addictions: What is an addiction? Neurology and hormonal basics of addictive behavior; How addictions are formed; Harmful effects of addictions on physical health & mental health; How to recognize the addictions in oneself; How to come out of addictions.

Stress management: What is stress; Various stressors faced by a student; Fight & Flight response of humans; Harmful effects of chronic stress; Symptoms of poor coping skills of stress; Stress & Psychiatric problems; Easy coping strategies for stress.

UNIT IV

Need for cultivating good hobbies: Why hobbies are important for maintaining work-life balance; how hobbies help in maintaining good physical and mental health, what are various hobbies.

What is habit? Why it is so important. How to cultivate good habits & discard bad habits: Why habits are critical for successful life; How habits forms; How to analyze one's own habits; How to recognize useless & harmful habits; How to cultivate & Sustain useful habits; Difference between hobby & habit.

Peer pressure and how to cope with it: Human being is a social animal; Physical pain & social pain; How to be aware of harmful social pressure; Role of prefrontal cortex in judgment and decision making; why teenagers are vulnerable to peer pressure; strategies to overcome

harmful peer pressure.

UNIT V

Continuous & lifelong learning: Accelerated change in technology landscape; shorter & shorter life cycles of technologies; Need for continuous learning ; Engineering knowledge alone is not enough to solve the real-life problems.

Cross culture sensitization: What is culture; why there are different cultures; How to understand culture; Today all workplaces are multi-cultural; How stereotypes develop in the mind about other cultures; Dangersof stereotypes & culture hatred prevailing society; How to overcome the culture prejudices.

Collaboration & team working skills. Why collaboration is important to succeed in one's own career, Today's workplace is all about teams, what is team working, what are various team working skills, how to be a good team member.

Textbooks:

1. The story of the human body by Daniel E Lieberman, Published by Pantheon Books, 2013
2. Spark by Dr. John J Ratey, *Publisher* Little Brown *Spark* 01-01-2013.
3. Creative thinking by Edward De Bono, Publisher: Penguin UK (25 October 2016).

Reference:

1. The power of positive confrontation by Barbara Pachter; Publisher: Da Capo Lifelong Books (November 28, 1999) ...
2. Habit by Charles Duhigg, Publisher: Random House Trade Paperbacks,2012
3. Communication skills for engineers and scientists by Sangeetha Sharma and Binod Mishra, PHI Learning, 2009.
4. Time management by Brian Tracy, Publisher: AMACOM, 2014

II YEAR
I SEMESTER

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

DIGITAL LOGIC DESIGN

Course Code: GR20A2067 **L/T/P/C: 3/0/0/3**

II Year I Semester

Course Objectives:

1. Comprehend different number systems including the binary system and Boolean algebraic principles.
2. Create minimal realizations of single and multiple output Boolean functions;
3. Design and analyze combinational circuits using medium scale integrated (MSI) components, including arithmetic logic units;
4. Apply strategies for state minimization, state assignment, for the implementation of synchronous Finite State Machines
5. Design of Combinational Programmable Logic Devices (CPLDs) like PROM, PAL, and PLA and develop HDL Models for Logic Circuits.

Course Outcomes:

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

1. Apply knowledge of fundamental Boolean principles and manipulation to design Logic Circuits.
2. Apply various techniques of Boolean function simplification to create minimal expressions.
3. Create combinational circuits for a specified behavior with minimal specification.
4. Synthesize Sequential circuits with minimal states.
5. Realize combinational circuitry using Combinational PLDs and develop & test HDL models of Logic Circuits.

UNIT I

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

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.

Teaching Methodologies:

- Power Point Presentations
- Tutorial Sheets
- Assignments

Text Books:

1. Digital Design with an Introduction to the Verilog HDL – Fifth Edition, M. Morris Mano, Pearson Education.
2. Fundamentals of Logic Design – Roth, 7^{th} Edition, Thomson.

References:

1. Switching and Finite Automata Theory by ZviKohavi, Tata Mc Graw Hill.
2. Switching and Logic Design – CVS Rao, Pearson Education
3. Digital Principles and Design – Donald D.Givone, Tata Mc Graw Hill.
4. Fundamentals of Digital Logic and Micro Computer Design, 5^{th} Edition, M.Rafiquzzaman (John Willey)

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
JAVA PROGRAMMING

Course Code: GR20A2076 **L/T/P/C: 3/0/0/3**
II Year I Semester

Course Objectives:

1. The Java programming language: its syntax, idioms, patterns and styles.
2. Object oriented concepts in Java and apply for solving the problems.
3. How exception handling and multithreading makes Java robust.
4. Explore java Standard API library such as io, util, applet,awt.
5. Building of applications using Applets and Swings.

Course Outcomes:

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

1. Identify the model of Object-Oriented Programming: Abstract data types, Encapsulation, Inheritance and Polymorphism.
2. Summarize the fundamental features like Interfaces, Exceptions and Collections.
3. Correlate the advantages of Multi-threading.
4. Design interactive programs using Applets, AWT and Swings.
5. Develop real time applications using the features of Java.

UNIT I

Object Oriented Thinking: Introduction, Need of object-oriented programming, principles of object-oriented languages, Applications of OOP, history of JAVA, Java Virtual Machine, Java features, Program structures, Installation of JDK.

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.

UNIT II

CLASSES, INHERITANCE, POLYMORPHISM:

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, Nested Classes

Strings: String, StringBuffer, StringTokenizer

Inheritance and Polymorphism: Types of Inheritance, deriving classes using extends keyword, super keyword, Polymorphism – Method Overloading, Method Overriding, final keyword, abstract classes.

UNIT III

INTERFACES, PACKAGES, EXCEPTIONS

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, COLLECTIONS

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

Collections: Overview of Collection Framework : ArrayList, LinkedList, Vector, HastSet, TreeSet, HashMap, HashTable, TreeMap, Iterator, Comparator

UNIT V

APPLETS, AWT AND SWINGS

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

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, Layout Managers.

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

Swing: Introduction, JFrame, JApplet, JPanel, Components in swings, JList and JScroll Pane, Split Pane, JTabbed Pane, Dialog Box, Pluggable Look andfeel.

Teaching Methodologies:

- Power Point Presentations
- Tutorial Sheets
- Assignments

Text Books/ References:

1. Java: The Complete Reference, 10thedition, 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 University Press

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
PROBABILITY AND STATISTICS

Course Code: GR20A2005 **L/T/P/C: 3/0/0/3**
II Year I Semester

Course Objectives

1. Interpret the measures of central tendency and dispersion.
2. Distinguish between explanatory and response variables and analyze data using correlation and regression.
3. Apply various probability distributions.
4. Apply tests of hypothesis.
5. Employ basic analysis of time series data.

Course Outcomes

The expected outcomes of the Course are:

1. Compute and interpret descriptive statistics.
2. Evaluate random processes which occur in engineering applications governed by the Binomial, Poisson, Normal and Exponential distributions.
3. Fit the models using Regression Analysis.
4. Apply Inferential Statistics to make predictions or judgments about the population from which the sample data is drawn.
5. Interpret Time series data.

UNIT I: Random Variables, Basic Statistics, Correlation and Regression

Notion of Randomness, Random Experiment, Random variables – Discrete and Continuous, Probability mass function and density function, constants of r.v.s (Mean, Variance, Monents about mean), Concept of Bivariate distributions and Covariance.
Measures of central tendency and moments.
Correlation : Karl-Pearson's correlation coefficient and Spearman's Rank correlation, Statements of their properties and problems, Simple and Multiple Linear Regression (three variables case only), Statements of properties of Regression coefficients and problems.

UNIT II : Probability Distributions

Discrete Distributions: Binomial and Poisson distributions - definition, real life examples, Statements of their Mean and Variance, related problems, evaluation of statistical parameters.
Continuous Distributions: Normal, Exponential and Gamma distributions - definition, real life examples, Statements of their Mean and Variance and related problems, evaluation of statistical parameters for Normal distribution.

UNIT III : Testing of Hypothesis-1 (Large sample)

Concept of Sampling distribution and Standard error, tests for single proportion, difference of proportions, single mean, difference of means and Chi-square test for independence of attributes. Estimation of confidence interval for population mean and population proportions.

UNIT IV : Testing of Hypothesis-2 (Small Sample)

Tests for single mean, difference of means, Population variance, ratio of variances, ANOVA 1-way and 2-way. Estimation of confidence interval for Population mean.

UNIT V : Time Series analysis

Components of Time series, Additive and Multiplicative Decomposition of Time series components, Measuring trend by method of Moving averages, Straight line and Second degree parabola, Measuring seasonal variation by Ratio to Trend method and Ratio to Moving averages method.

Text / References:

1. S. C.Gupta&V.K.Kapoor, “Fundamentals of Mathematical Statistics”, S.Chand.
2. Richard A.Johnson,” Probability and Statistics for Engineers”, Pearson Education.
3. Jay Devore, “Probability and Statistics for Engineering and the Sciences”,Cengage learning.
4. Murat Kulahci,“Time series analysis and forecasting by example*”*,John Wiley & Sons
5. S. C.Gupta&V.K.Kapoor, “Fundamentals of Applied Statistics”, S.Chand.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
DISCRETE MATHEMATICS

Course Code: GR20A2069 **L/T/P/C: 2/1/0/3**
II Year I Semester

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

1. Use mathematically correct terminology and notation.
2. Construct correct direct and indirect tproofs.
3. Use division into cases in a proof.
4. Use counter examples.
5. Apply logical reasoning to solve a variety of problems.

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

1. Express a given logic sentence in terms of predicates, quantifiers, and logical connectives.
2. Derive the solution for a given a problem, using deductive logic and prove the solution based on logical inference.
3. Classify a mathematical problem into its algebraic structure.
4. Evaluate Boolean functions and simplify expressions using the properties of Boolean algebra.
5. 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 of contradiction.

UNIT II
Set Theory: Properties of binary Relations, equivalence, compatibility and partial ordering relations, Hasse diagram.
Functions: Inverse Function Composite of functions, recursive Functions, Lattice and its Properties, Pigeon hole principle and its application.
Algebraic Structures: Algebraic systems Examples and general properties, Semi groups and monads, groups sub groups' homomorphism, Isomorphism.

UNIT III
Elementary Combinatorics: Basics 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 Inhomogeneous Recurrence Relation.

UNIT V
Graph Theory: Representation of Graph, Depth First Search, Breadth First Search, Spanning Trees, planar Graphs, Graph Theory and Applications, Basic Concepts Isomorphism and Sub graphs, Multi graphs and Euler circuits, Hamiltonian graphs, Chromatic Numbers.

Teaching Methodologies:

- Power Point Presentations
- Tutorial Sheets
- Assignments

Text Books/ References:

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, ThomasKoshy,Elsevier
6. Discrete Mathematical Structures, BernandKolman, Roberty C. Busby, Sharn Cutter Ross, Pearson

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
DATABASE MANAGEMENT SYSTEMS

Course Code: GR20A2070 **L/T/P/C: 3/0/0/3**
II Year I Semester

Course Objectives:

1. Understand the different issues involved in the design and implementation of a database system.
2. Understand Structured Query Language for manipulating the Data.
3. Study the physical, conceptual and logical database designs
4. Provide concepts of Transaction, Concurrency and Recovery Management Strategies of a DBMS
5. Design and build a simple database system and demonstrate competence with the fundamental tasks involved with modeling, designing, and implementing a DBMS.

Course Outcomes:

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

1. Identify the role of Database System Applications and the design issues related.
2. Design the logical model for the applications and apply indexing techniques.
3. Construct a Database Schema, manipulate data using a SQL.
4. Apply the Schema Refinement techniques for a database design for optimized access.
5. For a given transaction-processing system, determine the transaction atomicity, consistency, isolation, and durability.

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.

UNIT II

SQL Queries and Constraints: SQL Data Definition, Types of SQL Commands,Form of Basic SQL Query, SQL Operators, Set Operators, Nested Queries, Aggregate Operators, NULL values, Integrity Constraints Over Relations, Joins, Introduction to Views, 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: 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.

Teaching Methodologies:

- Power Point Presentations
- Tutorial Sheets
- Assignments

Text Books/ References:

1. "Data base Management Systems", Raghurama Krishnan, Johannes Gehrke,TATA McGraw Hill 3rdEdition
2. "Data base System Concepts", Silberschatz, Korth, McGraw hill, V Edition.
3. "Introduction to Database Systems", C.J.DatePearsonEducation.
4. "Database Systems design, Implementation, and Management", Rob & Coronel5th Edition.
5. "Database Management Systems", P. Radha Krishna HI-TECH Publications 2005.
6. "Database Management System", ElmasriNavate, PearsonEducation.
7. "Database Management System", Mathew Leon,Leo

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
SCRIPTING LANGUAGES LAB

Course Code: GR20A2071 **L/T/P/C: 0/0/4/2**
II Year I Semester

Course Objectives:

1. Classify the client-side and server-side programming works on the web.
2. Apply JavaScript and develop real time applications.
3. Analyze the use of PHP-based scripting to experiment on web application.
4. Identify the processing of data in MySQL database.
5. Learn how to use AJAX programming in PHP to make faster web pages.

Course Outcomes:

At the end of the course, the student will be ableto

1. Design JavaScript applications for day to day activities.
2. Implement web application using PHP.
3. Design, debug and run complete web applications using PHP and MYSQL.
4. Build web applications usingJavaScript and AJAX programming.
5. Develop web application to retrieve data from database using AJAX.

TASK 1

a. Write a JavaScript code to edit a paragraph text on a button click.
b. Insert an image in HTML page using image tag. Define a JavaScript code to change image on a button click.

TASK 2

Create a sample form program that collects the first name, last name, email, user id, and password and confirms password from the user. All the inputs are mandatory and email address entered should be in correct format. Also, the values entered in the password and confirm password textboxes should be the same. After validating using JavaScript, Report error messages in red color just next to the textbox where there is an error.

TASK 3

Design a simple multiplication table using JavaScript asking the user the number of rows and columns as user wants to print.

TASK 4

Develop a To-Do List application using JavaScript. Implement CSS when needed to judge the outlook of To-Do list.

TASK 5

Implement PHP script for the following.
a. Find the factorial of a number (while loop)
b. To reverse the digit (Use do while)
c. Find the sum of the digits (Use for loop)
d. Write a PHP script for the following: Design a form to accept the details of 5different items, such as item code, item name, units sold, and rate. Display thebill in the tabular format. Use only 4 text boxes. (Hint: Use of explodefunction.)
e. Assume an array with different values. Print only unique values from thearray.

TASK 6

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

b. Write a PHP script to store, retrieve and delete data cookies values.

TASK 7

Design a PHP application for

a. Organize a database table with user information like username, password andother required information.

b. Design a registration page and insert the data into created database table.

c. Design a login page and authenticate the user to display home page or else login error.

TASK 8

a. Examine and write a PHP script for updating required user information in the database.

b. Write a PHP script for deleting a specified user from the database.

TASK 9

Execute a PHP script to store, retrieve and delete session data using session variables. Example of Displaying username across all the pages from the time user login till user logout from the application.(using sessions)

TASK 10

Create a simple XMLHttpRequest and retrieve data from a text file.

TASK 11

Create a AJAX application to retrieve the contents of PHP file.

Example: Consider a webpage with textbox to search for a name, as the user enter a character, the application should display all the suggested names with that character, if no match display no suggests message.

TASK 12

Develop a AJAX application to retrieve the contents of database.

Example: Consider a webpage with a dropdown list of set of names, as user selects a name the application should be able to display selected userpersonal information(username, Phone number, Email-id, Place) in a table. When user selects other name, other user information should be displayed without reloading the page.

Text Books/ References:

1. Beginning PHP and MySQL 3rd Edition W. Jason Gilmoren - Third Edition, Apress publications

2. Beginning JavaScript with DOM scripting and AJAX: From Novice to Professional by Christian Heilman

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
JAVA PROGRAMMING LAB

Course Code: GR20A2080 **L/T/P/C: 0/0/4/2**
II Year I Semester

Course Objectives:

1. Understand Object Oriented Programming concepts and apply them in problem solving.
2. Get knowledge on Abstract classes, Interfaces and Multithreading.
3. Developing java applications and handle the exceptions.
4. Design applications for solving real world problems using Collection framework.
5. Building java GUI based applications using Applets, AWT and Swing.

Course Outcomes:

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

1. Analyze a problem, identify and define the computing requirements appropriate to its solution using object-oriented programming concepts.
2. Design the applications using Inheritance, Polymorphism and Synchronization concepts.
3. Handle exceptions at Compile time and Run time.
4. Solve the real-world problems using Java Collection framework.
5. Develop GUI applications using Applets, AWT and Swings.

TASK 1

Write java programs that implement the following

a. Constructor
b. Parameterized constructor
c. Method overloading
d. Construct or overloading.

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 ascending order.
c. Write a Java Program that reads a line of integers, and then displays each integer and the sum of all the integers (Use StringTokenizer class 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 method dispatch.
c. Write a Java program to implement multiple inheritance.
d. Write a java program that uses access specifiers.

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 in bytes.
b. Write a Java program that reads a file and displays the file on the screen, with a line number before each line.
c. Write a Java program that displays the number of characters, lines and words in a text file

TASK 6

a. Write a Java program for handling Checked Exceptions.
b. Write a Java program for handling Unchecked Exceptions.

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

Write a program illustrating following collections framework

a) ArrayList b) Vector c) HashTable d) Stack

TASK 9

a. Develop an applet that displays a simple message.
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" is clicked.
c. 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 mouse events.
b. Write a Java program for handling key events.

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 Num 2.
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 would throw Number Format Exception. If Num2 were Zero, the program would throw an Arithmetic Exception and display the exception 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 and ovals.

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 Books/ References:

1. Java: The Complete Reference, 10thedition, 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 University Press.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
DATABASE MANAGEMENT SYSTEMS LAB

Course Code: GR20A2073 **L/T/P/C: 0/0/3/1.5**
II Year I Semester

Course Objectives:

1. Develop the logical design of the database using data modeling concepts such as Relational model.
2. Infer the data models and use of queries in retrieving the data.
3. Create a relational database using a relational database package.
4. Manipulate a database using SQL.
5. Render the concepts of database system structure.

Course Outcomes:

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

1. Construct the schema of the database and modify it.
2. Compile a query to obtain the aggregated result from the database.
3. Speculate the concepts of various database objects.
4. Compare the use of procedure and function in database.
5. Use triggers and packages to create applications in the database.

TASK 1

DDL commands (Create, Alter, Drop, Truncate)

a. 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)

b. Add a column commission to the emptable. Commission should be numeric with null values allowed.

c. Modify the column width of the job field of emptable.

d. Create dept table with the following structure.

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

DEPTNO as the primary key

e. Add constraints to the emptable that is empno as the primary key and deptno as the foreign key

f. Add constraints to the emptable to check the empno value while entering(i.e)empno>100.

g. Salary value by default is 5000, otherwise it should accept the values from the user.

h. Add columns DOB to the emp table. Add and drop a column DOJ to the emp table.

TASK 2

DML COMMANDS (Insert, Update, Delete)

a. Insert 5 records into dept Insert few rows and truncate those from the emp1 table and also drop it.
b. Insert 11 records into emptable.
c. Update the emptable to set the value of commission of all employees to Rs1000/- who are working as managers.
d. Delete only those who are working as supervisors.
e. Delete the rows whose empnois7599.

TASK 3

TCL COMMANDS (Save Point, Rollback Commit)

TASK 4

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

a. List the records in the emptable order by salary in descending order.
b. Display only those employees whose deptnois30.
c. Display deptno from the table employee avoiding the duplicated values.
d. List all employee names, salary and 15% rise in salary. Label the column as pay hike.
e. Display the rows whose salary ranges from 15000 to 30000.
f. Display all the employees in dept 10 and 20 in alphabetical order of names.
g. List the employee names who do not earn commission.
h. Display all the details of the records with 5-character names with 'S' as starting character.
i. Display joining date of all employees in the year of1998.
j. List out the employee names whose salary is greater than 5000 and less than6000.

TASK 5

SQL Aggregate Functions, Group by clause, Having clause

a. Count the total records in the emptable.
b. Calculate the total and average salary of the employee.
c. Determinethemaxandminsalaryandrenamethecolumnasmax_salaryandmin_salary.
d. Find number of departments in employee table.
e. Display job wise sum, average, max, min salaries.
f. Display maximum salaries of all the departments having maximum salary >2000
g. 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 descending order.

TASK 6

SQL Functions

a. Display the employee name concatenate with employee number.
b. Display half of employee name in upper case and half in lowercase.
c. Display the month name of date "14-jul-09" in full.
d. Display the Date of joining of all employees in the format"dd-mm-yy".
e. Display the date two months after the Date of joining of employees.
f. Display the last date of that month in"05-Oct-09".
g. Display the rounded date in the year format, month format, day format in the employee
h. Display the commissions earned by employees. If they do not earn commission, display it as "No Commission".

TASK 7

Nested Queries

a. Find the third highest salary of an employee.

b. Display all employee names and salary whose salary is greater than minimum salary of the company and job title starts with'M'.
c. Write a query to display information about employees who earn more than any employee in dept30.
d. Display the employees who have the same job as Jones and whose salary is greater than or equal to the salary of Ford.
e. List out the employee names who get the salary greater than the maximum salaries of dept with deptno20,30.
f. Display the maximum salaries of the departments whose maximum salary is greater than9000.
g. Create a table employee with the same structure as the table emp and insert rows into the table using select clause.
h. Create a manager table from the emptable which should hold details only about the managers.

TASK 8

Joins, Set Operators

a. Display all the employees and the departments implementing a left outer join.
b. Display the employee name and department name in which they are working implementing a full outer join.
c. Write a query to display their employee names and their managers' name and salary for every employee.
d. Write a query to output the name, job, empno, deptname and location for each dept, even if there are no employees.
e. Display the details of those who draw the same salary.

TASK 9

Views

a. Create a view that displays the employee id, name and salary of employees who belong to 10^{th} department.
b. Create a view with read only option that displays the employee name and their department name.
c. Display all the views generated.
d. Execute the DML commands on views created and drop them

TASK 10

Practice on DCL commands, Sequence and indexes.

TASK 11

a. Write a PL/SQL code to retrieve the employee name, join date and designation of an employee whose number is given as input by the user.
b. Write a PL/SQL code to calculate tax of employee.
c. Write a PL/SQL program to display top ten employee details based on salary using cursors.
d. Write a PL/SQL program to update the commission values for all the employees' with salary less than 2000, by adding 1000 to the existing values.

TASK 12

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

TASK 13

a. Write PL/SQL program to handle predefined exceptions.
b. Write PL/SQL program to handle user defined exception.
c. Write a PL/SQL code to create

i) Package specification
ii) Package body to insert, update, delete and retrieve data on emptable.

TASK 14

Table locking (Shared Lock and Exclusive lock)

Text Books/ References:

1. The Complete Reference,3rd edition by James R.Groff, Paul N.Weinberg, AndrewJ. 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

Course Code: GR20A2002 **L/T/P/C: 2/0/0/2**
II Year I Semester

Course Objectives:

1. To understand about the importance of ethical values
2. To understand the significance of human conduct and self-development
3. To enable students to imbibe and internalize the value and Ethical behaviour in personal and professional lives.
4. To provide a critical perspective on the socialization of men and women.
5. To create an awareness on gender violence and condemn it.

Course Outcomes

1. To enable the student to understand the core values that shapes the ethical behaviour. And Student will be able to realize the significance of ethical human conduct and self-development
2. Students will be able to inculcate positive thinking, dignity of labour and religious tolerance.
3. The students will learn the rights and responsibilities as an employee and a team member.
4. Students will attain a finger grasp of how gender discrimination works in our society and how to counter it.
5. Students will develop a better understanding on issues related to gender and Empowering students to understand and respond to gender violence.

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.

- A Case study on values and self-development

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.

- A Case study on Personality

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.

- A Case study on professional ethics

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

- A Case study/ video discussion on attitudes towards 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.

- A Case study/ video discussion on gender-based violence in view of human rights

Textbooks

1. Professional Ethics: R. Subramanian, Oxford University Press, 2015.
2. Ethics in Engineering Practice & Research, Caroline Whit beck, 2e, Cambridge University Press 2015.
3. A Bilingual Textbook on Gender" written by A. Suneetha, Uma Bhrugubanda, DuggiralaVasanta, Rama Melkote, Vasudha Nagaraj, Asma Rasheed, GoguShyamala, Deepa Sreenivas and Susie Tharu and published by Telugu Akademi, Hyderabad,Telangana State in the year 2015.

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

II YEAR
II SEMESTER

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
COMPUTER ORANIZATION

Course Code: GR20A2074 **L/T/P/C: 3/0/0/3**
II Year II Semester

Course Objectives:

1. Comprehend operational concepts and understand register organization within a basic computer system
2. Analyze the basic computer organization and understand the concepts of Micro programmed control
3. Understand the design aspects of Central processing unit organization
4. Understand various algorithms for arithmetic operations within a computer system and communication with I/O devices and standard I/O interfaces.
5. 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

1. Demonstrate knowledge of register organization of a basic computer system
2. Incorporate In-depth understanding of control unit organization and micro programmed control.
3. Understand the performance of central processing unit of a basic computer system.
4. Apply various algorithms to perform arithmetic operations and propose suitable hardware and appraise various methods of communications with I/O devices.
5. Analyze and emphasize various communication media in the basic computer system using design of various memory structures and Multiprocessor systems.

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, Micro Operations and its types, Arithmetic logic shift unit.

UNIT II

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

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

UNIT III

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

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

UNIT IV

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

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

UNIT V

Memory 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.

Teaching Methodologies:

- Power Point Presentations
- Tutorial Sheets
- Assignments

Text Books:

1. Computer Systems Architecture – M.Moris Mano, 3rd Edition, Pearson/PHI
2. Computer Organization – Carl Hamacher, ZvonksVranesic, SafeaZaky, 5th Edition, McGraw Hill.

References:

1. Computer Organization and Architecture – William Stallings 7th Edition, Pearson/PHI
2. Structured Computer Organization – Andrew S. Tanenbaum, 6th Edition PHI/Pearson
3. Fundamentals or Computer Organization and Design, - SivaraamaDandamudi Springer Int. Edition.
4. Computer Architecture a quantitative approach, John L. Hennessy and David A. Patterson, 5th Edition Elsevier
5. Computer Architecture: Fundamentals and principles of Computer Design, Joseph D. Dumas II, BS Publication.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
OPERATING SYSTEMS

Course Code: GR20A2075 **L/T/P/C: 2/1/0/3**
II Year II Semester

Course Objectives:

1. Understand main concepts of OS and to analyze the different CPU scheduling policies.
2. Understand process synchronization and deadlock management.
3. Understand memory management and virtual memory techniques.
4. Appreciate the concepts of storage and file management.
5. Study OS protection and security concepts.

Course Outcomes:

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

1. Explain different functions and types of operating system and implement various process management concepts for maximization of CPU throughput
2. Analyse synchronization problems and design a deadlock management scheme.
3. Optimize memory management for improved system performance.
4. Demonstrate disk management, implement disk scheduling and file system interface
5. Describe and frame protection and security policy for OS.

UNIT I

Operating System Overview: Objectives and functions, Computer System Architecture, Evolution of Operating Systems, System Services, System Calls, System Programs, OS Structure, Virtual machines.

Process Management: Process concepts, CPU scheduling-criteria, algorithms with evaluation, Preemptive / Non-Preemptive Scheduling, Threads, Multithreading Models.

UNIT II

Concurrency: Process synchronization, the critical- section problem, Peterson's Solution, synchronization Hardware, semaphores, classic problems of synchronization, monitors.

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

UNIT III

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

Virtual Memory: Demand paging, page replacement algorithms, Allocation of Frames, Thrashing.

UNIT IV

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

File System implementation: Access Methods, File system structure, file system implementation, directory implementation, allocation methods, free-space management.

UNIT V

Protection: Goals and Principles of Protection, Implementation of Access Matrix, Access control, Revocation of Access Rights.

Security: The Security problem, program threats, system and network threats, implementing security defenses.

TEXT / REFERENCE BOOKS:

1. Operating System Concepts Essentials, 9th Edition by Avi Silberschatz, Peter Galvin, Greg Gagne, Wiley Asia Student Edition.
2. Operating Systems: Internals and Design Principles, 5th Edition, William Stallings, Prentice Hall of India.
3. Operating System: A Design-oriented Approach, 1st Edition by Charles Crowley, Irwin Publishing
4. Operating Systems: A Modern Perspective, 2nd Edition by Gary J. Nutt, Addison-Wesley
5. Modern Operating Systems, Andrew S Tanenbaum 3rd Edition PHI.
6. Operating Systems, R. Elmasri, A. G. Carrick and D. Levine, Mc Graw Hill.
7. Operating Systems in depth, T. W. Doeppner, Wiley.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
ECONOMICS AND ACCOUNTING FOR ENGINEERS

Course Code: GR20A2004 **L/T/P/C: 3/0/0/3**
II Year II Semester

Course Objectives:

1. To provide the student with a clear understanding of demand analysis, elasticity of demand and demand forecasting;
2. To provide the insight on theory of production and cost analysis.
3. To describe different types of markets and competition and to elaborate the different forms of organisation and different methods of pricing.
4. To make the students understand various capital budgeting techniques
5. To Provide an insight of fundamental of accounting and emphasis on describe final accounts preparation

Course Outcomes:

1. The student will be able to understand the concepts of economics and Demand concepts, elasticity and techniques for forecast demand of products
2. The student will be able to plan the production levels in tune with maximum utilization of organizational resources and with maximum profitability.
3. To understand the types of markets, types of competition and to estimate the cost of products and decide the price of the products and services produced
4. The student will be able to analyze the profitability of various projects using capital budgeting techniques and
5. The student is able will be able prepare the financial statements and more emphasis on preparation of final accounts.

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.

UNIT -III:

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 Bookkeeping. **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, Kalyani Publishers,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

PYTHON PROGRAMMING

Course Code: GR20A2068 **L/T/P/C: 3/0/0/3**

II Year II Semester

Course Objectives:

1. Know the basic features , control flow , functions and data structures in Python
2. Learn the file operations, exception handling mechanism and functional programming
3. Understand the concepts of object oriented and multi threaded programming
4. Learn the GUI programming and create GUI based applications
5. Understand the Django framework for website development

Course Outcomes:

1. Demonstrate the concepts of control flow, data structures and Functions in Python
2. Implement the file handling operations , exception handling mechanism and functional programming
3. Design python programs using object oriented programming and multithreaded programming concepts
4. Develop GUI based applications using Tkinter
5. Design quality web applications using open source Django framework

UNIT I

Basic features of Python-Interactive execution, comments, types, variables, operators, expressions, Statements-assignment, input, print, Control flow-Conditionals, Loops, break statement, continue statement, pass statement, Functions, definition, call, scope and lifetime of variables, keyword arguments, default parameter values, variable length arguments, recursive functions, Sequences-Strings ,Lists and Tuples-basic operations and functions, iterating over sequences , Sets and Dictionaries- operations and functions, Python program examples.

UNIT II

Files-operations-opening, reading, writing, closing, file positions. Exceptions – raising and handling exceptions, try/except statements, finally clause, standard exceptions, custom exceptions. Functional programming-mapping, filtering and reduction, Lambda functions, List comprehensions. Scope, namespaces and modules, import statement, creating own modules, avoiding namespace collisions whenimporting modules, iterators and generators, Python program examples.

UNIT III

Object oriented programming- classes, constructors, objects, class variables, class methods, static methods, operator overloading. Inheritance-is-a relationship, composition, polymorphism, overriding, multiple inheritance, abstract classes, multithreaded programming, Python program examples.

UNIT IV

GUI Programming with Tkinter, Widgets (Buttons, Canvas, Frame, Label, Menu, Entry,

Text, Scrollbar,Combobox, Listbox, Scale), event driven programming-events, callbacks, binding, layout management- geometry managers: pack and grid, creating GUI based applications in Python.

UNIT V

Introduction to Django Framework

Model Template View (MTV) framework, Creating a Project and Application,Configuring database, Defining a model, Defining a view, Defining a template,Defining a URL pattern, Enabling Admin site, Designing a RESTful API

TEXT BOOKS

1. Exploring Python, Timothy A. Budd, McGraw Hill Publications.
2. Introduction to Programming using Python, Y.Daniel Liang, Pearson.
3. Python Programming, R.Thareja, Oxford University Press.
4. Python Programming, Sheetal Taneja and Naveen Kumar, Pearson.
5. Core Python Programming, Wesley J.Chun, second edition, pearson.

REFERENCE BOOKS

1. Introduction to Computer Science using Python, Charles Dierbach, Wiley India Edition.
2. Internet of Things - A hands on approach, Arshdeep Bahga and Vijay Madisetti, UniversitiesPress, 2015.
3. Fundamentals of Python, K. A. Lambert, B.L. Juneja, Cengage Learning.
4. Think Python, how to think like a computer scientist, Allen B. Downey,SPD, O'Reilly.
5. www.python.org web site.Official Django Document (https://buildmedia.readthedocs.org/media/pdf/django/1.5.x/django.pdf)

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
DESIGN AND ANALYSIS OF ALGORITHMS

Course Code: GR20A2077 **L/T/P/C: 3/0/0/3**
II Year II Semester

Course Objectives:

1. Recall algorithm definition, its properties & performance analysis.
2. Demonstrate a familiarity with major algorithms and data structures.
3. Apply important algorithmic design paradigms and methods of analysis.
4. Evaluate efficient algorithms in common engineering design situations.
5. Understanding performances of various techniques.

Course Outcomes:

1. Distinguish various performances of algorithms.
2. Illustrating Divide and Conquer Design Paradigm algorithms.
3. Examining various algorithms based on Dynamic programming paradigm.
4. Discriminate greedy approach and back tracking algorithms.
5. Demonstrate branch and bound problems and Distinguish problems related to various complexity classes.

UNIT I

Introduction to Algorithms: Definition of an algorithm, properties of an Algorithm, performance analysis--space complexity & time complexity, amortized analysis

UNIT II

Disjoint sets: Disjoint set Representation, Operations, union and find algorithms.
Divide and Conquer: General method, applications, binary search, Quick sort, merge sort, Strassen's matrix multiplication.

UNIT III

Dynamic Programming: General method, applications, optimal binary search trees, 0/1 knapsack problem, All pairs shortest path problem, travelling salesperson problem, optimal rod-cutting-Top down approach and bottom up approach.

UNIT IV

Greedy Method: General method, applications-- job sequencing with deadlines, 0/1 knapsack problem, minimum cost spanning trees, single source shortest path problem, activity selection problem.
Backtracking: General method, applications, n-queen problem, sum of subsets problem, 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
Complexity Classes: Non deterministic algorithms, deterministic algorithms, relationship between P and NP, NP-completeness, circuit-satisfiability problem, 3-CNF satisfiability.

Teaching Methodologies:

- Power Point Presentations
- Tutorial Sheets
- Assignments

Text Books/ References:

1. Ellis Horowitz, SatrajSahni and S Rajasekharam, Fundamentals of Computer Algorithms, Galgotia publishers 2. T H Cormen, C E Leiserson, and R L Rivest, Introduction to Algorithms, 3rdEdn, Pearson Education

2. Cormen, Thomash H., Leiserson, Charles E., Rivest, Ronald L., & Stein, Clifford. Introduction to Algorithms. 3rd Edition. 2010.

3. Goodrich, Michael T. & Roberto Tamassia, Algorithm Design, Wiley Singapore Edition, 2002.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

PYTHON PROGRAMMING LAB

Course Code: GR20A2068 **L/T/P/C: 0/0/3/1.5**

II Year II Semester

Course Objectives:

1. Identify logical ability in programming.
2. Discuss the use of Lists, tuples and Dictionaries in Python
3. Illustrate step by step approach in solving problems with thehelp of strings, functions, modules and Files in Python programming.
4. Learn the concepts such as Exception handling, functions, modules and classes
5. Learn GUI programming and Django framework for developing web applications

Course Outcomes:

1. Demonstrate the use of control statements, Lists, Tuples and Dictionaries in Python.
2. Develop programs using files,exception handling, functionsinPython.
3. Illustrate the concepts such as modules, classes and multithreading in python
4. Design GUI applications for sample applications using python
5. Develop python web applications using Django framework.

TASK 1 (Control Statements & Lists)

a. Write a python program to find factorial of a given number.
b. Write a Python program to find GCD of two numbers.
c. Write a Python program that reads a list of names and ages, then prints the list sorted by age.

TASK 2 (Tuples & Dictionaries)

a. Write a program to demonstrate working with tuples in python.
b. Write a program to demonstrate working with dictionaries in python.

TASK 3 (Files)

a. Write a Python program that will prompt the user for a file name, read all the lines from the file into a list, sort the list, and then print the lines in sorted order.
b. Write a Python program that asks the user for a filename, and then prints the number of characters, words, and lines in the file.

TASK 4(Exception Handling)

a. Write a python program to create user defined exception.
b. Write a program to demonstrate ‘finally’ keyword in python.

TASK 5 (Lambda function)

a. Write a Python program to create a lambda function that adds 15 to a given number passed in as an argument, also create a lambda function that multiplies argument x with argument y and print the result.
b. Write a Python program to square and cube every number in a given list of integers using Lambda.

TASK 6 (Modules)

a. Write a Python program to shuffle the elements of a given list
b. Write a Python program to read and display the content of a given CSV file

TASK 7(Classes)

a. Create a class Rectangle. The constructor for this class should take two numeric arguments, which are the length and breadth. Add methods to compute the area and perimeter of the rectangle, as well as methods that simply return the length and breadth. Add a method 'isSquare' that returns a Boolean value if the Rectangle is a Square.
b. Write a class Complex for performing arithmetic with complex numbers. The constructor for this class should take two floating-point values. Add methods for adding, subtracting, and multiplying two complex numbers.

TASK 8 (Multithreading)

a. Write a program to demonstrate working with multiple threads in python.
b. Write a python program to illustrate synchronization in multithreading.

TASK 9 (GUI Applications)

a. Write a Python program that works as a simple calculator. Use a grid to arrange buttons for the digits and for the +, -,*, % operations. Add a text field to display the result.
b. Develop a Python GUI application that receives an integer in one text field, and computes its factorial Value and fills it in another text field, when the button named "Compute" is clicked.

TASK 10 (GUI Applications)

a. Write a Python program that creates a user interface to perform integer divisions. The user enters two numbers in the text fields, Num1 and Num2. The division of Num1 and Num2 is displayed in the Result field when the Divide button is clicked. If Num1 or Num2 were not an integer Num2 is Zero, the program should Display an appropriate message in the result field in Red color.
b. Write a Python program that simulates a traffic light. The program lets the user select one of three lights: red, yellow, or green. When a radio button is selected, the light is turned on, and only one light can be on at a time. No light is on when the program starts.

TASK 11 (Django Framework)

a. Create a Django web application for a simple calculator with basic operations (+, -, * and /) with two numbers.
b. Create a Django web application that implements Library MIS, which has the features like

1. Add/Delete a book
2. Issue a book to a person
3. Collect a book from a person
4. Search for a title or author

TASK 12 (Django Framework)

Create a Django web application that implements a bus reservation system, where a new bus can be added/removed with a given source and destination. A user should be able to reserve or cancel a seat.

Text Books/ References:

1. Core Python Programming, Wesley J. Chun, Second Edition, Pearson.
2. Allen B. Downey,"Think Python: How to Think Like a Computer Scientist‘‘, 2ndedition, updated for Python 3, Shroff O‘Reilly Publishers, 2016http://greenteapress.com/wp/thinkpython/)
3. Guido van Rossum and Fred L. Drake Jr, ―An Introduction to Python – Revised and updated for Python 3.2, Network Theory Ltd., 2011.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
OPERATING SYSTEMS LAB

Course Code: GR20A2079 **L/T/P/C: 0/0/3/1.5**
II Year II Semester

Course Objectives:

1. Learn different types of CPU scheduling algorithms.
2. Demonstrate the usage of semaphores for solving synchronization problems.
3. Understand Banker's algorithm used for deadlock avoidance.
4. Understand memory management techniques and various page replacement policies.
5. Learn various disk scheduling algorithm sand different file allocation methods.

Course Outcomes:

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

1. Evaluate the performance of different types of CPU scheduling algorithms
2. Implement producer-consumer problem, reader-writers problem, and Dining philosophers' problem using semaphores.
3. Simulate Banker's algorithm for deadlock avoidance
4. Implement paging techniques and page replacement policies, memory allocation techniques in memory management.
5. Implement disk scheduling techniques and file allocation strategies .

TASK 1

Practice the following commands in UNIX environment

a) cp b) rm c) mv d) chmod e) ps f) kill

TASK 2

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

TASK 3

Simulate the following Scheduling algorithms.

a) FCFS b)SJF c)Priority d)Round Robin

TASK 4

Simulate the Producer Consumer problem using semaphores.

TASK 5

Simulate the Readers – Writers problem using semaphores.

TASK 6

Simulate the Dining Philosophers problemusing semaphores

TASK 7

Simulate Bankers Algorithm for Deadlock Avoidance.

TASK 8

Simulate First Fit and Best Fit algorithms for Memory Management.

TASK 9

Simulate paging technique of memory management.

TASK 10
Simulate page replacement Algorithms.
a)FIFO b)LRU

TASK 11
Simulate following Disk Scheduling algorithms.
a)FCFS b)SSTF c)SCAN d)C-SCAN
e)LOOK f)C-LOOK

TASK 12
Simulate file allocation strategies.
a)Sequential b)Indexed c)Linked

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

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
VISUAL PROGRAMMING USING C# AND .NET LAB

Course Code: GR20A2072 **L/T/P/C: 0/0/3/1.5**
II Year II Semester

Course Objectives:
1. To provide hands on experience on .Net framework.
2. To appreciate the asynchronous event handling feature in .Net.
3. To offer end-to-end program model for web application development.
4. To develop applications for the .NET Framework using C#
5. To learn C# debugging techniques

Course Outcomes:
1. Create Event Driven Applications.
2. Develop asynchronous applications
3. Deploy Web services
4. Build database applications using ADO.NET
5. Understand the Language Integrated Query (Linq) library

TASK 1
Write a program to check weather a given number is palindrome using C#

TASK 2
Create a program to implement a concept of Overloading using C#.Net.

TASK 3
Write a program to store the employee details using class and methods in C# .NET

TASK 4
Create a program to implement the concepts of OOPS for creating class, inheritance

TASK 5
Create a Window Form using HTML Controls

TASK 6
Perform String Manipulation with the String Builder and String Classes and C#:
Demonstrates some basic string manipulation using both the String Builder and String classes.

TASK 7
Demonstrate the concept of
a) Creating a Thread
b) Managing a Thread
c) Deleting a Thread

TASK 8
Create a Sample program to Demonstrate Insertion of data intodatabase.

TASK 9
Create a Program to Demonstrate ColorDialog in C#.

TASK 10
Create a program to perform validation using validation controls.

TASK 11
Create a Sample program to Demonstrate creation and usage of Dynamic Link Libraries in C#.

TASK 12
Student Management System application development with required details: Use ADO.NET for storing and manipulating the data. Develop the necessary forms for the better user interface.

Text Books:

1. Professional C# 5.0 and .NET 4.5.1, Christian Nagel, Jay Glynn and Morgan Skinner, John Wiley & Sons Inc.
2. Beginning ASP.net 4.5.1 in C# and VB, Imar Spaanjaars, Wrox Publication, 2014.

References:

1. Microsoft Visual C# Step by Step, John Sharp, O'Reilly Media, Inc., 2013.
2. A Tester's Guide to .NET Programming, Randal Root and Mary Romero Sweeney, Apress

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
ENVIRONMENTAL SCIENCE

Course Code: GR20A2001 **L/T/P/C: 2/0/0/2**
II Year II Semester

Course Objectives:

1. Understanding the importance of ecological balance for sustainable development.
2. Understanding the impacts of developmental activities and mitigation measures.
3. Understanding the environmental policies and regulations
4. Integrate human ecology and science of environmental problems.
5. The effect of human activities on atmospheric pollution

Course Outcomes:

Based on this course, the Engineering graduate will

1. Understand the harmonious co-existence in between nature and human being
2. Recognize various problems related to environment degradation.
3. Develop relevant research questions for environmental investigation.
4. Generate ideas and solutions to solve environmental problems due to soil, air and water pollution.
5. Evaluate and develop technologies based on ecological principles and environmental regulations which in turn helps in sustainable development.

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 resources and resilience, ecosystem value, services and carrying capacity.

UNIT-II

Natural Resources: Classification of Resources: Living and Non-Living resources, natural capital & Resources water resources: use and over utilization of surface and ground water, conflicts over 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. Anthropogenic activities, influence on the occurrence of COVID-19 Pandemic? How environment benefitted due to global lockdown arising out of corona outbreak.

UNIT-V

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

TEXT BOOKS:

1. Environmental Studies by Anubha Kaushik, 4th Edition, New Age International Publishers.
2. Textbook of Environmental Studies for Undergraduate Courses by Erach Bharucha for University Grants Commission.

REFERENCE BOOKS:

1. Text book of Environmental Science and Technology - Dr. M. Anji Reddy 2007, BS Publications..
2. Environmental Science: towards a sustainable future by Richard T. Wright. 2008 PHL Learning Private Ltd. New Delhi.
3. Environmental Engineering and science by Gilbert M. Masters and Wendell P. Ela.2008 PHI Learning Pvt. Ltd.
4. Environmental Science by Daniel B. Botkin & Edward A. Keller, Wiley INDIA edition.
5. Introduction to Environmental Science by Y. Anjaneyulu, BS Publications.
6. Environmental Studies by R. Rajagopalan, Oxford University Press.

III YEAR
I SEMESTER

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

COMPUTER NETWORKS

Course Code: GR20A3043 **L/T/P/C: 3/0/0/3**

III Year I Semester

Pre-requisites:

Students are expected to have knowledge in

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

Course Objectives:

1. Learn various Network topologies and Network models and transmission media.
2. Describe error detection, Flow control mechanisms and Multiple access protocols.
3. Understand different Routing technologies involved to route packets
4. Distinguish the standard Internet Protocol (IP), Transport Control Protocol (TCP) and User Datagram Protocol for Internet.
5. Analyze and understand application layer protocols.

Course Outcomes:

1. Define basic terminologies of Computer Networks and to apply various networking configurations and transmission media to build a network for an organization.
2. Summarize error correction and detection techniques and MAC Protocols for specific networks.
3. Illustrate various routing algorithms and outline their applications.
4. Distinguish TCP and UDP protocols.
5. Make use of various application layer protocols in Internet based 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, and ATM header, Reference model, QoS.

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

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), wireless LANS (IEEE 802.11), Bluetooth (IEEE 802.15), The Network and internetwork devices.

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, QoS in the Internet.

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.
Multi Media: Audio and video compression techniques, streaming audio and video, VOIP.

Teaching Methodologies:

- Power Point Presentations
- Tutorial Sheets
- Assignments

Text Books:

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

References:

1. An Engineering Approach to Computer Networks-S.Keshav, 2nd Edition, Pearson Education.
2. Understanding communications and Networks- 3rd Edition, W.A. Shay, Thomson
3. Computer Networks – Dr.G.S.Bapiraju, 2nd Edition GRIET Publications.

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

Course Code: GR20A3044 **L/T/P/C:3/0/0/3**
III Year I Semester

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

Course Objectives:

1. Understand the basic principles, concepts and applications of data warehousing and data mining.
2. Obtain an idea of designing a data warehouse or data mart to present information needed by end user
3. Acquire knowledge on various data mining functionalities and pre-processing techniques.
4. Implement various data mining algorithms
5. Identify appropriate data mining algorithm for solving practical problems.

Course Outcomes:

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

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, CRISP model.

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 Marts, 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, Market Basket Analysis, Efficient and Scalable Frequent Item set Mining Methods, Mining various kinds of Association Rules, From Association Mining to Correlation Analysis, Constraint-Based Association Mining.

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, Regression techniques, 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.

Teaching Methodologies:

- Power Point Presentations
- Tutorial Sheets
- Assignments

Text Books:

1. Data Mining– Concepts and Techniques - Jiawei Han & Micheline Kamber, 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, Universities Press.
2. Data Warehousing in the Real World, Sam Aanhory and Dennis Murray, Pearson Edn Asia.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
ARTIFICIAL INTELLIGENCE

Course Code: GR20A3046 **L/T/P/C:2/1/0/3**
III Year I Semester

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

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

Course Objectives:

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

Course Outcomes:

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

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.

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, Practice problems.

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.

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.

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: Introduction, Early Image Processing operations- Edge detection, image segmentation. Object recognition, Using vision for manipulation and navigation.

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

Text Books:

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

References:

1. Artificial Intelligence – Riche &K.Night , 2nd edition, TMH.
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 –Ashitava Goshal, oxford.
4. A Textbook of Robotics 1-Basic Concepts-M. Shoham-Springer US.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
DATA SCIENCE WITH R-PROGRAMMING
(PROFESSIONAL ELECTIVE – I)

Course Code: GR20A3061 **L/T/P/C: 3/0/0/3**
III Year I Semester

Course Objectives

1. Understand the basics concepts and working environment of R
2. Learn basic and descriptive statistical analysis techniques using R
3. Outline the Data Science terminology and describe the Data Science process
4. Discuss Data analysis techniques and model evaluation using R
5. Know R Advance features to solve complex problems

Course Outcomes:

1. Use R environment, data structures, functions, to solve statistical problems
2. Analyse basic and descriptive statistical analysis methods using R
3. Apply data collection , preparation, visualization and feature engineering with R
4. Summarize data analysis and machine learning techniques with R
5. Implement R advanced features for real time business case studies

UNIT I

Introduction to R - R Windows Environment, R-Data types, R-Data Structures, R Functions and loops, Reading Datasets, Working with different file types, R packages. Introduction to statistical learning and R-Programming, Overview of CRAN.

UNIT II

Descriptive Statistics- Measures of central tendency, Measures of location of dispersions, Practice and analysis with R.

Basic Statistical Analysis - Statistical hypothesis generation and testing, Chi-Square test, t-Test, Analysis of variance, Correlation analysis, Maximum likelihood test, Practice and analysis with R.

UNIT III

Introduction to Data Science: Data Science Terminology, Data Science Process, Data Science Project Roles.

Data Collection and Management: Introduction, Sources of data, Data collection and APIs, Exploring and fixing data, Data storage and management, Using multiple data sources.

Data Preparation, Feature Engineering, Data Visualization in R.

UNIT IV

Data Analysis techniques - Exploratory data analysis, Association rules analysis, Regression analysis, Classification techniques, Clustering, Practice and analysis with R

Model Evaluation - Machine Learning concepts, types of machine learning, Machine learning with R.

UNIT V

Advanced R Programming – Data Models, PCA, LDA, Exploratory fact Analysis, NN Modeling with R.

Business Case studies and projects -Understanding business scenarios, scalable and parallel computing with Hadoop and Map-Reduce, Sensitivity Analysis.

Text Books:

1. Probability & Statistics for Engineers & Scientists (9th Edn.), Ronald E. Walpole, Raymond H. Myers, Sharon L. Myers and Keying Ye, Prentice Hall Inc.
2. The Elements of Statistical Learning, Data Mining, Inference, and Prediction (2nd Edn.), Trevor Hastie Robert Tibshirani Jerome Friedman, Springer, 2014
3. An Introduction to Statistical Learning: with Applications in R, G James, D. Witten, T Hastie, and R. Tibshirani, Springer, 2013
4. Software for Data Analysis: Programming with R (Statistics and Computing), John M. Chambers, Springer
5. Beginning R: The Statistical Programming Language, Mark Gardener, Wiley, 2013

Reference Books:

1. Advances in Complex Data Modeling and Computational Methods in Statistics, Anna Maria Paganoni and Piercesare Secchi, Springer, 2013
2. Data Mining and Analysis, Mohammed J. Zaki, Wagner Meira, Cambridge, 2012
3. Hadoop: The Definitive Guide (2nd Edn.) by Tom White, O'Reilly, 2014
4. MapReduce Design Patterns: Building Effective Algorithms and Analytics for Hadoop and Other Systems, Donald Miner, Adam Shook, O'Reilly, 2014

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

Course Code: GR20A3047 **L/T/P/C: 3/0/0/3**
III Year I Semester

Course Objectives:

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

Course Outcomes:

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

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, Pearson Education.
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/Pearson Education

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
WEB TECHNOLOGIES
(PROFESSIONAL ELECTIVE – I)

Course Code: GR20A3062 **L/T/P/C: 3/0/0/3**
III Year I Semester

Prerequisites:

1. Basic Programming knowledge
2. Basics of Java Programming and MYSQL

Course Objectives:

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

Course Outcomes:

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 Angular JS
3. Understand Core technologies of modern Java web programming like servlets and JSP
4. Create web application using JSP
5. Write JSP code without scriptlets tag and access the database.

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, Angular JS, 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 2ndedition,WILEY Dreamtech
2. Learning AngularJS: A Guide to AngularJS Development, Ken Williamson, O'Reilly
3. The complete Reference Java2 Fifth Edition by Patrick Naughton and HerbertSchildt.TMH.
4. Java Server Pages –Hans Bergsten, SPDO'Reilly

References:

1. Programming world wide web - Sebesta, Pearson
2. Core Servlets And Java server Pages Volume 1: Core Technologies By Marty Hall And LarryBrown pearson
3. Internet and World Wide Web – How to program by Dietel and Nieto PHI/Pearson Education, Asia.
4. Jakarta Struts Cookbook, Bill Siggelkow, SPDO'Reillyforchap8.
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 wideweb- Sebesta, Pearson
9. Web Warrior Guide to Web Programmming -Bai/Ekedaw- Thomas
10. Beginning Web Programming-JonDuckett, WROX.
11. Java Server Pages, Pekowsky, Pearson

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
FORMAL LANGUAGE AND AUTOMATA THEORY
(PROFESSIONAL ELECTIVE – I)

Course Code: GR20A3117 **L/T/P/C: 3/0/0/3**
III Year I Semester

Prerequisites:
Students are expected to have knowledge in

- Mathematical Foundation and Computer Science
- Data Structures

Course Objectives:

1. Understand mathematical models finite automata.
2. Explain Regular Expressions and Finite Automata Conversions.
3. Understand Grammars for Regular and Context Free Languages.
4. Learn Context Free Grammar Normal Forms and Push Down Automata.
5. Explain Computational theory and models.

Course Outcomes:

1. Design Finite Automata models.
2. Construct Regular Expressions and equivalent automata models.
3. Formulate Grammars for Formal languages.
4. Represent Normal Forms and Push Down Automata.
5. Experiment with Computational models.

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 language recognizers.
Finite Automata: NFA with ϵ transitions - significance, acceptance of languages.
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 Mealy machines.

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, Context free grammar, derivation trees, sentential forms, Right most and leftmost derivation of strings.

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 and DPDA.

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, Decidability of problems, Universal Turing Machine, un decidability of posts correspondence problem.

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 edition, Thomson.

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

INTERNET OF THINGS

(OPEN ELECTIVE -I)

Course Code: GR20A3063 **L/T/P/C: 3/0/0/3**

III Year I Semester

Course objectives

1. Understand the basic characteristics of IoT system
2. Realize the different IoT Protocols and architectures
3. Analyze the cloud interface and security concerns of IoT devices
4. Introduce programming in various real-time hardware platforms
5. Design a complete IoT ecosystem for various smart applications

Course outcomes

1. Ability to learn characteristics, applications, components and challenges of Internet of Things (IOT)
2. Create understanding of IOT networking concepts – terminologies, stack components , infrastructure and data protocols
3. Create understanding of the concept of Cloud based IOT technologies, cloud service providers and security aspects
4. Develop skills in understanding and programming the Arduino and Raspberry Pi hardware platforms
5. Make the student understand the requirements, components ,challenges and develop various application areas - smart homes, smart grids, smart health care, smart cities and industrial IOT

UNIT I

Introduction to IOT: Characteristics of IOT, Applications of IOT, IOT Categories, IOT Enablers and Connectivity Layers, Sensors, Actuators, IOT Components & Implementation, Challenges for IOT

UNIT II

IOT Networking & Connectivity Technologies: Connectivity terminologies-IOT Node, LAN,WAN, Gateway, IOT protocol Stack vs. Web Stack, IOT Identification and Data Protocols-IPV4,IPV6,HTTP,MQTT,COAP,AMQP,DDS Connectivity Technologies – Zigbee, Bluetooth, LoRa

UNIT III

Cloud for IOT: IOT with Cloud-Challenges, Cloud service providers for IOT-Overview, Cloud service model, Cloud Computing – Security aspects, Case Study, Fog computing, Edge computing

UNIT IV

Hardware Platforms: Programming with Arduino-Features of Arduino, Components of Arduino Board, Arduino IDE, Program Elements, Raspberry Pi – Introduction, Architecture, PIN Configuration, Implementation of IOT with Raspberry Pi

UNIT V

IOT Applications : Smart Homes-Smart Home Origin, Technologies, Implementation, Smart Grids-Characteristics, Benefits, Architecture, Components, Smart Cities-Characteristics, Frameworks, Challenges, Industrial IOT-Requirements, Design Considerations, Applications

Text Books:

1. Internet of Things, Jeeva Jose, Khanna Publishing, 2018
2. Internet of Things, Abhishek S Nagarajan, RMD Sundaram, Shriram K Vasudevan, Wiley, 2019

Reference Books:

1. The Internet of Things, Michael Miller, Pearson Education Limited, 2015
2. IoT Applications, Security Threats, and Countermeasures, Padmalaya Nayak, Niranjan Ray, P. Ravichandran,Taylor &Francis,2021
3. Internet of Things: Architecture, Implementation and Security, MayurRamgir, Pearson Education Limited, 2019
4. IOT Fundamentals: Networking Technologies, Protocols and Use Cases for IOT, Rowan Trollope, David Hanes, Patrick Gassetete, Jerome Henry,Pearson Education Limted, 2017
5. Beginning LoRa Radio Networks with Arduino, Pradeeka Seneviratne, Apress, 2019

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

Course Code: GR20A3044 **L/T/P/C:0/0/3/1.5**
III Year I Semester

Course Objectives:

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

Course Outcomes:

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 the data.
3. Apply pre-processing statistical methods for any given raw data.
4. Extract knowledge and implementation of various data mining techniques.
5. Implement data mining algorithms in real time problem solving using weka tool.

Implement the following Tasks using Weka Tool:
(Solve the tasks 1 to 6 by 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 after training.

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-validation results.

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

TASK 11

(a) Create a data set customer.arff with required fields.
(b) Write a procedure for Clustering Customer data using Simple K-Means Algorithm.

TASK 12

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

Text Books:

1. Data Mining– Concepts and Techniques - Jiawei Han &Micheline Kamber, 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, Universities Press.
2. Data Warehousing in the Real World, Sam Aanhory and Dennis Murray, Pearson EdnAsia.
3. www.data.gov.in repository

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
WEB TECHNOLOGIES LAB

Course Code: GR20A3052 **L/T/P/C:0/0/3/1.5**
III Year I Semester

Prerequisite:

- Basic Programming knowledge
- Basics of Java Programming and MYSQL,

Course Objectives:

1. Design syntactically correct web pages using HTML and Java Scripting
2. Build XML applications with DTD and schema that span mutiple domains
3. Develop single page applications using Angular JS
4. Differentiate server side programming for sessions and learn the concept to implement using cookies and url rewriting
5. Develop skills in students in developing applications using concepts like JDBC, Servlets, JSP and Java Beans

Course Outcomes:

1. Develop interactive web sites through the DOM API and to change the CSS styles through javascript
2. Build single-page web applications using Angular JS
3. Implement core technologies of modern Java web programming like servlets and JSP
4. Create web application using JSP
5. Develop JSP code without scriplets tag and access the database.

TASK 1

A. Create a HTML page of your present class timetable.

B. Write JavaScript code to change the HTML contents and attributes.

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 2

VALIDATION:

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

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

TASK 3

Design a web page using CSS (Cascading Style Sheets) which includes the following:
1)Use different font, styles:
In the style definition you define how each selector should work (font, color etc.). Then, in the body of your pages, you refer to these selectors to activate the styles.
2) Set a background image for both the page and single elements on the page.
3) Work with layers in CSS.

TASK 4

Write an XML file which will display the Book information which includes the following:
1) Title of the book
2) Author Name
3) ISBN number
4) Publisher name
5) Edition
6) Price
Write a Document Type Definition (DTD) to validate the above XML file.
Display the XML file as follows.
The contents should be displayed in a table. The header of the table should be in color GREY. And the Author names column should be displayed in one color and should be capitalized and in bold. Use your own colors for remaining columns.
Use XML schemas XSL and CSS for the above purpose.
Note: Give at least for 4 books. It should be valid syntactically

TASK 5

A. Consider an XML for library. Create XSLT for library XML to display the values in tabular format
B. Create a Single page Application(SPA) where navigation between the pages is performed without refreshing the whole page using angularJS

TASK 6

VISUAL BEANS:
Create a simple visual bean with a area filled with a color.
The shape of the area depends on the property shape. If it is set to true then the shape of the area is Square
and it is Circle, if it is false.
The color of the area should be changed dynamically for every mouse click. The color should also be changed if we change the color in the “property window “.

TASK 7

1) Install TOMCAT web server and APACHE.
While installation assign port number 4040 to TOMCAT and 8080 to APACHE. Make sure that these ports are available i.e., no other process is using this port.
2) Access the above developed static web pages for books web site, using these servers by putting the web pages developed in week-1 and week-2 in the document root.
Access the pages by using the urls : http://localhost:4040/rama/books.html (for tomcat)

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

TASK 8

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

1. Create a Cookie and add these four user id's and passwords to this Cookie.
2. Read the user id and passwords entered in the Login form (week1) and authenticate with the values (user id and passwords) available in the cookies.

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

Use init-parameters to do this. Store the user-names and passwords in the 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

Install a database (Mysql or Oracle). Create a table which should contain at least the following fields: name, password, email-id, phone number (these should hold the data from the registration form). Practice 'JDBC' connectivity.

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

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

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 10) 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 10) in a table with Name, Email and Phone number using JSTL SQL Tags.(Display Page)

REFERENCE BOOKS:

1. Programming world wide web-Sebesta, Pearson
2. Core Servlets And Javaserver Pages Volume 1: Core Technologies By Marty Hall and Larry Brown Pearson
3. Internet and World Wide Web – How to program by Dietel and Nieto PHI/Pearson Education
Asia.
4. Jakarta Struts Cookbook, Bill Siggelkow, SPDO'Reilly for chap8.
5. Murach's Beginning JAVA JDK5, Murach, SPD

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
R-PROGRAMMING LAB

Course Code: GR20A3064 **L/T/P/C:0/0/4/2**
III Year I Semester

Prerequisites:

1. Basic knowledge in statistics and programming skills

Course Objectives:

1. Summarize the fundamental concepts and analyze the syntax of Vectors and Arrays in R programming.
2. Explore various control flow statements for problem solving.
3. Construct R programs for implementation of various built-in statistical functions and plots.
4. Identify statistical functions that apply hypotheses and translate data into actionable predictions using R.
5. Demonstrate the results and effectively communicate the findings using visualization techniques.

Course Outcomes:

1. Work efficiently in R interactive environment and list arrays, vectors and other concepts
2. Develop and evaluate loop constructs available in R
3. Design logic for arithmetic operations and functions in R
4. Evaluate effectively the descriptive and predictive statistical methods using R.
5. Summarize different kinds of visualization techniques for plotting graphs.

TASK 1

Write a R program to create an array of two 3x3 matrices (each with 3 rows and 3 columns) from two given two vectors of any length. And display
(a) the second row of the second matrix of the array
(b) the element in the 3rd row and 3rd column of the 1st matrix.

TASK 2

(a) Find sum, mean and product of given vector values.
(b) Write R program to find the given number is prime or not.

TASK 3

(a) Write R program for implementation of built-in functions.
(b) Write R program to find the factors of a given number using functions.

TASK 4

(a) Write R program to generate Fibonacci series using recursive function.
(b) Write R program to find the sum of natural numbers using recursive function.

TASK 5

Write a R program to create a list of random numbers in normal distribution and count the occurrences of each value.

TASK 6

(a) Write a R program for addition of two matrices.
(b) Write a R program for multiplication of two matrices.

TASK 7

Write a R program to create a data frame from four given vectors of students details. (Name, roll.no., sub_name, marks)

TASK 8

Write a R program to create a Data Frame which contain details of 5 employees and display summary of the data.

TASK 9

Write a R programto read the .csv file and perform the following.
(a) Summary statistics on the data (b) Remove outliers from the data

TASK 10

Write a R programto read the .csv file and perform the following.
(a) Plot the data using using ggplot (b) Test a hypothesis about the data

TASK 11

(a) Use the R -Studio environment to code OLS models
(b) Review the methodology to validate the model and predict the dependent variable for a set of given independent variables
(c) Use R graphics functions to visualize the results generated with the model

Task 12

(a) Use R -Studio environment to code Logistic Regression models
(b) Review the methodology to validate the model and predict the dependent variable for a set of given independent variables.
(c) Use R graphics functions to visualize the results generated with the regression model

Text Books

1. Efficient R Programming, A practical guide to smarter programming, Colin Gillespie, Robin Lovelace;
Publisher: O'Reilly Media, 1 edition.
2. The Art of R Programming: A Tour of Statistical Software Design, by Norman Matlof, 1st Edition.
3. Hands-On Programming with R: Write Your Own Functions and Simulations 1st Edition, by Garrett
Grolemund (Author), Hadley Wickham (Foreword), Kindle Edition.

Reference Books

1. R Commands - Quick Reference
2. Surviving LINUX - Quick Reference

III YEAR
II SEMESTER

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
MACHINE LEARNING

Course Code: GR20A3123 **L/T/P/C: 2/1/0/3**
III Year II Semester

Prerequisites:

1. Mastery of introduction-level algebra , statistics and probability theory
2. Data Modeling and Evaluation

Course Objectives:

1. Recognize the basic terminology and fundamental concepts of machine learning.
2. Understand the concepts of Supervised Learning models with a focus on recent advancements.
3. Relate the Concepts of Neural Networks Models of supervised Learning
4. Discover Unsupervised learning paradigms of machine learning
5. Understand the concepts of Reinforcement learning and Ensemble methods

Course Outcomes:

1. Explain the concepts and able to prepare the dataset for different Machine learning models.
2. Identify and Apply appropriate Supervised Learning models.
3. Design Neural Network models for the given data.
4. Perform Evaluation of Machine Learning algorithms and Model Selection.
5. Devise un-supervised and Reinforcement learning models.

UNIT-I:
Introduction: Introduction to Machine learning, Supervised learning, Unsupervised learning, Reinforcement learning, Deep learning.
Feature Selection: Filter, Wrapper, Embedded methods.
Feature Normalization:- min-max normalization, z-score normalization, and constant factor normalization
Introduction to Dimensionality Reduction: Principal Component Analysis(PCA), Linear Discriminant Analysis(LDA)

UNIT-II:
Supervised Learning – I (Regression/Classification)
Regression models: Simple Linear Regression, multiple linear Regression. Cost Function, Gradient Descent, Performance Metrics: Mean Absolute Error(MAE),Mean Squared Error(MSE)
R-Squared error, Adjusted R Square.
Classification models: Decision Trees-ID3,CART, Naive Bayes, K-Nearest-Neighbours (KNN), Logistic Regression, Multinomial Logistic Regression
Support Vector Machines (SVM) - Nonlinearity and Kernel Methods

UNIT-III:
Supervised Learning – II (Neural Networks)
Neural Network Representation – Problems – Perceptrons, Activation Functions, Artificial Neural Networks (ANN) , Back Propagation Algorithm.

Convolutional Neural Networks - Convolution and Pooling layers, , Recurrent Neural Networks (RNN).
Classification Metrics: Confusion matrix, Precision, Recall, Accuracy, F-Score, ROC curves

UNIT-IV:
Model Validation in Classification : Cross Validation - Holdout Method, K-Fold, Stratified K-Fold, Leave-One-Out Cross Validation.
Bias-Variance tradeoff, Regularization, Overfitting, Underfitting.
Ensemble Methods: Boosting, Bagging, Random Forest.

UNIT-V:
Unsupervised Learning : Clustering-K-means, K-Modes, K-Prototypes, Gaussian Mixture Models, Expectation-Maximization.
Reinforcement Learning: Exploration and exploitation trade-offs, non-associative learning, Markov decision processes, Q-learning.

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. Data Mining–Concepts and Techniques -Jiawei Han and MichelineKamber,Morgan Kaufmann

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
BIG DATA ANALYTICS

Course Code: GR20A3131 **L/T/P/C: 3/0/0/3**
III Year II Semester

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:
1. Describe Big Data and its use cases from selected business domains.
2. Provide an overview of HDFS Architecture and its daemon services.
3. Perform Map Reduce analytics with YARN using Hadoop.
4. Understand the working of data ingestion tools and PIG Latin.
5. Use Hadoop related tools such as Hive and HBase for big data analytics.

Course Outcomes:
1. Understand the concepts of Big Data and navigation of the Hadoop Ecosystem.
2. Illustrate the HDFS Architecture and the coordination service of Hadoop.
3. Implement distributed processing Map Reduce Paradigm with YARN.
4. Analyze importing and exporting data from Hadoop using Sqoop, Flume and working with PIG.
5. Examine the data stores - Hive and HBase on Hadoop.

UNIT I
Introduction to Big Data and Hadoop:
Challenges of Traditional Decision Making, Solution with Big Data Analytics, Classification of Digital Data, Definition of Big Data, Characteristics of Big Data, Definition of Big Data Analytics, Features of Hadoop, History of Hadoop, RDBMS Vs. Hadoop, Hadoop Distributors, Ecosystems of Hadoop.

UNIT II
HDFS and Zoo Keeper:
HDFS: Concepts – Blocks, HDFS Components, Block Caching, Characteristics of HDFS, HDFS High Availability Architecture and its types, HDFS Command Line, Data Flow – Anatomy of File read and File write operations.
Zoo Keeper: Characteristics of Zoo Keeper, Zoo keeper Services, Zoo keeper Data Model.

UNIT III
Map Reduce and YARN
YARN: Elements of YARN Architecture, Map Reduce: Characteristics of Map Reduce, Phases of Map Reduce with an Example, Anatomy of MR Job Run with YARN, Handling Failures, Task Execution, Map Reduce Input and Output Formats, Shuffle and Sort, Built - in Counters of MR, Joins in MR

UNIT IV

Data Ingestion Tools and PIG

Data Ingestion Tools: Data Ingestion, Big Data Ingestion Tools, SQOOP - Benefits of SQOOP, SQOOP Connectors, Importing and Exporting to and from Hadoop using SQOOP, Limitations of SQOOP, FLUME – Apache Flume, Data Sources for FLUME, Components of FLUME Architecture.

PIG: Introduction to PIG, Components of PIG, Data Types in PIG – Simple and Complex, PIG Execution Modes, PIG Interactive Modes, Comparison of PIG with databases, Data Processing Operators.

UNIT V

HIVE and HBASE

HIVE: Features of HIVE, HIVE Architecture, HIVE Meta store, Data types in HIVE, HIVEQL, Tables, File Format Types – Text, Sequence, AVRO, Parquet, Querying Data.

HBASE: NOSQL Database, Types of NOSQL Database, Characteristics of HBASE, Architecture, HBase Vs RDBMS, HBASE Shell Commands.

Text Books:

1. Tom White “Hadoop: The Definitive Guide” 4thedition, O’reily Media, 2012.
2. Seema Acharya, Subhasini Chellappan, "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. Anand Rajaraman 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. Arvind Sathi, “Big Data Analytics: 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 ENGINEERING

Course Code: GR20A3054 **L/T/P/C: 3/0/0/3**
III Year II Semester

Prerequisites:

1. Basic knowledge of programming language
2. Idea about Data base systems
3. Design of flow charts

Course Objectives:

1. Identification and analysis of different Life cycle phases
2. Prepare Good SRS for a Software project.
3. Estimation of a Software Project
4. Understand the process of Design engineering.
5. Develop and Apply different testing techniques.

Course Outcomes:

1. Understand business requirements and choose a relevant Process model for a given software proposal
2. Analyze the requirements to prepare SRS
3. Estimate the Cost and Schedules of a Software Project.
4. Model various Functional and Object-Oriented design for a s/w project.
5. Develop various functional and structural test cases for a software module

UNIT I
The Software Problem and Process
Software development Process Models: Waterfall, Prototype, Iterative Development, Rational Unified Process, Time boxing Model, Extreme Programming and Agile Process, Unified Process Models, Software Management Process.

UNIT II
Software Requirement Analysis and Specification
Value of good SRS, Requirements Specification, and Functional specification with Use cases, other approaches for analysis, Data flow diagrams, Entity relationship Diagrams, Validation.

UNIT III
Planning a Software Project
Effort Estimation, Project Scheduling and Staffing, Quality Planning, Risk Management Planning, Project Monitoring Plan, Detailed Scheduling.

UNIT IV

Design

Design Concepts: Cohesion, Coupling, Functional oriented design: Structured chart, Structured design methodologies, Examples, Object Oriented Design: OO concepts, UML, Design Methodology, Examples, Detailed design: Logic/Algorithm Design, State Modeling of Classes, Verification, Metrics: Metrics for Object Oriented Design, Metrics for Functional Oriented Design

UNIT V

Software testing strategies:

A strategic approach to software testing, strategic issues, test strategies for conventional software, validation testing, system testing.

TEXTBOOKS

Software Engineering a precise approach by Pankaj Jalote, Wiley Publications.

REFERENCE BOOKS

1 Software Engineering, A practitioner's Approach- Roger S. Pressman, 6th edition. McGrawHill International Edition.
2 Software Engineering- Sommerville, 7th edition, Pearson Education.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
DATA VISUALIZATION
(PROFESSIONAL ELECTIVE II)

Course Code: GR20A3065 **L/T/P/C: 3/0/0/3**
III Year II Semester

Course Objectives:

1. Understand the visualization process and visual representations of data.
2. Learn visualization techniques for various types of data.
3. Explore the visualization techniques for graphs, trees, Networks.
4. Understand the visualization of maps, GIS and collaborative visualizations.
5. Discuss the recent trends in perception and visualization techniques.

Course Outcomes:

1. Apply the visualization process for creating visual representations.
2. Classify visualization techniques for different types of data.
3. Analyze visualization methods for graphs, trees, Networks.
4. Apply visualization techniques for GIS , maps and use collaborative visualization.
5. Summarize the recent trends in visualization techniques and their applications for real world problems.

UNIT I

Introduction to Visualization, Visualization process, visual representation of data, Gestalt principles, information overloads. Creating visual representations, visualization reference model, visual mapping, visual analytics, Design of visualization applications.

UNIT II

Introduction to Tableau, Tableau Architecture, Tableau Server Architecture VizQL, Introduction to Tableau Prep, Tableau Prep Builder User Interface, Data Preparation techniques using Tableau Prep Builder tool, Features of Tableau Desktop Connect to data from File and Database, Types of Connections, Joins and Unions, Data Blending, Tableau Desktop User Interface.

UNIT III

Classification of visualization systems, Interaction and visualization techniques misleading, Visualization of one, two and multi-dimensional data, text and text documents.
Visualization of groups, trees, graphs, clusters, networks, software, Metaphorical visualization.

UNIT IV

Visualization of volumetric data, vector fields, processes and simulations, Visualization of maps, geographic information, GIS systems, collaborative visualizations, Evaluating visualizations.

UNIT V

Recent trends in various perception techniques, various visualization techniques, data structures used in data visualization.

Text Books:

1. Matthew Ward Georges Grinstein Daniel Keim , Interactive Data Visualization: Foundations, Techniques, and Applications. A K Peters, Ltd. Natick.
2. E. Tufte, The Visual Display of Quantitative Information, Graphics Press.
3. Joshua N. Milligan, Learning Tableau 2019 Tools for Business Intelligence, data prep, and visual analytics, Third edition.

Reference Books:

1. Data Visualization: A Handbook for Data Drive by AndyKirk
2. Hand book of data visualization ,chun-houh chen,wolfgang hardle,Antonyunwin

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

Course Code: GR20A3118 **L/T/P/C: 3/0/0/3**
III Year II Semester

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

Course Objectives:
1. Understand the current trend and basics of cloud computing.
2. Learn cloud services from different providers.
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 on cloud.

Course Outcomes:
1. Understand the features, advantages and challenges of cloud computing, compare their operation ,implementation and performance
2. Understand, Analyze and compare different types of clouds and cloud services.
3. Understanding and validating the financial and technological implications in selecting cloud computing paradigm for an organization.
4. Understand and Analyze the security challenges and risks involved in the cloud.
5. Create/Deploying of an application in cloud.

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
DISTRIBUTED DATABASES
(PROFESSIONAL ELECTIVE II)

Course Code: GR20A3132 **L/T/P/C: 3/0/0/3**
III Year II Semester

Prerequisites

- A course on "Database Management Systems"

Course Objectives

1. To acquire knowledge on parallel and distributed databases and its applications.
2. To study the usage and applications of Object Oriented databases.
3. To learn the modeling and design of databases
4. To acquire knowledge on parallel and distributed databases and its applications.
5. Equip students with principles and knowledge of parallel and object oriented databases.

Course Outcomes

1. Understand theoretical and practical aspects of distributed database systems.
2. Study and identify various issues related to the development of distributed database system.
3. Understand the design aspects of object oriented database system and related development.
4. Demonstrate parallel and distributed databases applications
5. Design various models in parallel and distributed databases.

UNIT I

Features of Distributed versus Centralized Databases, Principles of Distributed Databases, Levels Of Distribution Transparency, Reference Architecture for Distributed Databases, Types of Data Fragmentation, Integrity Constraints in Distributed Databases, Distributed Database Design.

UNIT II

Translation of Global Queries to Fragment Queries, Equivalence transformations for Queries, Transforming Global Queries into Fragment Queries, Distributed Grouping and Aggregate Function Evaluation, Parametric Queries.
Optimization of Access Strategies, A Framework for Query Optimization, Join Queries, General Queries.

UNIT III

The Management of Distributed Transactions, A Framework for Transaction Management, Supporting Atomicity of Distributed Transactions, Concurrency Control for Distributed Transactions, Architectural Aspects of Distributed Transactions Concurrency Control, Foundation of Distributed Concurrency Control, Distributed Deadlocks, Concurrency Control based on Timestamps, Optimistic Methods for Distributed Concurrency Control.

UNIT IV

Reliability, Basic Concepts, Nonblocking Commitment Protocols, Reliability and concurrency Control, Determining a Consistent View of the Network, Detection and Resolution of Inconsistency, Checkpoints and Cold Restart, Distributed Database Administration, Catalog Management in Distributed Databases, Authorization and Protection

UNIT V

Architectural Issues, Alternative Client/Server Architectures, Cache Consistency, Object Management, Object Identifier Management, Pointer Swizzling, Object Migration, Distributed Object Storage, Object Query Processing, Object Query Processor Architectures, Query Processing Issues, Query Execution, Transaction Management, Transaction Management in Object DBMSs, Transactions as Objects DatabaseIntegration,SchemeTranslation,SchemeIntegration,QueryProcessingQueryProcessing Layers in Distributed Multi-DBMSs, Query Optimization Issues Transaction Management Transaction and Computation Model, Multidatabase Concurrency Control, Multidatabase Recovery, Object Orientation and Interoperability, Object Management Architecture CORBA and Database interoperability, Distributed Component Object Model, COM/OLE and Database Interoperability, PUSH-Based Technologies.

Text Books

1. Distributed Databases Principles &Systems, Stefano Ceri, Giuseppe Pelagatti,TMH.
2. Principles of Distributed Database Systems, M. Tamer Ozsu, Patrick Valduriez , Pearson Education, 2ndEdition.

Reference

1. Distributed Database Systems, Chanda Ray, Pearson.
2. Distributed Database Management Systems, S.K.Rahimiand Frank.S.Haug, Wiley.

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

Course Code: GR20A3130 **L/T/P/C: 3/0/0/3**
III Year II Semester

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

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

Course Outcomes:
1. Design and motivate software architecture for large scale software systems
2. Recognize major software architectural styles, design patterns, and frameworks
3. Describe a software architecture using various documentation approaches and architectural description languages
4. Generate architectural alternatives for a problem and select among them
5. Use well-understood paradigms for designing new system

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 Skeletal System.
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, Pearson Publication.
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
AUGMENTED REALITY AND VIRTUAL REALITY
(Open Elective –II)

Course Code: GR20A3067 **L/T/P/C: 3/0/0/3**
III Year II Semester

Course Objectives

1. To acquire the knowledge on augmented reality
2. To demonstrate the augmented reality devices.
3. To acquire the knowledge on virtual reality.
4. To illustrate the VR devices.
5. To explain how to apply VR/AR for various applications.

Course outcomes

1. To summarize about augmented reality.
2. To choose AR devices for various applications.
3. To summarize about augmented reality.
4. To experiment with VR devices.
5. To apply AR & VR technology in various domains.

UNIT I
What Is Augmented Reality?, Where Did Augmented Reality Come From?, Augmented Reality, The Relationship Between Augmented Reality and Other Technologies, Augmented Reality Concepts, How Does Augmented Reality Work?, Ingredients of an Augmented Reality Experience.

UNIT II
Augmented Reality Hardware, Major Hardware Components for Augmented Reality Systems, Augmented Reality Software, Major Software Components for Augmented Reality Systems, Software used to Create Content for the Augmented Reality Application.

UNIT III
Virtual Reality: The Three I's of Virtual Reality, A Short History of Early Virtual Reality, Early Commercial VR Technology , VR Becomes an Industry, The Five Classic Components of a VR System.
Input Devices: Trackers, Navigation, and Gesture Interfaces: Three-Dimensional Position Trackers, Navigation and Manipulation Interfaces

UNIT IV
Output Devices: Graphics, Three-Dimensional Sound, and Haptic Displays : Graphics Displays, Sound Displays, Haptic Feedback.
Human Factors in VR**:** Methodology and Terminology, User Performance Studies, VR Health and Safety Issues, VR and Society

UNIT V

Augmented Reality Applications, What Makes a Good Augmented Reality Application?, Application Areas, Magic Books, Magic Windows and Doors, Applying Augmented Reality to a Problem, Evaluating Augmented Reality Applications, VR Applications in Manufacturing, Applications of VR in Robotics.

Text Books

1. Alan B. Craig, Understanding Augmented Reality, Concepts and Applications, Morgan Kaufmann, 2013.
2. Burdea, G. C. and P. Coffet. Virtual Reality Technology, Second Edition. Wiley-IEEE Press, 2003/2006.

References

1. LaValle " Virtual Reality", Cambridge University Press, 2016.
2. Alan B Craig, William R Sherman and Jeffrey D Will, “Developing Virtual Reality Applications: Foundations of Effective Design”, Morgan Kaufmann, 2009.
3. John Vince, “Virtual Reality Systems “, Pearson Education Asia, 2007.
4. Anand R., “Augmented and Virtual Reality”, Khanna Publishing House, Delhi.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
MACHINE LEARNING LAB

Course Code: GR20A3122 **L/T/P/C: 0/0/3/1.5**
III Year II Semester

Prerequisites:

1. Mastery of introduction-level algebra , statistics and probability theory
2. Proficiency in programming basics, and some experience coding in Python or R-Tool

Course Objectives:

1. Learn usage of Libraries for Machine Learning in Python
2. Demonstrate Dimensionality reduction methods
3. Describe appropriate supervised learning algorithms for a given problem.
4. Explore back propagation algorithm and ensemble methods
5. Discuss different unsupervised learning algorithms

Course Outcomes:

1. Illustrate the applications of Python Machine Learning Libraries.
2. Apply Dimensionality reduction methods for Machine Learning Tasks.
3. Design and analyze various supervised learning mechanisms.
4. Develop back propagation algorithm and Random Forest Ensemble method.
5. Design and analyze various unsupervised learning algorithms.

Note: Implement the following Machine Learning Tasks using Python /R-Tool

TASK 1

Write a python program to import and export data using Pandas library functions.

TASK 2

Demonstrate various data preprocessing techniques for a given dataset.

TASK 3

Implement Dimensionality reduction using Principle Component Analysis (PCA) method.

TASK 4

Write a Python program to demonstrate various Data Visualization Techniques.

TASK 5

Implement Simple and Multiple Linear Regression Models.

TASK 6

Develop Logistic Regression Model for a given dataset.

TASK 7

Develop Decision Tree Classification model for a given dataset and use it to classify
a new sample.

TASK 8

Implement Naïve Bayes Classification in Python

TASK 9

Build KNN Classification model for a given dataset.

TASK 10

Build Artificial Neural Network model with back propagation on a given dataset.

TASK 11

a) Implement Random forest ensemble method on a given dataset.
b) Implement Boosting ensemble method on a given dataset.

TASK 12

Write a python program to implement K-Means clustering Algorithm.

Reference Books:

1. Python Machine Learning by Sebastian Raschka, Oreilly Publishers
2. Machine Learning – Tom M. Mitchell, -MGH
3. Christopher Bishop, Pattern Recognition and Machine Learning, Springer.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
BIG DATA ANALYTICS LAB

Course Code: GR20A3133 **L/T/P/C: 0/0/3/1.5**
III Year II Semester

Course Objectives:

1. Provide the knowledge to setup a Hadoop Cluster.
2. Impart knowledge to develop programs using MapReduce.
3. Discuss Pig, PigLatin and HiveQL to process big data.
4. Present latest big data frameworks and applications using Spark
5. Integrate Hadoop with R (RHadoop) to process and visualize.

Course Outcomes:

1. Understand Hadoop working environment.
2. Apply Map Reduce programs for real world problems.
3. Implement scripts using Pig to solve real world problems.
4. Analyze queries using Hive to analyze the datasets
5. Understand spark working environment and integration with R

TASK 1
a) Understanding and using basic HDFS commands
b) Run a basic word count Map Reduce program to understand Map Reduce Paradigm

TASK 2
Write a Map Reduce program that mines weather data

TASK 3
Implement matrix multiplication with Hadoop Map Reduce.

TASK 4
Working with files in Hadoop file system: Reading, Writing andCopying

TASK 5
Write Pig Latin scripts sort, group, join, project, and filter your data.

TASK 6
Run the Pig Latin Scripts to find Word Count and max temp for each and every year.

TASK 7
Writing User Defined Functions/Eval functions for filtering unwanted data in Pig

TASK 8
Working with Hive QL, Use Hive to create, alter, and drop databases, tables, views, functions and indexes

TASK 9
Writing User Defined Functions in Hive

TASK 10
Understanding the processing of large dataset on Spark framework.

TASK 11
Ingesting structured and unstructured data using sqoop and flume.

TASK 12
Integrating Hadoop with other data analytic framework like R

Text Books
1. Tom White, "Hadoop: The Definitive Guide", 4th Edition, O'Reilly Inc,2015.
2. Tanmay Deshpande, "Hadoop Real-World Solutions Cookbook", 2ndEdition, Packt Publishing, 2016.

Reference
1. Edward Capriolo, Dean Wampler, and Jason Rutherglen, "Programming Hive", O'Reilly Inc, 2012.
2. Vignesh Prajapati, "Big data Analytics with R and Hadoop", Packt Publishing, 2013.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
MINI PROJECT WITH SEMINAR

Course Code: GR20A3141 **L/T/P/C: 0/0/4/2**
III Year II Semester

Course Objectives:

1. Demonstrate a wide range of skills learned to deliver a project.
2. Encourage multidisciplinary research through the integration learned.
3. Develop problem solving, analysis, synthesis and evaluation skills.
4. Encourage teamwork.
5. Improve communication and presentation skills during project work.

Course Outcomes:

1. Formulate hypothesis for the problem statement with sound technical knowledge from selected project domain.
2. Design Engineering Solution to the problem statement with systematic approach.
3. Analyse and develop an efficient solution for implementation of the project.
4. Apply the theoretical concepts while providing solution to the problem statement with teamwork and multidisciplinary approach.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
CONSTITUTION OF INDIA

Course Code: GR20A2003 **L/T/P/C: 2/0/0/2**
III Year II Semester

Course objectives:

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:

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 etc and it will help students learn about Local Administration.
4. The Students understand the importance of Election Commission and the Students will become aware of how a Country and State are run in Democracy.
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: Zila Pachayat, Elected officials and their roles, CEO Zila Pachayat: Position and role, Block level: Organizational Hierarchy (Different departments), Village level: Role of Elected and Appointed officials.

UNIT V

Composition of Judiciary and Election Commission: Composition of Indian Judiciary, 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.

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

IV YEAR
I SEMESTER

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
CRYPTOGRAPHY AND NETWORK SECURITY

Course Code: GR20A4047 **L/T/P/C: 2/1/0/3**
IV Year I Semester

Pre Requisites:
Students should have good knowledge in Computer Networks

Course Objectives:
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 and encrypted E-mail message.
4. Understand the public-key cryptosystem and enhancements made to IPV4 by IPSec.
5. Understand with intrusion and intrusion detection / web security and Firewalls.

Course Outcomes:
1. Work and check the applications defined with confidentiality, integrity, and authentication.
2. Work with various public key and private key cryptographic algorithms.
3. Examine the issues and structure of Authentication Service and Electronic Mail Security.
4. Understand the IP Security Architecture, Web Security and Key Management techniques.
5. Understand intrusion and intrusion detection, Web security and firewalls

UNIT I
Security Attacks (Interruption, Interception, Modification and Fabrication), Security Services (Confidentiality, Authentication, Integrity, Non-repudiation, access Control and Availability), Security Mechanisms, a model for Internetwork security.
Conventional Encryption Principles, substitution ciphers, transposition ciphers.

UNIT II
Conventional encryption algorithms (DES, Blowfish, Idea), cipher block modes of operation, location of encryption devices, key distribution.
Public key cryptography principles, public key cryptography algorithms (RSA, Diffie-Hellman, ECC), digital signatures, digital certificates, certificate authority and key management.

UNIT III
Approaches of Message Authentication, Secure Hash Functions (MD-5,SHA-1) and HMAC.
Kerberos, X.509 Directory Authentication Service.
Email privacy: Pretty Good Privacy (PGP), MIME, S/MIME.

UNIT IV

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

UNIT V

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

Text Books

1. Network Security Essentials (Applications and Standards) by William Stallings Pearson Education.
2. Hack Proofing your network by Ryan Russell, Dan Kaminsky, Rain Forest Puppy, Joe Grand, David Ahmad, Hal Flynn IdoDubrawsky, 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
NEURAL NETWORKS AND DEEP LEARNING
(PROFESSIONAL ELECTIVE II)

Course Code: GR20A3119 **L/T/P/C: 3/0/0/3**
IV Year I Semester

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:

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

Course Outcomes:

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

UNIT I
Artificial Neural Networks - Introduction, Basic models of ANN, important terminologies, Supervised Learning Networks, Perceptron Networks, Adaptive Linear Neuron, Back-propagation Network. Associative Memory Networks. Training Algorithms for pattern association, BAM and Hopfield Networks.

UNIT II
Unsupervised Learning Network- Introduction, Fixed Weight Competitive Nets, Maxnet, Hamming Network, Kohonen Self-Organizing Feature Maps, Learning Vector Quantization, Counter Propagation Networks, Adaptive Resonance Theory Networks. Special Networks-Introduction to various networks.

UNIT III

Introduction to Deep Learning: Historical Trends in Deep learning, Deep Feed - forward networks, Gradient-Based learning, Hidden Units, Architecture Design, Back-Propagation and Other Differentiation Algorithms

UNIT IV

Regularization for Deep Learning: Parameter norm Penalties, Norm Penalties as Constrained Optimization, Regularization and Under-Constrained Problems, Dataset Augmentation, Noise Robustness, Semi-Supervised learning, Multi-task learning, Early Stopping, Parameter Typing and Parameter Sharing, Sparse Representations, Bagging and other Ensemble Methods, Dropout, Adversarial Training, Tangent Distance, tangent Prop and Manifold, Tangent Classifier

UNIT V

Optimization for Train Deep Models: Challenges in Neural Network Optimization, Basic Algorithms, Parameter Initialization Strategies, Algorithms with Adaptive Learning Rates, Approximate Second- Order Methods, Optimization Strategies and Meta-Algorithms.

Applications: Large-Scale Deep Learning, Computer Vision, Image classification, Speech Recognition, Natural Language Processing

Text Books

1. Deep Learning –Ian Good fellow, Yoshua Bengio, Aaron Courville — MIT Press book- ISBN-13: 978-0262035613,
2. Neural Networks a Comprehensive Foundations, Simon Haykin, PHI edition.

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

COMPILER DESIGN

(Professional Elective –III)

Course Code: GR20A4048 **L/T/P/C: 3/0/0/3**

IV Year I Semester

Course Objectives:

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 of compilers.
3. Introduce the major concept in the areas of language translation and compiler design.
4. Develop an awareness of the function and complexity of modern compilers.
5. Enrich the knowledge in various phases of compiler ant its use, code optimization techniques, machine code generation, and use of symbol table.

Course Outcomes:

1. Understand the basic concepts of compiler design, and its different phases.
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 effective way.
4. Learn the process of translating a modern high-level language to executable code.
5. Construct new tools for compilation for small programming languages.

UNIT I

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

UNIT II

Top down Parsing: Context-free grammars, Top down parsing – Backtracking, LL(1), Recursive Descent Parsing, Predictive parsing, preprocessing steps required for predictive parsing.

Bottom up Parsing: Shift Reduce parsing, LR and LALR parsing, Error recovery in parsing, handling ambiguous grammar, YACC – automatic parser/ generator.

UNIT III

Semantic Analysis: Intermediate forms of source programs – abstract syntax tree, polish notation and three address codes. Attributed Grammars, Syntax Directed Translation, Conversion of popular programming languages constructs into Intermediate code forms, Type checker.

Symbol Tables: Symbol table format, organization for block structures languages, hashing, tree structures representation of scope information.

UNIT IV

Block Structure and Non-Block Structure Storage Allocation: Static, Runtime stack and heap storage allocation, storage allocation for arrays, strings and records.

Code Optimization: Consideration for optimization, scope of optimization, local optimization, loop optimization, frequency reduction, folding, DAG representation.

UNIT V

Data Flow Analysis: Flow graph, data flow equation, global optimization, redundant sub expression elimination, Induction variable elements, Live variable analysis, Copy propagation.

Object Code Generation: Object code forms, machine dependent code optimization, register allocation and assignment, generic code generation algorithms, DAG for register allocation.

Text Books:

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

References:

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

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
IMAGE AND VIDEO PROCESSING
(Professional Elective –III)

Course Code: GR20A4050 **L/T/P/C: 3/0/0/3**
IV Year I Semester

Pre requisites:
Students are expected to have knowledge in

1. Analysis of algorithms and linear algebra.
2. Programming experience.

Course Objectives:

1. Describe and explain basic principles of digital image processing.
2. Cover the basic analytical methods such as image enhancement, restoration, segmentation
3. Learn Image compression techniques
4. Learn and explain basic principles of digital image and video processing.
5. Cover the basic motion estimations used in video processing.

Course Outcomes:

1. Describe the basic principles of Imaging.
2. Learn the knowledge of the images in transform domains and segmentation.
3. Apply Image compression on images.
4. Understand and develop algorithms video processing.
5. Implement various video motion techniques.

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 Video coding.

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 – VipulaSingh, 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)

Course Code: GR20A4051 **L/T/P/C: 3/0/0/3**
IV Year I Semester

Prerequisites:
Students are expected to have knowledge in Formal Languages and Automata Theory, Compiler Design.

Course Objectives:
1. Role of natural language processing and language modeling.
2. The analysis of text at word level, syntactic level and semantic level.
3. Discourse processing of the text.
4. Knowledge in automated natural language generation and machine translation.
5. Explanation of information retrieval systems and usage of Lexical resources.

Course Outcomes:
1. Summarize the role of natural language processing in various applications and explain language modeling.
2. Apply word level analysis, syntactic analysis and semantic analysis on natural language processing.
3. Discuss discourse processing of text.
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 Language Models, Statistical Language Model.

UNIT II
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

UNIT III
Word Level Analysis: Introduction, Regular Expressions, Finite State Automata, Morphological Parsing, Spelling Error Detection and correction, Words and Word classes, Part of Speech Tagging, TF, IDF.

Syntactic Analysis: Introduction, Context-free Grammar, Constituency, Parsing, Probabilistic Parsing.

UNIT IV

Semantic Analysis: Introduction, Meaning Representation, Lexical Semantics, Ambiguity, Word Sense Disambiguation.

Discourse Processing: Introduction, Cohesion, Reference Resolution, Discourse Coherence and Structure

UNIT V

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

Text Book

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", 2ndedition,1995.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

AGILE METHODOLOGIES

(Professional Elective –III)

Course Code: GR20A3128 **L/T/P/C: 3/0/0/3**

IV Year I Semester

Prerequisites: Students are expected to have knowledge in principles of software engineering

Course Objectives:

1. To understand the benefits and pitfalls of agile model.
2. To understanding of agile software development practices and how small teams can apply them to create high- quality software.
3. To provide a good understanding of software design and a set of software technologies.
4. To do a detailed examination and demonstration of Agile development and testing techniques.
5. To understand Agile development and testing.

Course Outcomes:

1. Realize the importance of interacting with business stakeholders in determining the requirements for a software system.
2. Perform iterative software development processes: how to plan them, how to execute them.
3. Develop techniques and tools for improving team collaboration and software quality.
4. Perform Software process improvement as an ongoing task for development teams.
5. Show how agile approaches can be scaled up to the enterprise level.

UNIT I

Introduction: Agile Definition, How to be Agile, Theories for Agile Management – Agile Software Development – Traditional Model vs. Agile Model – Classification of Agile Methods, 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

REFERENCE

1. Craig Larman, ―Agile and Iterative Development: A Managers Guide, Addison-Wesley, 2004.
2. Kevin C. Desouza, ―Agile Information Systems: Conceptualization, Construction, and Management, Butterworth-Heinemann, 2007.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
INFORMATION STORAGE AND MANAGEMENT
(Professional Elective –IV)

Course Code: GR20A4052 **L/T/P/C: 3/0/0/3**
IV Year I Semester

Course Objectives:

1. To understand the components of storage infrastructure.
2. To gain knowledge to evaluate storage architectures including storage subsystems
3. To understand the business continuity, backup and recovery methods.
4. To acquire knowledge on information security framework
5. To introduce the working principle of storage infrastructure with monitoring principles and to Understand the structure of cloud computing and its techniques

Course Outcomes:

1. Acquire the knowledge on the components of storage infrastructure
2. Attain the ability to evaluate storage architectures including storage subsystems
3. Realise the business continuity, backup and recovery methods.
4. Appreciate the concepts of storage security and information security applied to virtual machine.
5. Apply the knowledge for storage infrastructure and acquire the knowledge on structure of cloud computing and its techniques

UNIT I
INTRODUCTION TO INFORMATION STORAGE MANAGEMENT
Virtualization and Cloud Computing: Fiber Channel: Overview, Business Continuity, Back Up Recovery: Business Continuity: Information Availability, Storage Security And Management: Cloud Computing: Cloud Enabling Technologies
Evolution of Storage Architecture: SAN and its Evolution BC Terminology, BC Planning life cycle, Information Security Framework, Characteristics of Cloud Computing

UNIT II
DATA CENTRE INFRASTRUCTURE
Components of FC SAN, FC Connectivity, FC Architecture, Failure Analysis, Business Impact Analysis, Risk Triad, Benefits of Cloud Computing.
Virtualization and Cloud Computing: IPSAN-iSCSI components, BC Technology Solutions, Storage Security Domains, Cloud Service Models, Key challenges in managing information: iSCSI Protocol StackiSCSI Names, Backup and Archive: Backup Purpose, Security Implementations in Storage Networking, Cloud Deployment models

UNIT III

DATA CENTER ENVIRONMENT AND DBMS

Data Center Environment: Application, NAS: General Purpose Servers versus NAS Devices, Backup Considerations, Securing Storage Infrastructure in Virtualized and Cloud Environments, Cloud Infrastructure Mechanism: Logical Network Perimeter

Database Management System (DBMS): Benefits of NAS- File Systems and Network File Sharing Backup Granularity, Recovery considerations, RSA and VMware Security Products, Virtual Server, Cloud Storage Device

UNIT IV

HOST AND INTELLIGENT STORAGE SYSTEM

Host: Connectivity, Storage Components of NAS Backup Methods, Backup Architecture, Monitoring the Storage Infrastructure, Cloud Usage Monitor, Disk Drive Components, Disk Drive Performance, NAS I/O Operation, Backup and Restore Operations, Monitoring Parameters, Resource Replication

Intelligent Storage System: NAS Implementations, Backup Topologies, Components Monitored, Monitoring examples, Ready Made environment, Components of an Intelligent Storage System, NAS File Sharing Protocols Backup in NAS Environments Storage Infrastructure Management Activities Container

UNIT V

STORAGE PROVISIONING AND VIRTUAL STORAGE MACHINE

Storage Provisioning: Object Based Storage Devices, Backup Targets, Data Deduplication for Backup Storage Infrastructure Management Challenges, Storage Management Examples Cloud Challenges, Types of Intelligent Storage Systems, Content Addressed Storage, Backup in Virtualized Environments, Storage Allocation to a New Server/Host, Cloud Adoption Considerations

Virtual storage machine: Creation of Virtual storage machine, Configuration and Tracing of FC scan, Sharing Files between host and Virtual, Creation of a Linux Instance in Public, Usage of Cloud services with open source, Navigation of storage system, iSCSI scan Machines, Usage of Backup techniques, Cloud, Generate a private key, Access using SSH client, cloud tools (like Eucalyptus, Open stack, Open Nebula and others)

Text Books

1. EMC Education Services, “Information Storage and Management”, 2nd edition Wiley India, ISBN-13:978-1118094839
2. Thomas Erl, “Cloud Computing: Concepts, Technology & Architecture”, Prentice Hall, 2013,ISBN:9780133387568

References

1. Ulf Troppens, Rainer, Wolfgang, Muller,”Storage Networks Explained”, India, Wiley, 2010, ISBN-13: 978-0470741436
2. Matthew Portnoy, “Virtualization Essentials”, ISBN-13: 978-1119267720, Sybex; 2 edition.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
MULTIMEDIA APPLICATIONS
(Professional Elective –IV)

Course Code: GR20A4066 **L/T/P/C: 3/0/0/3**
IV Year I Semester

Course Objectives:

1. To Understand about Multimedia and Hyper media and video, audio and text applications.
2. To Learn Multimedia Action Scripts
3. To Understand Multimedia application Development and Multimedia Data Compression techniques.
4. To learn various Video Compression Techniques.
5. To understand various network aspects used for multimedia applications.

Course Outcomes:

1. Identify and categorize various file formats like text ,audio and video and image models.
2. Implement Action Script features in Multimedia applications.
3. Implement multimedia animation movies using action scripts.
4. Implement multimedia audio, video and data compression techniques.
5. Apply various networking protocols for multimedia applications.

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/Pearson Education
2. Essentials Action Script 2.0,Colin Moock, SPDO, REILLY

References:

1. Digital Multimedia,Nigel Chapman and JennyChapman,WileyDreantech
2. Macromedia Flash MX Professional 2004Unleashed, Pearson.
3. Multimedia and Communications Technology, SteveHeath, Elevier (FocalPress)
4. Multimedia Applications, Steinmetz, Nahrstedt, Springer

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
BLOCK CHAIN TECHNOLOGY
(Professional Elective –IV)

Course Code: GR20A3135 **L/T/P/C: 3/0/0/3**
IV Year I Semester

Course Objectives:

1. Understand how blockchain systems (mainly Bitcoin and Ethereum) work,
2. To securely interact with them,
3. Design, build, and deploy smart contracts and distributed applications,
4. Integrate ideas from blockchain technology into their own projects.
5. Explaining design principles of Bitcoin and Ethereum and Nakamoto consensus.

Course Outcomes:

1. Learn the Simplified Payment Verification protocol.
2. List and describe differences between proof-of-work and proof-of-stake consensus.
3. Interact with a blockchain system by sending and reading transactions.
4. Design, build, and deploy a distributed application.
5. Evaluate security, privacy, and efficiency of a given blockchain system.

UNIT 1

Basics: Distributed Database, Two General Problem, Byzantine General problem and Fault Tolerance, Hadoop Distributed File System, Distributed Hash Table, ASIC resistance, Turing Complete. Cryptography: Hash function, Digital Signature - ECDSA, Memory Hard Algorithm, Zero Knowledge Proof.

UNIT II

Blockchain: Introduction, Advantage over conventional distributed database, Blockchain Network, Mining Mechanism, Distributed Consensus, Merkle Patricia Tree, Gas Limit, Transactions and Fee, Anonymity, Reward, Chain Policy, Life of Blockchain application, Soft & Hard Fork, Private and Public blockchain.

UNIT III

Distributed Consensus: Nakamoto consensus, Proof of Work, Proof of Stake, Proof of Burn, Difficulty Level, Sybil Attack, Energy utilization and alternate.

UNIT IV

Cryptocurrency: History, Distributed Ledger, Bitcoin protocols - Mining strategy and rewards, Ethereum - Construction, DAO, Smart Contract, GHOST, Vulnerability, Attacks, Sidechain, Namecoin

UNIT V

Cryptocurrency Regulation: Stakeholders, Roots of Bit coin, Legal Aspects-Crypto currency Exchange, Black Market and Global Economy.

Applications: Internet of Things, Medical Record Management System, Domain Name

Service and future of Blockchain.

Tutorial & Practical: Naive Blockchain construction, Memory Hard algorithm - Hashcash implementation, Direct Acyclic Graph, Play with Go-ethereum, Smart Contract Construction, Toy application using Blockchain, Mining puzzles.

Text Books

1.Arvind Narayanan, Joseph Bonneau, Edward Felten, Andrew Miller and Steven Goldfeder, Bitcoin and Cryptocurrency Technologies: A Comprehensive Introduction, Princeton University Press (July 19, 2016)

2.Antonopoulos, Mastering Bitcoin: Unlocking Digital Cryptocurrencies

References

1. Satoshi Nakamoto, Bitcoin: A Peer-to-Peer Electronic Cash System

2. Dr. Gavin Wood, "ETHEREUM: A Secure Decentralized Transaction Ledger,"Yellow paper.2014.

3. Nicola Atzei, Massimo Bartoletti, and Tiziana Cimoli, A survey of attacks on Ethereum smart contracts.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
SOFTWARE TESTING METHODOLOGIES
(Professional Elective –IV)

Course Code: GR20A34058 **L/T/P/C:3/0/0/3**
IV Year I Semester

Prerequisites:
1. Students should have finished a course on Software Engineering.
2. Basic Knowledge about Object oriented design

Course Objectives:
1. Identify types of bugs and adopt a model for testing various bugs.
2. Apply path testing strategies various application software's
3. Techniques to test a given application using various dataflow and transaction flow testing techniques.
4. Design of decision tables for the given logic of a program subsystem.
5. Realization of graph matrices for given state diagrams.

Course Outcomes:
1. Create a model for testing and criticize various consequences of bugs.
2. Apply Path testing Strategies to conduct as part of White Box Testing.
3. Apply various Data flow testing techniques for exploring Data Bugs and Domain Bugs.
4. Design test cases based on decision tables for a given logical construct.
5. Attribute graph matrices techniques for the simplification of graphs and simplify testing 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 Reduction algorithm.

TEXT BOOKS:

1. Software Testing techniques – Boris Beizer, Dreamtech, 2nd Edition.
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
HUMAN COMPUTER INTERACTION
(Open Elective-III)

Course Code: GR20A4067 **L/T/P/C:3/0/0/3**
IV Year I Semester

Course Objectives:

1. The basic understanding of guidelines, principles, and theories influencing human computer interaction.
2. The knowledge of how a computer system may be modified to include human diversity.
3. The appropriate evaluation of human computer interaction system.
4. Select an effective style for a specific application.
5. The basic concepts of User Experience Design and the factors that influence the user experience.

Course Outcomes:

1. Learn the concepts of interaction design and how it relates to human computer interaction and other fields.
2. Design how technologies can be to change people's attitudes and behavior.
3. Apply the difference between qualitative and quantitative data and analysis.
4. Extract the social Mechanisms that are used by people to communicate and collaborate.
5. Explore the user Experience design and analyze the factors involved in design.

UNIT I

Introduction: Importance of user Interface, definition, importance of good design. Benefits of good design, a brief history of Screen design.

The graphical user interface: popularity of graphics, the concept of direct manipulation, graphical system, Characteristics, Web user, Interface popularity, characteristics, Principles of user interface.

UNIT II

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

UNIT III

Screen Designing : Design goals, Screen planning and purpose, organizing screen elements, ordering of screen 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, Soren Lauesen, PearsonEducation.
4. User Experience for Beginners, JoelMarsh.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
CRYPTOGRAPHY AND NETWORK SECURITY LAB

Course Code: GR20A34054 **L/T/P/C:0/0/4/2**
IV Year I Semester

Course Objectives:

1. Explain different types of ciphers used for encryption and decryption.
2. Demonstrate on symmetric encryption algorithms.
3. Demonstrate on asymmetric encryption algorithms.
4. Experiment on Hash algorithms.
5. Illustrate programs related to digital certificates and digital signatures.

Course Outcomes:

1. Use the concepts of different ciphers for encryption and decryption.
2. Implement symmetric encryption algorithms.
3. Examine asymmetric encryption algorithms.
4. Interpret hash algorithms and their functionalities.
5. Solve the problems on digital signatures and digital certificates.

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, Third Edition.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
DEEP LEARNING LAB

Course Code: GR20A4068 **L/T/P/C: 0/0/4/2**
IV Year I Semester

Course Objectives:
1. Understand the working principle of perceptron model.
2. Learn different activation functions and optimization techniques used in neural networks.
3. Know the applications of deep learning models for binary and multiclass classification.
4. Understand the architectures of CNN, RNN, LSTM and GRU.
5. Explore various types of Categorical Data Encoding Schemes.

Course Outcomes:
1. Illustrate Perceptron training algorithm and apply various activation functions.
2. Design multi-layer neural network with Back propagation algorithm and evaluate the performance of various optimization techniques.
3. Build Deep Learning models for binary and multiclass classification problems.
4. Compare the application of Deep learning models CNN, RNN, LSTM and GRU
5. Use data encoding schemes and develop Deep learning models for real world applications.

TASK 1
Implement Perceptron training algorithm to classify flowers in IRIS dataset.

TASK 2
Implement Activation Functions in Neural Networks and analyse their usage.

TASK 3
Build a three-layer Artificial Neural Network by implementing the Back propagation algorithm.

TASK 4
Design a GRU-based deep learning model for IMDB dataset. Compare the performance of GRU based model with LSTM based model

TASK 5
Build a Deep Neural Network for multi class text classification using Reuters dataset

TASK 6
Design a model for MNIST hand written digit classification using Deep Convolution Neural networks.

TASK 7
Train a simple Recurrent Neural Network using an Embedding layer and a Simple RNN layer for movie review classification problem.

TASK 8
Build a Deep learning model using LSTM layer in Keras for IMDB dataset.

TASK 9
Design a Neural network with various optimization algorithms and analyse their performance using Keras.

TASK 10
Design a Deep Learning Model to classify the movie reviews as Positive or Negative based on the text content of reviews using IMDB dataset.

TASK 11
Apply One Hot Encoding for categorical sequence data.

TASK 12
Design a Deep Learning framework for Object Detection.

Text Books
1. Deep Learning with Python, Francois Chollet, Manning Publications Co.
2. Fundamentals of Deep Learning: Designing Next-Generation Machine Intelligence Algorithms with contributions by Nikhil Buduma , O'Reilly publications

References:
1. Deep Learning, Ian Good fellow,Yoshua Bengio and Aaron Courville, MIT Press, London, England
2. Deep Learning: A Practitioner's Approach by Josh Patterson, Adam Gibs, O'Reilly publications

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
PROJECT WORK - PHASE I

Course Code: GR20A4129 **L/T/P/C: 0/0/12/6**
IV Year I Semester

Course Objectives:

1. Demonstrate a wide range of skills learned to deliver a project.
2. Encourage multidisciplinary research through the integration learned.
3. Develop problem solving, analysis, synthesis and evaluation skills.
4. Encourage teamwork.
5. Improve communication and presentation skills during project work.

Course Outcomes:

1. Formulate hypothesis for the problem statement with sound technical knowledge from selected project domain.
2. Design Engineering Solution to the problem statement with systematic approach.
3. Analyse and develop an efficient solution for implementation of the project.
4. Apply the theoretical concepts while providing solution to the problem statement with teamwork and multidisciplinary approach.
5. Demonstrate professionalism with ethics while preparing and presenting the project work.

IV YEAR
II SEMESTER

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
FUNDAMENTALS OF MANAGEMENT AND ENTREPRENEURSHIP

Course Code: GR20A3140 **L/T/P/C: 3/0/0/3**
IV Year II Semester

Course Objective:

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:

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. The students can explore the Management Practices in their domain area and understand, 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 be able to evaluate business ideas and attain hands on experience in designing value proposition and he 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.

UNIT II

Planning and Organizing: Planning – Planning Process, Types of Plans, Decision making and Steps 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 skills of an entrepreneur, Entrepreneur scenario in India and abroad. Types of entrepreneur, types of ownership, Small business in Indian economy. Risk Reduction strategies. Strategies for growth. Financial aspects: sources of rising capital, schemes of Department of Industries (DIC), KVIC, SIDBI, NABARD, NSIC, 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

REAL TIME OPERATING SYSTEMS

(Professional Elective –V)

Course Code: GR20A4114 **L/T/P/C: 3/0/0/3**

IV Year II Semester

Course Objectives:

1. Know the overview of the operating systems.
2. Know the distributed operating system.
3. Know the real time models and languages
4. Know the RTOS Kernel principles and standards
5. Know the RTOS domain applications

Course Outcomes:

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.

Implementation of RTOS in ESP32, Inter-Task Communication in the SparkFun ESP32 thing with Free RTOS.

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”, McGrawHill,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 FORENSICS

(Professional Elective –V)

Course Code: GR20A4125 **L/T/P/C: 3/0/0/3**

IV Year II Semester

Course Objectives:

1. Learn the security issues network layer and transport layer.
2. Be exposed to security issues of the application layer.
3. Learn computer forensics.
4. Be familiar with forensics tools.
5. Learn to analyze and validate forensics data.

Course Outcomes:

1. Discuss the security issues network layer and transport layer.
2. Apply security principles in the application layer.
3. Explain computer forensics.
4. Use forensics tools.
5. Analyze and validate forensics data.

UNIT I

Network Layer Security & Transport Layer Security IPSec Protocol - IP Authentication Header - IP ESP - Key Management Protocol for IPSec. Transport layer Security: SSL protocol, Cryptographic Computations – TLS Protocol.

UNIT II

E-Mail Security & Firewalls PGP - S/MIME - Internet Firewalls for Trusted System: Roles of Firewalls – Firewall related terminology- Types of Firewalls - Firewall designs - SET for E-Commerce Transactions.

UNIT III

Introduction to Computer Forensics Introduction to Traditional Computer Crime, Traditional problems associated with Computer Crime. Introduction to Identity Theft & Identity Fraud. Types of CF techniques - Incident and incident response methodology - Forensic duplication and investigation. Preparation for IR: Creating response tool kit and IR team. - Forensics Technology and Systems - Understanding Computer Investigation – Data Acquisition.

UNIT IV

Evidence Collection and Forensics Tools Processing Crime and Incident Scenes – Working with Windows and DOS Systems. Current Computer Forensics Tools: Software/Hardware Tools.

UNIT V

Analysis and Validation Validating Forensics Data – Data Hiding Techniques – Performing Remote Acquisition – Network Forensics – Email Investigations – Cell Phone and Mobile Devices Forensics.

Text Books

1. Man Young Rhee, "Internet Security: Cryptographic Principles", "Algorithms and Protocols", Wiley Publications, 2003.
2. Nelson, Phillips, Enfinger, Steuart, "Computer Forensics and Investigations", Cengage Learning, India Edition, 2008.

Reference

1. John R.Vacca, "Computer Forensics", Cengage Learning, 2005.
2. Richard E.Smith, "Internet Cryptography", 3rd Edition Pearson Education, 2008.
3. Marjie T.Britz, "Computer Forensics and Cyber Crime": An Introduction", 3rd Edition, Prentice Hall, 2013.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
FUNDAMENTALS OF ROBOTICS
(PROFESSIONAL ELECTIVE – V)

Course Code: GR20A4126 **L/T/P/C: 3/0/0/3**
IV Year II Semester

Course Objectives:
1. Understanding basic concepts of robots and their development.
2. Knowledge of various configuration of robots used in industry, role of robots in industrial automation.
3. Analyze the forces acting on gripper and selection and design of grippers, actuators and sensors.
4. Transformation of motion of robot end effector with Denavit and Hartenberg parameters.
5. Apply Euler-Lagrange and Newton-Euler equations of motion are used for finding force and torque required at each of the joint actuators.

Course Outcomes:
1. Configure various robots with the help of given or required motions.
2. Apply motion of end effect or and Calculate the forward kinematics and inverse kinematics of serial and parallel robots.
3. knowledge and analysis skills associated with trajectory planning.
4. Familiarized with the kinematic motions of robot and robot dynamics
5. Apply robot for various applications in manufacturing.

UNIT I
Introduction, Automation and Robotics: An overview of Robotics-classification by coordinate system and control systems.
Components of the Industrial Robotics: Degrees of freedom – End effectors: Mechanical gripper – Magnetic – Vacuum cup and other types of grippers – General Consideration on gripper selection and design, Robot actuators and sensors, RPA architecture.

UNIT II
Motion Analysis: Basic rotation matrices – Composite rotation matrices – Euler Angles – Equivalent Angle and axis – Homogeneous transformation – Problems.
Manipulator Kinematics: D-H notations – joint coordinates and world coordinates – Forward and inverse kinematics – problems.

UNIT III
Differential Kinematics: Differential Kinematics of planar and spherical manipulators – Jacobians – problems.
Robot Dynamics: Lagrange – Euler formulations – Newton-Euler formulations – Problems on planar two link manipulators.

UNIT IV

Trajectory Planning: Joint space scheme – cubic polynomial fit – Avoidance of obstacles – **Types of motion:** Slew motion – joint interpolated motion – straight line motion – problems. Robot actuators and Feedback components**:** Actuators: Pneumatic.

UNIT V

Robot Application in Manufacturing: Material handling – Assembly and Inspection-Work cell design, work volume, Robot screen.

Text Books:

1. M.P. Groover, "Industrial Robotics", Pearson Edu.
2. Introduction to Robotic Mechanics and Control / JJ Craig / Pearson / 3rd edition.

References:

1. Robotics / Fu K S / McGraw Hill.
2. Robotics Engineering / Richard D. Klaftez / Prentice Hall.
3. Robot Analysis and intelligence / Asada and Slotine / Wiley Inter Science.
4. Robot Dynamics & Control / Mark W. Spong and M. Vidyasagar / John Wiley & Sons (ASIA) Pvt. Ltd.
5. Robotics and Control / Mittal R K & Nagrath I J / TMH.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

DESIGN PATTERNS

(Professional Elective –V)

Course Code: GR20A4124 **L/T/P/C:3/0/0/3**

IV Year II Semester

Prerequisites:

Knowledge in OOPS and UML concepts

Course Objectives:

1. Ability to learn different design patterns available, and to apply them to solve Design Problems
2. The capability to analyze how Design patterns solve many of the day-to-day problems object-oriented designers face, and in many different ways.
3. Ability to learn creative, structural and behavioral design properties to help them understand existing object oriented systems.
4. The ability to learn different structural design patterns like Adapter, Bridge, Composite, Decorator, Façade. Flyweight, and Proxy.
5. The ability to use design patterns to make the system seen less complex by talking about it at a higher level of abstraction than that of a design notation.

Course Outcomes:

1. The ability to learn different design patterns available, and to organize them and solving of Design Problems using Design Patterns, to understand and analyze how to select a Design Pattern, use them in real life examples.
2. To capability to analyze how Design patterns solve many of the day-to-day problems object-oriented designers face, and in many different ways. To understand the applications of design patterns by using a case study of designing a Document Editor.
3. The skill to learn different creational design patterns like Abstract Factory, Builder, Factory Method, Prototype, Singleton. To Learn these design patterns to help them understand existing object-oriented systems.
4. The ability to learn different structural design patterns like Adapter, Bridge, Composite, Decorator, Façade. Flyweight, and Proxy. To recognize how the Design patterns help one identify less-obvious abstractions and the objects that can capture them. For example, objects that represent a process or algorithm dont occur in nature, yet they are a crucial part of flexible designs.
5. The ability to learn different behavioral design patterns like Chain of Responsibility Command, Interpreter, Iterator, Mediator, Observer, State, Strategy, Template Method, Visitor and To understand the impact the design patterns will have, how they are related to other work in design, and how you can get involved in finding and cataloging patterns.

UNIT I

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

UNIT II

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

UNIT III

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

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

UNIT IV

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

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

UNIT V

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

TEXT BOOKS

1. Design Patterns by Erich Gamma, Pearson Education

REFERENCES

1. Pattern's in JAVA Vol-I by Mark Grand,WileyDreamTech.
2. Pattern's in JAVA Vol-II by Mark Grand,WileyDreamTech.
3. JAVA Enterprise Design Patterns Vol-III by Mark Grand,WileyDreamTech

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

INTRODUCTION TO DRONES

(Professional Elective –VI)

Course Code: GR20A4127 **L/T/P/C: 3/0/0/3**

IV Year II Semester

Prerequisites:

- Basic knowledge in Linux and Raspberry Pi

Course Objectives:

1. Recognize and describe the role of unmanned aerial vehicles (UAVs) in past, present, and future society
2. Explore and explain various components of UAVs and LiPo Batteries
3. Comprehend and explain basics of flight and flight control systems
4. Describe basic regulations applicable to UAV flight.
5. Demonstrate basic setup of Drones using Linux and Raspberrypi.

Course Outcomes:

1. Summarize the fundamental concepts of Lipo Battries & UAVs.
2. Demonstrate techniques for drone flight operations, shooting methods, camera set-up
3. Classify various components of drone and build to fly
4. Compile and combine various components
5. Build a Linux based drone using RaspberryPi.

UNIT I

Introduction to Drones: Overview, History of UAVs, Classifications of UAV- scale and lift generation methods, Advantages of Drones, Applications of Drones.

Hardware: Motors-overview, Motor Anotomy, LiPo Batteries and their use, Battery Connector Converters, Flight Controllers, Electronic Speed Controllers (ESCs), RC and Telemetry, Propellers, Frames, GPS and Optical Flow.

UNIT II

Designing a Drone Build: Thrust to Weight Ratios, Estimating Weight of Drones, Drive-train of Drones: Props+Motors+Batteries, Estimating Thrust and Current Draw, Choosing ESCs.

How to build a Drone: Part Placement Planning, Soldering Bullet Connectors to ESCs, Soldering ESCs to PDB, Soldering Battery Connector to PDB, Attaching Legs to Frame, Installing Motors on Frame, Securing Raspberry Pi to Top Plate – Methods, Installing Top Plate to Drone Frame, Fixing ESCs to Drone Arms, Bind Receiver and Transmitter, Calibrate ESCs, Correct Motor Spin Direction, Fix PPM Encoder and RC Receiver to Frame, Wiring the ESC PWM Lines to Flight Controller, Install Telemetry Module to Drone, GPS Mount Assembly, Securing GPS to Frame, Velcro-ing Battery to Drone, Fixing Power Module to Frame, Securing Propellers to Motors.

UNIT III

Initial setup of Drone: Download and Flash OS Image to SD Card, Configure RPi to Connect to the Internet, SSH Into RPi, Configure ArduPilot on RPi, Install Mission Planner and Connect to Drone, Mission Planner Sensor Calibration and ArduPilot Setup, Setting Up the RC Controller, Charging LiPo Batteries, Leashing the Drone

UNIT IV

Flying the Drone: Flashing Light on Drone Flight Controller, Diagnosing Your Drone's Problems, Downloading Flight Logs and Requesting Help on ArduPilot Forum, RC Sticks and what they Control, Flight Modes in ArduPilot, Setting Up Flight Modes, First Time Flying Drills/Advice, Flying in ALT-HOLD Mode, Flying in LOITER Mode, Using the LANDode, Using the RTL Mode.

UNIT V

Using the Linux Feature of Drone: Downloading ArduPilot Source Code, Compile ArduPilot Source Code, Changing Firmware in NAVIO Image, Installing Drone Kit, Script for Autonomous Mission: Takeoff and Land, Script for Autonomous Mission: Velocity Commands.

Teaching Methodologies:

- Power Point Presentations
- Tutorial Sheets
- Assignments

Text Books:

1. A beginners guide, Quadcopters and Drones, Mark D Smith, 2015
2. Drones (The Ultimate Guide): Ben Rupert,
3. Build a Drone: A Step-by-Step Guide to Designing, Constructing, and Flying Your Very Own Drone, by Barry Davies

References:

1. Theory, Design, and Applications of Unmanned Aerial Vehicles- by A. R. Jha Ph.D. (Author), 2016
2. Handbook of Unmanned Aerial Vehicles- Editors: Valavanis, K., Vachtsevanos, George J. (Eds.), 2014
3. Jane's Unmanned Aerial Vehicles and Targets -by Kenneth Munson (Editor), 2010
4. Guidance of Unmanned Aerial Vehicles- by Rafael Yanushevsky (Author), 2011.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

COMPUTER GRAPHICS

(Professional Elective –VI)

Course Code: GR20A3057 **L/T/P/C:3/0/0/3**

IV Year II Semester

Prerequisites:

1. Matrices
2. Basic linear algebra such as solving a system of linear equations
3. Polynomials
4. Elementary signal processing (Fourier transform and filtering)

Course Objectives:

1. Outlining the use of the components of a graphics system and become familiar with building approach of graphics system components and algorithms related with them.
2. Learn the basic principles of 3- dimensional computer graphics.
3. Determine to scan and convert the basic geometrical primitives, how to transform the shapes to fit them as per the picture definition.
4. Change from a world coordinates to device coordinates, clipping and projections.
5. Articulate the application of computer graphics concepts in the development of computer games, information visualization and business applications.

Course Outcomes:

1. Describe the basic concepts used in computer graphics.
2. 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 such as transformations, area filling and clipping.
4. Describe the importance of viewing and projections.
5. Define the fundamentals of animation, virtual reality and its related technologies.

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 Antialiasing

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

UNIT V

Introduction to Multimedia- Pc specification, visual elements, wav and mp3 format, sound elements, multimedia storage, flash animation.

Textbooks:

1. Computer Graphics, Amarendra N Sinha, Arun DUdai, TataMcGrawHill
2. Fundamentals of Multimedia,Ze-Nian Li, Mark S. Drew,PearsonPrenticeHall

Reference Books:

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
SOFT COMPUTING
(Professional Elective –VI)

Course Code: GR20A4062 **L/T/P/C: 3/0/0/3**
IV Year II Semester

Course Objectives:

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 different domains.
3. To know the fundamental things about fuzzy systems, fuzzy logic and its applications.
4. To analyze the Fuzzy Inference technique with different variables.
5. Differentiate between the Neural Networks and Genetic Algorithms.

Course Outcomes:

1. Apply all the Soft Computing Techniques to solve real world problems.
2. Identify the problems, where Supervised and (Neural Networks) Unsupervised Learning Techniques can be applied.
3. Apply Genetic Algorithm to design New Algorithms/Protocols in any domain.
4. Differentiate between Fuzzy Model with respect to Probabilistic Model and apply Fuzzy Inference Techniques to solve problems in different domain.
5. To know how to evaluate the Fitness function in Genetic Algorithm.

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

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 IV

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.

UNIT V

Genetic Algorithms:

Basic operators and terminology, Traditional Algorithm vs Genetic Algorithm, Simple GA, General GA, Classification of GA, Genetic Programming, Applications of GA, Ant Colony Optimisation(ACO),Particle Swam Optimisation(PSO)

Applications of Soft Computing: Internet Search Technique, Hybrid Fuzzy Controllers.

Text Book:

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

REFERNCES:

1. Mitchell Melanie, "An Introduction to Genetic Algorithm", Prentice Hall,1998.
2. David E. Goldberg, "Genetic Algorithms in Search, Optimization and Machine Learning", Addison Wesley,1997.
3. Timothy J. Ross, "Fuzzy Logic with Engineering Applications" Wiley India
4. S. N. Sivanandam, S. Sumathi and S. N. Deepa, "Introduction to Fuzzy Logic using MATLAB", Springer,2007

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
SOFTWARE PRODUCT DEVELOPMENT AND MANAGEMENT
(Professional Elective –VI)

Course Code: GR20A4118 **L/T/P/C:3/0/0/3**
IV Year II Semester

Course Objectives

1. To learn the foundation and product planning in software development.
2. To understand the product development architecture, design and testing.
3. To make release the software with testing and training.
4. To meet the market and to sales of software with legal and management compliance.
5. To provide service and support with monitoring and controlling.

Course Outcomes:

1. Recite the foundation of Software Product Development Methodology and planning.
2. Apply the product development architecture, design and testing.
3. Release the software with prior testing and training.
4. Marketing and selling the software with legal and management compliance.
5. Software product service is provided with monitoring and controlling.

UNIT I

FOUNDATION AND PLANNING: INTRODUCTION AND FOUNDATION: Introduction to Software Product Development Methodology -Phases -Roles - Responsibilities. **PRODUCT PLANNING:** Product Envisioning - Conceptualize Product -Product Roadmap - High-Level Planning.

UNIT II

PRODUCT DEVELOPMENT: Initiation -Architecture and Design -Testing Approach - Release Planning -Iterative Development -Design by Feature -Build by Feature -Certify by Feature -Continuous Build and Integration.

UNIT III

PRODUCT RELEASE: Alpha Release/Product Qualification -Beta Release -Product Training Planning.

UNIT IV

PRODUCT SALES AND MARKETING: Product Sales and Marketing Approach -Product Legal and Compliance Management -Product Market Rollout.

UNIT V

SERVICES AND SUPPORT: Product Support -Product Governance -Monitoring andControl Through-Out Entire Product Lifecycle, Case study.

Text Books

1. Dan Conde, Software Product Management: Managing Software Development from Idea to Product to Marketing to Sales, Aspatore Books; 1st edition
2. Alyssa Dver , Software Product Management Essentials, Meghan KifferPr

References

1. GerardusBlokdyk, Software Product Development A Complete Guide, 5starcooks
2. Allan M. Anderson, Product Development and Management Body of Knowledge: A Guidebook for Training and Certification, CreateSpace Independent Publishing Platform
3. https://en.wikipedia.org/wiki/Software_development

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
PROJECT WORK - PHASE II

Course Code: GR20A4130 **L/T/P/C: 0/0/12/6**
IV Year II Semester

Course Objectives:

1. Demonstrate a wide range of skills learned to deliver a project.
2. Encourage multidisciplinary research through the integration learned.
3. Develop problem solving, analysis, synthesis and evaluation skills.
4. Encourage teamwork.
5. Improve communication and presentation skills during project work.

Course Outcomes:

1. Formulate hypothesis for the problem statement with sound technical knowledge from selected project domain.
2. Design Engineering Solution to the problem statement with systematic approach.
3. Analyse and develop an efficient solution for implementation of the project.
4. Apply the theoretical concepts while providing solution to the problem statement with teamwork and multidisciplinary approach.
5. Demonstrate professionalism with ethics while preparing and presenting the project work.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

SOFT SKILLS AND INTERPERSONAL COMMUNICATION

(OPEN ELECTIVE)

Course Code: GR20A3136 **L/T/P/C: 3/0/0/3**

Course Objectives:

1. To know the importance of soft skills.
2. To identify good leadership skills /qualities.
3. To recognize the importance of interpersonal skills.
4. To demonstrate the significance of confidence building.
5. To define and differentiate between a report and a proposal.

Course Outcomes:

1. Develop soft skills communication skills, leadership skills etc.
2. Implement goal setting techniques to build a promising career.
3. Design formal report and proposals with appropriate formal expressions.
4. Create healthy workplace environment by treating others with respect and dignity.
5. Evaluate the power of confidence building and self-esteem with examples.

UNIT I

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 – Proxemics, Presentation skills

UNIT II

Team Building & Leadership Qualities

Qualities of a good leader, Problem solving and Decision Making, Strategic management Crisis management

UNIT III

Personality Development

Motivation, Goal setting, Self-esteem, Team skills

UNIT IV

Developing Reports and Proposals

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

UNIT V

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:

1. Soft skills for Everyone - Jeff Butterfield, CENAGE Learning
2. Soft skills for Interpersonal Communication - S.Balasubramaniam (ORIENT BLACKSWAN)

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
HUMAN RESOURCE DEVELOPMENT AND ORGANIZATIONAL BEHAVIOUR
(OPEN ELECTIVE)

Course Code: GR20A3137 **L/T/P/C: 3/0/0/3**

Course Objectives:

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

Course Outcomes :

1. To acquaint the student with the determinants of intra -individual, inter-personnel and inter-group behaviour in organisational setting.
2. 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.
3. To assess the group behavior in organizations, including communication, leadership, power and politics, conflict, and negotiations in the framework of organization and to familiarize the concepts, techniques and practices of human resource development in the current organizational view.
4. To impart and apprise the capable of applying the principles and techniques as professionals for developing human resources in an organization.
5. To report the current trends and applications in HRD and Balanced Scorecard to measures the performance and to develop, implement, and evaluate organizational human resource development strategies aimed at promoting organizational effectiveness in different organizational environments.

UNIT I

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 II

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 III

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

UNIT IV

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 V

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.

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
CYBER LAW AND ETHICS
(OPEN ELECTIVE)

Course Code: GR20A3138 **L/T/P/C: 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

Course outcomes.

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 and the student will be able to know and learn web technologies and related issues.
5. The student will be in position to interface with various issues pertaining to Intellectual Property, copy rights, patents rights etc. and provide an 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 Consumer Forum, Tribunals, High Courts, Supreme Court), Arbitration: As an alternative to resolving disputes in the normal courts, parties who are in dispute 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 Cyber space : Freedom of Speech and Expression in Cyberspace, Right to Access Cyberspace, Access to Internet, Right to Privacy, Right to Data Protection.

UNIT IV

Cyber 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.

Text books:

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. Jonthan Rosenoer, 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

ECONOMIC POLICIES IN INDIA

(OPEN ELECTIVE)

Course Code: GR20A3139 **L/T/P/C: 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 Emphases the 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 I

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.

UNIT II

Factors and measure, Meaning of Economic development, National income, Percapital income, Quality of life, Capital Formation – Savings, Investment.

UNIT III

NITI Aayog and Planning in India, Niti Aayog and its function, how is Niti Aayog different from planning commission, 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 IV

Private and Public Sector, Public Sector – role and growth, Achievements of the public sector, Private Sector – Importance Problems, New foreign Trade Policy.

UNIT V

Present Economic Policy, Main feature, Globalization, Expansion of Private sector, more market orient approach. Public distribution system, Industrial policies before and after 1991, Industrial Licensing, Monetary and Fiscal Policy, elements of Indian current GDP and review of current budget.

Text books

1.Francis Cherunilam: Business Environment: Text and Cases. 18/e. Himalaya. 2009.
2. Misra and Puri: Indian Economy, Himalaya, 2009.

References:

1. Indian Economy- A. N. Agarwal
2. Indian Economy – Mishra &Puri
3. Indian Development and planning – M. L. Jhingan
4. Indian Economy – R. S. Rastogi Yozna and Kurukshetra Magazines