Academic Regulations
Programme Structure
&
Detailed Syllabus

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

Department of Information Technology

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

Academic Regulations

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

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

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

4. **Programme Pattern:**
   a) Each Academic year of study is divided 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 is 160.
   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	Course Description
1	BSC	Basic Science Courses	Basic Science Courses
2	ESC	Engineering Science Courses	Includes Engineering subjects
3	HSMC	Humanities and Social	Includes Management courses

		sciences	
4	PCC	Professional Core Courses	Includes core subjects related to the parent discipline/ department/ branch of Engineering.
5	PEC	Professional Elective Courses	Includes elective subjects related to the parent discipline/ department/ branch of Engineering.
6	OEC	Open Elective Courses	Electives from other technical and/or emerging subjects
7	LC	Laboratory Courses	Laboratory Courses
8	MC	Mandatory Courses	EnvironmentalSciences,Induction training, Indian Constitution, Essence of Indian Traditional Knowledge
9	PROJ	Project Work	Project work, seminar and internship in industry or elsewhere

5. **Award of B. Tech Degree:** A student will be declared eligible for the award of B. Tech Degree if he/she fulfills the following 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 Information Technology 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 be condoned.
e) Students whose shortage of attendance is not condoned in any semester are detained and are not eligible to take their end examinations of that semester. They may seek 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 I	30	70	100
6	Project II	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 marks each for a duration of 2 hours. Average of the two mid exams shall be considered **i) Subjective - 15 marks** **ii) Objective - 5 marks** **2) Tutorials - 5 marks** **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-10 marks** **ii) Record - 5 marks** **iii) Continuous Assessment - 15 marks**
		70	Semester end examination	The semester-end examination is for a duration of 3 hours

d) Mini Project: 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.

e) Main Project Phase–I and Phase-II: The project work is evaluated for 100 marks. Out of 100, 30 marksshall be for internal evaluation and 70 marksfor 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 Project I and Project II.

f) Engineering Graphics:

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

8. **Recounting of Marks in the End Examination Answer Books:** A student can request for 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 credits can appear for a supplementary examination, as per the schedule announced by the College.
11. **Malpractices in Examinations:** Disciplinary action shall be taken in case of malpractices during Mid / End-examinations as per the rules framed by the Academic Council.
12. **Academic Requirements and Promotion Rules:**
    a) A student shall be deemed to have satisfied the minimum academic requirements and earned the credits allotted to each theory or laboratories if he/she secures not less than 35% of marks in the Semester-end Examination and a minimum of 40% of the sum total of the Internal Evaluation and Semester-end Examination taken together.
    b) A student shall be promoted to the next year only when he/she satisfies the requirements of all the previous semesters.

S. No.	Promotion	Conditions to be fulfilled
1	First year first semester to first year second semester	Regular course of study of first year first semester.
2	First year second semester to second year first semester	(i) Regular course of study of first year second semester. (ii) Must have secured at least 50% credits up to first year second semester from all the relevant regular and supplementary examinations, whether the student takes those examinations or not.
3	Second year first semester to second year second semester	Regular course of study of second year first semester.
4	Second year second semester to third year first semester	(i) Regular course of study of second year second semester (ii) Must have secured at least 60% credits up to second year second semester from all the relevant regular and supplementary examinations, whether the student takes those examinations or not.
5	Third year first semester to third year second semester	Regular course of study of third year first semester.
6	Third year second semester to fourth year first semester	(i) Regular course of study of third year second semester. (ii) Must have secured at least 60% credits up to third year second semester from all the relevant regular and supplementary examinations, whether the student takes those examinations or not.
7	Fourth year first semester to fourth year second semester	Regular course of study of fourth year first semester.

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

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

Earning of Credit:

A student shall be considered to have completed a course successfully and earned the credits if he/she secures an acceptable letter grade in the range O-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 the 160 credits.

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

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

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

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

18. General Rules

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

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

(Applicable for Batches Admitted from 2019-2020)

1. All regulations as applicable for B.Tech Four year degree programme (Regular) will hold good for B.Tech (Lateral Entry Scheme) except for the 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 123 credits and secure all credits. The marks obtained in all 123 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 or not.
3	Third year first semester to third year second semester.	Regular course of study of third year first semester.
4	Third year second semester to fourth year first semester.	(i) Regular course of study of third year second semester. (ii) Must have secured at least 60% credits up to third year second semester from all the relevant regular and supplementary examinations, whether the student takes those examinations or not.
5	Fourth year first semester to fourth year second semester.	Regular course of study of fourth year first semester.

3. **Award of Class:** After a student satisfies all the requirements prescribed for the completion ofthe Degree and becomes eligible for the award of B. Tech Degree by JNTUH, he/she shall be placed in one of the following four classes based on CGPA secured from the 123 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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INFORMATION TECHNOLOGY

I YEAR I SEMESTER

S.NO.	Course Codes	COURSE	Hours			Total Hours	Total Credits	Int	Ext	Marks
			L	T	P					
1	GR18A1001	Linear Algebra and Differential Calculus	3	1	0	4	4	30	70	100
2	GR18A1005	Engineering Chemistry	3	1	0	4	4	30	70	100
3	GR18A1008	Basic Electrical Engineering	3	0	0	3	3	30	70	100
4	GR18A1006	English	2	0	0	2	2	30	70	100
5	GR18A1013	Engineering Chemistry Lab	0	0	3	3	1.5	30	70	100
6	GR18A1016	Basic Electrical Engineering Lab	0	0	2	2	1	30	70	100
7	GR18A1014	English Language and Communication Skills Lab	0	0	2	2	1	30	70	100
8	GR18A1017	Engineering Workshop	1	0	3	4	2.5	30	70	100
		Induction Programme					-			
Total			**12**	**2**	**10**	**24**	**19**	**240**	**560**	**800**

I YEAR II SEMESTER

S.NO.	Course Code	COURSE	Hours			Total Hours	Total Credits	Int	Ext	Marks
			L	T	P					
1	GR18A1002	Differential Equations and Vector Calculus	3	1	0	4	4	30	70	100
2	GR18A1003	Applied Physics	3	1	0	4	4	30	70	100
3	GR18A1007	Programming for Problem Solving	3	1	0	4	4	30	70	100
4	GR18A1010	Engineering Graphics	1	0	4	5	3	30	70	100
5	GR18A1011	Applied Physics Lab	0	0	3	3	1.5	30	70	100
6	GR18A1015	Programming for Problem Solving Lab	0	0	3	3	1.5	30	70	100
Total			**10**	**3**	**10**	**23**	**18**	**180**	**420**	**600**

II YEAR I SEMESTER

S.NO.	**Course Code**	**COURSE**	**Hours**			**Total Hours**	**Total Credits**	**Int**	**Ext**	**Marks**
			L	**T**	**P**					
1		Digital Logic Design	3	0	0	3	3	30	70	100
2		Data Structures	3	0	0	3	3	30	70	100
3		Probability & Statistics	3	0	0	3	3	30	70	100
4		Database Management Systems	3	0	0	3	3	30	70	100
5		Discrete Mathematics	3	1	0	4	4	30	70	100
6		Digital Electronics Lab	0	0	3	3	1.5	30	70	100
7		Data Structures Lab	0	0	3	3	1.5	30	70	100
8		Database Management Systems Lab	0	0	3	3	1.5	30	70	100
		Total	**15**	**1**	**9**	**25**	**20.5**	**240**	**560**	**800**
9		Value Ethics & Gender culture	2	0	0	2	2	30	70	100

II YEAR II SEMESTER

S.NO.	Course Code	COURSE	Hours			Total Hours	Total Credits	Int	Ext	Marks
			L	T	P					
1		Java Programming	3	0	0	3	3	30	70	100
2		Computer Organization	3	0	0	3	3	30	70	100
3		Economics & Accounting for Engineers	3	0	0	3	3	30	70	100
4		Data Communication & Computer Networks	3	1	0	4	4	30	70	100
5		Operating systems	3	0	0	3	3	30	70	100
6		Java Programming Lab	0	0	3	3	1.5	30	70	100
7		Operating systems and Sci Lab	0	0	4	4	2	30	70	100
8		Data Communication & Computer Networks Lab	0	0	4	4	2	30	70	100
		Total	**15**	**1**	**11**	**27**	**21.5**	**240**	**560**	**800**
9		Environmental Science	2	0	0	2	2	30	70	100

III YEAR I SEMESTER

S.NO.	Course Code	COURSE	Hours			Total Hours	Total Credits	Int	Ext	Marks
			L	T	P					
1		Object Oriented Software Engineering	3	0	0	3	3	30	70	100
2		Formal Languages & Automata Theory	3	0	0	3	3	30	70	100
3		Web Programming	3	0	0	3	3	30	70	100
4		Design and Analysis of Algorithms	3	0	0	3	3	30	70	100
5		Professional Elective I	3	0	0	3	3	30	70	100
6		Object Oriented Software Engineering Lab	0	0	3	3	1.5	30	70	100
7		Web Programming Lab	0	0	3	3	1.5	30	70	100
8		Animations Lab	0	0	2	2	1	30	70	100
		Total	**15**	**0**	**8**	**23**	**19**	**240**	**560**	**800**
9		Constitution of India	2	0	0	2	2	30	70	100

III YEAR II SEMESTER

S.NO.	Course Code	COURSE	Hours			Total Hours	Total Credits	Int	Ext	Marks
			L	T	P					
1		Compiler Design	3	0	0	3	3	30	70	100
2		Fundamentals of Management &Entrepreneurship	3	0	0	3	3	30	70	100
3		Data warehousing and Data Mining	3	0	0	3	3	30	70	100
4		Information Security	3	0	0	3	3	30	70	100
5		Open Elective I	3	0	0	3	3	30	70	100
6		Professional Elective II	3	0	0	3	3	30	70	100
7		Compiler Design Lab	0	0	2	2	1	30	70	100
8		Data ware housing and Data Mining Lab	0	0	2	2	1	30	70	100
9		Mini Project with Seminar	0	0	6	6	3	30	70	100
10		Summer Internship	-	-	-	-	-			
Total			**18**	**0**	**10**	**28**	**23**	**270**	**630**	**900**

IV YEAR I SEMESTER

S.NO.	Course Code	COURSE	Hours			Total Hours	Total Credits	Int	Ext	Marks
			L	T	P					
1		Machine Learning	3	0	0	3	3	30	70	100
2		Internet of Things	3	0	0	3	3	30	70	100
3		Open Elective II	3	0		3	3	30	70	100
4		Professional Elective III	3	0		3	3	30	70	100
5		Professional Elective IV	3	0		3	3	30	70	100
6		Machine Learning Lab	0	0	3	3	1.5	30	70	100
7		Internet of Things Lab	0	0	3	3	1.5	30	70	100
8		Project Work (Phase-I)	0	0	12	12	6	30	70	100
Total			**15**	**0**	**18**	**33**	**24**	**225**	**500**	**725**

IV YEAR II SEMESTER

S.NO.	Course Code	COURSE	Hours			Total Hours	Total Credits	Int	Ext	Marks
			L	T	P					
1		Open Elective III	3	0	0	3	3	30	70	100
2		Professional Elective V	3	0	0	3	3	30	70	100
3		Professional Elective VI	3	0	0	3	3	30	70	100
4		Project Work(Phase-II)	0	0	12	12	6	50	150	200
Total			**9**	**0**	**12**	**21**	**15**	**140**	**360**	**500**

Professional Electives

	Systems and Software Architecture	**Programming**	**Data Science and Machine Learning**	**Applications and Networking**
Professional Elective 1(III-I)	Advanced Computer Architecture	Principles of Programming Languages	Data Science	Computer Graphics
Professional Elective (III-II)	Advanced Operating Systems	Python and R Programming	Artificial Intelligence	Image and video Processing
Professional Elective 3 (IV-I)	Software Testing Methodologies	Advanced Computer Networks	Information Retrieval Systems	Adhoc Sensor Network
Professional Elective 4 (IV-I)	Distributed Systems	Scripting Languages	Soft Computing	Cryptography and Network Security
Professional Elective 5 (IV-II)	Embedded Systems	Essentials of Big Data Programming	Neural Networks and Deep Learning	Cloud Computing
Professional Elective 6 (IV-II)	Software Project Management	Middleware Technologies	Speech and Natural Language Processing	Storage Area Networks

OPEN ELECTIVES – 2 THREADS

S. No.	THREAD 1	THREAD 2
1	Soft Skills and Interpersonal Communication	CSE: 1. E-Commerce 2. Database Management Systems 3. Java Programming
2	Human Resource Development and Organizational Behaviour	IT: 1. Multimedia and Application Development 2. Web Programming 3. Operating Systems
3	Cyber Law and Ethics	EEE: 1.Embedded Systems 2. Control Systems 3. Artificial Intelligence Techniques
4	History of Science	ECE: 1. Principles of Satellite Communications 2. Scientific Computing 3. Wavelets
5	Introduction to Art and Aesthetics	ME: 1.Operations Research 2. Automobile Engineering 3. Robotics
6	Economic Policies in India	CE: 1. Green Building Technology 2.Building Materials and Construction Planning 3. Introduction to Fluid Mechanics

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

LINEAR ALGEBRA AND DIFFERENTIAL CALCULUS

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

Course Objectives: To provide the student with

- The ideas of linearity and linear systems, which lie at the core of many engineering concepts
- The concept of latent values of a matrix which is critical in many engineering applications
- The ideas of function approximation using the tools of mean value theorems
- The skill of using a definite integral for various geometrical applications
- The skill of finding the optimal values of multi-variable functions

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

- Compute the rank of a matrix to determine the existence of solutions of a linear algebraic system
- Determine the eigenvalues and eigenvectors of a square matrix which arise in several engineering applications
- Determine approximate solution of over determined systems using the pseudo inverse
- Apply the definite integral for various computational problems in geometry and Evaluate some improper integrals using special functions
- Develop the skill of determining optimal values of multivariable functions using classical methods

Unit I: VECTOR AND MATRIX ALGEBRA

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

Unit III: MATRIX DECOMPOSITION AND PSEUDO INVERSE OF A MATRIX

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

Unit IV: SINGLE VARIABLE CALCULUS

Mean value theorems: Rolle's theorem, Lagrange's Mean value theorem and Taylor's theorem (without proof), their geometrical interpretation and applications, approximation of a

function by Taylor's series, Applications of definite integrals to evaluate surface areas and volumes of revolutions of curves (only in Cartesian coordinates), Evaluation of improper integral using Beta and Gamma functions.

UnitV: MULTIVARIABLE DIFFERENTIAL CALCULUS AND FUNCTION OPTIMIZATION

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

Text/Reference Books:

1. R.K.Jain and S.R.K.Iyengar, Advanced Engineering Mathematics, Narosa publishing house,
2. Fourth edition 2014
3. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010
4. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9^{th} edition,Pearson, Reprint,
5. 2002.
6. Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006
7. GRIET reference manual.
8. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008.
9. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11thReprint, 2010.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

ENGINEERING CHEMISTRY

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

Course Objectives:

- To relate how the basic concepts and principles of chemistry can be applied to practical utility in a broader perspective of the society.
- 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.
- To identify and apply various principles of electrochemistry, corrosion and water treatment which are essential for an engineer in industry
- To acquire knowledge of existence of different organic molecules in different stereochemical orientations useful for understanding reaction path ways.
- To bring adaptability to the concepts of chemistry and to acquire the required skills to become a perfect engineer.

Course Outcomes:

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

UnitI:ATOMIC AND MOLECULAR STRUCTURE

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

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

UnitII: SPECTROSCOPIC TECHNIQUES AND APPLICATIONS

Regions of electromagnetic spectrum, Molecular spectroscopy Rotational Spectroscopy: Rotation of molecules, rotational spectra of rigid diatomic molecules, selection rules.

Vibrational Spectroscopy: The vibrating diatomic molecule, simple and anharmonic oscillators of a diatomic molecule, selection rules, applications of IR spectroscopy.

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

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

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

UnitIV:ENGINEERING MATERIALS AND WATER TECHNOLOGY

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

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

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

UnitV: STEREOCHEMISTRY AND ENERGY RESOURCES

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

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

Text/Reference Books:

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

GOKARAJU RANGARAJUINSTITUTE OF ENGINEERING AND TECHNOLOGY

BASIC ELECTRICAL ENGINEERING

Course Code: GR18A1008 **L/ T/ P/ C: 3/0/0/3**

Course Objectives:

- To introduce the fundamentals of Electrical Engineering.
- To Solve problems in AC circuits.
- To provide foundation in theory and applications of Transformers and DC machines
- Understand the basic principles of AC Electrical machinery and their applications.
- To import the knowledge of Electrical Installations.

Course Outcomes:

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

UnitI: D.C. CIRCUITS

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

UnitII:A.C. CIRCUITS

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

UnitIII: TRANSFORMERS

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

UnitIV: ELECTRICAL MACHINES

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

UnitV:ELECTRICAL INSTALLATIONS

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

Text/Reference Books:

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

GOKARAJU RANGARAJUINSTITUTE OF ENGINEERING AND TECHNOLOGY

ENGLISH

Course Code: GR18A1006 **L/T/P/C: 2/0/0/2**

INTRODUCTION

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

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

Course Objectives: The course will help to

- Improve the language proficiency of students in English with an emphasis on Vocabulary, Grammar, Reading and Writing skills.
- Equip students to study academic subjects more effectively and critically using the theoretical and practical components of English syllabus.
- Develop study skills and communication skills in formal and informal situations.
- Understand the importance of defining, classifying and practice the unique qualities of professional writing style.
- 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 should be able to

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

Unit I:

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

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

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

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

Unit II:

LETTER WRITING

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

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

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

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

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 Modifiersand Tenses.

Reading: Sub-skills of Reading- Skimming and Scanning

Writing: Nature and Style of Sensible Writing- **Defining- Describing** Objects, Places andEvents – **Classifying**- Providing Examples or Evidence

Unit IV:

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

Vocabulary: Standard Abbreviations in English

Grammar: Redundancies and Clichés in Oral and Written Communication.

Reading: Comprehension- Intensive Reading and Extensive Reading

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

Unit V:

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

Grammar: Common Errors in English

Reading: Reading Comprehension-Exercises for Practice

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

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

Text/Reference Books:

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

GOKARAJU RANGARAJUINSTITUTE OF ENGINEERING AND TECHNOLOGY

ENGINEERING CHEMISTRY LAB

Course code: GR18A1013 **L/T/P/C: 0/0/3/1.5**

Course Objectives:

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

Course Outcomes:

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

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

TASK 2: Determination of chloride content of water by Argentometry.

TASK 3: Redox titration: Estimation of ferrous iron using standard $KMnO_4$

TASK 4: Estimation of HCl by Conductometric titrations

TASK 5: Estimation of Acetic acid by Conductometric titrations

TASK 6: Estimation of Ferrous iron by Potentiometry using dichromate

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

TASK 8: Determination of acid value of coconut oil.

TASK 9: Adsorption of acetic acid by charcoal

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

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

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

TASK 13: Synthesis of Aspirin

TASK 14: Synthesis of Paracetamol.

Text/Reference Books:

1. Vogel's text book of Practical Organic Chemistry, 5th Edition.
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, New Delhi)

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BASIC ELECTRICAL ENGINEERING LAB

Course Code: GR18A1016 **L /T/ P/ C: 0/ 0/ 2/1**

Course Objectives:

- To introduce the use of measuring instruments.
- To analyze a given network by applying various electrical laws
- To calculate, measure and know the relation between basic electrical parameters.
- To know the response of electrical circuits for different excitations
- To summarize the performance characteristics of electrical machines.

Course Outcomes:

- Get an exposure to common electrical components and their ratings.
- Get an exposure to basic electrical laws.
- Understand the measurement, calculation and relation between the basic electrical parameters
- Understand the response of different types of electrical circuits to different excitations.
- Compare the basic characteristics of Electrical machines

TASK 1: Verification of Ohms Law
TASK2: Verification of KVL and KCL
TASK3: Transient Response of Series RL and RC circuits using DC excitation
TASK4: Transient Response of RLC Series circuit using DC excitation
TASK5: Resonance in series RLC circuit
TASK6: Calculations and Verification of Impedance and Current of RL, RC and RLC series circuits
TASK7: Measurement of Voltage, Current and Real Power in primary and Secondary Circuits of a Single-Phase Transformer
TASK8: Load Test on Single Phase Transformer (Calculate Efficiency and Regulation)
TASK9: Three Phase Transformer: Verification of Relationship between Voltages and Currents (Star-Delta, Delta-Delta, Delta-star, Star-Star)
TASK10: Measurement of Active and Reactive Power in a balanced Three-phase circuit
TASK11: Performance Characteristics of a Separately/Self Excited DC Shunt/Compound Motor
TASK 12: Torque-Speed Characteristics of a Separately/Self Excited DC Shunt/Compound Motor
TASK13: Performance Characteristics of a Three-phase Induction Motor
TASK14: Torque-Speed Characteristics of a Three-phase Induction Motor
TASK15: No-Load Characteristics of a Three-phase Alternator

GOKARAJU RANGARAJUINSTITUTE OF ENGINEERING AND TECHNOLOGY

ENGLISH LANGUAGE AND COMMUNICATION SKILLS LAB

Course code: GR18A1014 **L/T/P/C:0/0/2/1**

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

Course Objectives:

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

Course Outcomes:

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

Listening Skills Objectives:

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

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

Students should be given practice in listening to the sounds of the language, to be able to recognize them and find the distinction between different sounds, to be able to mark stress and recognize and use the right intonation in sentences.

- Listening for general content
- Listening to fill up information
- Intensive listening
- Listening for specific information

Speaking Skills Objectives:

- To involve students in speaking activities in various contexts
- To enable students express themselves fluently and appropriately in social and professional contexts
- Oral practice: Just A Minute (JAM) Sessions
- Describing objects/situations/people
- Role play – Individual/Group activities

 The following course content is prescribed for the English Language and Communication Skills Lab based on Unit-6 of AICTE Model Curriculum 2018 for B.Tech First English. As the syllabus is very limited, it is required to prepare teaching/learning materials by the teachers collectively in the form of handouts based on the needs of the students in their respective colleges for effective teaching/learning and timesaving in the Lab)

Exercise – I

CALL Lab:

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

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

ICS Lab:

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

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

Exercise – II

CALL Lab:

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

ICS Lab:

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

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

Exercise-III:

CALL Lab:

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

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

ICS Lab:

Understand:How to make Formal Presentations.

Practice:Formal Presentations.

Exercise – IV:

CALL Lab:

Understand: Listening for General Details.

Practice: Listening Comprehension Tests.

ICS Lab:

Understand: Public Speaking – Exposure to Structured Talks.

Practice: Making a Short Speech – Extempore.

Exercise – V:

CALL Lab:

Understand: Listening for Specific Details.

Practice: Listening Comprehension Tests.

ICS Lab:

Understand: Interview Skills.

Practice: Mock Interviews.

Minimum Requirement of infrastructural facilities for ELCS Lab:

1. Computer Assisted Language Learning (CALL) Lab:

The Computer Assisted Language Learning Lab has to accommodate 40 students with 40systems, with one Master Console, LAN facility and English language learning software for self- study by students.

System Requirement (Hardware component):

Computer network with LAN facility (minimum 40 systems with multimedia) with the following specifications:

i) Computers with Suitable Configuration

ii) High Fidelity Headphones

2. Interactive Communication Skills (ICS) Lab:

The Interactive Communication Skills Lab: A Spacious room with movable chairs andaudio-visual aids with a Public-Address System, a LCD and a projector etc.

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ENGINEERING WORKSHOP

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

Course Objectives:

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

Course Outcomes:

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

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

i. Carpentry
ii. Fitting Shop
iii. Tin-Smithy
iv. Casting
v. Welding Practice
vi. House-wiring
vii. Black Smithy

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

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DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS

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

Course Objectives: To provide the student with

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

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

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

UnitI:FIRST ORDER ODE

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

UnitII: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

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

UnitIV: VECTOR DIFFERENTIATION AND LINE INTEGRATION

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

Vector line integration:Evaluation of the line integral, concept of work done by a force field, Conservative fields

UnitV: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 proofs) and their applications

Text/ReferenceBooks:

1. R.K.Jain and S.R.K.Iyengar, Advanced Engineering Mathematics, Narosa publishing house,
2. Fourth edition 2014
3. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010
4. Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons,2006
5. 4.. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9thEdition, Pearson, Reprint, 2002.
6. GRIET reference manual
7. Paras Ram, Engineering Mathematics, 2nd Edition, CBS Publishes
8. S. L. Ross, Differential Equations, 3rd Ed., Wiley India, 1984.

GOKARAJU RANGARAJUINSTITUTE OF ENGINEERING AND TECHNOLOGY

APPLIED PHYSICS

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

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

- Demonstrate skills in scientific inquiry and problem-solving techniques.
- Identify the role of quantum mechanics and its applications on physical system.
- Summarize the use of semiconductors and optoelectronics devices.
- Interpret the properties of Laser light and its uses in optical fiber communication.
- Outline the properties of electric and magnetic materials.

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

- Outline the development of quantum mechanics and solve Schrodinger equation for simple potentials.
- Demonstrate the operation mechanism of electronic devices such as transistors and diodes.
- Explain the development and applications of optoelectronic devices.
- Analyze the properties of Laser and its propagation in optical fibers.
- Evaluate the properties of dielectric and magnetic materials for various applications

UnitI: QUANTUM MECHANICS

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

UnitII: SEMICONDUCTOR PHYSICS

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

UnitIII: OPTOELECTRONICS

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

UnitIV: LASERS AND FIBER OPTICS

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

UnitV: DIELECTRIC AND MAGNETIC PROPERTIES OF MATERIALS

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

Text/ References Books:

1. Engineering Physics, B.K. Pandey, S. Chaturvedi - Cengage Learing.
2. Halliday and Resnick, Physics - Wiley.
3. Engineering Physics, P.K Palanisamy, 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.
6. Richard Robinett, Quantum Mechanics
7. Fundamentals of Semiconductor Devices, Second Edition, Anderson and Anderson, McGraw Hill.
8. J. Singh, Semiconductor Optoelectronics: Physics and Technology, McGraw- Hill Inc.(1995)
9. Semiconductor Physics and Devices, 4e, Neamen and Biswas, McGraw Hill.
10. Online Course: “Optoelectronic Materials and Devices” by Monica Katiyar and Deepak Gupthaon NPTEL

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

PROGRAMMING FOR PROBLEM SOLVING

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

Prerequisite: Knowledge of Mathematics required.

Course Objectives:

- To learn the fundamentals of computers.
- To understand the various steps in program development.
- To learn the syntax and semantics of C programming language.
- To learn the usage of structured programming approach in solving problems.

Course Outcomes:

The Student will learn:

- To write algorithms and to draw flowcharts for solving problems.
- To convert the algorithms/flowcharts to C programs.
- To code and test a given logic in C programming language.
- To decompose a problem into functions and to develop modular reusable code.
- To use arrays, pointers, strings and structures to write C programs.

Unit I: INTRODUCTION TO PROGRAMMING

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

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

Introduction to C Programming Language: variables (with data types and space requirements), Syntax and Logical Errors in compilation, object and executable code , Operators, expressions and precedence, Expression evaluation, Storage classes (auto, extern, static and register), type conversion, The main method and command line arguments Bitwise operations: Bitwise AND, OR, XOR and NOT operators

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

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

Unit II: ARRAYS, STRINGS, STRUCTURES AND POINTERS

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

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

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

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

Unit III: PREPROCESSOR AND FILE HANDLING IN C

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

Unit IV: FUNCTION AND DYNAMIC MEMORY ALLOCATION

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

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

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

Unit V: INTRODUCTION TO ALGORITHMS

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

Text/ Reference Books:

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

GOKARAJU RANGARAJUINSTITUTE OF ENGINEERING AND TECHNOLOGY

ENGINEERINGGRAPHICS

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

Course Objectives:

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

Course Outcomes:

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

Unit I: INTRODUCTION TO ENGINEERING DRAWING

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

Unit II: ORTHOGRAPHIC PROJECTIONS

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

Unit III: PROJECTIONS OF REGULAR SOLIDS

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

Unit IV: DEVELOPMENT OF SURFACES OF RIGHT REGULAR SOLIDS

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

Unit V: ISOMETRIC PROJECTIONS

Principles of Isometric Projection – Isometric Scale – Isometric Views –Conventions – Isometric Views of Lines, Plane Figures, Simple and Compound Solids – Isometric Projection of objects having non- isometric lines. Isometric Projection of Spherical Parts. Conversion of Isometric Views to Orthographic Views and Vice-versa – Conventions

Introduction to CAD: (**For Internal Evaluation Weightage only**): Introduction to CAD Software Package Commands. - Free Hand Sketches of 2D- Creation of 2D Sketches by CAD Package

Text /Reference Books:

1. Engineering Drawing by N.D. Bhatt/Charotar
2. Engineering Drawing/ N.S.Parthasarathy and Vela Murali/Oxford
3. EngineeringGraphics.ByBasanthAgrawal/CMAgrawal/McGrawHillEducation
4. EngineeringDrawingbyK.VenuGopal/NewAgePublications.
5. Computer Aided Engineering Drawing / K Balaveerareddy et al-CBS publishers
6. Engineering Graphics and Design by Kaushik Kumar / Apurba kumar Roy / Chikesh Ranjan

APPLIED PHYSICS LAB

Course Code: GR18A1011 **L/T/P/C: 0/0/3/1.5**

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

- Compare and tabulate the characteristics of Solar cells, LED and Laser sources.
- Analyze the behavior of semiconductors in various aspects.
- Apply the theoretical concepts of optical fibers in practical applications.
- Recall the basic concepts of LCR and RC circuits through hands on experience.
- Analyze the behavioral aspects of electric and magnetic fields.

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

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

TASK 1. Energy gap of P-N junction diode: To determine the energy gap of a semiconductor diode.

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

TASK 3. Light emitting diode: Plot V-I and P-I characteristics of light emitting diode.

TASK 4. Stewart – Gee's experiment: Determination of magnetic field along the axis of a current carrying coil.

TASK 5. Hall effect: To determine Hall co-efficient of a given semiconductor.

TASK 6. Photoelectric effect: To determine work function of a given material.

TASK 7. LASER: To study the characteristics of LASER sources.

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

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

TASK 10. R-C Circuit: To determine the time constant of R-C circuit.

Note: Any 8 experiments are to be performed

PROGRAMMING FOR PROBLEM SOLVING LAB

Course Code: GR18A1015L/T/P/C: 0/0/3/1.5

Prerequisite: Basic operations of computer and knowledge of mathematics

Laboratory Objectives: The students will learn the following:

- To work with an IDE to create, edit, compile, run and debug programs
- To analyse the various steps in program development.
- To develop programs to solve basic problems by understanding basic concepts in C like operators, control statements etc.
- To develop modular, reusable and readable C Programs using the concepts like functions, arrays etc.
- To Write programs using the Dynamic Memory Allocation concept and to create, read from and write to text and binary files.

Laboratory Outcomes: The candidate is expected to be able to:

- formulate the algorithms for simple problems and translate given algorithms to a working and correct program.
- correct syntax errors as reported by the compilers
- identify and correct logical errors encountered during execution
- represent and manipulate data with arrays, strings and structures and use pointers of different types
- 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: (Practice sessions)

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

Task 2: (Simple numeric problems)

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

Task 3: (Simple numeric problems)

a. Write a program that prints a multiplication table for a given number and the number of rows in the table. For example, for a number 5 and rows = 3, the output should be:
    i. 5 x 1 = 5
    ii. 5 x 2 = 10
    iii. 5 x 3 = 15
b. Write a program that shows the binary equivalent of a given positive number between 0 to 255.

Task 4: (Expression Evaluation)

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

Task 5: (Expression Evaluation)

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

Task 6: (Expression Evaluation)

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

Task 7: (Arrays and Pointers and Functions)

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

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

Task 8: (Arrays and Pointers and Functions)

a. Write C programs that use both recursive and non-recursive functions
   i. To find the factorial of a given integer.
   ii. To find the GCD (greatest common divisor) of two given integers.
   iii. To find x^n
b. Write a program for reading elements using pointer into array and display the values using array.
c. Write a program for display values reverse order from array using pointer.
d. Write a program through pointer variable to sum of n elements from array.

Task 9: (Files)

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

Task 10: (Files)

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

Task 11: (Strings)

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

Task 12: (Strings)

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

Task 13: (Miscellaneous)

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

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

Task 14: (Sorting and Searching)

a. Write a C program that uses non-recursive function to search for a Key value in a given list of integers using linear search method.

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

Task 15: (Sorting and Searching)

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

Text/ Reference Books:

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

GOKARAJU RANGARAJUINSTITUTE OF ENGINEERING AND TECHNOLOGY

DIGITAL LOGIC DESIGN

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

II Year I Semester

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

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

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

- Apply knowledge of fundamental Boolean principles and manipulation to design Logic Circuits.
- Apply various techniques of Boolean function simplification to create minimal expressions.
- Create combinational circuits for a specified behavior with minimal specification.
- Synthesize Sequential circuits with minimal states.
- 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 andHexadecimal 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 ofSum'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, BinaryAdder - Subtractor, Decimal Adder, Binary Multiplier, Magnitude Comparator, Decoders, Encoders, Multiplexers.

Unit IV:SYNCHRONOUS SEQUENTIAL LOGIC

Sequential Circuits, Latches, Flip-Flops, Analysis of clockedsequential 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, StructuralDefinition of HDL, HDL Models for Combinational circuits, HDL for Models for Sequential circuits.

Text/Reference Books

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

GOKARAJU RANGARAJUINSTITUTE OF ENGINEERING AND TECHNOLOGY

DATA STRUCTURES

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

II Year I Semester

Course Objectives: The students will learn

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

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

- Implement searching techniques for a given problem.
- Write pseudo code for various sorting techniques.
- Implement various linear data structures and determine the time complexity.
- Understand the non-linear data structures like trees, graphs.
- Choose appropriate data structures to represent data items in real world problems

Unit I:

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

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

Sorting: Quick Sort, Merge Sort.

Unit II:

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

Queue ADT, Types of Queues: Simple Queue, Circular Queue, Priority Queue; Operations on each types of Queues: Algorithms and their analysis.

Unit III:

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

Doubly linked list: operations and algorithmic analysis;

Circular Linked Lists: operations and algorithmic analysis.

Unit IV:

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

Unit V:

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

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

Text/Reference Books:

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

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHN

PROBABILITY AND STATISTICS

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

II Year I Semester

Course objectives

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

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

Course Outcomes

The expected outcomes of the Course are:

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

Module 1: BASIC PROBABILITY AND RANDOM VARIABLES

Probability spaces, conditional probability, independence, Bayes' rule;Discrete random variables, Continuous random variables and their properties, Distribution functions and densities

Independent random variables, Sums of independent random variables; Expectation of Discrete and Continues Random Variables, Moments, Variance of a sum, Chebyshev's Inequality.

Module 2:BASIC STATISTICS AND DISCRETE PROBABILITY DISTRIBUTIONS

Measures of Central tendency: Moments, Skewness and Kurtosis.

Probability distributions: Infinite sequences of Bernoulli trials, Binomial, Poisson, Poisson approximation to the binomial distribution, multinomial distribution and evaluation of statistical parameters for Binomial and Poisson distributions.

Module 3: CONTINUOUS PROBABILITY DISTRIBUTIONS AND BIVARIATE DISTRIBUTIONS

Bivariate distributions and their properties, Distribution of sums and quotients, Conditional densities.

Normal, Exponential and Gamma density functions, Evaluation of statistical parameters for Normal distribution.

Module 4: CURVE FITTING, CORRELATION AND REGRESSION

Curve fitting by the method of least squares- fitting of straight line, Second degree parabola, Exponential and Power curves.

Correlation (Karl Pearson’s Correlation coefficient and Spearman’s Rank correlation (Statements of their properties and problems)), Regression (including Multiple regression with two independent random variables), (Statements of their properties and problems only).

Module 5: APPLIED STATISTICS

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

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

Text / References:

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

GOKARAJU RANGARAJUINSTITUTE OF ENGINEERING AND TECHNOLOGY

DATABASE MANAGEMENT SYSTEMS

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

II Year I Semester

Course Objectives:

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

Course Outcomes:

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

UnitI:INTRODUCTION TO DATABASE AND SYSTEM ARCHITECTURE

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

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

UnitII:SQL:

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

UnitIII: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.

UnitIV: SCHEMA REFINEMENT AND NORMAL FORMS

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

UnitV: TRANSACTION MANAGEMENTTRANSACTIONS

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

Concurrency Control: Lock based Protocols, Timestamp based protocols

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

Text/Reference Books

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

GOKARAJU RANGARAJUINSTITUTE OF ENGINEERING AND TECHNOLOGY

DISCRETE MATHEMATICS

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

II Year I Semester

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

- Use mathematically correct terminology and notation.
- Construct correct direct and indirect proofs.
- Use division into cases in a proof.
- Use counterexamples.
- Apply logical reasoning to solve a variety of problems.

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

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

Unit I:MATHEMATICAL LOGIC

Statements and notations, Connectives, Well-formed formulas, Truth Tables, tautology, equivalence implication, Normal forms.

Predicates: Predicative logic, Free & Bound variables, Rules of inference, Consistency, proof 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 principles and its application.

Algebraic structures: Algebraic systems Examples and general properties, Semi groups and monads, groups sub groups' homomorphism, Isomorphism.

Unit III:ELEMENTARY COMBINATORY

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

Unit IV:RECURRENCE RELATION

Generating Functions, Function of Sequences Calculating Coefficient of generating function, Recurrence relations, solving recurrence relation by substitution and Generating funds. Characteristics roots solution of in homogeneous Recurrence Relation.

Unit V:GRAPH THEORY

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

Text /Reference Books:

1. Discrete and Combinational Mathematics- An Applied Introduction-5th Edition – Ralph. P.Grimaldi.Pearson Education
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, Fifth Edition.TMH.
5. Discrete Mathematics with Applications, Thomas Koshy, Elsevier
6. Discrete Mathematical Structures, BernandKolman, Roberty C. Busby, Sharn Cutter Ross, Pearson

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

DIGITAL ELECTRONICS LAB

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

II Year I Semester

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

- Introduction to digital fundamental techniques and process in logic design
- Visualization of digital combinational circuits using VHDL
- Skill of seeing the equations and code developments in design of digital logic circuits
- To understand the concept of VHDL fundamentals
- To understand the counters and registers design with VHDL programming

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

- Comprehend the fundamentals digital theory to enable the process of logical design
- Analyze the concept of design of digital combinational circuits using VHDL programming
- Know the origin of sequential circuits design using VHDL
- Acquaint with binary to grey and parity checker
- Discriminate in digital counters and registers

LIST OF EXPERIMENTS

1.DESIGN AND SIMULATION OF COMBINATIONAL CIRCUITS USING VHDL

Experiment 1: Realization of Gates

Experiment 2: Half adder, Full adder

Experiment 3: Magnitude comparator

Experiment 4: Decoder

Experiment 5: Multiplexer

Experiment 6: Demultiplexer

Experiment 7: Binary to Grey Code Converter

Experiment 8: Parity Checker

2.DESIGN AND SIMULATION OF SEQUENTIAL CIRCUITS USING VHDL

Experiment 9: D and T Flip-Flops

Experiment 10: Frequency Divider

Experiment 11: Left Shift Register

Experiment 12: Serial to Parallel Shift Register

Experiment 13: Binary Counter

Experiment 14: Asynchronous BCD Up Counter

Experiment 15: Synchronous Down Counter

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

Text Books

1. Digital Design – Fourth Edition, M. Morris Mano, Pearson Education.
2. Fundamentals of Logic Design – Roth, 5th Edition, Thomson.

References Books

1. Switching and Finite Automata Theory by ZviKohavi, Tata McGraw Hill.
2. Fundamentals of Digital Logic with VHDL Design, Stephen Brown, Zvonko Vranesic, TataMcGraw Hill, Indian edition.
3 Switching and Logic Design – CVS Rao, Pearson Education

GOKARAJU RANGARAJUINSTITUTE OF ENGINEERING AND TECHNOLOGY

DATA STRUCTURES LAB

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

II Year I Semester

Course Objectives: The students will learn

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

Course Outcomes: After completion of course, student will be able to:

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

Task-1:
Write a C Program for implementing the following searching methods
a. Linear Search b. Binary Search

Task-2:
Write a C Program for implementing the following Sorting Algorithms
a. Selection sort b. Bubble sort c. Insertion sort

Task-3
Write a C Program for implementing the following Sorting Algorithms
a. Quick sort b. Merge sort

Task-4:
Write a C Program for implementing the following using an array
a. Stack ADT b. Queue ADT

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

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

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

a. Stack ADT b. Queue ADT

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

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

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

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

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

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

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

Text/Reference Books

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

GOKARAJU RANGARAJUINSTITUTE OF ENGINEERING AND TECHNOLOGY

DATABASE MANAGEMENT SYSTEMS LAB

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

II Year I Semester

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

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

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

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

Task-1:

DDL commands (Create, Alter, Drop, Truncate)

1. Create a table EMP with the following structure.

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

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

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

DEPTNO as the primary key

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

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

1. Insert 5 records into dept Insert few rows and truncate those from the emp1 table and also drop it.
2. Insert 11 records into emp table.
3. Update the emp table to set the value of commission of all employees to Rs1000/- who are working as managers.
4. Delete only those who are working as supervisors.
5. Delete the rows whose empno is 7599.

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

1. List the records in the emp table order by salary in descending order.
2. Display only those employees whose deptno is 30.
3. Display deptno from the table employee avoiding the duplicated values.
4. List all employee names, salary and 15% rise in salary. Label the column as pay hike.
5. Display the rows whose salary ranges from 15000 to 30000.
6. Display all the employees in dept 10 and 20 in alphabetical order of names.
7. List the employee names who do not earn commission.
8. Display all the details of the records with 5-character names with 'S' as starting character.
9. Display joining date of all employees in the year of 1998.
10. List out the employee names whose salary is greater than 5000 and less than 6000

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

1. Count the total records in the emp table.
2. Calculate the total and average salary of the employee.
3. Determine the max and min salary and rename the column as max-salary and min_salary.
4. Find number of departments in employee table.
5. Display job wise sum, average, max, min salaries.
6. Display maximum salaries of all the departments having maximum salary > 2000
7. Display job wise sum, avg, max, min salaries in department 10 having average salary is greater than 1000 and the result is ordered by sum of salary in descending order.

Task-5: SQL Functions

1. Display the employee name concatenate with employee number.
2. Display half of employee name in upper case and half in lower case.
3. Display the month name of date "14-jul-09" in full.
4. Display the Date of joining of all employees in the format "dd-mm-yy".
5. Display the date two months after the Date of joining of employees.
6. Display the last date of that month in "05-Oct-09".
7. Display the rounded date in the year format, month format, day format in the employee
8. Display the commissions earned by employees. If they do not earn commission, display it as "No Commission".

Task-6: Nested Queries

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

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

Task-7:

Joins, Set Operators.

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

Task-8; 1. Views

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

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

Task-10:

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

Task-11:

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

Task-12:

1. Write PL/SQL program to handle predefined exceptions.
2. Write PL/SQL program to handle user defined exception.
3. Write a PL/SQL code to create

a. Package specification

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

Text/Reference Books

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

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

VALUE ETHICS AND GENDER CULTURE

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

Course objectives

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

Course Outcomes

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

UnitI: 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.

UnitII: PERSONALITY AND BEHAVIOUR DEVELOPMENT-positive thinking, punctuality, avoiding fault finding, Free from anger, Dignity of labour, religious tolerance, Aware of self-destructive habits.

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

UnitIV:INTRODUCTION TO GENDER- Definition of Gender, Basic Gender Concepts and Terminology, Attitudes towards Gender, Social Construction of Gender.

UnitV:GENDER-BASED VIOLENCE-The concept of violence, Types of Gender-based violence, the relationship between gender, development and violence, Gender-based violence from a human rights perspective.

Text Books

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

2. Ethics in Engineering Practice & Research, Caroline Whit beck, 2e, Cambridge University Press 2015.

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

GOKARAJU RANGARAJUINSTITUTE OF ENGINEERING AND TECHNOLOGY

JAVA PROGRAMMING

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

II Year II Semester

Course Objectives: The students will learn the following:

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

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

- Write java programs and differentiate between object-oriented programming and procedure-oriented programming.
- Apply object-oriented programming features for solving a given problem.
- Incorporate exception handling mechanism.
- Implement Use java standard API library to write complex programs.
- Develop interactive programs using applet and swing.

Unit I: INTRODUCTION TO OOP

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

Unit II: PROGRAMMING CONSTRUCTS

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

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

Unit III: INHERITANCE

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

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

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

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

Unit IV: MULTITHREADING

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

Unit V: APPLETS

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

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

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

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

Text/Reference Books:

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

GOKARAJU RANGARAJUINSTITUTE OF ENGINEERING AND TECHNOLOGY

COMPUTER ORGANIZATION

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

II Year II Semester

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

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

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

- Demonstrate knowledge of register organization of a basic computer system
- Incorporate In-depth understanding of control unit organization and micro programmed control.
- Understand the performance of central processing unit of a basic computer system.
- Apply various algorithms to perform arithmetic operations and propose suitable hardware for them.
- 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, FixedPoint Representation, Floating – Point Representation, Error Detection codes.

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

Unit II:BASIC COMPUTER ORGANIZATION AND DESIGN

Instruction codes, Computer Registers, Computerinstructions, 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 – pointArithmetic operations, BCD Adder.

Unit IV:INPUT-OUTPUT ORGANIZATION

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

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

Unit V: MEMORY ORGANIZATION

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

Multi Processors: Characteristics or Multiprocessors, Interconnection Structures, Cache Coherence, Shared Memory Multiprocessors.

Text/ReferenceBooks

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

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

ECONOMICS AND ACCOUNTING FOR ENGINEERS

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

Course Objectives:

- To provide the student with a clear understanding of demand analysis, elasticity of demand and demand forecasting;
- To provide the insight on theory of production and cost analysis.
- To describe different types of markets and competition, forms of organization and methods of pricing.
- To make the students understand various capital budgeting techniques.
- To describe fundamentals of accounting.

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

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

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

Text Books

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

DATA COMMUNICATION & COMPUTER NETWORKS

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

II Year II Semester

Course Objectives: The objectives of this course are to

- Explain the evolution of computer networks and the concepts data communication;
- Illustrate the general principles of network design and compare the different network topologies
- Introduce to the digital and analogue representations and channels and techniques of encoding.
- Explain the general principles of circuit and packet switching;
- Explain about the wireless Local Area Networks, types of protocols

Course Outcomes: After completing this course the students will be able to

- Independently understand basic computer network technology, Data Communications System and its components
- Identify the different types of network topologies and protocols,
- Identify the different types of network devices and their functions within a network
- Understand and building the skills of subnetting and routing mechanisms.
- Familiarity with the basic protocols of computer networks, and how they can be usedto assist in network design and implementation.

Unit I: DATA COMMUNICATIONS

Components – Direction of Data flow – Networks – Componentsand Categories – Types of Connections – Topologies –Protocols and Standards – ISO / OSI model, Example Networks such as ATM, Frame Relay, ISDN Physical layer: Transmission modes, Multiplexing, Transmission Media, Switching, Circuit Switched Networks, Datagram Networks, Virtual Circuit Networks.

Unit II: DATA LINK LAYER

Introduction, Framing, and Error – Detection and Correction – Parity – LRC – CRC Hamming code, Flow and Error Control, Noiseless Channels, Noisy Channels, HDLC, Point to Point Protocols. 111 Medium Access sub layer: ALOHA, CSMA/CD, LAN – Ethernet IEEE 802.3, IEEE 802.5 – IEEE 802.11, Random access, Controlled access, Channelization.

Unit III:NETWORK LAYER

Logical Addressing, Internetworking, Tunneling, Address mapping, ICMP, IGMP, Forwarding, Uni-Cast Routing Protocols, Multicast Routing Protocols.

Unit IV: TRANSPORT LAYER

Process to Process Delivery, UDP and TCP protocols, Data Traffic, Congestion, Congestion Control, QoS, Integrated Services, Differentiated Services, QoS in Switched Networks.

UNIT – V: Application Layer

Domain name space, DNS in internet, electronic mail, SMTP, FTP,WWW, HTTP, SNMP.

Text/Reference Books:

1. Data Communications and Networking, Behrouz A. Forouzan , Fourth Edition TMH, 2006.
2. Computer Networks, Andrew S Tanenbaum, 4th Edition. Pearson Education, PHI.
3. Data communications and Computer Networks, P.C .Gupta, PHI.
4. An Engineering Approach to Computer Networks, S. Keshav, 2nd Edition, Pearson Education.
5. Understanding communications and Networks, 3rd Edition, W.A. Shay, Cengage Learning.
6. Computer Networking: A Top-Down Approach Featuring the Internet. James F. Kurose & Keith W. Ross, 3 rd Edition, Pearson Education.
7. Data and Computer Communication, William Stallings, Sixth Edition, Pearson Education, 2000

GOKARAJU RANGARAJUINSTITUTE OF ENGINEERING AND TECHNOLOGY

OPERATING SYSTEMS

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

II Year II Semester

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

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

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

- Explain functions, structures of operating system
- Determine various process management concepts including scheduling and synchronization.
- Demonstrate the concepts of memory management and I/O systems.
- Solve issues related to file system interface and implementation of disk management.
- Classify protection and security mechanisms.

Unit I:COMPUTER SYSTEM AND OPERATING SYSTEM OVERVIEW

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

Unit II:PROCESS MANAGEMENT

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

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

Unit III:MEMORY MANAGEMENT

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

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

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

Unit IV:FILE SYSTEM INTERFACE

The concept of a file, Access Methods, Directory structure, file sharing, protection. File System implementation- File system structure, file system implementation, directory implementation, allocation methods, free-space management, efficiency and performance.
Mass-storage structure: Overview of Mass-storage structure, Disk structure, disk attachment, disk scheduling, swap-space management, RAID structure, stable-storage implementation, Tertiary storage structure.

Unit V:PROTECTION
Protection, Goals of Protection, Principles of Protection, Domain of protection, Access Matrix, Implementation of Access Matrix, Access control, Revocation of Access Rights, Capability-Based systems, Language – Based Protection.
Security: The Security problem, program threats, system and network threats, cryptography as a security tool, user authentication, implementing security defenses, firewalling to protect systems and networks, computer – security classifications.

Text/Reference Books:

1. Operating System Concepts Essentials, 9th Edition by AviSilberschatz, Peter Galvin, Greg Gagne, Wiley Asia 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. Design of the Unix Operating Systems, 8th Edition by Maurice Bach, Prentice-Hall of India
6. Understanding the Linux Kernel, 3rd Edition, Daniel P. Bovet, Marco Cesati, O'Reilly and Associates

GOKARAJU RANGARAJUINSTITUTE OF ENGINEERING AND TECHNOLOGY

JAVA PROGRAMMING LAB

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

II Year II Semester

Course Objectives: The students will learn the following

- Working with java compiler and eclipse platform.
- Writing of java programs using object-oriented concepts.
- Developing java applications and handle the exceptions.
- Building java GUI based applications using swing.
- To handle the events.

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

- Implement object-oriented programming concepts.
- Analyze a problem, identify and define the computing requirements appropriate to its solution.
- Explore the java standard API library to write complex programs.
- Implement and manage multithreading.
- Develop graphical user interface in Java programs.

Task-1: Write java programs that implement the following

a) Constructor
b) Parameterized constructor
c) Method overloading
d) Constructor overloading.

Task-2:

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

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 method overriding
b) Write a java program to implement dynamic method dispatch.
c) Write a Java program to implement multiple inheritance.
d) Write a java program that uses access 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 "Good Morning" every one second, the second thread displays "Hello" every two seconds and the third thread displays "Welcome" every three seconds.
b) Write a Java program that correctly implements producer consumer problem using the concept of inter thread communication.

Task-8:

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.

Task-9:

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

Task-10:

a) Write a Java program for handling 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 exeption in a message dialog box.

Task -12:

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

1. Java: The Complete Reference, 10th edition, Herbert Schildt, Mcgraw Hill.
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, Universities Press.
5. Thinking in Java, Bruce Eckel, Pearson Education
6. Programming in Java, S.Malhotra and S.Choudhary, Oxford University Press.

GOKARAJU RANGARAJUINSTITUTE OF ENGINEERING AND TECHNOLOGY

OPERATING SYSTEMS & SCI LAB

Course Code: **L/T/P/C : 0/0/4/2**

II Year II Semester

Course Objectives:

- Demonstrate the core features of Operating Systems and Sci Lab.
- Evaluate various Scheduling algorithms, memory management techniques.
- Understand the file storage and organization concepts.
- Explain of the syntax, semantics, data-types and library functions of numerical computing using SCILAB.
- Implement simple mathematical functions/equations in numerical computing environment such as SCILAB.

Course Outcomes:

- Understand and analyze the various file organization techniques.
- Implementation of CPU scheduling algorithms, page replacement techniques.
- Understand the need for simulation/implementation for the verification of mathematical functions.
- Implement simple mathematical functions/equations in numerical computing environment such as SCILAB.
- Interpret and visualize simple mathematical functions and operations thereon using plots/display.

PART I:

Task-1: Simulate the following CPU scheduling algorithms

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

Task-2: Simulate all file allocation strategies

a) Sequential b) Indexed c) Linked

Task-3: Simulate MVT and MFT

Task-4: Simulate all File Organization Techniques

a) Single level directory b) Two level directory

Task-5: Simulate all page replacement algorithms

a) FIFO b) LRU c) LFU

Task-6: Simulate Paging Technique of memory management.

PART II

Task-7: Scilab environment

Task-8: The Workspace and Working Directory

Task-9: Matrix Operations

Task-10: Sub-matrices

Task-11: Statistics

Task-12: Plotting Graphs

Task-13: Plotting 3D Graphs

Task-14: Scilab Programming Language

Task-15: Script Files and Function Files

Task-16: Functions in Scilab

Task-17: File Operations

Task-18: Reading Micros

Text/Reference Books:

1. Operating System Concepts Essentials, 9th Edition by AviSilberschatz, 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. Scilab, from theory to practiceFundamentals Perrine Mathieu, Philippe Roux2016ISBN: 978-2-8227-0293-5

GOKARAJU RANGARAJUINSTITUTE OF ENGINEERING AND TECHNOLOGY

DATA COMMUNICATIONS &COMPUTER NETWORKS LAB

Course Code: **L/T/P/C : 0/0/4/2**

II Year II Semester

Course Objectives: The objectives of this course are to

- Introduces the architecture, structure, functions, components, and models of the data communication, devices and configurations
- Develop network using different topologies and protocols
- Understanding the working of wired and wireless networks
- Illustrate various framing techniques, error correction and detection methods
- Simulate the routing algorithms

Course Outcomes: After completing this course the student must demonstrate the knowledge and ability to:

- Independently understand basic computer network technology, Data Communications System and its components.
- Identify the different types of network topologies and protocols.
- Understanding the working of wired and wireless networks
- Understand the implementation of different framing techniques, Error detecting and correcting techniques
- Implementation of various routing algorithms.

PART I

Task-1: Introduction to Cisco Packet tracer Simulator

Task-2: Initial Configuration of switch and router

Task-3: Working with static and dynamic IP addressing

Task-4: Design star,bus,ring topology using packet tracer

Task-5: Design a network using NAT and tunnelling concept.

Task-6: Design a wireless LAN

PART II

Task-7: Implement the data link layer framing methods such as character, character stuffing and bit stuffing.

Task-8: Implement on a data set of characters the three CRC polynomials – CRC 12, CRC 16 andCRC CCIP.

Task-9: Implement Hamming code

Task-10: Implement Dijkstra‘s algorithm to compute the Shortest path through a graph.

-Task-11: Take an example subnet graph with weights indicating delay between nodes. Now obtain Routing table art each node using distance vector routing algorithm.

Task-12: Take an example subnet of hosts. Obtain broadcast tree for it.

Text/reference Books:

1. Data Communications and Networking, Behrouz A. Forouzan , Fourth Edition TMH, 2006.
2. Computer Networks, Andrew S Tanenbaum, 4th Edition. Pearson Education, PHI.
3. Data communications and Computer Networks, P.C .Gupta, PHI.
4. An Engineering Approach to Computer Networks, S. Keshav, 2nd Edition, Pearson Education.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

ENVIRONMENTAL SCIENCE

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

Course Objectives:

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

Course Outcomes:

Based on this course, the Engineering graduate will

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

UnitI: ECOSYSTEMS

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

UnitII: NATURAL RESOURCES

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

UnitIII: 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.

UnitIV: 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.

UnitV: ENVIRONMENTAL POLICY, LEGISLATION & EIA

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

TEXT BOOKS:

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

REFERENCE BOOKS:

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

Academic Regulations

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY, HYDERABAD

DEPARTMENT OF INFORMATION TECHNOLOGY (B. Tech)

GR18 REGULATIONS

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

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

4. **Programme Pattern:**
   a) Each Academic year of study is divided 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 is 160.
   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	Course Description
1	BSC	Basic Science Courses	Basic Science Courses
2	ESC	Engineering Science Courses	Includes Engineering subjects
3	HSMC	Humanities and Social sciences	Includes Management courses
4	PCC	Professional Core Courses	Includes core subjects related to the parent discipline/ department/ branch of Engineering.
5	PEC	Professional Elective Courses	Includes elective subjects related to the parent discipline/ department/ branch of Engineering.
6	OEC	Open Elective Courses	Electives from other technical and/or emerging subjects
7	LC	Laboratory Courses	Laboratory Courses
8	MC	Mandatory Courses	Environmental Sciences, Induction training, Indian Constitution, Essence of Indian Traditional Knowledge
9	PROJ	Project Work	Project work, seminar and internship in industry or elsewhere

5. **Award of B. Tech Degree:** A student will be declared eligible for the award of B. Tech Degree if he/she fulfills the following 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 Information Technology 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 be condoned.

e) Students whose shortage of attendance is not condoned in any semester are detained and are not eligible to take their end examinations of that semester. They may seek 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 I	30	70	100
6	Project II	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 marks each for a duration of 2 hours. Average of the two mid exams shall be considered **i) Subjective - 15 marks** **ii) Objective - 5 marks** **2) Tutorials - 5 marks** **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-10 marks** **ii) Record - 5 marks** **iii) Continuous Assessment - 15 marks**
		70	Semester end examination	The semester-end examination is for a duration of 3 hours

d) **Mini Project:** 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.

e) **Main Project Phase–I and Phase-II:** The project work is evaluated for 100 marks. Out of 100, 30 marksshall be for internal evaluation and 70 marksfor 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 Project I and Project II.

f) Engineering Graphics:

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

8. **Recounting of Marks in the End Examination Answer Books:** A student can request for 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 credits can appear for a supplementary examination, as per the schedule announced by the College.
11. **Malpractices in Examinations:** Disciplinary action shall be taken in case of malpractices during Mid / End-examinations as per the rules framed by the Academic Council.
12. **Academic Requirements and Promotion Rules:**

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

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

S. No.	Promotion	Conditions to be fulfilled
1	First year first semester to first year second semester	Regular course of study of first year first semester.
2	First year second semester to second year first semester	(i) Regular course of study of first year second semester. (ii) Must have secured at least 50% credits up to first year second semester from all the relevant regular and supplementary examinations, whether the student takes those examinations or not.
3	Second year first semester to second year second semester	Regular course of study of second year first semester.
4	Second year second semester to third year first semester	(i) Regular course of study of second year second semester (ii) Must have secured at least 60% credits up to second year second semester from all the relevant regular and supplementary examinations, whether the student takes those examinations or not.

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

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

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

Earning of Credit:

A student shall be considered to have completed a course successfully and earned the credits if he/she secures an acceptable letter grade in the range O-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 ≥ 2.

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

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

14. **Award of Class:** After a student satisfies all the requirements prescribed for the completion of the Degree and becomes eligible for the award of B. Tech Degree by JNTUH, he/she shall be placed in one of the following four classes based on CGPA secured from the 160 credits.

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

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

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

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

18. General Rules

a) The academic regulations should be read as a whole for the purpose of any interpretation.

b) In the case of any doubt or ambiguity in the interpretation of the above rules, the decision of the Academic Council is final.

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

d) The college may change or amend the academic regulations or syllabi at any time and the changes or amendments made shall be applicable to all the students with effect from the dates notified by the college.

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

(Applicable for Batches Admitted from 2019-2020)

1. All regulations as applicable for B.Tech Four year degree programme (Regular) will hold good for B.Tech (Lateral Entry Scheme) except for the 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 123 credits and secure all credits. The marks obtained in all 123 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 or not.
3	Third year first semester to third year second semester.	Regular course of study of third year first semester.

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

3. **Award of Class:** After a student satisfies all the requirements prescribed for the completion ofthe Degree and becomes eligible for the award of B. Tech Degree by JNTUH, he/she shall be placed in one of the following four classes based on CGPA secured from the 123 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**

III YEAR I SEMESTER

S.NO.	Course Code	COURSE	Hours			Total Hours	Total Credits	Int	Ext	Marks
			L	T	P					
1		Software Engineering	3	0	0	3	3	30	70	100
2		Micro Controllers and Applications	3	0	0	3	3	30	70	100
3		Web Programming	3	0	0	3	3	30	70	100
4		Algorithms Analysis & Design Foundation	3	0	0	3	3	30	70	100
5		Professional Elective I	3	0	0	3	3	30	70	100
6		Micro Controllers and Applications and Lab	0	0	3	3	1.5	30	70	100
7		Web Programming Lab	0	0	3	3	1.5	30	70	100
8		Animations Lab	0	0	2	2	1	30	70	100
		Total	**15**	**0**	**8**	**23**	**19**	**240**	**560**	**800**
9		Constitution of India	2	0	0	2	2	30	70	100

III YEAR II SEMESTER

S.NO.	Course Code	COURSE	Hours			Total Hours	Total Credits	Int	Ext	Marks
			L	T	P					
1		Automata and Compiler Design	3	0	0	3	3	30	70	100
2		Fundamentals of Management &Entrepreneurship	3	0	0	3	3	30	70	100
3		Data warehousing and Data Mining	3	0	0	3	3	30	70	100
4		Unified Modelling Language	3	0	0	3	3	30	70	100
5		Open Elective I	3	0	0	3	3	30	70	100
6		Professional Elective II	3	0	0	3	3	30	70	100
7		Unified Modelling Language Lab	0	0	2	2	1	30	70	100
8		Data ware housing and Data Mining Lab	0	0	2	2	1	30	70	100
9		Mini Project with Seminar	0	0	6	6	3	30	70	100
10		Summer Internship	-	-	-	-	-			
Total			**18**	**0**	**10**	**28**	**23**	**270**	**630**	**900**

IV YEAR I SEMESTER

S.NO.	Course Code	COURSE	Hours			Total Hours	Total Credits	Int	Ext	Marks
			L	T	P					
1		Machine Learning	3	0	0	3	3	30	70	100
2		Internet of Things	3	0	0	3	3	30	70	100
3		Open Elective II	3	0		3	3	30	70	100
4		Professional Elective III	3	0		3	3	30	70	100
5		Professional Elective IV	3	0		3	3	30	70	100
6		Machine Learning Lab	0	0	3	3	1.5	30	70	100
7		Internet of Things Lab	0	0	3	3	1.5	30	70	100
8		Project Work (Phase-I)	0	0	12	12	6	30	70	100
		Total	**15**	**0**	**18**	**33**	**24**	**225**	**500**	**725**

IV YEAR II SEMESTER

S.NO.	Course Code	COURSE	Hours			Total Hours	Total Credits	Int	Ext	Marks
			L	T	P					
1		Open Elective III	3	0	0	3	3	30	70	100
2		Professional Elective V	3	0	0	3	3	30	70	100
3		Professional Elective VI	3	0	0	3	3	30	70	100
4		Project Work (Phase-II)	0	0	12	12	6	50	150	200
Total			**9**	**0**	**12**	**21**	**15**	**140**	**360**	**500**

Professional Electives

	Systems and Software Architecture	**Programming**	**Data Science and Machine Learning**	**Applications and Networking**
Professional Elective 1(III-I)	Artificial Intelligence	Principles of Programming Languages	Distributed Database and Systems	Computer Graphics
Professional Elective (III-II)	Advanced Linux Programming	Python and R Programming	E-Commerce	Image and video Processing
Professional Elective 3 (IV-I)	Software Testing Methodologies	Advanced Computer Networks	Information Retrieval Systems	Adhoc Sensor Network
Professional Elective 4 (IV-I)	Mobile Application Development	Scripting Languages	Soft Computing	Cryptography and Network Security
Professional Elective 5 (IV-II)	Embedded Systems	Essentials of Big Data Programming	Neural Networks and Deep Learning	Cloud Computing
Professional Elective 6 (IV-II)	Software Project Management	Middleware Technologies	Speech and Natural Language Processing	Storage Area Networks

OPEN ELECTIVES – 2 THREADS

S. No.	THREAD 1	THREAD 2
1	Soft Skills and Interpersonal Communication	CSE: 1. E-Commerce 2. Database Management Systems 3. Java Programming
2	Human Resource Development and Organizational Behavior	IT: 1. Multimedia and Application Development 2. Web Programming 3. Operating Systems
3	Cyber Law and Ethics	EEE: 1.Embedded Systems 2. Control Systems 3. Artificial Intelligence Techniques
4	History of Science	ECE: 1. Principles of Satellite Communications 2. Scientific Computing 3. Wavelets
5	Introduction to Art and Aesthetics	ME: 1.Operations Research 2. Automobile Engineering 3. Robotics
6	Economic Policies in India	CE: 1. Green Building Technology 2.Building Materials and Construction Planning 3. Introduction to Fluid Mechanics

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

SOFTWARE ENGINEERING

Course code: **L/T/P/C: 3/0/0/3**

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 Programing 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

Testing

Testing Concepts, Testing Process, Black Box Testing, White Box Testing, Unit testing, Code

Insepection, Metrics.

TEXT BOOKS

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

MICRO CONTROLLERS AND APPLICATIONS

Course code: **L/T/P/C: 3/0/0/3**

Course Objectives:

1. To describe the 8051 microcontroller architecture.
2. To explain the instruction set of 8051 microcontrollers.
3. To analyze assembly language programming concepts.
4. To interface various devices with 8051 microcontroller.
5. To create various programs to run several applications.

Course Outcomes:

1. Analyze the functionality of 8051 microcontroller
2. Write assembly language programs using 8051 instruction set.
3. Acquainted with design of microcontrollers.
4. Interface various devices with 8051 microcontroller.
5. Design various programs to run several applications.

UNIT-I

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

UNIT-II

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

UNIT-III

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

UNIT-IV

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

UNIT-V

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

Text Book

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

Reference Book

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

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

WEB PROGRAMMING

Course code: **L/T/P/C: 3/0/0/3**

Course Objectives

1. Learn to write syntactically correct web pages and describe the various tags related to HTML.
2. Learn to build XML and Java Bean applications that span multiple domains.
3. Describe server side programming for sessions conceptually and learn the concept to implement using cookies.
4. Develop a reasonably sophisticated web application using JSP that appropriately employs the MVC architecture
5. Develop skills in developing applications using concepts like JDBC, Servlets, JSP.

Course Outcomes

1. Develop web page using JavaScript for event handling which uses HTML tags and intrinsic event attributes.
2. Understand the concept and learn to use the building blocks of XML and Java Bean Components.
3. Build server side applications using servlets for web applications.
4. Design dynamic and interactive websites using JSP.
5. Design databases and Develop the supporting code for Client and Server-Side applications using JSP and Servlets.

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

UNIT - II:
XML: Introduction to XML, Building Blocks in XML, Document type definition, XML Schemas, Presenting XML.
Java Beans: Introduction to Java Beans, Advantages of Java Beans, Java Beans API and Features of Java Beans: Introspection, Bound properties, Constrained properties, Persistence, Customization.

UNIT - III:
Servlets: Introduction, Lifecycle, Generic Servlet Package, Reading parameters, Reading Initialization parameters, HTTP Servlet Package, Handling Http Request & Responses, Cookies, Session Tracking.

UNIT - IV:

JSP Application Development: The Problem with Servlet, The Anatomy of a JSP Page, JSP Processing, JSP Components: Directives, Action Elements, Scripting Elements, Tag Libraries, Expression Language, Java Bean Components, Deploying JAVA Beans in a JSP Page, Model View Controller, JSP Application Design with MVC Setting Up, Error Handling, Scope of Implicit Objects.

UNIT -V:

Database Access: Database Programming using JDBC, Studying javax.sql.* package, Steps to access database, Working with Prepared Statements, Accessing a Database from a Java/Servlet/JSP, Application – Specific Database Actions, Introduction to struts framework.

TEXT BOOKS:

1. Web Programming, building internet applications, Chris Bates 2nd edition, WILEYDreamtech
2. The complete Reference Java 2 Fifth Edition by Patrick Naughton and Herbert Schildt. TMH
   Java Server Pages –Hans Bergsten, SPD O'Reilly

REFERENCE BOOKS:

1. Programming world wide web-Sebesta,Pearson
2. Core SERVLETS ANDJAVASERVER PAGES VOLUME 1: CORE TECHNOLOGIES By Marty Hall and Larry Brown Pearson
3. Internet and World Wide Web – How to program by Dietel and Nieto PHI/Pearson Education Asia.
4. Jakarta Struts Cookbook , Bill Siggelkow, S P D O'Reilly for chap 8.
5. Murach's beginning JAVA JDK 5, Murach, SPD
6. An Introduction to web Design and Programming –Wang-Thomson.
7. Web Applications Technologies Concepts-Knuckles,John Wiley.
8. Programming world wide web-Sebesta,Pearson.
9. Web Warrior Guide to Web Programmming-Bai/Ekedaw-Thomas.
10. Beginning Web Programming-Jon Duckett WROX.
11. Java Server Pages, Pekowsky, Pearson.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

ALGORITHMS ANALYSIS & DESIGN FOUNDATION

Course code: **L/T/P/C: 3/0/0/3**

Course Objectives:

Upon completion of this course, students will be able to do the following:

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:

Students who complete the course will have demonstrated the ability to do the following:

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, asymptotic notations: big oh notation, omega notation, theta notation, little oh notation & little omega notation. . Review of Recurrence Relations and solution Techniques, Probabilistic Analysis of Algorithms – Examples.

Unit II:

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

Divide and Conquer

Divide and conquer: General method, applications, binary search, merge sort, strassen's matrix multiplication.

Randomization: General method, example: Randomized Quick Sort and its analysis

Unit-III:

Dynamic Programming:

General method, applications, matrix chain multiplication, optimal binary search trees, 0/1 knapsack problem, All pairs shortest path problem, travelling salesperson problem, reliability design, 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, graph coloring, Hamiltonian cycles.

Unit-V:
Branch and Bound:
General method, applications, travelling sales person problem, 0/1 knapsack problem: LC branch and bound solution, FIFO branch and bound solution
Complexity Classes: non deterministic algorithms, deterministic algorithms, relationship between P, NP, NP-completeness, circuit-satisfiability problem, 3-CNF satisfiability.

Textbooks:
T1. 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

T2. Cormen, Thomash H., Leiserson, Charles E., Rivest, Ronald L., & Stein, Clifford. Introduction to Algorithms. 3rd Edition. 2010.

T3. Goodrich, Michael T. & Roberto Tamassia, Algorithm Design, Wiley Singapore Edition, 2002.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

CONSTITUTION OF INDIA

Course code: **L/T/P/C: 3/0/0/3**

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

ARTIFICIAL INTELLIGENCE

Course code: **L/T/P/C: 3/0/0/3**

Course Objectives:

1. Understand different AI Environments, Agents and Applications.
2. Analyze the searching techniques and solve the problems.
3. Demonstrate Informed Search and Heuristic Search.
4. Applying Adversarial Search for solving problems
5. Illustrate various approaches for knowledge representation and inference techniques.

Course Outcomes:

1. Recall various AI applications and recognize different environments and agents.
2. Select appropriate searching technique for the problem.
3. Solve the problem using Informed Search and Heuristic Search.
4. Use Adversarial Search to solve the problems.
5. Express the statements using First Order Logic and Propositional Logic.

UNITI

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

UNIT II

Problem Solving: Solving Problems by Searching: Problem-Solving Agents, Example Problems, Searching for Solutions, Uninformed Search Strategies: Breadth-first search ,Depth-first ,Depth-limited , Iterative deepening depth-first search , Bidirectional ,Comparing uninformed search strategies, Avoiding Repeated States, Searching with Partial Information.

UNIT III

Informed Search and Exploration: Informed (Heuristic) Search Strategies: Greedy best-first search, A* search: Minimizing the total estimated solution cost, Memory-bounded heuristic search, Learning to search better. **Heuristic Functions:** The effect of heuristic accuracy on performance, Inventing admissible heuristic functions, Learning heuristics from experience, Local Search Algorithms and Optimization Problems.

UNIT IV

Adversarial Search: Games, Optimal Decisions in Games- Optimal strategies, The minimax algorithm, Optimal decisions in multiplayer games, Alpha-Beta Pruning, Imperfect. Real-Time

Decisions- Evaluation functions, Cutting off search, Games That Include an Element of Chance- Position evaluation in games with chance nodes, Complexity of expectiminimax, Card games, State-of-the-Art Game Programs.

UNIT V

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

First order logic: Inference in first order logic, propositional Vs. first order inference, unification & lifts forward chaining, Backward chaining, Resolution.

TEXT BOOKS

1. Artificial Intelligence – A Modern Approach. Second Edition, Stuart Russel, Peter Norvig, PHI/ Pearson Education.

REFERENCES

1. Artificial Intelligence, 2nd Edition, E.Rich and K.Knight (TMH).

2. Artificial Intelligence and Expert Systems – Patterson PHI.

3. Expert Systems: Principles and Programming- Fourth Edn, Giarrantana/ Riley, Thomson.

4. Artificial Intelligence, 3rd Edition, Patrick Henry Winston., Pearson Edition.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

PRINCIPAL OF PROGRAMMING

Course code: **L/T/P/C: 3/0/0/3**

Course Objectives: The Objective of this course is to provide
1. To understand the language constructs in different programming languages.
2. Compare and contrast syntax and semantics of a programming language.
3. To articulate different data types and control structures in different programming language.
4. To outline abstract data types, concurrency and exception handling
5. Summarize the logic programming language and functional programming language.

Course Outcomes: When a student completes this course, she/he should be able to
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, denotational semantics and axiomatic semantics for common programming language features.

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

UNIT - III

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

Subprograms and Blocks: Fundamentals of sub-programs, Scope and lifetime of variable, static and dynamic scope, Design issues of subprograms and operations, local referencing environments,

parameter passing methods, overloaded sub-programs, generic sub-programs, parameters that are sub-program names, design issues for functions, user defined overloaded operators, co routines.

UNIT - IV

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

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

3...Programming languages –Watt, Wiley Dreamtech

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

5. Programming in PROLOG Clocksin, Springer

6. Programming Languages: Concepts and Constructs by Ravi Sethi, Pearson Education

7. The Complete reference to Python-Martin Brown

8. .The complete reference to Php-Steven Holzner

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

DISTRIBUTED DATABASE AND SYSTEMS

Course code: **L/T/P/C: 3/0/0/3**

Course Objectives

1 To understand the architecture of Distributed databases.
2 To apply the concepts and techniques of distributed systems including principles, architectures, design, implementation and major domain of application.
3 To learn query processing techniques in DDBMS.
4 To understand transactional aspect and concurrency control of distributed systems
5 To learn the parallel database systems and architecture

Course Outcomes

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

1. Demonstrate system architecture based on distributed databases.
2. Illustrate the introductory distributed system concepts and its structures.
3. Develop the query processing techniques in DDBMS.
4. Understand transaction management and concurrency control of distributed systems
5. Discover the parallel database systems and its architecture.

UNIT I

Introduction: Distributed data processing, what is a Distributed Database System, Advantages and Disadvantages of DDBS, Design Issues, Overview of Database and Computer Network Concepts
Distributed DBMS Architecture: Transparencies in a distributed DBMS, Distributed DBMS architecture**.**

UNIT II

Distributed Database Design: Alternative design strategies, Distributed design issues, Fragmentation, Allocation
Semantic Data Control: View management, Data security, Semantic Integrity Control.

UNIT III

Overview of Query Processing: Query processing problem, Objectives of Query Processing, Complexity of Relational Algebra operations, characterization of Query processors, Layers of Query Processing, Query decomposition, Localization of distributed data
Optimization of Distributed Queries: Factors governing query optimization; Centralized query optimization; Ordering of fragment queries; Distributed query optimization algorithms

UNIT IV

Introduction to Transaction Management: Definition of Transaction, Properties of transaction, Types of transaction
Distributed Concurrency Control: Serializability theory, Taxonomy of concurrency control mechanisms, locking-based concurrency control algorithms, Timestamp-based concurrency control algorithms, Optimistic Concurrency Control Algorithms, Deadlock Management

UNIT V

Reliability: Reliability concepts and measures, Failures in Distributed DBMS, Local Reliability protocols, Distributed Reliability protocols, dealing with site failures, Network Partitioning
Parallel Database Systems
Parallel architectures; parallel query processing and optimization; load balancing

Text Books

1. Principles of Distributed Database Systems, Second Edition, M. Tamer Ozsu Patrick Valduriez.
2. Distributed Databases principles and systems, Stefano Ceri, Giuseppe Pelagatti, Tata McGraw Hill.

References

1. Fundamental of Database Systems, Elmasri & Navathe, Pearson Education, Asia.
2. Database System Concepts, Korth & Sudarshan, TMH.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

COMPUTER GRAPHICS

Course code: **L/T/P/C: 3/0/0/3**

Prerequisites:
Student should have knowledge of the following mathematical topics

- Vectors, vector operations, and vector spaces
- Matrices
- Basic linear algebra such as solving a system of linear equations
- Polynomials
- Elementary signal processing (Fourier transform and filtering)

Course Objectives:

1. To introduce 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. To learn the basic principles of 3- dimensional computer graphics.
3. Provide an understanding of how to scan and convert the basic geometrical primitives, how to transform the shapes to fit them as per the picture definition.
4. Provide an understanding of mapping from a world coordinates to device coordinates, clipping and projections.
5. To be able to discuss the application of computer graphics concepts in the development of computer games, information visualization and business applications.

Course Outcomes:

1. To list the basic concepts used in computer graphics.
2. To implement various algorithms to draw line, circle, scan and convert the basic geometrical primitives.
3. Understand the basics of different algorithms for drawing 2D primitives such as transformations, area filling and clipping.
4. To describe the importance of viewing and projections.
5. To 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 Antialising

UNIT-III

Two Dimensional Transformations-Introduction, Representation of points, Matrix Algebra and Transformation, Transformation of points, Transformation of straight line, Midpoint Transformation, Transformation of Parallel Lines, Transformation of Intersecting Lines, Rotation

Window Clipping- Introduction, Viewing Transformation, Clipping, Point Clipping, Line Clipping, Cohen-Sutherland Line clipping, Polygon Clipping, Sutherland-Hodgman Algorithm, Curve Clipping

UNIT-IV

3D Concepts and Techniques- Introduction, 3D Transformations, Rotation about an axis Parallel to a Coordinate Axis, Rotation about an Arbitrary Axis in Space, Reflection through an Arbitrary Plane, 3D Modeling Schemes, Projection, Orthographic Projection, Isometric Projection, Oblique Projection, perspective projection

Curves-Introduction, Parametric cubic polynomial curves, Solution of cubic polynomial curves, Bezier curves, Spline representation, Parametric and geometric continuity condition, Spline as piecewise polynomials, Spline as blending function, Closed curves based Spline, Changing knot spacing, Basis function for Spline curves, B-Spline basis functions, B-Spline with multiple knots

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 D Udai, TataMcGrawHill
2. Fundamentals of Multimedia,Ze-Nian Li, Mark S. Drew,Pearson Prentice Hall

Reference Books:

1. Multimedia and communications technology, Steve Heath, Elsevier
2.Mathematical Elements for Computer Graphics,2nd Edition, David F. Rogers, J. Alan Adams

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

MICRO CONTROLLERS AND APPLICATIONS LAB

Course code: **L/T/P/C: 0/0/3/1.5**

Course Objectives:

1. To analyze the code and build simple real time applications using microcontrollers.
2. To develop the skills to write and to upload the programs on LED patterns, Switches and LEDs.
3. To create the LCD and UART based programs.
4. To discriminate the control based programs.
5. To interpret Bluetooth and Zigbee transmitter and Receiver.

Course Outcomes:

1. Analyze the code and build simple real time applications using microcontrollers.
2. Develop the skills to write and to upload the programs on LED patterns, Switches and LEDs.
3. Create the LCD and UART based programs.
4. Discriminate the control based programs.
5. Interpret with Bluetooth and Zigbee transmitter and Receiver.

Task1. LED patterns

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

Task2. Switches & LEDs

a) Press switch to make corresponding LED on and off using delay function
b) First switch press, last LED on and off using delay function.

Task3. LCD

a) Character &string display on LCD,
b) Press switch1 to display string1 on first line of LCD
c) Press switch2 to display string2 on second line of LCD

Task4. UART

a) Echo Program – read a string from serial monitor and display it back on serial monitor
b) Take command from PC(serial monitor) & glow corresponding LED,
c) Press Switch & display switch number on PC(serial monitor),
d) Display data received by UART on LCD

Task5. TRIAC

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

Task6. Temperature Sensor – LM35

a) Read LM35 sensor data, convert the value into temperature and display it on serial monitor and on LCD

b) Read LM35 sensor data, convert the value into voltage and display it on serial monitor and on LCD with a message.
c) Read LM35 sensor data, convert the value into Fahrenheit and display it on serial monitor and on LCD with a message

Task7. Light Sensor – LDR

a) Read LDR sensor data and display it on serial monitor as well as on LCD

b) Read LDR sensor data and make the LED ON or OFF according LDR readings.

Task8. DC motor

a) Rotate motor Clock wise, Counter Clock wise and stop using switches

b) Rotate motor Clock wise, Counter Clock wise and stop using commands received from Hyper Terminal(serial monitor).

Task9. ZigBee

a) Receive data on ZigBee from PC ZigBee dongle and display data on LCD
d) Triac based control of light using data received on ZigBee.

Task10. Bluetooth

a) Transfer/receive data to/from PC using Bluelink & display data on LCD
b) Transfer data from mobile phone and receive using Blue link and control motor operation.

Task11. Ethernet

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

Task12. RTC

a) Read and display RTC data on LCD,
b) Read and display RTC data on Hyper Terminal

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WEB PROGRAMMING LAB

Course code: **L/T/P/C: 0/0/3/1.5**

Software's

1. XML editor like Altova Xml-spy [www.Altova.com/XMLSpy free]
2. A database either Mysql or Oracle
3. JVM(Java virtual machine) must be installed on your system
4. BDK(Bean development kit) must be also be installed
5. Apache Tomcat Sever

Course Objectives

1. Choose best technologies for solving web client/server problems.
2. Model JavaScript applications to validate web page form input entry
3. Create adaptive web pages for applications.
4. Demonstrate installing web server and database server applications.
5. Build applications using Java Bean and Servlets

Course Outcomes

1. Create web pages using HTML, DHTML and Cascading Styles sheets.
2. Design dynamic web pages using JavaScript (client side programming).
3. Apply the concepts of XML, Servlets, JSP and protocol usage in the workings of the web applications
4. Analyze a web page and identify its elements and attributes.
5. Create interactive web applications using JSP.

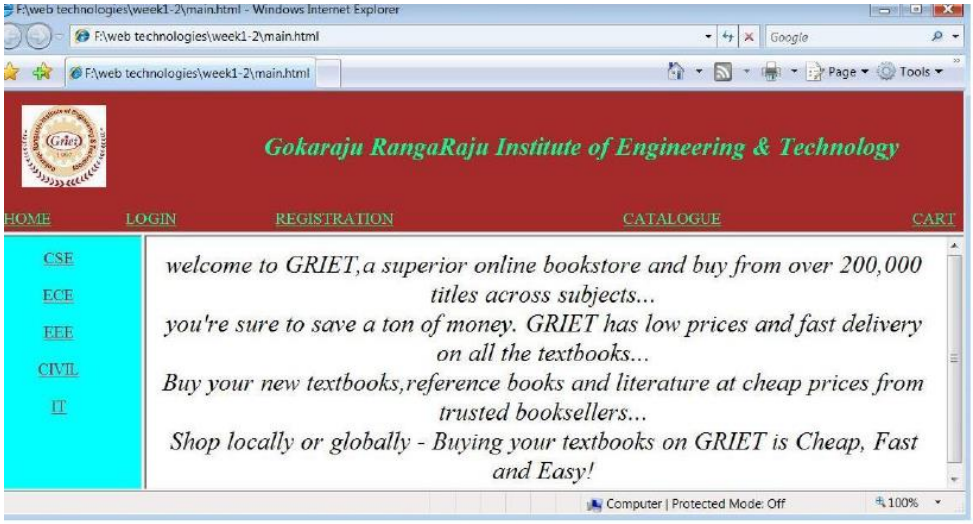
Task -1

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

Home Page: The static home page must contain three frames.

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

Right frame: The pages to the links in the left frame must be loaded here. Initially this page contains description of the web site.



Login Page

CATOLOGUE PAGE

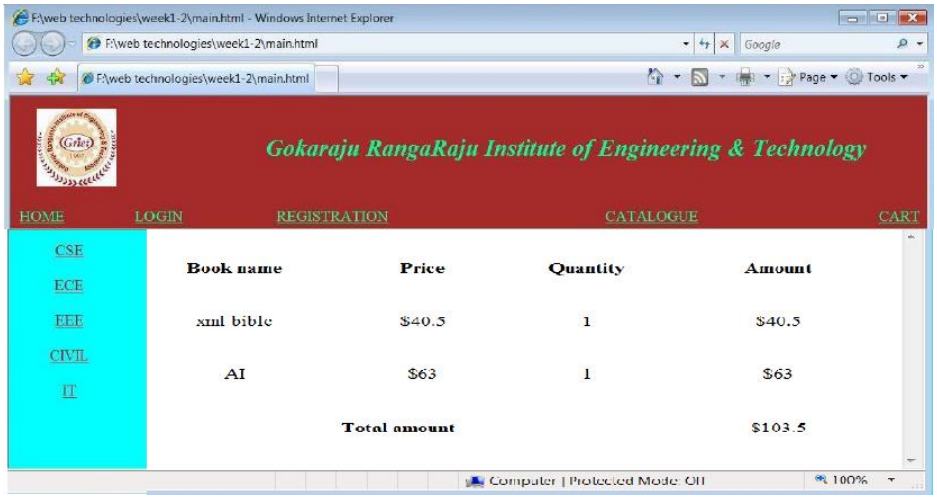
The catalogue page should contain the details of all the books available in the web site in a table.

The details should contain the following:

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

Note: Task 2 contains the remaining pages and their description.
Task -2

Cart Page
The cart page contains the details about the books which are added to the cart. The cart page should look like this:



Registration Page

Create a "registration form "with the following fields

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

Task-3

Validation

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

1. Name (Name should contains alphabets and the length should not be less than 6 characters).
2. Password (Password should not be less than 6 characters length).
3. E-mail id (should not contain any invalid and must follow the standard pattern name@domain.com)
4. Phone number (Phone number should contain 10 digits only).

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

Task-4

Design a web page using CSS (Cascading Style Sheets) which includes the following:

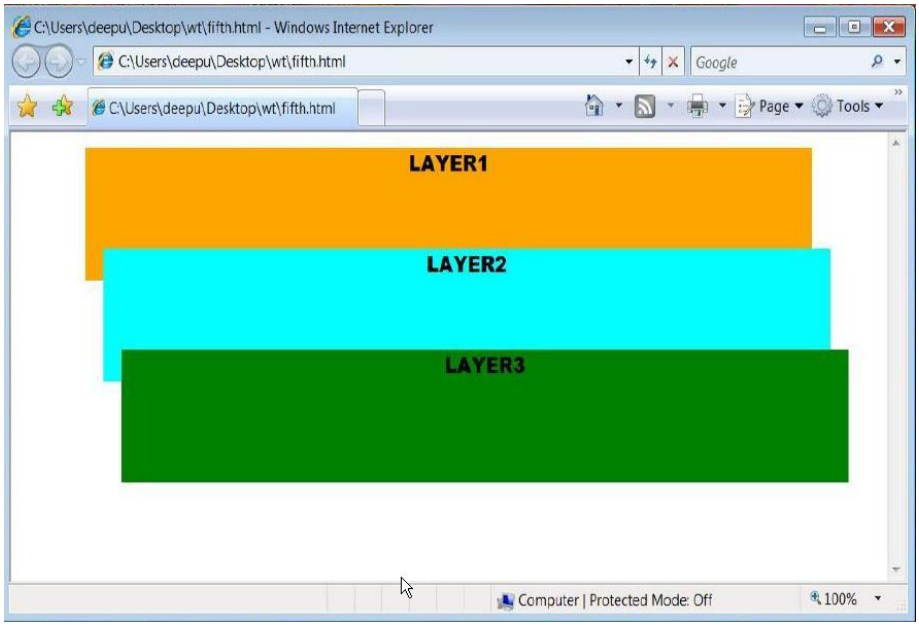
1. Use different font, styles: In the style definition you define how each selector should work (font, color etc.). Then, in the body of your pages, you refer to these selectors to activate the styles.

2. Set a background image for both the page and single elements on the page.

3. Control the repetition of the image with the background-repeat property. As background-repeat: repeat Tiles the image until the entire page is filled, just like an ordinary background image in plain HTML.

4. Define hyperlinks using links using A:link, A:visited, A:active, A:hover

5. Work with layers



6. Add a customized cursor like crosshair, help, wait, move, e-resize

Task-5

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

1. Title of the book
2. Author Name
3. ISBN number
4. Publisher name
5. Edition
6. Price

Write a Document Type Definition (DTD) to validate the above XML file. Display the XML file as follows. The contents should be displayed in a table. The header of the table should be in color GREY. And the Author names column should be displayed in one color and should be capitalized and in bold. Use your own colors for remaining columns. Use XML schemas XSL and CSS for the above purpose.

Task- 6

Visual Beans

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

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

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

Task-7

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

2. Access the above developed static web pages for books web site, using these servers by putting the web pages developed in week-1 and week-2 in the document root.
   Access the pages by using the urls http://localhost:4040/rama/books.html (for tomcat)
   http://localhost:8080/books.html (for Apache)

Task-8

User Authentication :

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

- Create a Cookie and add these four user id's and passwords to this Cookie.
- 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/she 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 ".

2. Repeat the same using by storing the 4 user ids and passwords in web.xml file using init-parameters.

Task-9

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

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

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

Task-10

Write a JSP which does the following job:

Insert the details of the 3 or 4 users who registered with the web site using week9 by using registration form. Authenticate the user when he submits the login form using the user name and password from the database.

Task-11

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

Task-12

HTTP is a stateless protocol. Session is required to maintain the state. The user may add some items to cart from the catalog page. He can check the cart page for the selected items. He may visit the catalogue again and select some more items. Here our interest is the selected items should be added to the old cart rather than a new cart. Multiple users can do the same thing at a time. This can be achieved through the use of sessions. Every user will have his own session which will be created after his successful login to the website. When the user logs out his session should get invalidated (by using the method session.invalidate()). Modify the catalogue and cart JSP pages to achieve the above mentioned functionality using sessions.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

ANIMATION LAB

Course code: **L/T/P/C: 0/0/2/2**

Week 1: An introduction of the various drawing and painting tools in Adobe Flash and their uses

Week 2: A clean up drawing from a provided pencil sketch using Adobe Flash.

Week 3: Design of a character displaying a pose from various perspectives.

Week 4: Clean up of various poses on multiple layers.

Week 5: Several short animations will be produced using a series of traditional animation procedures.

Week 6: Create a walk cycle in Adobe Flash.

Week 7: A study of traditional animation skills.

Week 8: Create a 360 degree turn around animation of a character's head using traditional pose-to-pose animation principles.

Week 9: Multi-plane and Shape Tweening

Week 10: Create a multi-plane scene with assets provided by the instructor

Week 11: Design assets and successfully create a shape tween.

Week 12: Instruction on the use of bones in Adobe Flash

Week 13: Introduction to various studio workflows used in the digital animation industry.

Week 14: Create a scene for animation using proper layout procedures.

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CONSTITUTION OF INDIA

Course code: **L/T/P/C: 0/0/3/1**

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

AUTOMATA AND COMPILER DESIGN

Course code: **L/T/P/C: 3/0/0/3**

Course Objectives:

1. Use the knowledge of Finite Automata and able to represent the language in form of Regular Expressions, Grammar and convert NFA to DFA and vice versa.
2. Understand different phases of the compiler, Lexical analyser and Top down parsing.
3. Demonstrate Bottom up parsing technique.
4. Illustrate memory management techniques during different phases.
5. Identify the effectiveness of optimization and differences between machine dependent and independent translation

Course Outcomes:

1. Express the statements in form of Regular Expression and Grammar using the knowledge of Finite Automata.
2. Identify the objectives of the phases of the compiler and explain lexical analysis phase and their connection to language definition through regular expressions and grammars.
3. Explain the syntax analysis phase and differentiate among various parsing techniques and grammar transformation techniques.
4. Analyze different memory management techniques during different phases of the compiler.
5. Differentiate machine dependent and independent translation of intermediate code.

UNIT I

Introduction: Alphabets, Strings and Languages; Automata and Grammars, Deterministic Finite Automata (DFA)-Formal Definition, Simplified notation: State transition graph, Transition table, Language of DFA, Nondeterministic Finite Automata (NFA), Equivalence of NFA and DFA, Minimization of Finite Automata, Regular Expressions, Arden's theorem.

UNIT II

Compiler Structure: Compilers and Translators, Various Phases of Compiler, Pass Structure of Compiler, Bootstrapping of Compiler. **Lexical Analysis**: The role of Lexical Analyser, The Lexical-Analyzer Generator Lex , **Syntax Analysis** : CFG, Lexical Versus Syntactic Analysis , Eliminating Ambiguity , Elimination of Left Recursion , Left Factoring , **Top-Down parsers**: Recursive-Descent Parsing, FIRST and FOLLOW, LL(1) Grammars, Non recursive Predictive Parsing, Error Recovery in Predictive Parsing.

UNIT III

Bottom–up Parsers: Reductions, Handle Pruning ,Shift-Reduce Parsing, Conflicts During

Shift-Reduce Parsing, Operator Precedence Parsers, LR parsers : SLR, Canonical LR, LALR, Using Ambiguous Grammars: Precedence and Associativity to Resolve Conflicts, The "Dangling-Else" Ambiguity , Parser Generators : YACC.

Intermediate Code Generation: Variants of Syntax Trees, Three-Address Code, Types and Declarations, Translation of Expressions, Type Checking, Control Flow, Switch-Statements, Intermediate Code for Procedures.

UNIT IV

Run Time Memory Management: Static and Dynamic storage allocation, stack based memory allocation schemes, Symbol Table management, Error Detection and Recovery: Lexical phase errors, Syntactic phase errors, Semantic errors

UNIT V

Code Optimization and Code Generation: Local optimization, Loop optimization, Peephole optimization, Basic blocks and flow graphs, DAG, Data flow analyzer, Machine Model, Order of evaluation, Register allocation and code selection.

TEXT BOOKS

1. Introduction to Theory of Computation.Sipser, 2nd Edition,Thomson.
2. Hopcroft, Ullman, “Introduction to Automata Theory, Languages and Computation”, Pearson Education
3. Compilers Principles, Techniques and Tools Aho, Ullman, Sethi, PearsonEducation

REFERENCES

1. Modern Compiler Construction in C , Andrew W.Appel Cambridge UniversityPress.
2. Compiler Construction, LOUDEN,Thomson.
3. Elements of Compiler Design, A. Meduna, Auerbach Publications, Taylor and FrancisGroup.
4. Principles of Compiler Design, V. Raghavan,TMH.
5. Engineering a Compiler, K. D. Cooper, L. Torczon,ELSEVIER.
6. Introduction to Formal Languages and Automata Theory and Computation - Kamala Krithivasan and Rama R,Pearson.
7. Modern Compiler Design, D. Grune and others,Wiley-India.
8. A Text book on Automata Theory, S. F. B. Nasir, P. K. Srimani, Cambridge Univ.Press.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

FUNDAMENTALS OF MANAGEMENT AND ENTREPRENEURSHIP

Course code: **L/T/P/C: 3/0/0/3**

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

DATAWAREHOUSING AND DATA MINING

Course code: **L/T/P/C: 3/0/0/3**

Prerequisites

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

Course Objectives: The Objective of this course is to provide

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

Course Outcomes: When a student completes this course, she/he should be able to

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.

Data Preprocessing: Need for Preprocessing the Data, Data Cleaning, Data Integration and Transformation, Data Reduction.

UNIT - II

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

UNIT - III

Mining Frequent Patterns, Associations and Correlations: Basic Concepts, Efficient and Scalable Frequent Itemset 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, Accuracy and Error measures, Evaluating the accuracy of a Classifier or a Predictor.

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

UNIT - V

Mining Streams, Time Series and Sequence Data: Mining Data Streams, Mining Time-Series Data, Mining Sequence Patterns in Transactional Databases.

Mining Object, Spatial, Multimedia, Text and Web Data: Multidimensional Analysis and Descriptive Mining of Complex Data Objects, Spatial Data Mining, Multimedia Data Mining, Text Mining, Mining the World Wide Web.

TEXT BOOKS:

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

REFERENCE BOOKS :

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

UNIFIED MODELLING LANGUAGE

Course code: **L/T/P/C: 3/0/0/3**

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

1. Understand static design view modeling in UML System
2. Understand dynamic design view modeling in UML System
3. Able to know the importance of the Software Design Process in Real time Systems
4. Design building blocks of the Software Intensive system
5. Assess the differences between object oriented modeling and structural modeling in real time systems. Demonstrate the Structural and Behavioral Modeling in UML System

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

1. Design the interface between classes and objects
2. Create class diagrams that model both the domain model and design model of a software system
3. Create interaction diagrams that model the dynamic aspects of a software system. Create use case documents that capture requirements for a software system.
4. Identify business classes, attributes and relationships and construct the domain model as a class diagram using Rational Rose Model. Construct Component and Deployment diagrams for Real time Systems
5. Model Forward and reverse engineering design for all UML Diagrams

UNIT I Introduction to UML: Importance of modeling, Principles of modeling, Object oriented modeling, conceptual model of the UML, Architecture, Software Development Life Cycle. Basic Structural Modeling: Classes, Relationships, common Mechanisms, and diagrams.

UNIT II Advanced Structural Modeling: Advanced classes, advanced relationships.
Class & Object Diagrams: Terms, concepts, Modeling Techniques for Class & Object Diagrams

UNIT III Basic Behavioral Modeling-I: Interactions, Interaction diagrams.
Basic Behavioral Modeling-II: Use cases, Use case Diagrams, Activity Diagrams.

UNIT IV Advanced Behavioral Modeling: Events and signals, State machines, processes and Threads, time and space, State chart diagrams.

UNIT V Architectural Modeling: Component, Deployment, Component diagrams and Deployment diagrams.
Case Study: The Unified Library application

TEXT BOOKS 1.

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

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

MULTIMEDIA AND APPLICATION DEVELOPMENT

Course code: **L/T/P/C: 3/0/0/3**

Course Objectives: The Student will be able to

1. Understand the constraints on multimedia systems and the range of technologies available to multimedia systems designers and integrators.
2. Learn and understand technical aspect of Multimedia Systems.
3. Understand the standards available for different audio, video and text applications.
4. Design and develop various Multimedia Systems applicable in real time.
5. Learn various multimedia authoring systems.

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

1. Understand various file formats for audio, video and text media.
2. Develop various Multimedia Systems applicable in real time.
3. Design interactive multimedia software.
4. Evaluate multimedia application for its optimum performance.
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.

UNIT - II

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 - III

Action Script I: ActionScript Features, Object-Oriented ActionScript, Data types and Type Checking, Classes, Authoring an ActionScript Class.

UNIT - IV

Action Script II : Inheritance, Authoring an ActionScript 2.0 Subclass, Interfaces, Packages, Exceptions.

Application Development : An OOP Application Frame work, Using Components with ActionScript MovieClip Subclasses.

UNIT - V

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

TEXT BOOKS :

1. Fudamentals of Multimedia by Ze-Nian Li and Mark S. Drew PHI/Pearson Education.
2. Essentials ActionScript 2.0, Colin Moock, SPD O,REILLY.

REFERENCES :

1. Digital Multimedia, Nigel chapman and jenny chapman, Wiley-Dreamtech
2. Macromedia Flash MX Professional 2004 Unleashed, Pearson.
3. Multimedia and communications Technology, Steve Heath, Elsevier(Focal Press).

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

UNIX PROGRAMMING

Course code: **L/T/P/C: 3/0/0/3**

Course Objectives

1. Comprehend different file handling utilities, process utilities, disk utilities and network utilities and explore various procedures for shell programming
2. Understand the kernel in file and directory management
3. Explore the process and signal handling concepts of UNIX operating system
4. Learn to create IPC using pipes, FIFOs and concurrency management
5. Demonstrate the ability to work with SYSTEM V IPC

Course Outcomes

1. Experiment with different utilities of UNIX and work with various shell scripts.
2. Demonstrate the usage of various system calls for file and directory management
3. Develop the ability to implement various process and signal handling mechanisms of UNIX
4. Select the appropriate mechanism for working with IPC using pipes, named pipes along with concurrency management
5. Interpret the usage of system calls for SYSTEM-V IPC using programs

UNIT-I

Unix Utilities-Introduction to Unix file system, file handling utilities, process utilities, disk utilities, networking utilities detailed commands to be covered are cp, mv, rm, unlink, mkdir, rmdir, du, df, mount, umount, find, unmask, ulimit, ps, who, w, finger, ftp, telnet, text processing utilities and backup utilities, detailed commands to be covered are cat, tail, head, sort, nl, uniq, grep, egrep, fgrep, cut, paste, join, tee, comm, cmp, diff, tr, tar.

Working with the Bourne shell: shell responsibilities, shell meta characters, shell variables, shell commands, control structures, shell script examples.

UNIT-II

Unix Files: Unix file structure, low level file access system calls, usage of open, creat, read, write, close, lseek, stat, fstat, umask, dup, dup2. Formatted I/O, streams and file descriptors, file and directory maintenance system calls chmod, chown, unlink, link, symlink, mkdir, rmdir, chdir, getcwd, Directory handling system calls opendir, readdir, closedir, rewinddir, seekdir, telldir.

UNIT-III

Unix Process and Signals: process structure, starting new process, waiting for a process, zombie process, process control, system call interface for process management-fork, vfork, exit, wait, waitpid, exec, system, **Signals**- Signal functions, unreliable signals, kill, raise, alarm, pause, abort, sleep functions.

UNIT-IV

Interprocess Communication Overview: Introduction to IPC, IPC between processes on a single computer system, file and record locking, other Unix locking techniques, pipes, FIFOs,

streams and messages, namespaces, introduction to three types of IPC(system-V)-message queues, semaphores and shared memory.

UNIT-V

Message Queues-Unix system-V messages, unix kernel support for messages, unix APIs for messages, client/server example. Semaphores-Unix system-V semaphores, unix kernel support for semaphores, unix APIs for semaphores, file locking with semaphores. Shared Memory-Unix system-V shared memory, unix kernel support for shared memory, unix APIs for shared memory, semaphore and shared memory example.

Text Books:

1. Unix the ultimate guide, Sumitabha Das, TMH
2. Unix Network Programming, W.R.Stevens, Pearson/PHI

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

PYTHON AND R PROGRAMMING

Course code: **L/T/P/C: 3/0/0/3**

COURSE OBJECTIVES:

1. To know the basics of Python variables, expressions, statements, develop programs with conditionals and loops.
2. To define Python functions and call them, and usage of Strings
3. To use Python data structures –-lists, tuples, dictionaries.
4. To do input/output with files and Regular expressions in Python
5. To know the basics of R variables, expressions, statements, develop programs with conditionals and loops.

COURSE OUTCOMES:

Upon completion of the course, students will be able to

1. Structure simple Python programs for solving problems, and to decompose a Python program into functions.
2. Represent compound data using Python lists, tuples, and dictionaries.
3. Read and write data from/to files in Python Programs.
4. Structure simple R programs for solving problems, and to decompose a Python program into functions
5. Represent compound data using R Vectors, Lists, Matrices, Data frames

UNIT I

Introduction to Python interpreter and interactive mode; values and types: int, float, boolean, string, and list; variables, expressions, statements, tuple assignment, precedence of operators, comments; modules and functions, function definition and use, flow of execution, parameters and arguments; Conditionals: Boolean values and operators, conditional (if), alternative (if-else), chained conditional (if-elif-else); Iteration: state, while, for, break, continue, pass;

UNIT II

Functions: return values, parameters, local and global scope, function composition, recursion; **Strings:** string slices, immutability, string functions and methods, string module; Lists as arrays. **Lists:** list operations, list slices, list methods, list loop, mutability, aliasing, cloning lists, list parameters; Tuples: tuple assignment, tuple as return value; Dictionaries: operations and methods; advanced list processing -list comprehension.

UNIT III

Files and exception: text files, reading and writing files, format operator; command line arguments, errors and exceptions, handling exceptions, modules, packages; Regular expressions.

UNIT IV

Introduction to R, syntax, data types, variables, operators, decision making, loops, Functions:

defining functions, built-in functions, user defined functions, String manipulation.

UNIT V

Vectors, Lists, Matrices, Arrays, Data frames, Factors, Packages using R.

TEXT BOOKS:

1. Allen B. Downey, ``Think Python: How to Think Like a Computer Scientist‘‘, 2ndedition, Updated for Python 3, Shroff/O‘Reilly Publishers,
2. Guido van Rossum and Fred L. Drake Jr, ―An Introduction to Python –Revised and updated for Python 3.x
3. The Art of R Programming, Norman Matloff, Cengage Learning
4. R for Everyone, Lander, Pearson

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

E-COMMERCE

Course code: **L/T/P/C: 3/0/0/3**

Course Objectives:

1. Identify the major categories and trends of e-commerce applications.
2. Identify the essential processes of an e-commerce system.
3. Define various electronic payment types and associated security risks and the ways to protect against them..
4. Understand the main technologies behind e-commerce systems and how these technologies interact.
5. Discuss the various marketing strategies for an online business.

Course Outcomes:

After completion of course, students would be able to:

1. Summarize nature and types of e-commerce.
2. Differentiate all types of business models.
3. Plan suitable software, hardware and e-com tools for developing a better web application.
4. Implement a robust, safe and secured online payment system.
5. Recognize online content and management.

UNIT-I:

E-Commerce: Electronic Commerce-Frame work, anatomy of E-Commerce applications, E-commerce Consumer applications, E-Commerce organization applications.

Consumer Oriented Electronic commerce: Consumer-Oriented Applications, Mercantile Process Models, Mercantile Models from the Consumer's Perspective, and Mercantile Models from the Merchant's Perspective.

UNIT-II:

Business Models for E-commerce: Business-to-Consumer (B2C),Business-to-Business(B2B), Consumer-to-Consumer (C2C),Consumer-to-Business(C2B).

Electronic Payment Systems: Types of Electronic Payment System, Smart Cards, Credit Cards, Risks and Electronic Payment System.

Inter Organizational Commerce and EDI: Electronic Data Interchange, Standardization and EDI, EDI Software Implementation, Value-Added Networks(VANs).

UNIT-III

Intra Organizational Commerce - work Flow Automation and Coordination, Customization and internal Commerce, Supply chain Management.

Corporate Digital Library - Document Library, digital Document types, corporate Data Warehouses.

UNIT-IV

Electroinc Commerce and World Wide Web: Architectural Framework for Electronic Commerce, World Wide Web(WWW) as the Architecture, Web Background:Hypertext

Publishing,Technology behind the Web.
Advertising and Marketing - Information based marketing, Advertising on Internet, on-line marketing process, market research.
Consumer Search and Resource Discovery - Information search and Retrieval, Commerce Catalogues, Information Filtering

UNIT-V
Multimedia - key multimedia concepts, Digital Video and electronic Commerce, Desktop video processing's, Desktop video conferencing.

Text Books:
1. Frontiers of electronic commerce – Kalakata, Whinston, Pearson.
2. E-COMMERCE: An Indian Perspective,3rd edition P.T.Joseph,S.J.

Reference Books:

1. Hochreiter, Sepp, and Jargen Schmidhuber. "Long short-term memory." Neural computation 9.8 (1997).
2. E-Commerce fundamentals and applications Hendry Chan, Raymond Lee, TharamDillon, Ellizabeth Chang, John Wiley.
3. Bengio, Yoshua. "Learning deep architectures for AI." Foundations and trends in Machine Learning 2.1 (2009).
4. E-Commerce, Efrain Turbon, Jae Lee, David King, H.Michael Chang.
5. Electronic Commerce – Gary P.Schneider – Ce yngage Learning..
6. E-Commerce – Business, Technology, Society, Kenneth C.Taudon, Carol Guyerico Traver.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

IMAGE AND VIDEO PROCESSING

Course code: **L/T/P/C: 3/0/0/3**

Course Objectives:

1. Understand the fundamentals and mathematical models in digital image and video processing.
2. Develop time and frequency domain techniques for image enhancement.
3. Describe the current technologies and issues in image and video processing.
4. Develop image and video processing applications in practice.
5. Explain Two-Dimensional Motion Estimation.

Course outcomes: Students will be able to

1. Recognize the procedures and concepts involved in Image and Video Processing.
2. Interpret and analyze 2D signals in frequency domain through image transforms.
3. Apply quantitative models of image and video processing for various engineering applications.
4. Develop innovative design for practical applications in various field.
5. Design various two Dimensional Motion Estimation.

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. Image Segmentation: Segmentation concepts, Point, Line and Edge Detection, Thresholding , Region based segmentation.

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.

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. Gonzaleze and Woods, "Digital Image Processing", 3rd Edition, Pearson.
2. Yao Wang, Joem Ostermann and Ya–quin Zhang, "Video Processing and Communication",1st Edition, PH Int.

REFRENCE BOOKS:

1. Gonzaleze and Woods, "Digital Image Processing using MATLAB", 2nd Edition, McGraw Hill Education, 2010
2. Milan Sonka, Vaclan Hlavac, "Image Processing Analysis , and Machine Vision", 3rd Edition, CENGAGE, 2008
3. A Murat Tekalp, "Digital Video Processing", PERSON, 2010
4. S. Jayaraman, S. Esakkirajan, T. Veera Kumar, "Digital Image Processing", TMH, 2009

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

UNIFIED MODELLING LANGUAGE LAB

Course code: **L/T/P/C: 0/0/2/1**

Course Objectives:

1. Analyze and design with object-oriented method in unified modelling language.
2. Construct various UML models including use case diagrams, class diagrams, interaction diagrams, statechart diagrams, activity diagrams, and implementation diagrams using the appropriate notation.
3. To describe the behavior of the system as seen by its end users, analysts, and testers
4. To prepare system modeling using unified modeling language.
5. Understand dynamic design view modeling in UML System.

Course outcomes:

1. An ability to learn analysis and design of a business process and system as a whole by using uml.
2. An ability to apply forward and reverse engineering of system using uml with a team effort.
3. An ability to distinguish the different uml diagrams.
4. An ability to learn how to apply the UML to a number of common modeling techniques.
5. Show the role and function of each UML model in developing object oriented software.

I.UML diagrams to be developed are:

- Use Case diagram.
- Class diagram.
- Sequence diagram.
- Collaboration diagram.
- State diagram.
- Activity diagram
- Component Diagram
- Deployment Diagram.

II. Case Studies:

- Hospital Management System
- Library Management System
- Railway reservation system.
- Airport check-in and security screening business model.
- Restaurant business model

TEXT BOOKS

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

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

DATAWAREHOUSING AND DATA MINING LAB

Course code: **L/T/P/C: 0/0/2/1**

Prerequisites

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

Course Objectives: The Objective of this course is to provide

1. Basic concepts of creating tables in attribute relation file format
2. Idea of using attribute relation file format table for data analysis.
3. Knowledge on various pre-processing techniques.
4. Skill in implementing various data mining functionalities.
5. Appropriate mining algorithm using weka tool to solve real time problems.

Course Outcomes: When a student completes this course, she/he should be able to

1. Learn the concept of creating database tables in attribute relation file format (.arff).
2. Design a database tables in .arff format and insert, modify 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 a quarter).
- Own_telephone: German phone rates are much higher than in Canada, so fewer people own telephones.
- Foreign_worker: There are millions of these in Germany (many from Turkey). It is very hard to get German citizenship if you were not born of German parents.
- There are 20 attributes in judging a loan applicant. The goal is to classify the applicant into two categories: good or bad.

Task 1: List all the categorical (or nominal) attributes and the real-valued attributes separately. What attributes do you think might be crucial in making the credit assessment? Come up with some simple rules in plain English using your selected attributes. One type of model that you can create is a Decision Tree - train a Decision Tree using the complete dataset as the training data. Report the model obtained after training.

Task 2: Suppose you use your above model (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 j48 algorithm
(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 KMeans Algorithm.

Task 12: Demonstration of clustering rule process on dataset student.arff using simple k-means

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

MACHINE LEARNING

Course code: **L/T/P/C: 3/0/0/3**

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 Compare different machine learning models.
2. Apply Supervised Learning models
3. Design Neural Network models for the given data.
4. Devise un-supervised model with optimized features.
5. Perform Evaluation of Machine Learning algorithms and Model Selection.

Unit-I

Introduction: Introduction to Machine learning, Supervised learning, Unsupervised learning, Reinforcement learning. Deep learning.

Terminology: Regularization, overfitting, underfitting, bias-variance trade off, feature selection, feature normalization, confusion matrix, cross-validation, learning curves, gradient descent.

Unit-II

Supervised Learning – I (Regression/Classification)-

Basic methods: Distance-based methods, Nearest-Neighbours, Decision Trees, Naive Bayes

Linear models: Linear Regression, Logistic Regression, Generalized Linear Models, Support Vector Machines, Nonlinearity and Kernel Methods,

Beyond Binary Classification: Multi-class/Structured Outputs, Ranking

Unit-III

Supervised Learning – II (Neural Networks)

Neural Network Representation – Problems – Perceptrons – Multilayer Networks and Back Propagation Algorithms.

Foundations of Convolutional Neural Networks - Convolution and Pooling, the basics of ConvNets, Recurrent Neural Networks (RNN).

Unit-IV

Unsupervised Learning

Clustering: K-means/Kernel K-means, Gaussian Mixture Models, Expectation Maximization

Dimensionality Reduction: PCA and kernel PCA Matrix Factorization and Matrix Completion - Generative Models (mixture models and latent factor models)

Unit-V

Reinforcement Learning: Exploration and exploitation tradeoffs, non-associative learning, Markov decision processes, Q-learning.

Evaluating Machine Learning algorithms and Model Selection, Introduction to Statistical Learning Theory.

Ensemble Methods: Boosting, Bagging, Random Forests

Text Books

1. Machine Learning – Tom M. Mitchell, - MGH
2. Kevin Murphy, Machine Learning: A Probabilistic Perspective, MIT Press, 2012
3. R. S. Sutton and A. G. Barto. Reinforcement Learning - An Introduction. MIT Press. 1998.

Reference Books

1. Trevor Hastie, Robert Tibshirani, Jerome Friedman, The Elements of Statistical Learning, Springer 2009
2. Christopher Bishop, Pattern Recognition and Machine Learning, Springer, 2007.
3. Machine Learning Yearning, Andrew Ng.
4. DataMining–Conceptsand Techniques -Jiawei Han and Micheline Kamber, Morgan Kaufmann

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

INTERNET OF THINGS

Course code: **L/T/P/C: 3/0/0/3**

Course Objectives:

1. Study Vision and Introduction to IoT.
2. Understand IoT Market perspective.
3. Understand Data and Knowledge Management and use of Devices in IoT Technology.
4. Understand State of the Art – IoT Architecture.
5. Learn Real World IoT Design Constraints, Industrial Automation and Commercial Building Automation in IoT.

Course Outcomes

1. Explain the vision of IoT from a global context.
2. Determine the Market perspective of IoT.
3. Examine Devices, Gateways and Data Management.
4. Describe the building state of the IoT architecture.
5. Apply IoT in Industrial and Commercial Building Automation and Real World Design Constraints

UNIT-I

IoT and Web Technology: The Internet of Things Today, Time for Convergence Towards the IoT Universe, Internet of Things Vision, IoT Strategic Research and Innovation Directions, IoT Applications, Future Internet Technologies, Infrastructure, Networks and Communication, Processes, Data Management, Security, Privacy & Trust.

UNIT-II

M2M to IoT : A Basic Perspective: Introduction, Some Definitions, M2M Value Chains, IoT Value Chains, An emerging industrial structure for IoT, The international driven global value chain and global information monopolies.

UNIT-III

M2M to IoT: An Architectural Overview: Building an architecture, Main design principles and needed capabilities, An IoT architecture outline, standards considerations.

UNIT-IV

IoT Architecture - State of the Art: Introduction, State of the art.
Architecture Reference Model: Introduction, Reference Model and architecture, IoT reference Model.

UNIT-V

IoT Applications for Value Creations: Introduction, IoT applications for industry: Future Factory Concepts, Brownfield IoT, Smart Objects, Smart Applications, Four Aspects in your Business to Master IoT, Value Creation from Big Data and Serialization, IoT for Retailing

Industry, IoT in Home Management, IoT in eHealth.

Text Book:

1. Jan Holler, Vlasios Tsiatsis, Catherine Mulligan, Stefan Avesand, Stamatis Karnouskos, David Boyle: "From Machine-to-Machine to the Internet of Things: Introduction to a New Age of Intelligence", 1st Edition.

Reference Books:

1. Vijay Madisetti, Arshdeep Bahga : "Internet of Things (A Hands-on-Approach)", 1st Edition, VPT, 2014. 2.
2. Francis daCosta: "Rethinking the Internet of Things: A Scalable Approach to Connecting Everything", 1st Edition, Apress Publications, 2013.

E-Resources:

1. https://github.com/connectIOT/iottoolkit
2. https://www.arduino.cc/
3. http://www.zettajs.org/
4. Contiki (Open source IoT operating system) 5. Arduino (Open source IoT project)

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

WEB PROGRAMMING

Course code: **L/T/P/C: 3/0/0/3**

Course Objectives

1. Learn to write syntactically correct web pages and describe the various tags related to HTML.
2. Learn to build XML and Java Bean applications that span multiple domains.
3. Describe server side programming for sessions conceptually and learn the concept to implement using cookies.
4. Develop a reasonably sophisticated web application using JSP that appropriately employs the MVC architecture
5. Develop skills in developing applications using concepts like JDBC, Servlets, JSP.

Course Outcomes

1. Develop web page using JavaScript for event handling which uses HTML tags and intrinsic event attributes.
2. Understand the concept and learn to use the building blocks of XML and Java Bean Components.
3. Build server side applications using servlets for web applications.
4. Design dynamic and interactive websites using JSP.
5. Design databases and Develop the supporting code for Client and Server-Side applications using JSP and Servlets.

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

UNIT - II:
XML: Introduction to XML, Building Blocks in XML, Document type definition, XML Schemas, Presenting XML.
Java Beans: Introduction to Java Beans, Advantages of Java Beans, Java Beans API and Features of Java Beans: Introspection, Bound properties, Constrained properties, Persistence, Customization.

UNIT - III:
Servlets: Introduction, Lifecycle, Generic Servlet Package, Reading parameters, Reading Initialization parameters, HTTP Servlet Package, Handling Http Request & Responses, Cookies, Session Tracking.

UNIT - IV:

JSP Application Development: The Problem with Servlet, The Anatomy of a JSP Page, JSP Processing, JSP Components: Directives, Action Elements, Scripting Elements, Tag Libraries, Expression Language, Java Bean Components, Deploying JAVA Beans in a JSP Page, Model View Controller, JSP Application Design with MVC Setting Up, Error Handling, Scope of Implicit Objects.

UNIT -V:

Database Access: Database Programming using JDBC, Studying javax.sql.* package, Steps to access database, Working with Prepared Statements, Accessing a Database from a Java/Servlet/JSP, Application – Specific Database Actions, Introduction to struts framework.

TEXT BOOKS:

1. Web Programming, building internet applications, Chris Bates 2nd edition, WILEYDreamtech
2. The complete Reference Java 2 Fifth Edition by Patrick Naughton and Herbert Schildt. TMH
   Java Server Pages –Hans Bergsten, SPD O'Reilly

REFERENCE BOOKS:

1. Programming world wide web-Sebesta,Pearson
2. Core SERVLETS ANDJAVASERVER PAGES VOLUME 1: CORE TECHNOLOGIES By Marty Hall and Larry Brown Pearson
3. Internet and World Wide Web – How to program by Dietel and Nieto PHI/Pearson Education Asia.
4. Jakarta Struts Cookbook , Bill Siggelkow, S P D O'Reilly for chap 8.
5. Murach's beginning JAVA JDK 5, Murach, SPD
6. An Introduction to web Design and Programming –Wang-Thomson.
7. Web Applications Technologies Concepts-Knuckles,John Wiley.
8. Programming world wide web-Sebesta,Pearson.
9. Web Warrior Guide to Web Programmming-Bai/Ekedaw-Thomas.
10. Beginning Web Programming-Jon Duckett WROX.
11. Java Server Pages, Pekowsky, Pearson.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

SOFTWARE TESTING METHODOLOGIES

Course code: **L/T/P/C: 3/0/0/3**

Course Objectives:

The objective of this course is to provide the student:

1. Identify types of bugs and adopt a model for testing various bugs.
2. Apply path testing strategies various applications softwares
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:

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

- Create a model for testing and criticize various consequences of bugs.
- Apply a path testing technique for a given software.
- Apply various Data flow testing techniques for exploring Data Bugs and Domain Bugs.
- Design test cases based on decision tables for a given logical construct.
- 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 - BarisBeizer, Dreamtech, second edition.
2. Software Testing Tools – Dr.K.V.K.K.Prasad, Dreamtech.

REFERENCE BOOKS:

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

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

ADVANCED COMPUTER NETWORKS

Course code: **L/T/P/C: 3/0/0/3**

Course Objectives:

Students undergoing this course are expected to

1. Identify different transmission media used for wired networks and wireless networks.
2. Analyze the functionalities of various kinds of networking devices used for Communication.
3. Design different Routing technologies involved to route packets with respect to Unicasting, Broadcasting and Multicasting.
4. Compare Internet protocol (IP), Transmission Control Protocol (TCP) and User Datagram Protocol (UDP).
5. Learn routing procedure in Cellular Networks, Wireless Mesh Networks and Optical Systems

COURSE OUTCOMES:

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

1. Compare different kinds of transmission media for wired networks and wireless networks.
2. Construct various networking devices used for different networks.
3. Implement routing methods and protocols for unicasting, broadcasting and multicasting Communication.
4. Compare the functionalities of Internet protocol (IP), Transport Control Protocol (TCP) and User Datagram Protocol (UDP).
5. Validate various routing procedures used in Cellular Networks, Wireless Mesh Networks and Optical Networks.

UNIT-I

Computer Networks and the Internet: What is the Internet, The Network edge, The Network core, Access Networks and Physical Media, ISPs and Internet Backbones, Delay and Loss in Packet-Switched Networks. Foundation of Networking Protocols: 5-layer TCP/IP Model, 7-Layer OSI Model, Equal-Sized Packets Model-ATM

UNIT-II

The Link Layer and Local Area Networks: Link Layers: Introduction and Services, Error-Detection and Error-Correction techniques, Multiple Access protocols, Link Layer Addressing, Point to Point Protocol (PPP)

Networking Devices: Multiplexers, Modems and Internet Access Devices, Switching and Routing Devices, Router Structure. Routing and Internetworking: Network-Layer Routing, Least –cost-path algorithms, non-least-cost-path algorithms, Intra-domain Routing Protocols, Inter-domain Routing Protocols, Congestion control at Network Layer

UNIT-III

Logical Addressing: IPV4 Addresses, IPV6 Addresses –Internet Protocol: Internetworking,

IPV4,IPV6, Transitions from IPV4 to IPV6 –Multicasting Techniques and Protocols: Basic Definitions and Techniques, Intra-domain Multicast Protocols, Inter-domain Multicast Protocols. Transport and End-to-End Protocols: Transport Layer, Transmission Control Protocols (TCP),User Datagram Protocol (UDP) Applications, The Web and HTTP, FTP, Electronic Mail in the Internet, Domain Name System (DNS) , P2P File sharing, Socket Programming with TCP and UDP

UNIT-IV

Wireless Networks and Mobile IP: Infrastructure of Wireless Networks, Wireless LAN Technologies, IEEE 802.11 Wireless Standard, Cellular Networks, Mobile IP, Wireless Mesh Networks (WMNs)Optical Networks and WDM Systems: Overview of Optical Networks, Basic Optical Networking Devices, Large-Scale Optical Switches, Optical Routers, Wavelength Allocations in Networks, Case Study: An All-optical Switch

UNIT-V

VPNs, Tunneling and Overlay Networks: Virtual Private Networks(VPNs) , Multiprotocol Label Switching(MPLS), Overlay Networks –VoIP and Multimedia Networking : Overview of IP Telephony , VoIP Signaling Protocols, Real-Time Media Transport Protocols, Stream Control Transmission Protocol-Mobile A-Hoc Networks : Overview of Wireless Ad-Hoc Networks, Routing in Ad-Hoc Networks, Routing Protocols for Ad-Hoc Networks.

TEXT BOOKS

1. 1.Computer Networking: A Top Down Approach Featuring the Internet, James F. Kurose,Keith W. Ross, Third edition, Pearson Education,2007.
2. Computer and Communication networks, Nader F. Mir, Pearson Education, 2007.

REFERENCE BOOKS

1. Data communications and Networking, Behrouz Z. Forouzan, Fourth Edition, Tata McGraw Hill, 2007
2. Guide to Networking Essentials, Greg Tomsho, Ed Title, David Johnson, Fifth Edition, Thomson.
3. An Engineering Approach to Computer Networking, S. Keshav, Pearson Education.
4. 4Campus Network design Fundamentals, Diane Teare, Catherine Paquet, Pearson Education (CISCO Press)5.Computer Networks, Andrew S. Tanenbaum, Fourth Edition,

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INFORMATION RETRIEVAL SYSTEMS

Course code: **L/T/P/C: 3/0/0/3**

Course Objectives

1. To learn the different models for information storage and retrieval
2. To learn about the various retrieval utilities
3. To understand indexing and querying in information retrieval systems
4. To expose the students to the text search algorithms
5. To learn about web search

Course Outcomes

Possess the ability to store and retrieve textual documents using appropriate models

1. Possess the ability to use the various retrieval utilities for improving search
2. Possess an understanding of indexing and compressing documents to improve space and time efficiency
3. Possess the skill to formulate parallel and distributed text search algorithms
4. Understand issues in web search.

UNIT-I

Introduction, Retrieval Strategies: Vector space model, Probabilistic retrieval strategies: Simple term weights, Non binary independence model, Language Models.

UNIT-II

Retrieval Utilities: Relevance feedback, Clustering, N-grams, PAT data structure,,Regression analysis, Thesauri.

UNIT-III

Retrieval Utilities: Semantic networks, Parsing Cross-Language Information Retrieval: Introduction, Crossing the language barrier.

UNIT-IV

Efficiency: Inverted index, Query processing, Signature files, Duplicate document detection.

UNIT-V

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

TEXT BOOK

1. David A. Grossman, Ophir Frieder, information Retrieval —Algorithms and Heuristics, Springer, 2 Edition (Distributed by Universities Press), 2004.
2. Kowalski, Gerald, Mark T Maybury: Information Retrieval Systems: Theory and Implementation, Kluwer Academic Press, 1997.

REFERENCE BOOKS

1. Gerald J Kowaiski, Mark T Maybury. Information Storage and Retrieval Systems, Springer, 2000
2. Soumen Chakrabarti, Mining the Web : Discovering Knowledge from Hypertext Data, Morgan-Kaufrnann Publishers, 2002
3. Christopher D. Manning, Prabhakar Raghavan, Hinñch Schütze, An Introduction to Information Retrieval, Cambridge University Press, Cambridge, England, 2009

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

ADVANCE SENSOR NETWORKS

Course code: **L/T/P/C: 3/0/0/3**

Course Objectives:

1. Understand the basics of Ad-hoc & Sensor Networks.
2. Learn various clustering and emerging protocols of all layers and routing in ad-hoc network.
3. Understand various ad-hoc and sensor network architectures using QoS and Congestion control mechanisms.
4. Explain sensor networks Design Considerations.
5. Demonstrate various security practices.

Course Outcomes:

1. Build a Sensor network environment for different type of applications.
2. Select appropriate routing algorithms for different network environments.
3. To understand sensor network communication protocols
4. Interpret the various design considerations
5. Deploy security mechanisms in the wireless ad-hoc and sensor networks.

UNIT I
ADHOC NETWORKS FUNDAMENTALS AND MAC PROTOCOLS

Fundamentals of WLans -IEEE 802.11 Architecture -Self Configuration And Auto Configuration-Issues In Ad-Hoc Wireless Networks –MAC Protocols For Ad-Hoc Wireless Networks – ContentionBased Protocols -TCP Over Ad-Hoc Networks-TCP Protocol Overview -TCP And MANETs –Solutions For TCP Over Ad-Hoc Networks.

UNIT II
ADHOC NETWORK ROUTING AND MANAGEMENT

Routing in Ad-Hoc Networks-Introduction -Topology based versus Position based Approaches -Proactive, Reactive, Hybrid Routing Approach -Principles and issues –Location services -DREAM –Quorums based Location Service –Grid –Forwarding Strategies –Greedy Packet Forwarding –Restricted Directional Flooding-Hierarchical Routing-Other Routing Protocols.

UNIT III
SENSOR NETWORK COMMUNICATION PROTOCOLS

Introduction – Architecture -Single Node Architecture –Sensor Network Design Considerations –Energy Efficient Design Principles for WSN's –Protocols for WSN – Physical Layer –Transceiver Design Considerations –MAC Layer Protocols – IEEE 802.15.4 Zigbee –Link Layer and Error Control Issues -Routing Protocols –Mobile Nodes and Mobile Robots -Data Centric &Contention Based Networking –Transport Protocols &QoS – Congestion Control Issues – Application Layer Support.

UNIT IV

SENSOR NETWORK DESIGN CONSIDERATIONS

Introduction-Empirical Energy Consumption-Sensing and communication range-Design issues-Localization Scheme-Clustering of SNs-MAC Layer-Self organizing MAC for WSNs and the Eaves-drop-And-Register Protocol-Operation based Protocols-Location-based Routing-High Level Application Layer support.

UNIT V

ADHOC AND SENSOR NETWORK SECURITY

Security in Ad-Hoc and Sensor Networks – Key Distribution and Management - Cooperation in Manets-Wireless sensor Networks-Intrusion Detection Systems-Software based Antitamper Techniques –Water Marking techniques –Defence against Routing Protocols – Broadcast Authentication WSN Protocols – TESLA –Biba – Sensor Network Security Protocols – SPINS

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

MOBILE APPLICATION DEVELOPMENT

Course code: **L/T/P/C: 3/0/0/3**

Course Objectives: Students will be able to

1. Recall the key technological principles and methods for delivering and maintaining mobile applications on Android devices.
2. Understand Android platform architecture.
3. Design, develop, debug, and deploy Android applications.
4. Construct user interfaces with built-in views and layouts.
5. Develop applications that uses SQLite Data base.

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

1. Design simple GUI applications.
2. Apply key technological principles and methods for delivering and maintaining mobile applications on Android devices.
3. Make use of built-in widgets and components.
4. Design apps which uses the database to store data locally.
5. Develop the apps that make use of Android Debug Bridge tool.

UNIT I

Java Concepts: OOPs Concepts, Inheritance in detail, Exception handling, Packages & interfaces, Multi threading , JVM & .jar file extension, SQL-DML and DDL Queries.

UNIT II

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

UNIT III

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

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

UNIT IV

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

Content Providers: SQLite Programming , SQLite OpenHelper ,SQLite Databse, Cursor , Reading and updating Contacts, Reading bookmarks, Examples.

UNIT V

Threads: Threads running on UI thread (runOnUiThread) , Worker thread ,Handlers & Runnable , AsynTask, Examples.

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

TEXT BOOKS

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

REFERENCE BOOKS

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

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

SCRIPTING LANGUAGES

Course code: **L/T/P/C: 3/0/0/3**

Course Objectives:

1. Interpret and analyze the fundamentals of PHP
2. Use scripting languages to collect, manipulate and store data from web applications.
3. Evaluate PHP Authentication Methodologies.
4. Identify PHP Encryption functions and Mcrypt Package.
5. Understand basic syntax, built-in-functions and user defined methods of Perl and Python.

Course Outcomes:

1. Analyze a problem, identify and define the computing requirements appropriate to its solution.
2. Design Web pages with DB.
3. Implement the PHP Authentication Methodologies.
4. Implement PHP Encryption functions and Mcrypt Package
5. Understand the syntax and functions in Perl and Python.

Unit- I

PHP Basics

PHP Basics- Features, Embedding PHP Code in your Web pages, outputting the data to the browser, Data types, Variables, Constants, expressions, string interpolation, control structures. Function, Creating a Function, Function Libraries, Arrays, strings and Regular Expressions.

Unit -II

MySQL Basics

Introduction to MYSQL: Database Concepts, General Overview of MySQL database, Installation. Connecting and disconnecting from MySQl Server, Querying the database, Data Definition Language, Functions and Logical operators, Access privilege system.

Unit -III

Advanced PHP Programming

Advanced PHP Programming: PHP and Web Forms, Files, PHP Authentication and Methodologies -Hard Coded, File Based, Database Based, IP Based, and Uploading Files with PHP, Sending Email using PHP, PHP Encryption Functions, the Mcrypt package.

Unit- IV

PERL: Names and Values, Variables, Scalar Expressions, Control Structures, arrays, list, hashes, strings, pattern and regular expressions, subroutines.

Advanced PERL: Finer points of looping, pack and unpack, file system, data structures, packages, modules, objects, interfacing to the operating system.

Unit -V

Python: Introduction to Python language, Python-syntax, statements, functions, Built-in-functions and Methods, Modules in Python, Exception Handling.

TEXT BOOKS:

1. The World of Scripting Languages, David Barron,Wiley India. Beginning PHP and MySQL, 3rd Edition, Jason Gilmore,Apress Publications (Dream tech.).
2. Python Web Programming, Steve Holden and David Beazley ,New Riders Publications.

REFERENCE BOOKS:

1. Open Source Web Development with LAMP using Linux ,Apache,MySQL,Perl and PHP, Lee and B.Ware(Addison Wesley) Pearson Education.
2. Programming Python,M.Lutz,SPD.
3. PHP 6 Fast and Easy Web Development ,Julie Meloni and Matt Telles, Cengage
4. Learning Publications.
5. PHP 5.1,I.Bayross and S.Shah,The X Team,SPD.
6. Core Python Programming,Chun,Pearson Education.
7. Guide to Programming with Python,M.Dawson,Cengage Learning.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

SOFT COMPUTING

Course code: **L/T/P/C: 3/0/0/3**

Prerequisites:

1. Basic understanding of problem solving, Design and Analysis of Algorithms and Computer Programming.
2. Basic Knowledge of Artificial Intelligence

Course Objectives:

On completion of this Subject/Course the student will be able to:

1. Understand soft computing techniques and apply these techniques to solve real-world problems
2. Understand the complete structure of Neurons and its applicability in different domains.
3. Differentiate between the Neural Networks and Genetic Algorithms
4. To know the fundamental things about fuzzy systems, fuzzy logic and its applications.
5. To analyze the Fuzzy Inference technique with different variables

Course Outcomes:

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

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. To know how to evaluate the Fitness function in Genetic Algorithm
4. Apply Genetic Algorithm to design New Algorithms/Protocols in any domain
5. Differentiate between Fuzzy Model w.r.t Probabilistic Model and Apply Fuzzy Inference Techniques to solve problems in different domain

Unit - I

Introduction to Soft Computing and Neural Networks: Neural Networks: I (Introduction and Architecture) Neuron, Nerve Structure and synapse, Artificial Neuron and It's Model, Activations functions

Neural Network Architectures: Single Layer and Multi-Layer feed forward Networks, Recurrent Networks, Various learning techniques; Perception and Convergence Rules, Auto Associative and hetero Associative Memory.

Unit- II

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

Unit-III

Genetic Algorithms: Introduction to Genetic Algorithms (GA), Working Principle, Procedures of

GA, Flow Chart of GA, Genetic Representation, (Encoding) Initialization and Selection, Genetic Operators, Mutation, Generational Cycle, Applications.

Unit-IV

Fuzzy Logic: I(Introduction): Fuzzy Logic Basic concepts, Fuzzy Sets and Crisp Sets, Fuzzy Set Theory and Operations, Properties of Fuzzy Sets, Fuzzy and Crisp Relations, Fuzzy to Crisp Conversation.

Unit-V

Fuzzy Logic: II (Fuzzy Membership, Rules): Membership Functions, Interference in Fuzzy Logic, Fuzzy if then else Rules, Fuzzy Implications and Fuzzy Algorithms, Fuzzifications and Defuzzifications, Fuzzy Controller, Industrial Applications

Text Books

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

Reference Books:

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 FuzzyLogic using MATLAB", Springer, 2007.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

CRYPTOGRAPHY AND NETWORK SECURITY

Course code: **L/T/P/C: 3/0/0/3**

Course Objectives:

1. To recall the security concepts like Message authentication and cryptography
2. To understand the concept of wireless Network Security
3. To understand the role of security in context to different layers of TCP/IP protocol Stack
4. To familiarize the role of security at system level and understand about the network management tools, intrusion detection systems
5. To understand the concept of cyber Security.

Course Outcomes:

1. Student will be able to recall and understand basic cryptographic algorithms, message and authentication and security issues.
2. Interpret the different Wireless LAN security issues and the approaches to handle them
3. Develop an understanding about the security at different layers of TCP/IP protocol stack
4. Recognize the threats to systems and the mechanisms for preventing it.
5. Understanding about cyber security and its challenges.

Unit –I:

Security Concepts: Overview of Security Concepts, The need for security, Security approaches, Principles of security, Types of Security attacks, Security services, Security Mechanisms, Block and stream cipher principles, overview of DES, AES, Blowfish IDEA algorithm. Overview of Public key cryptography: RSA and DH Key Exchange, Overview of Message Authentication Approaches.

Unit -II:

Wireless Network Security:Wireless Security overview, Wireless LAN,, Mobile Device Security, IEEE 802.11 Wireless LAN, IEEE 802.11i Wireless LAN Security, Wireless Transport Layer Security.

Unit – III:

Transport-level Security: Web security considerations, Secure Socket Layer and Transport Layer Security, HTTPS, Secure Shell (SSH) ,

E-Mail Security and Web Security: PGP, S/MIME, Domain Keys Identified Mail.

IP Security: IP Security overview, IP Security policy,ESP and AH headers,IKE, Cryptographic suites.

Unit-IV:

System Security: SNMP Protocol, Its Components, Different versions of SNMP. Tools for network management, Intruders, Malicious software and Firewalls, IDS and its types, Trusted systems. Introduction to Smart phone Security.

Unit-V:

Introduction to Cyber Security Overview of Cyber Security, Internet Governance – Challenges and Constraints, Cyber Threats, Cyber Security Vulnerabilities: vulnerabilities in software, System administration, Cyber Security Safeguards- Overview, Access control, Audit, Authentication, Biometrics, Cryptography, Deception, Denial of Service Filters, Ethical Hacking, Firewalls, Intrusion Detection Systems, Response, Scanning, Security policy, Threat Management.

TEXT BOOKS:

1. Cryptography and Network Security – Principles and Practice: William Stallings, Pearson Education, 6th Edition
2. Cryptography and Network Security: Atul Kahate, Mc Graw Hill, 3rd Edition
3. Cyber Security by Nina Godbole, SunitBelapure, Willey-India.

REFERENCE BOOKS:

1. Cryptography and Network Security: C K Shyamala, N Harini, Dr T R Padmanabhan, Wiley India, 1st Edition.
2. Cryptography and Network Security : Forouzan Mukhopadhyay, Mc Graw Hill, 3rd Edition
3. Information Security, Principles, and Practice: Mark Stamp, Wiley India.
4. Principles of Computer Security: WM. Arthur Conklin, Greg White, TMH
5. Introduction to Network Security: Neal Krawetz, CENGAGE Learning
6. Network Security and Cryptography: Bernard Menezes, CENGAGE Learning

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

MACHINE LEARNING LAB

Course code: **L/T/P/C: 0/0/3/1.5**

Prerequisites:

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

Course Objectives:

1. Learn the basic concepts of python / R-Tool
2. Understand Python scripts using Numpy & Pandas libraries.
3. Describe various supervised learning algorithms.
4. Discuss different unsupervised learning algorithms
5. Explore back propagation algorithm and ensemble methods

Course Outcomes: After completion of course, students would be able to

- Illustrate various basic features of python or R-Tool.
- Implement Python script for simple problems and apply pandas for creation of databases.
- Design and analyze various supervised learning mechanisms.
- Design and analyze various unsupervised learning algorithms.
- Illustrate back propagation algorithm and Random Forest Ensemble method.

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

Task 1: Implement a Python script for importing and exporting data using python Pandas.
Task 2: Write a program to demonstrate various visualization techniques.
Task 3: Plot the graphs for employee database using Matplotlib
Task 4: Implement KNN algorithm to classify the Iris data set.
Task 5: Implement Simple Linear Regression
Task 6: Implement Logistic Regression
Task 7: Design non-linear model using Support Vector Machines
Task 8: Implement K-means Clustering Algorithm
Task 9: Implement Random Forest ensemble method
Task-10: Build an Artificial Neural Network by implementing the Back propagation algorithm and test the same using appropriate data sets.
Task-11: Sentiment analysis on tweets – a case study
Task-12: Object Detection in an image – a case study

Reference Books:

1. Machine Learning – Tom M. Mitchell, - MGH
2. Christopher Bishop, Pattern Recognition and Machine Learning, Springer, 2007.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

INTERNET OF THINGS LAB

Course code: **L/T/P/C: 0/0/3/1.5**

Course objectives

1. To impart the knowledge on WiFi based Board &its programming •
2. To extract the features of WiFi based Board and interfacing with different peripherals.
3. To learn the concepts of IOT.
4. To learn different protocols used in IOT.
5. To Apply IOT to different applications

Course outcomes

The students will be able

1. Programming on NODE MCU /WiFi based board.
2. Implement WiFi based web server.
3. Understand the concepts of Internet of Things
4. Analyze basic protocols in wireless sensor network
5. Design IOT applications in different domain and be able to analyze their performance

Task1
Write a Program to Interface sensors (DHT11 and LDR) with WiFi based board and display the sensor values on PC.

Task2
Write a Program to control the appliances using Relay module.

Task3
Write a Program to implement WiFi based Web Server.

Task4
Write a Program to send sensors data to cloud using WiFi module.

Task5
Write a Program to implement IOT based appliance control system.

Task6
Write a Program to sends alert using internet when sensor readings are abnormal.

Task7
Write a Program to demonstrate mobile app Development.

Task8
Write a Program to implement IoT based motion detector using WiFi module and android app.

Task9
Write a Program to implement GISMO as Zigbee to WiFi Gateway.

Task10
Write a Program to implement GISMO as Bluetooth to WiFi Gateway.

Task11
Write a Program to implement IOT based Scrolling Display.

Task12
Write a Program to implement IOT based health care monitoring and alert system

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OPERATING SYSTEM

Course code: **L/T/P/C: 3/0/0/3**

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EMBEDDED SYSTEMS

Course code: **L/T/P/C: 3/0/0/3**

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

ESSENTIALS OF BIG DATA PROGRAMMING

Course code: **L/T/P/C: 3/0/0/3**

Course Objectives :

1. Understand the Big Data Platform and its Use cases.
2. Provide HDFS Concepts and Interfacing with HDFS
3. Understand Map Reduce Jobs.
4. Provide an deep insight on Hodoop Eco System
5. Understand Machine Learning with Big Data

Course Outcomes :

The students will be able to:

1. Distinguishes applications and Analytic Challenges with Traditional Data and Big Data.
2. Manage Large Data Storage requirement on Hadoop Distributed File System.
3. Develop Map Reduce Jobs for Large data Processing in Hadoop Environment
4. Analyze Big Data Solutions using Hadoop Eco System
5. Apply Different types of Analytics on Big Data.

Pre- requisites :

Knowledge of a Programming Language (Java preferably), Practice of SQL (queries and sub queries), Data Warehousing and Mining knowledge and exposure to Linux Environment.

UNIT I : INTRODUCTION TO BIG DATA AND BIG DATA ANALYTICS

Types of Digital Data : Structured, Semi-Structured and Unstructured data. Characteristics of Data, Evolution of Big Data, Why Big Data, What is Big Data Analytics, Big Data Challenges, Features of Hadoop, Evolution of Hadoop, Introduction to Hadoop Eco System.

UNIT II : HDFS(Hadoop Distributed File System)

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

UNIT III : Map Reduce

Analyzing Data with Unix tools, Analyzing Data with Hadoop.
Hadoop Map Reduce Programming Model : Map, Reduce, Combine, Sort and Shuffle. Anatomy of Map Reduce Job Run, Failures handling in Map Reduce, Input/output File Formats in MR, Hadoop Streaming : A Framework for Map Reduce with Python.

Unit IV : Hadoop Eco System

Pig : Introduction to PIG, Execution Modes of Pig, Comparison of Pig with Databases, Pig Latin, Data Processing operators and , User Defined Functions in Pig
Structured Data Queries with Hive : The Hive Command Line Interface(CLI), Hive Query Language(HQL), Data Analysis with Hive.

NoSQL Database HBase : CAP theorem, NoSQL Databases, Column-Oriented Databases, Real Time analytics with HBase.

UNIT V :

In-Memory Computing with Spark : Spark Basics, Interactive Spark Using PySpark, Writing Spark Applications with PySpark.

Scalable Machine Learning with Spark : Collaborative Filtering, Classification, Clustering.

Text Books

1. Tom White " Hadoop: The Definitive Guide" Third Editon, O'reilly Media, 2012.
2. Seema Acharya, Subhasini Chellappan, "Big Data Analytics" Wiley 2015.
3. Benjamin Bengfort & Jenny Kim, "Data Analytics with Hadoop" First Editon, O'reilly Media, 2016.

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 Jef rey David Ulman, "Mining of Massive Datasets", Cambridge University Press, 2012.
5. Bill Franks, "Taming the Big Data Tidal Wave: Finding Opportunities in Huge Data Streams with Advanced Analytics", John Wiley & sons, 2012.
6. Glen J. Myat, "Making Sense of Data", John Wiley & Sons, 2007
7. Pete Warden, "Big Data Glossary", O'Reily, 2011.
8. Michael Mineli, Michele Chambers, Ambiga Dhiraj, "Big Data, Big Analytics: Emerging Business Intelligence and Analytic Trends for Today's Businesses", Wiley Publications, 2013.
9. ArvindSathi, "BigDataAnalytics: Disruptive Technologies for Changing the Game", MC Press, 2012
10. Paul Zikopoulos ,Dirk DeRoos , Krishnan Parasuraman , Thomas Deutsch , James Giles , David Corigan , "Harness the Power of Big Data The IBM Big Data Platform ", Tata McGraw Hill Publications, 2012.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

NEURAL NETWORKS AND DEEP LEARNING

Course code: **L/T/P/C: 3/0/0/3**

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

Course Objectives
The objectives of this course are to make the student

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
After the course the student should be able to:

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.

Syllabus:

UNIT -I
Applied Math and Deep Learning basics: Historical trends in deep learning, Scalars, Vectors, Matrices and Tensors. Multiplying matrices and vectors, identity and inverse matrices, Linear dependence and span, Norms, Eigen Decomposition, Singular Value Decomposition, The moore-penrose psuedoinverse, The trace operator. **Probability and Information Theory**: Why probability, Random variables, Probability distributions, marginal probability, conditional probability, The chain rule of conditional probability, Independence and conditional independence, expectation, variance, Covariance. Baye's Rule.

UNIT-II
Introduction to Neural Network: A Neural Network, Human Brain, Models of a Neuron, Neural Networks viewed as Directed Graphs, Network Architectures, Knowledge Representation, Artificial Intelligence and Neural Networks Learning Process: Error Correction Learning, Memory Based Learning, Hebbian Learning, Competitive, Boltzmann Learning, Credit Assignment Problem, Memory, Adaption, Statistical Nature of the Learning Process(Ref:TextBook2)
Single Layer Perceptrons: Adaptive Filtering Problem, Unconstrained Organization Techniques,

Linear Least Square Filters, Least Mean Square Algorithm, Learning Curves, Learning Rate Annealing Techniques, Perceptron —Convergence Theorem, Relation Between Perceptron and Bayes Classifier for a Gaussian Environment. (Ref:Textbook2)

UNIT –III

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

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

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

UNIT-IV

Optimization for training deep models: How learning differs from pure optimization. Challenges in Neural Network Optimization. Basic algorithms, parameter initialization strategies, algorithms with adaptive learning rates. Approximate second order methods ,optimization strategies and meta-algorithms.

Convolutional Networks: The convolution operation, motivation, pooling, convolution and pooling as an infinitely strong prior, variants of basic convolution function, structured outputs, data types, Efficient convolution algorithms, random or unsupervised features, the neuroscientific basis for convolution networks.

UNIT-V:

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

Applications: Large-scale deep learning, computer vision, Natural Language Processing,

TEXT BOOK

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

REFERENCE BOOKS

1. Artificial Neural Networks – B. Vegnanarayana Prentice Hall of India P Ltd 2005
2. Neural Networks in Computer Inteligance, Li Mm Fu TMH 2003
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

CLOUD COMPUTING

Course code: **L/T/P/C: 3/0/0/3**

Pre-requisites: Should 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 Map Reduce 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.

Reference Books:

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

SOFTWARE PROJECT MANAGMENT

Course code: **L/T/P/C: 3/0/0/3**

Course Objectives

1. Understand the fundamental principles of Software Project management.
2. To provide the students on conventional management, economics software.
3. Acquire Plan and manage projects at each stage of the software development life cycle (SDLC)
4. To prepare organizational needs to the most effective software development model.
5. To assists the student with an academic environment aware of excellence, guidelines and lifelong Learning needed for a successful professional carrier.

Course Outcomes

1. To take responsibility of a project team and project organization
2. Apply problem solving skills, core IT concepts, best practices and standards to information Technologies.
3. Work with high level and low level Displays of mobile and storing data by using record management system
4. Design, implement and deploy mobile applications using an appropriate software development Environment with database
5. Understands how different management and development practices affect software and process Quality.

UNIT - I

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

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

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

UNIT - II

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

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

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

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

UNIT -III

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

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

UNIT - IV

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

Process Automation : Automation Building blocks, The Project Environment.

UNIT - V

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

TEXT BOOK :

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

REFERENCES :

1. Software Project Management, Bob Hughes and Mike Cotterell: Tata McGraw-Hill Edition.
2. Software Project Management, Joel Henry, Pearson Education.
3. Software Project Management in practice, Pankaj Jalote, Pearson Education.2005.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

MIDDLEWARE TECHNOLOGIES

Course code: **L/T/P/C: 3/0/0/3**

Course Objectives: Students will be able to

1. Understand Client/Server Model.
2. Understand Component Technology.
3. Design dynamic remote applications.
4. Develop Client-server applications.
5. Adapt different technologies for different paradigms.

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

1. Choose appropriate client server computing model for given problem.
2. Develop java bean component model with EJBS and CORBA.
3. Design dynamic remote applications with RMI.
4. Develop client server applications using COM/.NET.
5. Select appropriate technology for homogeneous and heterogeneous objects.

UNIT-I

CLIENT/SERVER CONCEPTS: Client – Server – File Server, Database server, Group server, Object server, Web server. Middleware – General Middleware – Service specific middleware. Client/Server Building blocks-RPC – Messaging – Peer – to – Peer.

UNIT-II

EJB ARCHITECTURE: EJB –EJB Architecture – Overview of EJB software architecture – View of EJB – Conversation – Building and Deploying EJBs – Roles in EJB.

UNIT-III

EJB APPLICATIONS: EJB Session Beans – EJB entity beans – EJB clients –EJB Deployment – Building an application with EJB.

UNIT-IV

CORBA: CORBA – Distributed Systems – Purpose – Exploring CORBA alternatives – Architecture overview – CORBA and networking model – CORBA object model – IDL – ORB – Building an application with CORBA.

UNIT-V

COM: COM – Data types – Interfaces – Proxy and stub – Marshalling –Implementing server/Client – Interface pointers – Object Creation, Invocation, Destruction – Comparison COM and CORBA – Introduction to .NET – Overview of .NET architecture–Marshalling – Remoting.

TEXT BOOKS

1. Robert Orfali, Dan Harkey and Jeri Edwards, “The Essential Client/server Survival Guide”, Galgotia publications Pvt. Ltd., 2002.(UNIT 1)
2. Tom Valesky, “Enterprise Java Beans”, Pearson Education, 2002.(UNIT 2 & 3)

3. Jason Pritchard. “COM and CORBA side by side”, Addison Wesley,2000 (UNIT 4 & 5)
4. Jesse Liberty, “Programming C#”, 2nd Edition, O’Reilly press,2002. (UNIT 5)

REFERENCE BOOKS

1. Mowbray, “ Inside CORBA”, Pearson Education, 2002.
2. Jeremy Rosenberger, “Teach yourself CORBA in 14 days”, Tec media,2000

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

SPEECH AND NATURAL LANGUAGE PROCESSING

Course code: **L/T/P/C: 3/0/0/3**

Unit -I

Basic Text Processing: Tokenization, Stemming,

Language Modeling: N-grams, smoothing

Unit -II

Morphology, Parts of Speech Tagging

Syntax: PCFGs, Dependency Parsing

Unit -III

Distributional Semantics

Lexical Semantics, Word Sense Disambiguation

Unit -IV

Information Extraction: Relation extraction, Event extraction

Text Summarization

Text Classification

Unit -V

Machine Translation

Reference Books

1. Daniel Jurafsky and James H. Martin. 2009. Speech and Language Processing: An Introduction to Natural Language Processing, Speech Recognition, and Computational Linguistics. 2nd edition. Prentice-Hall.

2. Christopher D. Manning and Hinrich Schütze. 1999. Foundations of Statistical Natural Language Processing. MIT Press.

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STORAGE AREA NETWORKS

Course code: **L/T/P/C: 3/0/0/3**

Course Objectives:

The objectives of this course are to:

1. Evaluate storage architectures, and Data protection Methods.
2. Examine emerging technologies including IP-SAN.
3. Define backup, recovery, disaster recovery, business continuity, and replication.
4. Define cloud computing and storage virtualization technologies.
5. Identify components of Securing, managing and monitoring the data infrastructure.

Course Outcomes:

After completing this course the student must demonstrate the knowledge and ability to:

1. Understand the storage architectures and data protection Methods.
2. Explain components and the implementation of NAS
3. Identify the different types of backup, recovery and replication techniques.
4. Identify key challenges in managing information and analyze different storage networking technologies and virtualization
5. Illustrate the secure and storage infrastructure and management activities

UNIT – I

Storage System Introduction to Information Storage: Evolution of Storage Architecture, Data Center Infrastructure, Virtualization and Cloud Computing. Data Center Environment: Application, Host (Compute), Connectivity, Storage. **Data Protection-RAID:** RAID Implementation Methods, RAID Techniques, RAID Levels, RAID Impact on Disk Performance. Intelligent Storage Systems: Components of Intelligent Storage System, Storage Provisioning.,

UNIT – II:

Storage Networking Technologies Fiber Channel Storage Area Networks: Components of FC SAN, FC connectivity, Fiber Channel Architecture, Zoning, FC SAN Topologies, Virtualization in SAN. IP SAN and FCoE: iSCSI, FCIP, FCoE. **Network Attached Storage:** Components of NAS, NAS I/O Operation, NAS File-Sharing Protocols, File-Level Virtualization, Object-Based Storage and Unified Storage: Object-Based Storage Devices, Content-Addressed Storage, Unified Storage.

UNIT – III

Backup, Archive and Replication Introduction to Business Continuity: Information Availability, BC Terminology, BC Planning Lifecycle, Failure Analysis, BC Technology Solutions. Backup and Archive: Backup Methods, Backup Topologies, Backup Targets, Data De duplication for Backup, Backup in Virtualized Environments, Data Archive. Local Replication: Replication Terminology, Uses of Local Replicas, Local Replication Technologies, Local Replication in a Virtualized Environment. Remote Replication: Remote Replication Technologies, Three-Site Replication, Remote Replication and 8 Hours Migration in a Virtualized Environment.

UNIT – IV

Cloud Computing and Virtualization Cloud Enabling Technologies, Characteristics of Cloud Computing, Benefits of Cloud Computing, Cloud Service Models, Cloud Deployment Models, Cloud Computing Infrastructure, Cloud Challenges and Cloud Adoption Considerations. **Virtualization Appliances:** Black Box Virtualization, In-Band Virtualization Appliances, Out of-Band Virtualization Appliances, High Availability for Virtualization Appliances, Appliances for Mass Consumption. Storage Automation and Virtualization: Policy-Based Storage Management, Application-Aware Storage Virtualization, Virtualization-Aware Applications.

UNIT – V

Securing and Storage Infrastructure Securing and Storage Infrastructure: Information Security Framework, Risk Triad, Storage Security Domains, Security Implementations in Storage Networking, Securing Storage Infrastructure in Virtualized and Cloud Environments.

Managing the Storage Infrastructure Monitoring the Storage Infrastructure, Storage Infrastructure Management activities, Storage Infrastructure Management Challenges, Information Lifecycle management, Storage Tiering.

TEXT BOOKS:

1. Information Storage and Management, Author :EMC Education Services, Publisher: Wiley ISBN: 9781118094839
2. Storage Virtualization, Author: Clark Tom, Publisher: Addison Wesley Publishing Company ISBN : 9780321262516

REFERENCE BOOKS:

1. Robert Spalding, “Storage Networks: The Complete Reference“, Tata McGraw Hill, Osborne, 2003.
2. Marc Farley, “Building Storage Networks”, Tata McGraw Hill ,Osborne, 2001.
3. Meeta Gupta, Storage Area Network Fundamentals, Pearson Education Limited, 2002.