ACADEMIC REGULATIONS

PROGRAM STRUCTURE

and

DETAILED SYLLABUS

Master of Technology

(Computer Science and Engineering)

(Two Year Regular Programme)

(Applicable for Batches admitted from 2018)

GokarajuRangaraju Institute of Engineering and Technology

(Autonomous)

Bachupally, Kukatpally, Hyderabad- 500 090

Academic Regulations

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY, HYDERABAD
For all Post Graduate Programmes (M.Tech)
GR18 REGULATIONS

Gokaraju Rangaraju Institute of Engineering & Technology - 2018 Regulations (GR 18 Regulations) are given hereunder. These regulations govern all the Post Graduate programmes offered by various departments of Engineering with effect from the students admitted to the programmes in 2018-19 academic year.

1. **Programme Offered:** The Post Graduate programme offered by the department is M.Tech, a two-year regular programme in that discipline.
2. **Medium of Instruction:** The medium of instruction (including examinations and reports) is English.
3. **Admissions:** Admission into the M.Tech Programme in any discipline shall be made subject to the eligibility and qualifications prescribed by the University from time to time. Admissions shall be made either on the basis of the merit rank obtained by the student in PGCET conducted by the APSCHE for M. Tech Programmes or on the basis of any other order of merit approved by the University, subject to reservations as prescribed by the Government from time to time.
4. **Programme Pattern:**
   - **a) A student is introduced to "Choice Based Credit System (CBCS)" for which he/she has to register for the courses at the beginning of each semester as per the procedure.**
   - **b)** Each Academic year of study is divided into two semesters.
   - **c)** Minimum number of instruction days in each semester is 90.
   - **d)** The total credits for the Programme is 68.
   - **e) 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).**
   - **f) A student has a choice of registering for credits from the courses offered in the programme.**
   - **g) All the registered credits will be considered for the calculation of final CGPA.**
5. **Award of M.Tech Degree:** A student will be declared eligible for the award of the M. Tech Degree if he/she fulfills the following academic requirements:
   - a) A student shall be declared eligible for the award of M.Tech degree, if he/she pursues the course of study and completes it successfully in not less than two academic years and not more than four academic years.
   - b) A Student, who fails to fulfill all the academic requirements for the award of the degree within four academic years from the date of admission, shall forfeit his/her seat in M.Tech course.
   - c) The Degree of M.Tech 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) Students whose shortage of attendance is not condoned in any semester are detained and are not eligible to take their end examinations of that semester. They may seek re-registration for that semester when offered next with the academic regulations of the batch into which he/she gets re-registered.
7. **Paper Setting, Evaluation of Answer Scripts, Marks and Assessment**
   a) Paper setting and Evaluation of the Answer Scripts shall be done as per the procedures laid down by the Academic Council of the College from time to time.
   b) The following is the division of marks between internal and external evaluations.

Particulars	Internal Evaluation	External Evaluation	Total
Theory	30	70	100
Practical	30	70	100
Mini Project	30	70	100
Dissertation	30	70	100

   c) The marks for internal evaluation per semester per theory course are divided as follows:

      i. **Mid Examinations:** **20 Marks**
      ii. **Tutorials/Assignment:** **5 Marks**
      iii. **Continuous Assessment:** **5 Marks**
      Total: **30 Marks**

   d) **Mid Examination:** There shall be two mid examinations during a semester. The first mid examination shall be conducted from the first 50 per cent of the syllabus and the second mid examination shall be conducted from the remaining 50 per cent of the syllabus. The mid examinations shall be evaluated for **20 marks** and average of the marks scored in the two mid examinations shall be taken as the marks scored by each student in the mid examination for that semester.

   e) **Assignment:** Assignments are to be given to the students and marks not exceeding 5 (5%) per semester per paper are to be awarded by the teacher concerned.
   f) **For Internal Evaluation in Practical/Lab Subjects:** The marks for internal evaluation are 30. Internal Evaluation is done by the teacher concerned with the help of the other staff member nominated by Head of the Department. Marks Distribution is as follows:

      i. **Writing the program/Procedure:** **10 Marks**
      ii. **Executing the program/Procedure:** **10 Marks**

iii.	**Viva:**	**05 Marks**
iv.	**Continuous Assessment:**	**05 Marks**
	Total:	**30Marks**

g) **For external Evaluation in Practical/Lab Subjects:** The Semester end examination shall be conducted by an external examiner and a staff member of the Department nominated by Head of the Department. Marks distribution is as follows:

i.	**Writing the program/Procedure:**	**20 Marks**
ii.	**Executing the program/Procedure:**	**20 Marks**
iii.	**Viva:**	**15 Marks**
iv.	**Lab Record:**	**15 Marks**
	Total:	**15 Marks**

h) **Mini Project:** The Mini Project is to 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. At the end of the semester the mini project report is evaluated by Project Review Committee. The mini project report shall be presented before Project Review Committee in the presence of External Examiner and the same is evaluated for 70 marksman Project Review Committee consists of HOD, Mini Project Coordinator and Supervisor.

i) **Dissertation-I and Dissertation-II:** A Project Review Committee (PRC) is to be constituted by Principal/Director with Head of the Department as the Chairman and two other senior faculty members of the department.

i. **Registration for Project work:** A candidate is permitted to register for the project work after satisfying the attendance requirements of all the courses (theory and practical courses) up to III Semester.

ii. After satisfying the registration requirements, a candidate is permitted to register for the project work after satisfying, the title, objectives and plan of action of his project work to the Project Review Committee for its approval. Only after obtaining the approval of Project Review Committee of the Department, the student can initiate the project work. Any changes thereafter in the project are to be approved by PRC. The student has to work under the guidance of both internal guide (one faculty member of the department) and external guide (from Industry not below the rank of an officer). Internal guide is allotted by the Head of the Department or Coordinator of the Project Work whereas external guide is allotted by the industrial organization in which the project is undertaken.

iii. The candidate shall submit status of the report in two stages at least with a gap of 20 days between them.

iv. The work on the project shall be initiated in the beginning of the fourth semester and the duration is one semester. A candidate is permitted to submit project report only after successful completion of theory and practical courses with the approval of PRC and not earlier than 40 days from the date of registration of the project work. For the approval of PRC the candidate shall submit the draft copy of the thesis to the Head/Coordinator (through internal research guide) and shall make an oral presentation before the PRC.

v. After approval from the PRC, the final thesis is to be submitted along with ANTI-PLAGIARISM report from the approved agency with a similarity index not more than 30%.

vi. Two hardcopies and one soft copy of the project work (dissertation) certified by the research supervisors shall be submitted to the College/Institute.

vii. The thesis shall be adjudicated by one external examiner selected by the Institute out of 5-member panel, submitted by the department.

viii. **The marks allotted for project work review are 100, out of which 30 are for internal and 70 for external.** Internal evaluation marks are awarded by the PRC on the basis of the student's performance in the three pre-submission reviews and the external evaluation is done by the external examiner.

ix. **The marks allotted for dissertation are 100, out of which 30 are for internal and 70 for external.** Internal evaluation marks are awarded by the PRC on the basis of the student's performance in the three pre-submission reviews and the external evaluation is done by the external examiner. In both internal and external evaluations the student shall score at least 40% marks and an aggregate of 50% marks to pass in the project work. If the report of the examiner is favourable, Viva-voce examination shall be conducted by a Board consisting of the Supervisor, Head and the External Examiner who adjudicated the project work. The Board shall jointly evaluate the student's performance in the project work.

x. In case the student doesn't pass through the project work, he/she has to reappear for the viva-voce examination, as per the recommendations of the Board. If he fails succeed at the second Viva-voce examination also, he will not be eligible for the award of the degree, unless he is asked to revise and resubmit the Project by the Board. Head of the Department and Project coordinator shall coordinate and make arrangements for the conduct of viva-voce examination. When one does get the required minimum marks both in internal and external evaluations the candidate has to revise and resubmit the dissertation in the time frame prescribed by the PRC. If the report of the examiner is unfavorable again, the project shall be summarily rejected.

xi. If the report of the viva-voce is not satisfactory, the candidate will retake the viva-voce examination after three months. If he fails to get a satisfactory report at the second viva-voce examination, he will not be eligible for the award of the degree, unless the candidate is asked to revise and resubmit.

8. **Recounting of Marks in the End Examination Answer Books:** A student can request for re-counting of his/her answer book on payment of a prescribed fee.

9. **Re-evaluation of the End Examination Answer Books:** A student can request for re-evaluation of his/her answer book on payment of a prescribed fee.

10. **Supplementary Examinations:** A student who has failed in an end semester examination can appear for a supplementary examination, as per the schedule announced by the College/Institute.

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:**

a) A student shall be deemed to have secured the minimum academic requirement in a subject if he / she secures a minimum of 40% of marks in the Semester-end Examination and a minimum aggregate of 50% of the total marks in the Semester-end examination and Internal Evaluation taken together.

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

c) In order to qualify for the award of M.Tech Degree, the student shall complete the academic requirements of passing in all the Courses as per the course structure including Seminars and Project if any.

d) In case a Student does not secure the minimum academic requirement in any course, he/she has to reappear for the Semester-end Examination in the course, or re-register for the same course when next offered or re-register for any other specified course, as may be required. However, one more additional chance may be provided for each student, for improving the internal marks provided the internal marks secured by a student are less than 50% and he/she failed finally in the course concerned. In the event of taking another chance for re-registration, the internal marks obtained in the previous attempt are nullified. In case of re-registration, the student has to pay the re-registration fee for each course, as specified by the College.

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

Letter Grade	Grade Points	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 (Above Average)	**6**	**Marks >= 50 and Marks < 60**
F (Fail)	**0**	**Marks < 50**
Ab (Absent)	**0**	

Earning of Credit:

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

Computation of SGPA and CGPA:

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

i) S_k the SGPA of kth semester(1 to 4) 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 ith course and G_i is the grade point scored by the student in the ith course and n is the number of courses registered in that semester.

ii) The CGPA is calculated in the same manner taking into account all the courses m, registered by a 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.

13. **Award of Class:** After a student satisfies all the requirements prescribed for the completion of the Degree and becomes eligible for the award of M. Tech Degree by JNTUH, he/she shall be placed in one of the following four classes:

	Class Awarded	CGPA Secured
13.1	First Class With Distinction	CGPA ≥ 7.75
13.2	First Class	CGPA ≥ 6.75 and CGPA < 7.75
13.3	Second Class	CGPA ≥ 6.00 and CGPA < 6.75

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

15. **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.

16. **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 to the same or equivalent subjects as and when they are offered.

17. **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.

Gokaraju Rangaraju Institute of Engineering and Technology

Computer Science and Engineering

I YEAR - I SEMESTER

Sl. No	Group	Course Code	Subject	Hours			Total Hours	Credits	Int. Marks	Ext. Marks	Total Marks
				L	T	P					
1	Core	GR18D5001	Mathematical Foundation For Computer Science Applications	3	0	0	3	3	30	70	100
2	Core	GR18D5002	Advanced Data Structures	3	0	0	3	3	30	70	100
3	**PE I**	GR18D5003 GR18D5004 GR18D5005	1. Advanced Data Mining 2. Information Security 3. Advanced Python Programming	3	0	0	3	3	30	70	100
4	**PE II**	GR18D5006 GR18D5007 GR18D5008	1. Computer System Design 2. Object Oriented Modelling 3. Distributed Computing	3	0	0	3	3	30	70	100
5	Core	GR18D5009 GR18D5010 GR18D5011	Advanced Data Mining Lab/ Information Security Lab/ Advanced Python Programming Lab	0	0	4	4	2	30	70	100
6	Core	GR18D5013	Advanced Data Structures Lab	0	0	4	4	2	30	70	100
7	Core	GR18D5012	Research Methodology and IPR	2	0	0	3	2	30	70	100
			Total	**14**	**0**	**8**	**22**	**18**	**210**	**490**	**700**
8	Audit		Audit course -1	2	0	0	2	2	30	70	100

I YEAR - II SEMESTER

Sl. No	Group	Course Code	Subject	Hours			Total Hours	Credits	Int. Marks	Ext. Marks	Total Marks
				L	T	P					
1	Core	GR18D5014	Machine Learning and Applications	3	0	0	3	3	30	70	100
2	Core	GR18D5015	Advanced Algorithms	3	0	0	3	3	30	70	100
3	**PE III**	GR18D5016 GR18D5017 GR18D5018	1. Image Processing 2. Advanced Data Science 3. Data Analytics	3	0	0	3	3	30	70	100
4	**PE IV**	GR18D5019 GR18D5020 GR18D5021	1. Cloud computing and Applications 2. High Performance Computing 3. Advanced Computer Networks	3	0	0	3	3	30	70	100
5	Core	GR18D5022 GR18D5023 GR18D5024	Image Processing Lab/ Advanced Data Science Lab/ Data Analytics Lab	0	0	4	4	2	30	70	100
6	Core	GR18D5025	Machine Learning and Applications Lab	0	0	4	4	2	30	70	100
7	Core	GR18D5190	Mini-Project	2	0	0	2	2	30	70	100
			Total	**14**	**0**	**8**	**22**	**18**	**210**	**490**	**700**
8	Audit		Audit course – 2	2	0	0	2	2	30	70	100

II YEAR - I SEMESTER

Sl. No	Group	Course Code	Subject	Hours			Total Hours	Credits	Int. Marks	Ext. Marks	Total Marks
				L	T	P					
1	**PE V**	GR18D5026 GR18D5027 GR18D5040	1. Mobile Applications and Services 2. Information Storage and Retrieval 3. Distributed Databases	3	0	0	3	3	30	70	100
	Open Elective	GR18D5201 GR18D5202 GR18D5203 GR18D5204 GR18D5205 GR18D5206	1. Business Analytics 2. Industrial Safety 3. Operations Research 4. Cost Management of Engineering Projects 5. Composite Materials 6. Waste to Energy	3	0	0	3	3	30	70	100
3	Dissertatio	GR18D5191	Dissertation Phase – I	0	0	20	20	10	30	70	100
Total				**6**	**0**	**20**	**26**	**16**	**90**	**210**	**300**

II YEAR - II SEMESTER

Sl. No	Group	Course Code	Subject	Hours			Total Hours	Credits	Int. Marks	Ext. Marks	Total Marks
				L	T	P					
1	Dissertat	GR18D5192	Dissertation Phase – II	0	0	32	32	16	30	70	100
Total						**32**	**32**	**16**	**30**	**70**	**100**

Audit course 1 & 2

1. English for Research Paper Writing (GR18D5207)
2. Disaster Management (GR18D5208)
3. Sanskrit for Technical Knowledge (GR18D5209)
4. Value Education (GR18D5210)
5. Indian Constitution (GR18D5211)
6. Pedagogy Studies (GR18D5212)
7. Stress Management by Yoga (GR18D5213)
8. Personality Development through Life Enlightenment Skills. (GR18D5214)

SEMESTER - I

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

MATHEMATICAL FOUNDATION FOR COMPUTER SCIENCE APPLICATIONS

Course Code: GR18D5001 **L/T/P/C:3/0/0/3**

Course Objectives:

- To understand the mathematical fundamentals that is prerequisites for a variety of courses like Data mining, Network protocols, analysis of Web traffic, Computer security, Software engineering, Computer architecture, operating systems, distributed systems, Bioinformatics, Machine learning.
- To develop the understanding of the mathematical and logical basis to many modern techniques in information technology like machine learning, programming language design, and concurrency.
- Developing an appreciation for the use of to multivariate statistical models like regression and classification problems, principal components analysis, problem of over fitting model.
- To study various sampling and classification problems.
- Designing and Developing planar Graphs, Euler circuits, Graph Coloring, Hamiltonian graphs and their applications

Course Outcomes: After completion of course, students would be able to

- Understand the basic notions of distribution functions, discrete and continuous probability.
- Formulate the methods of statistical inference and the role that sampling distributions play in those methods.
- Perform correct and meaningful statistical analysis of simple to moderate complexity.
- Solve mathematical as well as graphical problems in systematic and logical manner and also familiarity in calculating number of possible outcomes of elementary combinatorial processes such as permutations and combinations.
- Apply discrete structures in computer science for various engineering applications.

Unit I

Probability mass, density, and cumulative distribution functions, parametric families of distributions, Expected value, variance, conditional expectation, Applications of the univariate and multivariate Central Limit Theorem, Probabilistic inequalities, Markov chains

Unit II

Random samples, sampling distributions of estimators**,** Methods of Moments and Maximum Likelihood

Unit III

Statistical inference, Introduction to multivariate statistical models: regression and classification problems, principal components analysis**,** The problem of over fitting model assessment.

Unit IV

Graph Theory: Isomorphism, Planar graphs, graph Coloring, Hamilton circuits and Euler cycles.Permutations and Combinations with and without repetition. Specialized techniques to solve combinatorial enumeration problems

Unit V

Computer science and engineering applications: Data mining, Network protocols, analysis of Web traffic, Computer security, Software engineering, Computer architecture, operating systems, distributed systems, Bioinformatics, Machine learning.Recent Trends in various distribution functions in mathematical field of computer science for varying fields like bioinformatics, soft computing, and computer vision.

Reference Books:

1. John Vince, Foundation Mathematics for Computer Science, Springer.
2. K. Trivedi. Probability and Statistics with Reliability, Queuing, and Computer Science Applications. Wiley.
3. M. Mitzenmacher and E. Upfal.Probability and Computing: Randomized Algorithms and Probabilistic Analysis.
4. Alan Tucker, Applied Combinatorics, Wiley

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

ADVANCED DATA STRUCTURES

Course Code: GR18D5002 **L/T/P/C: 3/0/0/3**

Course Objectives:

- The student should be able to choose appropriate data structures, understand the ADT/libraries, and use it to design algorithms for a specific problem.
- Students should be able to understand the necessary mathematical abstraction to solve problems.
- To familiarize students with advanced paradigms and data structure used to solve algorithmic problems.
- Student should be able to come up with analysis of efficiency and proofs of correctness.
- Express algorithms in a language independent manner (as pseudo codes), thus exemplifying the professional ethics imbibed through this course.

Course Outcomes: After completion of course, students would be able to

- Understand the implementation of symbol table using hashing techniques.
- Develop and analyze algorithms for red-black trees, B-trees and Splay trees.
- Develop algorithms for text processing applications.
- Identify suitable data structures and develop algorithms for computational geometry problems.
- Compare and contrast various computational geometry methods for efficiently solving new evolving problems.

Unit I

Dictionaries: Definition, Dictionary Abstract Data Type, Implementation of Dictionaries. Hashing: Review of Hashing, Hash Function, Collision Resolution Techniques in Hashing, Separate Chaining, Open Addressing, Linear Probing, Quadratic Probing, Double Hashing, Rehashing, Extendible Hashing.

Unit II

Skip Lists: Need for Randomizing Data Structures and Algorithms, Search and Update Operations on Skip Lists, Probabilistic Analysis of Skip Lists, Deterministic Skip Lists.

Unit III

Trees: Binary Search Trees, AVL Trees, Red Black Trees, 2-3 Trees, B-Trees, Splay Trees.

Unit IV

Text Processing: Sting Operations, Brute-Force Pattern Matching, The Boyer-Moore Algorithm, The Knuth-Morris-Pratt Algorithm, Standard Tries, Compressed Tries, Suffix Tries, The Huffman Coding Algorithm, The Longest Common Subsequence Problem (LCS), Applying Dynamic Programming to the LCS Problem.

Unit V

Computational Geometry: One Dimensional Range Searching, Two Dimensional Range Searching, Constructing a Priority Search Tree, Searching a Priority Search Tree, Priority Range Trees, Quad trees, k-D Trees. Recent Trends in Hashing, Trees, and various computational geometry methods for efficiently solving the new evolving problem.

Text/Reference Books:

1. Mark Allen Weiss, Data Structures and Algorithm Analysis in C++, 2nd Edition, Pearson, 2004.
2. M T Goodrich, Roberto Tamassia, Algorithm Design, John Wiley, 2002.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

ADVANCED DATA MINING

Course Code: GR18D5003 **L/T/P/C: 3/0/0/3**

Course Objectives: Students undergoing this course are expected to

- Understand data mining functionalities and pattern mining.
- Learn different classification techniques for mining patterns.
- Describe advanced clustering methods with real time applications.
- Discuss types of web mining and text mining techniques.
- Understand spatial and temporal mining applications in data mining,

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

- Summarize the basic data mining tasks and various types of pattern mining.
- Apply classification techniques for data mining.
- Evaluate the performance of different advanced clustering algorithms.
- Analyse recent trends in data mining such as web mining, text mining and spatial mining.
- Construct temporal association rules and sequence mining algorithms.

UnitI

Data mining Overview and Advanced Pattern Mining: Data mining tasks – mining frequent patterns, associations and correlations, classification and regression for predictive analysis, cluster analysis , outlier analysis; advanced pattern mining in multilevel, multidimensional space – mining multilevel associations, mining multidimensional associations, mining quantitative association rules, mining rare patterns and negative patterns.

Unit II

Advanced Classification: Classification by back propagation, support vector machines, classification using frequent patterns, other classification methods – genetic algorithms, roughest approach, and fuzzy set approach.

Unit III

Advanced Clustering: Density - based methods –DBSCAN, OPTICS, DENCLUE; Grid - Based methods – STING, CLIQUE; Expectation – maximization algorithm; clustering High - Dimensional Data; Clustering Graph and Network Data.

Unit IV

Web and Text Mining: Introduction, web mining, web content mining, web structure mining, web usage mining, Text mining – unstructured text, episode rule discovery for texts, hierarchy of categories, text clustering.

Unit V

Temporal and Spatial Data Mining: Introduction; Temporal Data Mining – Temporal Association Rules, Sequence Mining, GSP algorithm, SPADE, SPIRIT Episode Discovery, Time Series Analysis, Spatial Mining – Spatial Mining Tasks, Spatial Clustering, Data Mining Applications.

Text Books:

1. Data Mining Concepts and Techniques, Jiawei Hang MichelineKamber, Jianpei, Morgan Kaufmannn.
2. Data Mining Techniques – Arun K pujari, Universities Press.

Reference Books:

1. Introduction to Data Mining – Pang - Ning Tan, Vipinkumar, Michael Steinbach, Pearson.
2. Data Mining Principles & Applications – T.V Suresh Kumar, B.Eswara Reddy, JagadishSKalimani, Elsevier.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

INFORMATION SECURITY

Course Code: GR18D5004 **L/T/P/C: 3/0/0/3**

Course Objectives:

- To demonstrate the principal concepts, major issues, technologies and basic approaches in information security.
- To illustrate the concepts of cryptograph, how it has evolved and some key encryption techniques used today.
- To interpret security policies (such as authentication, integrity and confidentiality) as well as digital signatures to perform secure message exchanges.
- To Interpret network security designs using available secure solutions (such as PGP, S/MIME and IPSec).
- To implement security protocols and discus about Intruders and firewalls.

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

- Analyze information security governance, and related issues.
- Illustrate various cryptography algorithms.
- Apply authentication mechanisms and Hash functions to provide secure data exchange.
- Access network security design using available secure solutions (such as PGP, S/MIME and IPSec).
- Infer advanced security issues and technologies.

Unit I

Attacks on Computers and Computer Security: Introduction, The need for security, Security approaches, Principles of security, Types of Security attacks, Security services, Security Mechanisms, A model for Network Security Cryptography: Concepts and Techniques: Introduction, plain text and cipher text, substitution techniques, transposition techniques, encryption and decryption, symmetric and asymmetric key cryptography, stenography, key range and key size, possible types of attacks.

Unit II

Symmetric key Ciphers: Block Cipher principles & Algorithms(DES, AES,Blowfish), Differential and Linear Cryptanalysis, Block cipher modes of operation, Stream ciphers, RC4,Location and placement of encryption function, Key distribution, Asymmetric key Ciphers: Principles of public key cryptosystems Algorithms(RSA, Diffie-Hellman,ECC), Key Distribution

Unit III

Message Authentication Algorithms and Hash Functions: Authentication requirements, Functions, Message authentication codes, Hash Functions, Secure hash algorithm, Whirlpool, HMAC, CMAC,

Digital signatures, knapsack algorithm Authentication Applications: Kerberos, X.509 Authentication Service, Public — Key Infrastructure, Biometric Authentication

Unit IV

E-Mail Security: Pretty Good Privacy, S/MIME IP Security: IP Security overview, IP Security architecture, Authentication Header, Encapsulating security payload, Combining security associations, key management.

Unit V

Web Security: Web security considerations, Secure Socket Layer and Transport Layer Security, Secure electronic transaction Intruders, Virus and Firewalls: Intruders, Intrusion detection, password management, Virus and related threats, Countermeasures, Firewall design principles, Types of firewalls Case Studies on Cryptography and security: Secure Inter-branch Payment Transactions, Cross site Scripting Vulnerability, Virtual Elections

Text Books:

1. Cryptography and Network Security: William Stallings, Pearson Education, 4t" Edition.
2. Cryptography and Network Security: AtulKahate, McGraw Hill, 2nd Edition.

Reference Books:

1. Cryptography and Network Security: C K Shyamala, N Harini, Dr T R Padmanabhan, Wiley India, 1' Edition.
2. Cryptography and Network Security: ForouzanMukhopadhyay, McGraw Hill, 2 Edition.
3. Information Security, Principles and Practice: Mark Stamp, Wiley India.
4. Principles of Computer Sceurity: 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

ADVANCED PYTHON PROGRAMMING

Course Code: GR18D5005 **L/T/P/C: 3/0/0/3**

Course Objectives:

- To understand why Python is a useful scripting language for developers.
- To learn how to design and program Python applications.
- To learn how to use lists, tuples, and dictionaries in Python programs.
- To learn how to identify Python object types.
- To learn how to use indexing and slicing to access data in Python programs.

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

- Demonstrate understanding of modern version control tools.
- Demonstrate understanding of the role of testing in scientific computing, and write unit tests in Python.
- Use command line tools to write and edit code.
- Implement publication-ready graphics from a dataset.
- Summarize sorting techniques

Unit I

Algorithmic Problem Solving: Algorithms, building blocks of algorithms (statements, state, control flow, functions), notation (pseudo code, flow chart, programming language), algorithmic problem solving, simple strategies for developing algorithms (iteration, recursion). Illustrative problems: find minimum in a list, insert a card in a list of sorted cards, and guess an integer number in a range, Towers of Hanoi.

Unit II

Data, Expressions, Statements: 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; Illustrative programs: exchange the values of two variables, circulate the values of n variables, distance between two points.

Unit III

Control Flow, Functions: Conditionals, Boolean values and operators, conditional (if), alternative (if-else), chained conditional (if-elif-else); Iteration: state, while, for, break, continue, pass; Fruitful functions: return values, parameters, local and global scope, function composition, recursion; Strings: string slices, immutability, string functions and methods, string module; Lists as arrays. Illustrative programs: square root, gcd, exponentiation, sum an array of numbers, linear search, binary search.

Unit IV

Lists, Tuples, Dictionaries: 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; Illustrative programs: selection sort, insertion sort, mergesort, histogram.

Unit V

Files, Modules, Packages: Files and exception: text files, reading and writing files, format operator; command line arguments, errors and exceptions, handling exceptions, modules, packages; Illustrative programs: word count, copy file.

Text Books:

1. Allen B. Downey, "Think Python: How to Think Like a Computer Scientist‘‘, 2nd edition, Updated for Python 3, Shroff/O‘Reilly Publishers, 2016 (http://greenteapress.com/wp/think-python/)
2. Guido van Rossum and Fred L. Drake Jr, ―An Introduction to Python – Revised and updated for Python 3.2, Network Theory Ltd., 2011.

Reference Books:

1. John V Guttag, ―Introduction to Computation and Programming Using Python‘‘, Revised and expanded Edition, MIT Press , 2013
2. Robert Sedgewick, Kevin Wayne, Robert Dondero, ―Introduction to Programming in Python: An Inter-disciplinary Approach, Pearson India Education Services Pvt. Ltd., 2016.
3. Timothy A. Budd, ―Exploring Python‖, Mc-Graw Hill Education (India) Private Ltd.,, 2015.
4. Kenneth A. Lambert, ―Fundamentals of Python: First Programs‖, CENGAGE Learning, 2012.
5. Charles Dierbach, ―Introduction to Computer Science using Python: A Computational Problem- Solving Focus, Wiley India Edition, 2013.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

COMPUTER SYSTEM DESIGN

Course Code: GR18D5006 **L/T/P/C: 3/0/0/3**

Course Objectives: Students undergoing this course are expected to

- Understand the components of the computer and its working and also basic concepts of number system.
- Understand the concepts of Input-Output interface and its organization.
- Understand the concepts of memory management, i.e cache, associative and virtual, auxiliary memory's and its organization.
- Understand different approaches to memory management.
- Learn and understand the security aspects of a UNIX

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

- Learn IA-32 Pentium processor architecture and Computer I/O operations
- Compare hardwired control and micro programmed control in processing unit.
- Learn the management of different type of memories in the computer system
- Determine the reasons of deadlocks and understand the different types of IPC mechanisms.
- Compare and analyze different file systems being used in different operating systems

Unit I

Computer structure: Hardware, software, system software, Von-Neumann architecture – case study. IA -32 Pentium: registers and addressing, instructions, assembly language, program flow control, logic and shift/rotate instructions, multiply, divide MMX, SIMD instructions, I/O operations, subroutines. Input/output organization, interrupts, DMA, Buses, Interface circuits, I/O interfaces, device drivers in windows, interrupt handlers.

Unit II

Processing Unit: Execution of a complete instruction, multiple bus organization, hardwired control, micro programmed control. Pipelining: data hazards, instruction hazards, influence on instruction sets, data path & control consideration, and RISC architecture introduction.

Unit III

Memory: types and hierarchy, model level organization, cache memory, performance considerations, mapping, virtual memory, swapping, paging, segmentation, replacement policies

Unit IV

Processes and Threads: processes, threads, inter process communication, classical IPC problems, Deadlocks.

Unit V

File system: Files, directories, Implementation, UNIX file system Security: Threats, intruders, accident data loss, basics of cryptography, user authentication.

Text Books:

1. Computer Organization – Car Hamacher, ZvonksVranesic, SafeaZaky, Vth Edition, McGraw Hill.
2. Modern Operating Systems, Andrew S Tanenbaum 2nd edition Pearson/PHI

Reference Books:

1. Computer Organization and Architecture – William Stallings Sixth Edition, Pearson/PHI
2. Morris Mano -Computer System Architecture –3rd Edition-Pearson Education.
3. Operating System Principles- Abraham Silberchatz, Peter B. Galvin, Greg Gagne 7th Edition, John Wiley

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

OBJECT ORIENTED MODELLING

Course Code: GR18D5007 **L/T/P/C: 3/0/0/3**

Course Objectives:

- Create a requirements model using UML class notations and use-cases based on statements Of user requirements, and to analyze requirements models given to them for correctness and Quality
- Create the OO design of a system from the requirements model in terms of a high Level architecture description, and low-level models of structural organization and dynamic Behavior using UML class, object, and sequence diagrams.
- Design the architectural and Behavioral UML Diagrams for Real time applications and Enough Java to see how to create software the implements the OO designs modeled Using UML. Understand the Unified Process Models and Design and implement and to realize the Use cases and design the architecture centric process model.
- Create the iterative incremental and generic iteration workflow phases in Unified Process.
- Construct the Modern Software Development life Cycle Phase.

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

- Able to know the fundamental principles of OO programming and key principles in OO analysis, design, and development.
- Able to Design Behavioral and Architerutal Modeling UML Diagrams for Real time Applications.
- Demonstrate the Unified Process Phases and uses of the Use cases in architecture
- Understand the iterative and incremental and generic iteration work flows in unified process.
- Develop software applications using inception, elaboration, construction and transition phases

Unit I

Introduction to UML: The meaning of Object Orientation, object identity, Encapsulation, information hiding, polymorphism, generosity, importance of modelling, principles of modelling, object oriented modelling, conceptual model of the UML, Architecture. Basic Structural Modelling: Classes, Relationships, common Mechanisms, and diagrams. Class & Object Diagrams: Terms, concepts, modelling techniques for Class & Object Diagrams. Collaboration Diagrams: Terms, Concepts, depicting a message, polymorphism in collaboration diagrams, iterated messages, use of self in messages. Sequence Diagrams: Terms, concepts, depicting asynchronous messages with/without priority, call back mechanism, broadcast messages.

Unit II

Basic Behavioural Modelling: Use cases, Use case Diagrams, Activity Diagrams. Advanced Behavioural Modelling: Events and signals, state machines, processes and Threads, time and space, state chart diagrams. Architectural Modelling: Component, Deployment, Component diagrams and Deployment diagrams.

Unit III

The Unified process: use case driven, architecture centric, iterative, and incremental
The Four Ps: people, project, product, and process
Use case driven process: why use case, capturing use cases, analysis, design, and implementation to realize the use cases, testing the use cases
Architecture-centric process: architecture in brief, why we need architecture, use cases and architecture, the steps to architecture, an architecture description.

UNIT-IV
Iterative incremental process: Iterative incremental in brief, why iterative incremental development? The iterative approach is risk driven, the generic iteration.
The Generic Iteration workflow: phases are the first division workflow, planning proceeds doing, risks affect project planning, use case prioritization, resource needed, assess the iteration and phases.
Inception phase: early in the inception phase, the archetypal inception iteration workflow, execute the core workflows, requirements to test.

Unit V
Elaboration Phase: elaboration phase in brief, early in the elaboration phase, the architectural elaboration iteration workflow, execute the core workflows-Requirements to test.
Construction phase: early in the construction phase, the archetypal construction iteration workflow, execute the core workflow.
Transition phase: early in the transition phase, activities in transition phase Case Studies: Automation of a Library, Software Simulator application (2-floor elevator simulator).

Text Books:

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

Reference Books:

- Fundamentals of Object Oriented Design in UML By Meilir Page-Jones, Pearson Education
- Object Oriented Analysis & Design By AtulKahate, The McGraw-Hill.
- Practical Object-Oriented Design with UML By Mark Priestley, TATA McGraw Hill
- Object Oriented Analysis & Design By Brett D McLaughlin, Gary Pollice and David West, O'REILY.
- Object-Oriented Analysis and Design using UML by Simon Bennet, Steve Mc Robb and Ray Farmer, 2nd Edition, TATA McGraw Hill.
- Object-Oriented Analysis and Design with the Unified Process By John W. Satzinger, Robert B Jackson and Stephen D Burd, THOMSON Course Technology.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

DISTRIBUTED COMPUTING

Course Code: GR18D5008 **L/T/P/C: 3/0/0/3**

Course Objectives: Students undergoing this course are expected to

- To differentiate among concurrent, networked, distributed, and mobile
- To study about different computing paradigms
- To demonstrate the remote method invocation and compare with CORBA
- To describe and learn about Distributed Document Based systems.
- To distinguish about Grid computing and Cluster computing.

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

- Compare and differentiate between different form computing techniques and computing paradigms.
- Demonstrate of the remote method invocation and its comparison with CORBA
- Define and study the Distributed Document Based systems and distributed multimedia systems.
- Capable to understand the characteristics of distributed multimedia systems.
- Express the outline of Grid computing concept and cluster computing concept.

Unit I

Introduction: The different forms of computing – Monolithic, Distributed, parallel and cooperative computing, the meaning of Distributed computing, Examples of Distributed systems, the strengths and weaknesses of Distributed computing, operating system concepts relevant to distributed computing, the architecture of distributed applications.

Unit II

Distributed computing Paradigms: Paradigms for Distributed Applications – Message passing Paradigm, The Client-Server Paradigm (JAVA Socket API), The peer-to-peer paradigm, Message System (or MOM) Paradigm – the Point-to-point message model and the publish/subscribe message model, RPC model, The Distributed Objects Paradigms-RMI,ORB, the object space Paradigm, The Mobile Agent Paradigm, the Network Services Paradigm, The Mobile Agent Paradigm, the Network Services Paradigm, The collaborative application (Groupware Paradigm), choosing a Paradigm for an application.

Unit III

Distributed Objects Paradigm (RMI): Message passing versus Distributed Objects, An Archetypal Distributed Object Architecture, Distributed Object Systems, RPC, RMI, The Java RMI Architecture, Java RMI API, A sample RMI Application, steps for building an RMI application,

testing and debugging, comparison of RMI and socket API, Distributed Object Paradigm (CORBA): The basic Architecture, The CORBA object interface, Inter-ORB Protocols, object servers and object clients, CORBA Object references, CORBA Naming Service and the Interoperable Naming Service, CORBA object services, Object Adapters, Java IDL, An example CORBA application.

Unit IV

Distributed Document-based Systems: WWW, Lotus Notes, comparison of WWW and Lotus Notes, Distributed Coordination-based systems- Introduction to coordination models, TIB, JINI, comparison of TIB and JINI, Software Agents, Agent Technology, Mobile Agents. Distributed Multimedia Systems – characteristics of multimedia data, QOS of service management, Resource Management, Stream Adaption.

Unit V

Grid Computing: Definition of grid, grid types – computational grid, data grid, grid benefits and applications, drawback of grid computing, grid components, grid architecture and its relation to various Distributed Technologies. Cluster Computing, Parallel computing overview, cluster computing – Introduction, Cluster Architecture, parallel programming models and Paradigms, Applications of Clusters.

Text Books:

1. Distributed, Computing, Principles and applications, M.L.Liu, Pearson Education
2. Distributed Systems, Principles and paradigms, A.S. Tannenbaum and M.V. Steen, Pearson Education
3. Client-Server Programming with Java and CORBA 2nd edition, R. Orfali& Dan Harkey, John Wiley &Sons
4. Grid Computing, J. Joseph & C. Fellenstein, Pearson Education 5. High Performance cluster computing, RajKumarBuyya, Pearson Education

Reference Books:

1. A Networking Approach to grid computing, D.Mimoli, Wiley & Sons
2. Grid Computing: a practical guide to technology and applications, A. Abaus, Firewall media
3. Java Network Programming, E.R. Harold, 2nd Edition, O. Reilly, SPD.
4. Distributed systems, concepts and Design, 3rd edition, G. Coulouris, J. Dollimore, and Tim Kindbirg, Pearson Education.
5. Java programming with CORBA, 3rd Edition, Brose, Vogel, Duddy, Wiley Dreamtech.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

RESEARCH METHODOLOGY AND IPR

Course Code: GR18D5012 **L/T/P/C: 2/0/0/2**

Course objectives:

- To familiarise students with the different aspects of research.
- To provide an idea of good scientific writing and proper presentation skills.
- To provide an understanding of philosophical questions behind scientific research.
- To provide a brief background on the historical legacy of science.
- To provide an insight of nature of Intellectual Property and new developments in IPR.

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

- Understand research problem formulation.
- Analyze research related information and follow research ethics
- Understand that today's world is controlled by Computer, Information Technology, but tomorrow world will be ruled by ideas, concept, and creativity.
- Understanding that when IPR would take such important place in growth of individuals & nation, it is needless to emphasise the need of information about Intellectual Property Right to be promoted among students in general & engineering.
- Understand the nature of Intellectual Property and IPR in International scenario.

Unit I

Meaning of research problem, Sources of research problem, Criteria Characteristics of a good research problem, Errors in selecting a research problem, Scope and objectives of research problem. Approaches of investigation of solutions for research problem, data collection, analysis, interpretation, Necessary instrumentations

Unit II

Effective literature studies approaches, analysis Plagiarism, Research ethics,

Unit III

Effective technical writing, how to write report, Paper Developing a Research Proposal, Format of research proposal, a presentation and assessment by a review committee

Unit IV

Nature of Intellectual Property: Patents, Designs, Trade and Copyright. Process of Patenting and Development: technological research, innovation, patenting, development. International Scenario: International cooperation on Intellectual Property. Procedure for grants of patents, Patenting under PCT.

Unit V

Patent Rights: Scope of Patent Rights. Licensing and transfer of technology. Patent information and databases. Geographical Indications.New Developments in IPR: Administration of Patent System. New developments in IPR; IPR of Biological Systems, Computer Software etc. Traditional

knowledge Case Studies, IPR and IITs.

Reference Books:

1. Stuart Melville and Wayne Goddard, “Research methodology: an introduction for science & engineering students’”
2. Wayne Goddard and Stuart Melville, “Research Methodology: An Introduction”
3. RanjitKumar, 2 ndEdition , “Research Methodology: A Step by Step Guide for beginners”
4. Halbert, “Resisting Intellectual Property”, Taylor & Francis Ltd ,2007.
5. Mayall , “Industrial Design”, McGraw Hill,1992.
6. Niebel , “Product Design”, McGraw Hill,1974.
7. Asimov , “Introduction to Design”, Prentice Hall,1962.
8. Robert P. Merges, Peter S. Menell, Mark A. Lemley, “ Intellectual Property in New Technological Age”,2016. T. Ramappa, “Intellectual Property Rights Under WTO”, S. Chand,2008

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

ADVANCED DATA STRUCTURES LAB

Course Code: GR18D5013 **L/T/P/C: 0/0/4/2**

Course Objectives:

- To design and implementation of various basic and advanced data structures.
- To introduce various techniques for representation of the data in the real world
- To familiarize students with advanced paradigms and data structure used to solve algorithmic problems.
- Student should be able to come up with analysis of efficiency and proofs of correctness.
- To improve the logical ability

Course Outcomes:

- Student will be able to choose appropriate data structure as applied to specified problem definition.
- Student will be able to handle operations like searching, insertion, deletion, traversing mechanism etc. on various data structures.
- Students will be able to use linear and non-linear data structures like stacks, queues , linked list etc..
- Students will be able to Implement various searching and sorting algorithms
- Students will be able to apply the various data structures in real time applications

Task 1: Implement a Java program that prompts the user for an integer and then prints out all prime numbers up to that integer

Task 2: Implement a Java program to implements List ADT using arrays

Task 3: Implement a Java program to implements List ADT using linked lists

Task 4: Implement a java program that reads an infix expression, converts the expression to postfix form and then evaluates the postfix expression.

Task 5: Implement a Java programs to implement the deque (double ended queue) ADT using Arrays

Task 6: Implement a Java programs to implement the deque (double ended queue) ADT Doubly linked list.

Task 7: Implement a Java program to perform the following operations:

- Insert an element into a binary search tree.
- Delete an element from a binary search tree.
- Search for a key element in a binary search tree

Task 8: Implement a Java program to perform the following operations
Insertion into an AVL-tree
Deletion from an AVL-tree

Task 9: Implement a Java program to implement all the functions of a dictionary (ADT) using Hashing

Task 10: Implement a Java programs for implementing Graph colouring

Task 11: Implement a Java programs for implementing the following sorting methods:

- Bubble sort
- Selection sort
- Insertion sort
- Quick sort

Task 12: Implement a Java program for implementing KMP pattern matching algorithm

Text/Reference Books:

1. Mark Allen Weiss, Data Structures and Algorithm Analysis in C++, 2nd Edition, Pearson, 2004.
2. M T Goodrich, Roberto Tamassia, Algorithm Design, John Wiley, 2002.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

ADVANCED DATA MINING LAB

Course Code: GR18D5009 **L/T/P/C: 0/0/4/2**

Course Objectives: Students undergoing this course are expected to

- Differentiate On-line Transaction Processing and On-line Analytical processing
- Learn Multidimensional schema suitable for data warehousing
- Understand various data mining functionalities
- Understands the various classification and clustering algorithms
- Understands the Analysis Procedure by using various Decision tree algorithms.

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

- Adapt to new data mining tools.
- Explore recent trends in data mining such as web mining, spatial-temporal mining
- To understand the basic principles, concepts and applications of data warehouse and data mining.
- Ability to create training data set using data mining tools.
- Explores knowledge on Clustering and Classification analysis.

Case Study1:

Hospital Management System Data Warehouse consists of Dimension Table and Fact Table. REMEMBER the following Dimension the dimension object (Dimension): _ Name_ Attributes (Levels), with one primary key _ Hierarchies One time dimension is must. About Levels and Hierarchies Dimension objects (dimension) consist of a set of levels and a set of hierarchies defined over those levels. The levels represent levels of aggregation. Hierarchies describe parent-child relationships among a set of levels.

For example, a typical calendar dimension could contain five levels. Two hierarchies can be defined on these levels: H1: YearL>QuarterL>MonthL>WeekL>DayL H2: YearL>WeekL>DayLThe hierarchies are described from parent to child, so that Year is the parent of Quarter, Quarter the parent of Month, and so forth. About Unique Key Constraints When you create a definition for a hierarchy, Warehouse Builder creates an identifier key for each level of the hierarchy and a unique key constraint on the lowest level (Base Level) Design a Hospital Management system data warehouse (TARGET) consists of Dimensions Patient, Medicine, Supplier, Time. Where measures are 'NO UNITS', UNIT PRICE. Assume the Relational database (SOURCE) table schemas as follows TIME (day, month, year), PATIENT (patient_name, Age, Address, etc.,) MEDICINE (Medicine_Brand_name, Drug_name, Supplier, no_units, Uinit_Price, etc.,) SUPPLIER :(Supplier_name, Medicine_Brand_name, Address, etc.,) If each Dimension has 6 levels, decide the levels and hierarchies, Assume the level names suitably. Design the Hospital Management system data warehouse using all schemas. Give the example 4-D cube with assumption names.

Case Study2:

Credit Risk Assessment Description:

The business of banks is making loans. Assessing the credit worthiness of an applicant is of crucial importance. You have to develop a system to help a loan officer decide whether the credit of a customer is good, or bad. A bank's business rules regarding loans must consider two opposing factors. On the one hand, a bank wants to make as many loans as possible. Interest on these loans is the banks profit source. On the other hand, a bank cannot afford to make too many bad loans. Too many bad loans could lead to the collapse of the bank. The bank's loan policy must involve a compromise: not too strict, and not too lenient. To do the assignment, you first and foremost need some knowledge about the world of credit. You can acquire such knowledge in a number of ways.

Knowledge Engineering. Find a loan officer who is willing to talk. Interview her and try to represent her knowledge in the form of production rules. Books. Find some training manuals for loan officers or perhaps a suitable textbook on finance. Translate this knowledge from text form to production rule form. Common sense. Imagine yourself as a loan officer and make up reasonable rules which can be used to judge the credit worthiness of a loan applicant. Case histories. Find records of actual cases where competent loan officers correctly judged when, and when not to, approve a loan application.

List of Tasks: (Turn in your answers to the following tasks)

Task 1. List all the categorical (or nominal) attributes and the real-valued attributes separately.

Task 2. What attributes do you think might be crucial in making the credit assessment. Come up with One type of model that you can create is a Decision Tree - train a Decision Tree busing the complete dataset as the training data. some simple rules in plain English using your selected attributes.

Task 3. Report the model obtained after training.

Task 4. Suppose you use your above model trained on the complete dataset, and classify credit good/bad for each of the examples in the dataset. What % of examples can you classify correctly? (This is also called testing on the training set) Why do you think you cannot get 100 % training accuracy?

Task 5. Is testing on the training set as you did above a good idea? Why or Why not?

Task 6. One approach for solving the problem encountered in the previous question is using cross-validation? Describe what is cross-validation briefly. Train a Decision Tree again using cross-validation and report your results. Does your accuracy increase/decrease? Why?

Task 7. Check to see if the data shows a bias against "foreign workers" (attribute 20),or "personal-status" (attribute 9). One way to do this (perhaps rather simple minded) is to remove these attributes from the dataset and see if the decision tree created in those cases is significantly different from the full dataset case which you have already done. To remove an attribute you can use the preprocess tab in Weka's GUI Explorer. Did removing these attributes have any significant effect? Discuss.

Task 8. Another question might be, do you really need to input so many attributes to get good results? Maybe only a few would do. For example, you could try just having attributes 2, 3, 5, 7, 10, 17 (and 21, the class attribute (naturally)). Try out some combinations. (You had removed

two attributes in problem 7. Remember to reload the arff data file to get all the attributes initially before you start selecting the ones you want.)

Task 9. Sometimes, the cost of rejecting an applicant who actually has a good credit (case 1) might be higher than accepting an applicant who has bad credit (case 2). Instead of counting the misclassifcations equally in both cases, give a higher cost to the first case (say cost 5) and lower cost to the second case. You can do this by using a cost matrix in Weka. Train your Decision Tree again and report the Decision Tree and cross-validation results. Are they significantly different from results obtained in problem 6 (using equal cost)?

Task 10. 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?

Task 11. 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 increases.

Task 12. (Extra Credit): How can you convert a Decision Trees into "if-then- else rules". Make up your own small Decision Tree consisting of 2-3 levels and convert it into a set of rules. There also exist different classifiers that output the model in the form of rules - one such classifier in Weka is rules.PART, train this model and report the set of rules obtained. Sometimes just one attribute can be good enough in making the decision, yes, just one! Can you predict what attribute that might be in this dataset?OneR classifier uses a single attribute to make decisions (it chooses the attribute based on minimum error). Report the rule obtained by training a one R classifier. Rank the performance of j48, PART and oneR.

Task Resources

- Mentor lecture on Decision Trees
- Andrew Moore's Data Mining Tutorials (See tutorials on Decision Trees and Cross Validation)
- Decision Trees (Source: Tan, MSU)
- Tom Mitchell's book slides (See slides on Concept Learning and Decision Trees)

Weka Resources

- Introduction to Weka (html version) (download ppt version)
- Download Weka
- Weka Tutorial
- ARFF format
- Using Weka from command line

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

INFORMATION SECURITY LAB

Course Code: GR18D5010 **L/T/P/C: 0/0/4/2**

Course Objectives:

- Explain different types of ciphers used for encryption and decryption.
- Emphases on symmetric encryption algorithms.
- Demonstrate on asymmetric encryption algorithms.
- Experiment on Hash algorithms.
- Illustrate programs related to digital certificates and digital signatures.

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

- Use the concepts of different ciphers for encryption and decryption.
- Implement symmetric encryption algorithms.
- Examine asymmetric encryption algorithms.
- Interpret hash algorithms and their functionalities.
- Solve the problems on digital signatures and digital certificates.

List of Tasks:

Task 1. Write a Java program to perform encryption and decryption using the following algorithms a. Ceaser cipher b. Substitution cipher c. Hill Cipher

Task 2. Write a C/ JAVA program to implement the DES algorithm logic.

Task 3. Write a C/JAVA program to implement the Blowfish algorithm logic.

Task 4. Write a C/JAVA program to implement the AES algorithm logic.

Task 5. Write the RC4 logic in Java.

Task 6. Implement DES-2 and DES-3 using Java cryptography package.

Task 7. Write a Java program to implement RSA algorithm.

Task 8. Implement the Diffie-Hellman Key Exchange mechanism

Task 9. Calculate the message digest of a text using the SHA-1 algorithm in JAVA.

Task 10. Calculate the message digest of a text using the MD5 algorithm in JAVA.

Task 11. Explore the Java classes related to digital certificates.

Task 12. Write a program in java, which performs a digital signature on a given text.

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ADVANCED PYTHON PROGRAMMING LAB

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

Course Objectives:

- To improve the logical ability in programming
- To understand concepts about searching and sorting techniques
- To understanding about python script and step by step approach in solving problems with the help of fundamental data structures
- Provide you with the knowledge and expertise to become a Python programmer
- Produce Python code to statistically analyze the data

Course Outcomes:

- Take a huge step towards OOP, Object Orientated Programming
- Learn many advanced Python methods and variables
- Adequately use Python programming in functions, modules
- Ability to summarize searching and sorting techniques
- Learn matrix arithmetic and ability to design graphics for video games

List of Tasks:

Task 1. Compute the GCD of two numbers.

Task 2. Find the square root of a number (Newton‘s method)

Task 3. Exponentiation (power of a number)

Task 4. Find the maximum of a list of numbers

Task 5. Linear search and Binary search

Task 6. Selection sort, Insertion sor

Task 7. Merge sort

Task 8. First n prime numbers

Task 9. Multiply matrices

Task 10. Programs that take command line arguments (word count)

Task 11. Find the most frequent words in a text read from a file

Task 12. Simulate elliptical orbits in Pygame

Task 13. Simulate bouncing ball using Pygame

Text Books:

1. Allen B. Downey, ``Think Python: How to Think Like a Computer Scientist'', 2nd edition,Updated for Python 3, Shroff/O'Reilly Publishers, 2016 http://greenteapress.com/wp/thinkpython/)
2. Guido van Rossum and Fred L. Drake Jr, "An Introduction to Python – Revised and updatedfor Python 3.2, Network Theory Ltd., 2011.

SEMESTER - II

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

MACHINE LEARNING AND APPLICATIONS

Course Code: GR18D5014 **L/T/P/C: 3/0/0/3**

Course Objectives:

- Understand Supervised and Unsupervised Learning methods with a modern outlook focusing on recent advances.
- Discuss the Statistical Learning Theory and Ensemble methods.
- Explore Deep learning techniques and various feature extraction strategies.
- Describe Scalable machine Learning and Bayesian Learning.
- Understand the recent trends in various machine learning methods for IOT applications

Course Outcomes: After completion of course, students would be able to

- Compare Supervised and Unsupervised Learning methods.
- Demonstrate various Ensemble methods and apply Statistical Learning Theory to real world problems.
- Analyse Deep Learning and Feature Representation techniques.
- Categorize the Scalable Machine Learning techniques.
- Summarize the recent trends in various machine learning methods for IOT applications.

Unit I

Supervised Learning (Regression/Classification), Basic methods: Distance-based methods, Nearest-Neighbors, 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 II

Unsupervised Learning Clustering: K-means/Kernel K-means,Dimensionality Reduction: PCA and kernel PCA, Matrix Factorization and Matrix Completion,Generative Models (mixture models and latent factor models).

Unit III

Evaluating Machine Learning algorithms and Model Selection, Introduction to Statistical Learning Theory, Ensemble Methods (Boosting, Bagging, Random Forests)

Unit IV

Sparse Modelling and Estimation, Modelling Sequence/Time-Series Data, Deep Learning and Feature Representation Learning.

Unit V

Scalable Machine Learning (Online and Distributed Learning), A selection from some other advanced topics, e.g., Semi-supervised Learning, Active Learning, Reinforcement Learning, Inference in Graphical Models, Introduction to Bayesian Learning and Inference. Recent trends in various learning techniques of machine learning and classification methods for IOT applications. Various models for IOT applications.

Reference Books:

1. Kevin Murphy, Machine Learning: A Probabilistic Perspective, MIT Press, 2012
2. Trevor Hastie, Robert Tibshirani, Jerome Friedman, The Elements of Statistical Learning,
3. Springer 2009 (freely available online) Christopher Bishop, Pattern Recognition and Machine Learning, Springer, 2007.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

ADVANCED ALGORITHMS

Course Code: GR18D5015 **L/T/P/C: 3/0/0/3**

COURSE OBJECTIVES:

The Objectives of this course is to provide the student:

- Advanced methods of designing and analyzing algorithms.
- Learn appropriate algorithms and use it for a specific problem.
- With basic paradigms and data structures used to solve advanced algorithmic problems.
- Different classes of problems concerning their computation difficulties.
- Recent developments in the area of algorithmic design.

COURSE OUTCOMES

After completion of course, students would be able to:

- Analyze performance of different algorithms.
- Determine the appropriate data structure for solving a particular set of problems.
- Apply algorithmic paradigms for advanced algorithmic problems.
- Apply various mathematical techniques for solving the problems.
- Categorize the different problems in various classes according to their complexity.

Unit I

Sorting: Review of various sorting algorithms, topological sorting

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

Unit II

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

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

Unit III

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

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

Unit IV

Shortest Path in Graphs: Floyd-Warshall algorithm and introduction to dynamic programming paradigm. More examples of dynamic programming.

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

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

Unit V

Linear Programming: Geometry of the feasibility region and Simplex algorithm

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

Text/References:

1. "Introduction to Algorithms" by Cormen, Leiserson, Ripest,Stein.
2. "The Design and Analysis of Computer Algorithms" by Aho, Hopcroft,Ullman.
3. "Algorithm Design" by Kleinberg andTardos.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

IMAGE PROCESSING

Course Code: GR18D5016 **L/T/P/C: 3/0/0/3**

Course Objectives

- Describe and explain basic principles of digital image processing.
- Design and implement algorithms that perform basic image processing
- Design and implement algorithms for image compression
- Design and implement algorithms for image segmentation.
- Assess the performance of image processing algorithms and systems.

Course Outcomes

- Analyze general terminology of digital image processing and image transforms.
- Examine various types of images, Filtering techniques.
- Examine Image Restoration models.
- Evaluate the methodologies for image segmentation.
- Implement image processing compression.

UnitI

Digital Image Fundamentals & Image Transforms: Digital Image Fundamentals, Sampling and Quantization, Relationship between Pixels,
Image Transforms: 2-D FFT, Properties, Walsh Transform, Hadamard Transform, Discrete Cosine Transform, Haar Transform, Slant Transform, Hoteling Transform.

Unit II

Image Enhancement (Spatial Domain): Introduction, Image Enhancement in Spatial Domain, Enhancement Through Point Operation, Types of Point Operation, Histogram Manipulation, Linear and Non — Linear Gray Level Transformation, Local or Neighborhood Operation, Median Filter, Spatial Domain High-Pass Filtering.
Image Enhancement (Frequency Domain): Filtering in Frequency Domain, Obtaining Frequency Domain Filters from Spatial Filters, Generating Filters Directly in the Frequency Domain, Low Pass (Smoothing) and High Pass (Sharpening) Filters in Frequency Domain.

Unit III

Image Restoration: Degradation Model, Algebraic Approach to Restoration, Inverse Filtering, Least Mean Square Filters, Constrained Least Squares Restoration, Interactive Restoration.

Unit IV

Image Segmentation: Detection of Discontinuities, Edge Linking And Boundary Detection, Thresholding, Region Oriented Segmentation.
Morphological Image Processing: Dilation and Erosion: Dilation, Structuring Element Decomposition, Erosion, Combining Dilation and Erosion, Opening and Closing, The Hit or Miss Transformation.

Unit V

Image Compression: Redundancies and their Removal Methods, Fidelity Criteria, Image Compression Models, Huffman and Arithmetic Coding, Error Free Compression, Lossy Compression, Lossy and Lossless Predictive Coding, Transform Based Compression, JPEG 2000 Standards.

Text Books:

1. Digital Image Processing – Rafael C. Gonzalez, Richard E. Woods, 3rd Edition, Pearson, 2008
2. Digital Image Processing- S Jayaraman, S Esakkirajan, T Veerakumar- TMH, 2010.

Reference Books:

1. Digital Image Processing using MATLAB — Rafael C. Gonzalez, Richard E Woods and Steven L. Eddings, 2nd Edition, TMH, 2010.
2. Fundamentals of Digital Image Processing — A.K.Jain, PHI, 1989
3. Digital Image Processing with MATLAB &Labview — Vipula Singh, Elsevier.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

ADVANCED DATA SCIENCE

Course Code:GR18D5017 **L/T/P/C: 3/0/0/3**

Course Objectives:

- Understand the Data Science process and toolkit.
- Learn how to collect, store and manage data from multiple data sources.
- Identify different Machine Learning algorithms for data analysis.
- List the types and technologies of data visualization.
- Discuss the applications of Data Science for real world problems.

Course Outcomes: On completion of the course the student should be able to

- Examine Data Science process and use its toolkit for a problem.
- Interpret how data is collected, stored and managed from multiple sources.
- Differentiate various Machine Learning algorithms used for data analysis.
- Practice different data visualization techniques.
- Categorize the applications of Data Science and summarize the recent trends for application development using data science.

Unit I

Introduction to core concepts and technologies: Introduction, Terminology, data science process, data science toolkit, Types of data, Example applications.

Unit II

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

Unit III

Data analysis: Introduction, Terminology and concepts, Introduction to statistics, Central tendencies and distributions, Variance, Distribution properties and arithmetic, Samples/CLT, Basic machine learning algorithms, Linear regression, SVM, Naive Bayes.

Unit IV

Data visualization: Introduction, Types of data visualization , Data for visualization: Data types, Data encodings, Retinal variables, Mapping variables to encodings, Visual encodings.

Unit V

Applications of Data Science, Technologies used for visualization, Bokeh (Python).

Recent trends in various data collection and analysis techniques, various visualization techniques, application development methods used in data science.

Text Books:

1. Cathy O'Neil and Rachel Schutt. Doing Data Science, Straight Talk From The Frontline.O'Reilly./
2. Jure Leskovek, AnandRajaraman and Jeffrey Ullman. Mining of Massive Datasets. v2.1, Cambridge UniversityPress.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

DATA ANALYTICS

Course Code: GR18D5018 **L/T/P/C: 3/0/0/3**

Course Objectives:

- To introduce the terminology, technology and its applications
- To introduce the concept of Analytics for Business
- To introduce the tools, technologies & programming languages which is used in day to day analytics cycle
- To Master the R programming and understand how various statements are executed in R
- Understand and use linear, non-linear regression models, and classification techniques for data analysis.

Course Outcomes: After completion of course, students would be able to

- Understand the introduction of R programming for data analytics, develop and analyze Summary Statistics.
- Analyze connecting of R to SQL databases and identify suitable Regression analysis and correlation.
- Compare and contrast various Verticals - Engineering, Financial and others.
- Apply how to manage our work to meet requirements.
- Come up with analysis of working effectively with Colleagues.

Unit I

Introduction to Analytics and R programming

Introduction to R, RStudio (GUI): R Windows Environment, introduction to various data types, Numeric, Character, date, data frame, array, matrix etc., Reading Datasets, Working with different file types .txt, .csv etc. Outliers, Combining Datasets, R Functions and loops.
Summary Statistics - Summarizing data with R, Probability, Expected, Random, Bivariate Random variables, Probability distribution. Central Limit Theorem etc.

Unit II

SQL using R & Correlation and Regression Analysis

Introduction to NoSQL, Connecting R to NoSQL databases. Excel and R integration with R connector.
Regression Analysis, Assumptions of OLS Regression, Regression Modelling. Correlation, ANOVA, Forecasting, Heteroscedasticity, Autocorrelation, Introduction to Multiple Regression etc.

Unit III

Understand the Verticals - Engineering, Financial and others

Understanding systems viz. Engineering Design, Manufacturing, Smart Utilities, Production lines, Automotive, Technology etc.
Understanding Business problems related to various businesses

Unit IV

Manage your work to meet requirements
Understanding Learning objectives, Introduction to work & meeting requirements, Time Management, Work management & prioritization, Quality & Standards Adherence,

Unit V
Work effectively with Colleagues
Introduction to work effectively, Team Work, Professionalism, Effective Communication skills, etc.

Text Books:

1. **Student's Handbook for Associate Analytics.**
2. Introduction to Scientific Programming and Simulation Using R, Owen Jones, Robert Maillardet and Andrew Robinson, Second Edition, CRC Press, 2014
3. A First Course in Statistical Programming with R, Braun W. J., Murdoch D. J.. — Cambridge University Press, 2007
4. Data Manipulation with R, JaynalAbedin and Kishor Kumar Das, Second Edition, Packt publishing, BIRMINGHAM – MUMBAI.
5. Beginning R The Statistical Programming language- Mark Gardener, John Wiley & Sons, Inc., 2012

Reference Books:

1. Introduction to Probability and Statistics Using R, ISBN: 978-0-557-24979-4, is a textbook written for an undergraduate course in probability and statistics.
2. An Introduction to R, by Venables and Smith and the R Development Core Team. This may be downloaded for free from the R Project website (http://www.r-project.org/, see Manuals). There are plenty of other free references available from the R Project website.
3. Time Series Analysis and Mining with R**,** Yanchang Zhao
4. Graphics for Statistics and Data Analysis with R – Kevin J. Keen, CRC Press, 2010
5. Data Analysis and Graphics Using R, Third Edition, John Maindonald, W. John Braun, Cambridge University Press, 2010
6. Exploratory Data Analysis with R – Roger D. Peng, Leanpub publications, 2015

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

CLOUD COMPUTING AND APPLICATIONS

Course Code: GR18D5019 **L/T/P/C: 3/0/0/3**

Course Objectives: Students undergoing this course are expected to

- Understand the emerging area of "cloud computing" and how it is related to the traditional models of computing.
- Understand various types of cloud services and models of cloud computing.
- Provide strong foundation of the Cloud computing, so that students will be able to start using and adopting Cloud Computing services and tools in their real life.
- Develop and Deploy an Application on a Cloud.
- Understand various Schedules and task managements, collaborating on project management and social networks

.

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

- Understand the key dimensions, advantages and challenges of Cloud computing.
- Understand, Explain and characterize different types of clouds.
- Examine the different services offered by cloud and exploring the state of art of major cloud players.
- Provide cloud computing solutions for individual users as well as enterprises.
- Understand the assessment of the economics, financial, and technological implications for selecting cloud computing for an organization

Unit I

UNDERSTANDING CLOUD COMPUTING: Cloud Computing –Introduction about CloudComputing –Cloud Architecture–Cloud Storage–Why Cloud Computing Matters–Advantages ofCloud Computing –Disadvantages of Cloud Computing –Companies in the Cloud Today –CloudServices

Unit II

DEVELOPING CLOUD SERVICES: Web-Based Application –Pros and Cons of Cloud ServiceDevelopment –Types of Cloud service Development –Software as a Service –Platform as aService –Web Services –On-Demand Computing –Discovering Cloud Services DevelopmentServices and Tools –Amazon Ec2 –Google App Engine –IBM Clouds, Virtualization.

Unit III

CLOUD COMPUTING FOR EVERYONE: Centralizing Email Communications–Collaborating on Schedules –Collaborating on To-Do Lists –Collaborating Contact Lists –Cloud Computing for the Community –Collaborating on Group Projects and Events –Cloud Computing for the Corporation

Unit IV

USING CLOUD SERVICES: Collaborating on Calendars, Schedules and Task Management – Exploring Online Scheduling Applications –Exploring Online Planning and Task Management – Collaborating on Event Management –Collaborating on Contact Management –Collaborating onProject Management –Collaborating on Word Processing -Collaborating on Databases – StoringAnd Sharing Files

Unit V

OTHER WAYS TO COLLABORATE ONLINE: Collaborating via Web-Based CommunicationTools –Evaluating Web Mail Services –Evaluating Web Conference Tools – Collaborating viaSocial Networks and Groupware –Collaborating via logs and Wikis.

Text Books:

1. "Cloud Computing: Principles and Paradigms", Raj Kumar Bunya, James Bromberg, Andrej Kosciusko, Wiley, New York, USA.

Reference Books:

1. Michael Miller, Cloud Computing: Web-Based Applications That Change the Way YouWork ND Collaborate Online, Qu Publishing, August 2008.
2. Kumar Sarah, "Cloud Computing –Insights into New Era Infrastructure", Wiley IndianEdition, 2011.
3. Haley Beard, Cloud Computing Best Practices for Managing and Measuring ProcessesFor On-demand Computing, Applications and Data Centers in the Cloud with SLAs.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

HIGH PERFORMANCE COMPUTING

Course Code: GR18D5020 **L/T/P/C: 3/0/0/3**

Course Objectives:
Students undergoing this course are expected to

- Improvise and recollect in the basic concepts of parallelism and gain the exposure of architectures.
- Understand and utilize the architecture and design models.
- Aware of all issues and deploy the shared memory programming models.
- Comprehend and recall the Distributed memory programming.
- Manipulate and Illustrate the General-purpose computing on graphics
- Processing units(GPUs) in digital applications.

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

- Understand and recall the basic concepts of parallelism such as SIMD,SIMT,SPMD.
- Analyze the data decomposition techniques such as data level parallelism, task level parallelism and data flow parallelism.
- Aware and recognize the implementation of shared memory programming and to know the real time design issues.
- Able to develop parallel programs using MPI/OMP in multicore system.
- Distinguish and design the General-purpose computing on graphics processing units in real time processing.

Unit I

Parallel Processing Concepts: Levels of parallelism (instruction, transaction, task, thread, memory, function), Models: SIMD, MIMD, SIMT, SPMD, Dataflow Models, Demand-driven Computation etc., Architectures: N-wide superscalar architectures, multi-core, multi-threaded, Motivating high performance applications

Unit II

Designing Parallel Programs: Automatic vs. Manual Parallelization, Understand the Problem and the Program, Partitioning, Communications, Synchronization, Data Dependencies, Load Balancing, Granularity, Limits and Costs of Parallel Programming, Performance Analysis and Optimization tuning

Unit III

Shared memory programming: Fundamentals of Shared Memory Programming, Basic Open MP concepts, PARALLEL directive, Data scoping rules, Basic Open MP constructs/directives/calls, Examples: Parallelizing an existing code using Open MP, More advanced Open MP directives &

functions, Open MP Performance issues, Running threaded/Open MP programs on multicore system.

Unit IV

Distributed memory programming, Fundamentals of message passing concepts, MPI message passing APIs, send, receive, collective operations. Groups, Contexts and Communicators, Topologies, Runtime and Environment Management, MPI profiling interface and tracing, Open MP 3.0 enhancements.

Unit V

GPGPU Programming with CUDA and Opens – Introduction to GPGPU Programming and CUDA: Programming Model, CUDA API, CUDA Memory Model, Short introduction to Opens. Application case study. Future of Computing: Pataskala computing.

Text Books:

1. Parallel Computer Architecture: A hardware/Software Approach", by David Culler Jaswinder Pal Singh, Morgan Kaufmann, 1999.(I&II)
2. CUDA by Example: An Introduction to General Purpose GPU Programming, by Jason Sanders and Edwards Kandrot, Addison Wesley, 2011.(unit- V)
3. Using MPI - 2nd Edition: Portable Parallel Programming with the Message Passing Interface by, William Gropp, Ewing L. Lusk, and Anthony Skjellum. Scientific and Engineering Computation, 2nd edition, 1999(unit-IV)
4. Using OpenMP: Portable Shared Memory Parallel Programming by Barbara Chapman, Gabriele Jost and Rudvander Pas. Scientific and Engineering Computation, 2nd edition(unit-III)

Reference Books:

1. Parallel Programming: Techniques and Application Using Networked Workstations and Parallel Computers, 2nd edition, by B. Wilkinson and M. Allen, Prentice Hall Inc., 2005
2. Heterogeneous Computing with OpenCL. Benedict Gaster, Lee Howes, David R. Kaeli, PerhaadMistry, Dana Schaa, Elsevier, 2011.
3. Scalable Parallel Computing, by Kai Hwang, McGraw Hill 1998.
4. Introduction to Parallel Computing, AnanthGrama, Anshul Gupta, George Karypis, and Vipin Kumar, 2nd edition, Addison-Welsey, 2003.
5. Petascale Computing: Algorithms and Applications, David A. Bader (Ed.), Chapman & Hall/CRC Computational Science Series, 2007.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

ADVANCED COMPUTER NETWORKS

Course Code: GR18D5021 **L/T/P/C: 3/0/0/3**

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

- Understanding about the Network Technologies and to know the differences between wired and wireless technologies.
- Analysis of different types of Wireless Networks, IP Addressing Schemes and Routing Protocols at Network Layer
- To differentiate between Intra-domain, Inter-domain and Cellular Network and Mobile Ad hoc Networks
- Clear idea about Optical Networks and how to allocate wavelengths in Optical Networks
- Capability to distinguish between Ad hoc Networks and Wireless Sensor Networks

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

- Find the difference, advantages, disadvantages between Wired and Wireless Networking Technologies and different transmission technologies
- Set-up IP addresses in different systems and practically realize the path of routing.
- Differentiate between Uni-casting, Broadcasting and Multicasting and develop the routing protocols.
- Implement virtual Cellular communication and Ad hoc communication and measure the performance of the network using Network Simulators.
- Demonstrate the Optical Network and Wireless Sensor Network.

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: 4-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.

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. 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, Beerhouse Z. Frozen, Fourth Edition, Tata McGraw Hill, 2007
2. Guide to Networking Essentials, Greg Tomcod, Ed Title, David Johnson, Fifth Edition, Thomson.
3. An Engineering Approach to Computer Networking, S. Kasha, Pearson Education.
4. Campus Network design Fundamentals, Diane Tear, Catherine Piquet, Pearson Education (CISCO Press)
5. Computer Networks, Andrew S. Tanenbaum, Fourth Edition, Prentice Hall. 6. The Internet and Its protocols, A. Farrel, Elsevier

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

MACHINE LEARNING AND APPLICATIONS LAB

Course Code: GR18D5025 **L/T/P/C: 0/0/4/2**

Course Objectives:

- Learn the basic concepts of python / R-Tool
- Understand Python script and Pandas.
- Describe various supervised learning algorithms.
- Discuss different unsupervised learning algorithms
- Explore various 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 Random Forest Ensemble method.

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

Task 1: Implement a Python script for creating and sorting of array elements

Task 2: Apply Python pandas for creation of student database.

Task 3: Plot the graphs for Bank database using Matplotlib

Task 4: Implement Simple Linear Regression

Task 5: Implement Logistic Regression

Task 6: Construct Decision Tree for classification of any data set

Task 7: Design non-linear model using Support Vector Machines

Task 8: Implement K-means Clustering Algorithm

Task 9: Implement Principle Component Analysis for Dimensionality Reduction and plot the graph.

Task 10: Implement Random Forest ensemble method

Task-11: Build an Artificial Neural Network by implementing the Back propagation algorithm and test the same using appropriate data sets.

Task-12: Write a program to construct a Bayesian network considering medical data. Use this model to demonstrate the diagnosis of heart patients using standard Heart Disease Data Set.

Reference Books:

1. Kevin Murphy, Machine Learning: A Probabilistic Perspective, MIT Press, 2012

2. Trevor Hastie, Robert Tibshirani, Jerome Friedman, The Elements of Statistical Learning,
3. Springer 2009 (freely available online)
4. Christopher Bishop, Pattern Recognition and Machine Learning, Springer, 2007.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

IMAGE PROCESSING LAB

Course Code: GR18D5022 **L/T/P/C: 0/0/4/2**

Course Objectives:

- Describe and explain basic principles of digital image processing.
- Design and implement algorithms that perform basic image processing
- Design and implement algorithms for image compression
- Design and implement algorithms for image segmentation.
- Assess the performance of image processing algorithms and systems.

Course Outcomes: At the end of the course, students will demonstrate the ability to

- Implement Denoise of images, Linear filtering of images
- Apply the principles of segmentation, grouping and modeling in image processing and computer vision.
- Evaluate the methodologies for image segmentation, restoration etc.
- Implement image process with morphological operations.
- Implement image processing compression.

List of Tasks:

Task 1. Implement Image Manipulation: Read, write, view images and conversion between different formats.
Task 2. Implement Special Transformations: Convolution and correlation
Task 3. Implement Frequency Transformations: Fourier transform, explore histogram as an enhancement technique.
Task 4. Implement Filtering, Noise identification
Task 5. Implement noise removing using filtering techniques
Task 6. Implement Morphological Transformations: Dilatation and erosion Segmentation using
Task 7. Implement Edge Detection: Detection of boundaries between two regions using different gradient approximations.
Task 8. Implement Segmentation using Thresholding: Divide the image in regions depending on the gray level.
Task 9. Implement DCT based image compression
Task 10. Implement Image stitching
Task 11. Implement Object detection
Task 12. Implement Object tracking

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

ADVANCED DATA SCIENCE LAB

Course Code: GR18D5023 **L/T/P/C: 0/0/4/2**

Course Objectives:

- Understand the process of Importing and Exporting the data.
- Learn how to collect, store and manage data from multiple data sources.
- Identify different techniques for data analysis and data visualization.
- Know the statistical methods and machine learning algorithms
- Discuss the applications of Data Science for real world problems.

Course Outcomes: On completion of the course the student should be able to

- Examine the process for importing and exporting the data.
- Interpret how data is collected, stored and managed from multiple sources.
- Practice different data analysis and data visualization techniques
- Differentiate various Statistical and Machine Learning algorithms
- Apply the Data Science techniques to real world problems.

Note: Implement the following tasks using Python Programming

Task-1:
Write a program for Accessing/Importing and Exporting Data

Task-2:
Write a program to implement different Data Manipulation techniques

Task-3:
Write a program to implement various techniques for Data Analysis

Task-4:
Write a program to demonstrate various visualization techniques

Task-5:
Practice Basic Statistical methods and apply the same to sample datasets

Task-6:
Write a program to implement Linear Regression technique

Task-7:
Assuming a set of documents that need to be classified, use the naïve Bayesian Classifier model to perform this task. Calculate the accuracy, precision, and recall for your data set.

Task-8:
Write a program to implement k-Nearest Neighbour algorithm to classify the iris data set. Print both correct and wrong predictions.

Task-9:
Write a program for stock market prediction

Task-10:
Case Study : Sentiment Analysis on Tweets

Task-11:
Case Study : Predict the class of the flower based on available attributes.

Task-12:
Case Study : Object detection in an image

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

DATA ANALYTICS LAB

Course Code: GR18D5024 **L/T/P/C: 0/0/4/2**

Course Objectives:

- Create competitive advantage from both structured and unstructured data.
- Study and analyse various models and its visualization.
- Imparting the R programming concepts
- Work with R and R Studio to analyze structured data.
- Work with R and R Studio to analyze unstructured data

Course Outcomes: Student is able to

- Demonstrate proficiency with statistical analysis of data.
- Construct and assess data-based models.
- Apply data modelling techniques to large data sets.
- Design applications for data analytics using R programming.
- Identify tools for data analytic solution.

List of Tasks:

Basic Statistics, Visualization, and Hypothesis Tests

Task 1. Reload data sets into the R statistical package

Task 2. Perform summary statistics on the data

Task 3. Remove outliers from the data

Task 4. Plot the data using R

Task 5. Plot the data using lattice and ggplot

Task 6. Test a hypothesis about the data

Linear Regression

Task 7. Use the R -Studio environment to code OLS models

Task 8. Review the methodology to validate the model and predict the dependent variable for a set of given independent variables

Task 9. Use R graphics functions to visualize the results generated with the model

Logistic Regression

Task 10. Use R -Studio environment to code Logistic Regression models

Task 11. Review the methodology to validate the model and predict the dependent variable for a set of given independent variables

Task 12. Use R graphics functions to visualize the results generated with the model

Reference Books

- R Commands - Quick Reference
- Surviving LINUX - Quick Reference

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

MINI PROJECT

Course Code: GR18D5190 **L/T/P/C: 2/0/0/2**

Course Objectives:

- To improve the technical presentation skills of the students.
- To train the students to do literature review.
- To impart critical thinking abilities for problem solutions.
- To learn different implementation techniques.
- To prepare technical reports

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

- Choose the problem domain in the specialized area under computer science and engineering.
- Acquire and categorize the solution paradigms with help of case studies
- Design and code using selected hardware, software and tools.
- Execute, Implement and demonstrate the problem statement by using the selected hardware, software and tools.
- Document the thesis and publish the final work in a peer reviewed journal.

Syllabus Contents:

Mini Project will have mid semester presentation and end semester presentation. Mid semester presentation will include identification of the problem based on the literature review on the topic referring to latest literature available.

End semester presentation should be done along with the report on identification of topic for the work and the methodology adopted involving scientific research, collection and analysis of data, determining solutions highlighting individuals' contribution. Continuous assessment of Mini Project at Mid Sem and End Sem will be monitored by the Departmental committee.

SEMESTER - III

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

MOBILE APPLICATIONS AND SERVICES

Course Code:GR18D5026 **L/T/P/C: 3/0/0/3**

Course Objectives:

- To aware of mobile computing environment and to learn about developing mobile applications using Android.
- To develop user interface, to design data storing and retrieval techniques for mobile data.
- To develop application using mobile Memory management, networking, clock and notification.
- To make the application available in android package, using of multimedia, location aware services and mobile agents.
- To learn about IOT in mobile communications and its applications.

Course Outcomes: On completion of the course the student should be able to

- To identify the mobile application environment and to recite about developing mobile applications using android.
- To design and implement the user interface, data storing and retrieval in mobile environment.
- To implement an application using mobile Memory management, networking, clock and notification.
- To comprehend about IOT in mobile communications and its applications.

Unit I

J2ME Overview: Java 2 Micro Edition and the World of Java, Inside J2ME, J2ME and Wireless Devices. Small Computing Technology: Wireless Technology, Radio Data Networks, Microwave Technology, Mobile Radio Networks, Messaging, Personal Digital Assistants. J2ME Architecture and Development Environment:J2ME Architecture, Small Computing Device Requirements, Run-Time Environment, MIDlet Programming, Java Language for J2ME, J2ME Software Development Kits, Hello World J2ME Style, Multiple MIDlets in a MIDlet Suite, J2ME Wireless Toolkit.

Unit II

J2ME Best Practices and Patterns: The Reality of Working in a J2ME World, Best Practices Commands, Items, and Event Processing: J2ME User Interfaces, Display Class, The Palm OS Emulator, Command Class, Item Class, Exception Handling.

Unit III

High-Level Display: Screens: Screen Class, Alert Class, Form Class, Item Class, List Class, Text Box Class, Ticker Class. Low-Level Display: Canvas: The Canvas, User Interactions, Graphics, Clipping Regions, Animation. Record Management System: Record Storage, Writing and Reading Records, Record Enumeration, Sorting Records, Searching Records, Record Listener.

Unit IV

Mobile Services: Evolution of Mobile Services, Types of Mobile Services, Personal Services,

Comm Moduley Services, Introduction to Consumer Services, Various Consumer Services, SMS, MMS, Games, Proprietary vs. Standardize Interface, Various Developer Services, SMS Web Service, MMS Web Service

Unit V

Mobile platform and NW environment: Mobile App Testing Environment, OTA App Provisioning. Mobile Applications: What is Web App?, Context of Mobile Applications, Pros and Cons of Mobile Web App, SIM based Mobile App Development, What is SIM?, SIM as a Platform, SIM as Service Differentiator, Introduction to UI, Principles for UI development Module -IV: Mobile Services 8 hrs. Evolution of Mobile Services, Types of Mobile Services, Personal Services, Comm Moduley Services

Text Books:

1. J2ME: The Complete Reference, James Keogh, Tata McGraw Hill. 2. Professional Mobile Application Development by Jeff Mc Wherter, Scott Gowell, 2012

Reference Books:

1. Enterprise J2ME: Developing Mobile Java Applications, Michael Juntao Yuan, Pearson Education, 2004.
2. Beginning Java ME Platform, Ray Rischpater, Apress, 2009.
3. Beginning J2ME: From Novice to Professional, Third Edition, Sing Li, Jonathan B. Knudsen, Apress, 2005.
4. Kicking Butt with MIDP and MSA: Creating Great Mobile Applications, First Edition, J.Knudsen, Pearson.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

INFORMATION STORAGE AND RETRIEVAL

Course Code: GR18D5027 **L/T/P/C: 3/0/0/3**

Course objectives

- Learn various data structures involved in IRS
- Describe Information Retrieval System capabilities.
- Compare and contrast software text search algorithms and hardware text search systems.
- Illustrate measures used in system evaluation.
- Demonstrate Document and term clustering, Cataloging and Indexing.

Course outcomes

- Use IRS capabilities and information visualization technologies.
- Demonstrate the use of Cataloging and Indexing.
- Differentiate software text search algorithms and hardware text search systems.
- Analyze the accuracy for various clustering algorithms.
- Construct multimedia retrieval systems**.**

Unit I

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

Information Retrieval System Capabilities - Search, Browse, Miscellaneous.

Unit II

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

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

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

Unit III

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

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

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

Unit IV

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

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

Unit V

Multimedia Information Retrieval: Models and Languages – Data Modeling, Query Languages, Indexing and Searching

Libraries and Bibliographical Systems: Online IR Systems, OPACs, Digital Libraries.

Text Books

1. Information Storage and Retrieval Systems: Theory and Implementation By Kowalski, Gerald, Mark T Maybury Kluwer Academic Press, 2000.
2. Modern Information RetrivalBy Ricardo Baeza-Yates, Pearson Education, 2007.

Reference Books:

1. Information Retrieval: Algorithms and Heuristics By David A Grossman and OphirFrieder, 2nd Edition, Springer International Edition, 2004.
2. Information Retrieval Data Structures and Algorithms By William B Frakes, Ricardo Baeza-Yates, Pearson Education, 1992.
3. Information Storage &RetievalBy Robert Korfhage – John Wiley & Sons.
4. Introduction to Information Retrieval By Christopher D. Manning and Prabhakar Raghavan, Cambridge University Press, 2008.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

DISTRIBUTED DATABASES

Course Code: GR18D5040 **L/T/P/C: 3/0/0/3**

COURSE OBJECTIVES:

The objective of the course is to provide the student:

• Ability to understand the difference between centralized and distributed systems.
• Ability to analyze the key characteristics of distributed databases.
• Understanding about the architecture of Distributed databases.
• Transactional aspect of the distributed environment.
• Introduction to the object oriented distributed environment.

COURSE OUTCOMES:

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

• Demonstrate a view of the Distributed Database environment
• Applicability to solve the fragment queries
• Capable of understanding the architecture of the distributed database environment.
• Define of the Transaction and the Concurrency issues
• Understand the outline of the object databases
• Understand data integration issues

Unit I

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

Unit II

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

Unit III

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

Unit IV

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

Unit V

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

TEXT BOOKS

1. Distributed Databases Principles & Systems, Stefano Ceri, Giuseppe Pelagatti,TMH.

2. Principles of Distributed Database Systems, M. Tamer Ozsu, Patrick Valduriez , Pearson Education, 2nd Edition.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

BUSINESS ANALYTICS

Course Code: GR18D5201 **L/T/P/C: 3/0/0/3**

Course objectives

- Understand the role of business analytics and statistical tools used within an organization.
- Discuss Trendiness and Regression Analysis and different visualization techniques to explore data.
- Describe the organization structures and different type of business analytics.
- Know Forecasting Techniques, Monte Carlo Simulation and Risk Analysis.
- Understand decision analysis and recent trends in business intelligence.

Course outcomes

- Demonstrate business analytics process and use statistical tools for implementation of business process.
- Design relationships and trends to explore and visualize the data.
- Examine the organization structures of business analytics and Categorize types of analytics.
- Apply Forecasting Techniques, Monte Carlo Simulation and Risk Analysis.
- Formulate decision analysis and summarize recent trends in business intelligence.

Unit I

Business analytics: Overview of Business analytics, Scope of Business analytics, Business Analytics Process, Relationship of Business Analytics Process and organization, competitive advantages of Business Analytics.
Statistical Tools: Statistical Notation, Descriptive Statistical methods, Review of probability distribution and data modelling, sampling and estimation methods overview.

Unit II

Trendiness and Regression Analysis: Modelling Relationships and Trends in Data, simple Linear Regression, Important Resources, Business Analytics Personnel, Data and models for Business analytics, problem solving, Visualizing and Exploring Data, Business Analytics Technology.

Unit III

Organization Structures of Business analytics, Team management, Management Issues, Designing Information Policy, Outsourcing, Ensuring Data Quality, Measuring contribution of Business analytics, Managing Changes, Descriptive Analytics, predictive analytics, predicative Modeling, Predictive analytics analysis, Data Mining, Data Mining Methodologies, Prescriptive analytics and its step in the business analytics Process, Prescriptive Modeling, nonlinear Optimization.

Unit IV

Forecasting Techniques: Qualitative and Judgmental Forecasting, Statistical Forecasting Models, Forecasting Models for Stationary Time Series, Forecasting Models for Time Series with a Linear Trend, Forecasting Time Series with Seasonality, Regression Forecasting with Casual Variables, Selecting Appropriate Forecasting Models.
Monte Carlo Simulation and Risk Analysis: Monte Carle Simulation Using Analytic Solver Platform, New-Product Development Model, Newsvendor Model, Overbooking Model, Cash Budget Model.

Unit V

Decision Analysis: Formulating Decision Problems, Decision Strategies with the without Outcome Probabilities, Decision Trees, The Value of Information, Utility and Decision Making, Recent Trends in Embedded and collaborative business intelligence, Visual data recovery, Data Storytelling and Data journalism.

Reference Books

1. Business analytics Principles, Concepts, and Applications by Marc J. Schniederjans, Dara G.
1. Schniederjans, Christopher M. Starkey, Pearson FT Press.
2. Business Analytics by James Evans, persons Education.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

INDUSTRIAL SAFETY

Course Code: GR18D5202 **L/T/P/C: 3/0/0/3**

Course objectives

- To understand the importance of maintaining a safe workplace.
- To maintain safety standards in compliance with regulatory requirements and within engineering limits understand personal safety and industrial safety.
- To create a job safety analysis (JSA) for a given work project.
- To follow safety recordkeeping and management, and the role of the safety manager.
- To utilize personal proactive equipment.

Course outcomes

- Understanding of Safety principles.
- Analyze different types of exposure and biological effects, exposure guidelines and basic workplace monitoring Ability to do Hazard analysis.
- Demonstrate an understanding of workplace injury prevention, risk management, and incident investigations.
- Understand the acute and chronic health effects of exposures to chemical, physical and biological agents in the workplace.
- Demonstrate knowledge of the types of hazards, planning, organization and training needed to work safely with hazardous materials.

Unit I

Industrial safety: Accident, causes, types, results and control, mechanical and electrical hazards, types, causes and preventive steps/procedure, describe salient points of factories act 1948 for health and safety, wash rooms, drinking water layouts, light, cleanliness, fire, guarding, pressure vessels, etc, Safety color codes. Fire prevention and firefighting, equipment and methods.

Unit II

Fundamentals of maintenance engineering: Definition and aim of maintenance engineering, Primary and secondary functions and responsibility of maintenance department, Types of maintenance, Types and applications of tools used for maintenance, Maintenance cost & its relation with replacement economy, Service life of equipment.

Unit III

Wear and Corrosion and their prevention: Wear- types, causes, effects, wear reduction methods, lubricants-types and applications, Lubrication methods, general sketch, working and applications, i. Screw down grease cup, ii. Pressure grease gun, iii. Splash lubrication, iv. Gravity lubrication, v.

Wick feed lubrication vi. Side feed lubrication, vii. Ring lubrication, Definition, principle and factors affecting the corrosion. Types of corrosion, corrosion prevention methods.

Unit IV

Fault tracing: Fault tracing-concept and importance, decision tree concept, need and applications, sequence of fault finding activities, show as decision tree, draw decision tree for problems in machine tools, hydraulic, pneumatic, automotive, thermal and electrical equipment's like, I. Any one machine tool, ii. Pump iii. Air compressor, iv. Internal combustion engine, v. Boiler, vi. Electrical motors, Types of faults in machine tools and their general causes.

Unit V

Periodic and preventive maintenance: Periodic inspection-concept and need, degreasing, cleaning and repairing schemes, overhauling of mechanical components, overhauling of electrical motor, common troubles and remedies of electric motor, repair complexities and its use, definition, need, steps and advantages of preventive maintenance. Steps/procedure for periodic and preventive maintenance of: I. Machine tools, ii. Pumps, iii. Air compressors, iv. Diesel generating (DG) sets, Program and schedule of preventive maintenance of mechanical and electrical equipment, advantages of preventive maintenance. Repair cycle concept and importance.

Reference Books

1. Maintenance Engineering Handbook, Higgins & Morrow, Da Information Services.
2. Maintenance Engineering, H. P. Garg, S. Chand and Company.
3. Pump-hydraulic Compressors, Audels, Mcgrew Hill Publication.
4. Foundation Engineering Handbook, Winterkorn, Hans, Chapman & Hall London.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

OPERATIONS RESEARCH

Course Code: GR18D5203 **L/T/P/C: 3/0/0/3**

Course objectives

- To define and formulate linear and Non-linear programming problems and appreciate their limitations arising from a wide range of applications.
- To perform sensitivity analysis to determine the direction and magnitude of change of a model's optimal solution as the data change.
- To distinguish various inventory models and develop proper inventory policies.
- To solve the scheduling and sequencing models.
- To understand how to model and solve problems using dynamic programming, Game Theory.

Course outcomes

- The student will formulate and solve problems as networks and graphs for optimal allocation of limited resources such as machine, material and money.
- The student will able to carry out sensitivity analysis.
- The student will solve network models like the shortest path, minimum spanning tree, and maximum flow problems.
- The student will able to distinguish various inventory models and develop proper inventory policies.
- The student will also propose the best strategy using decision making methods under uncertainty and game theory.

Unit I

Optimization Techniques, Model Formulation, models, General L.R Formulation, Simplex techniques, Sensitivity Analysis, Inventory Control Models

Unit II

Formulation of a LPP - Graphical solution revised simplex method - duality theory - dual simplex method - sensitivity analysis - parametric programming

Unit III

Nonlinear programming problem - Kuhn-Tucker conditions min cost flow problem - max flow problem - CPM/PERT

Unit IV

Scheduling and sequencing - single server and multiple server models - deterministic inventory models - Probabilistic inventory control models - Geometric Programming.

Unit V

Competitive Models, Single and Multi-channel Problems, Sequencing Models, Dynamic Programming, Flow in Networks, Elementary Graph Theory, Game Theory Simulation

Reference Books

1. H.A. Taha, Operations Research, An Introduction, PHI, 2008
2. H.M. Wagner, Principles of Operations Research, PHI, Delhi, 1982.
3. J.C. Pant, Introduction to Optimization: Operations Research, Jain Brothers, Delhi, 2008
4. Hitler Libermann Operations Research: McGraw Hill Pub. 2009
5. Panner selvam, Operations Research: Prentice Hall of India 2010
6. Harvey M Wagner, Principles of Operations Research: Prentice Hall of India 2010

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

COST MANAGEMENT OF ENGINEERING PROJECTS

Course Code: GR18D5204 **L/T/P/C: 3/0/0/3**

Course objectives

- To provide the student with a clear understanding of strategic cost management process.
- To describe the various stages of project execution.
- To prepare the project schedule by bar charts and network diagrams.
- To conduct breakeven and cost-volume-profit analysis.
- To make students understand various budgets and quantitative techniques used for cost management.

Course outcomes

- The student will be able to explain the various cost concepts used in decision making.
- To be able to identify and demonstrate various stages of project execution.
- The student will be able to prepare the project schedule by bar charts and network diagrams.
- The student will be to differentiate absorption costing and marginal costing, also conduct breakeven and cost-volume-profit analysis.
- The student will be able to prepare various budgets and quantitative techniques used for cost management.

Unit I

Introduction and Overview of the Strategic Cost Management Process, Cost concepts in decision-making; Relevant cost, Differential cost, Incremental cost and Opportunity cost. Objectives of a Costing System; Inventory valuation; Creation of a Database for operational control; Provision of data for Decision-Making.

Unit II

Project: meaning, Different types, why to manage, cost overruns centres, various stages of project execution: conception to commissioning. Project execution as conglomeration of technical and nontechnical activities. Detailed Engineering activities. Pre project execution main clearances and documents Project team: Role of each member. Importance Project site: Data required with significance.

Unit III

Project contracts. Types and contents. Project execution Project cost control. Bar charts and Network diagram. Project commissioning: mechanical and process

Unit IV

Cost Behavior and Profit Planning Marginal Costing; Distinction between Marginal Costing and Absorption Costing; Break-even Analysis, Cost-Volume-Profit Analysis. Various decision-making

problems. Standard Costing and Variance Analysis. Pricing strategies: Pareto Analysis. Target costing, Life Cycle Costing. Costing of service sector. Just-in-time approach, Material Requirement Planning, Enterprise Resource Planning, Total Quality Management and Theory of constraints.

Unit V

Activity-Based Cost Management, Bench Marking; Balanced Score Card and Value-Chain Analysis. Budgetary Control; Flexible Budgets; Performance budgets; Zero-based budgets. Measurement of Divisional profitability pricing decisions including transfer pricing. Quantitative techniques for cost management, Linear Programming, PERT/CPM, Transportation problems, Assignment problems, Simulation, Learning Curve Theory.

Reference Books

1. Cost Accounting A Managerial Emphasis, Prentice Hall of India, New Delhi
2. Charles T. Horngren and George Foster, Advanced Management Accounting
3. Robert S Kaplan Anthony A. Alkinson, Management & Cost Accounting
4. Ashish K. Bhattacharya, Principles & Practices of Cost Accounting A. H. Wheeler publisher
5. N.D. Vohra, Quantitative Techniques in Management, Tata McGraw Hill Book Co. Ltd.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

COMPOSITE MATERIALS

Course Code: GR18D5205 **L/T/P/C: 3/0/0/3**

Course objectives

- To understand the concepts of fundamental science and engineering principles relevant to materials engineering.
- To expose the various methods to test mechanical properties on materials.
- To categorize the various equilibrium diagrams and describe the changes which occurs on metals.
- To explain the concepts on various heat treatment operations.
- To categorize the various ferrous and non-ferrous metals with their properties and applications.

Course outcomes

- Relate crystal structures and identify the relation between different materials.
- Test the various mechanical properties of metal by suitable method.
- Relate the equilibrium transformation diagrams for various ferrous and Non- ferrous metals.
- Utilize appropriate techniques in treating a metal with proper heat treatment operations.
- Evaluate the behaviour of material when it is subjected to heat treatment process.

UNIT I

Introduction: Definition – Classification and characteristics of Composite materials. Advantages and application of composites. Functional requirements of reinforcement and matrix. Effect of reinforcement (size, shape, distribution, volume fraction) on overall composite performance.

UNIT II

Reinforcement: Preparation-layup, curing, properties and applications of glass fibers, carbon fibers, Kevlar fibers and Boron fibers. Properties and applications of whiskers, particle reinforcements. Mechanical Behavior of composites: Rule of mixtures, Inverse rule of mixtures. Isostrain and Isostress conditions.

UNIT III

Manufacturing of Metal Matrix Composites: Casting – Solid State diffusion technique, Cladding – Hot isostatic pressing. Properties and applications. Manufacturing of Ceramic Matrix, Composites: Liquid Metal Infiltration – Liquid phase sintering. Manufacturing of Carbon – Carbon composites: Knitting, Braiding, Weaving. Properties and applications.

UNIT IV

Manufacturing of Polymer Matrix Composites: Preparation of Moulding compounds and prepregs – hand layup method – Autoclave method – Filament winding method – Compression moulding – Reaction injection moulding. Properties and applications.

UNIT V

Strength, Laminar Failure Criteria-strength ratio, maximum stress criteria, maximum strain criteria, interacting failure criteria, hygro thermal failure. Laminate first play failure-insight strength; Laminate strength-ply discount truncated maximum strain criterion; strength design using caplet plots; stress concentrations.

Text Books

1. Material Science and Technology – Vol 13 – Composites by R.W.Cahn – VCH, West Germany.
2. Materials Science and Engineering, An introduction. WD Callister, Jr., Adapted by R.
3. Balasubramaniam, John Wiley & Sons, NY, Indian edition, 2007.

Reference Books

1. Hand Book of Composite Materials-ed-Lubin.
2. Composite Materials – K.K.Chawla.
3. Composite Materials Science and Applications – Deborah D.L. Chung.
4. Composite Materials Design and Applications – Danial Gay, Suong V. Hoa, and Stephen W. Tasi.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

ENGLISH FOR RESEARCH PAPER WRITING

Course Code: GR18D5207 **L/T/P/C: 2/0/0/2**

Course objectives:

- To state how to put research on paper
- To demonstrate how to write an abstract
- To apply the process of research
- To appraise the key skills involved in writing the title, abstract, introduction and review of literature
- To compose a paper which is good and has the qualities of acceptance and publication

Course Outcomes:

- Will be able to understand how to write a research paper
- Will outline the drafting of an abstract
- Will acquire the skills of various elements of research
- Will be in a position to write a good paper
- Will result in increasing the chance of publication

Unit I

Planning and Preparation, Word Order, Breaking up long sentences, Structuring Paragraphs and Sentences, Being Concise and Removing Redundancy, Avoiding Ambiguity and Vagueness.

Unit II

Clarifying Who Did What, Highlighting Your Findings, Hedging and Criticising, Paraphrasing and Plagiarism, Sections of a Paper, Abstracts,Introduction.

Unit III

Review of the Literature, Methods, Results, Discussion, Conclusions, TheFinal Check.

Unit IV

Key skills are needed when writing a Title, key skills are needed when writing an Abstract, key skills are needed when writing an Introduction, skills needed when writing a Review of the Literature.

Unit V

Skills are needed when writing the Methods, skills needed when writing the Results, skills are needed when writing the Discussion, skills are needed when writing the Conclusion.

Unit VI

Useful phrases, how to ensure paper is as good as it could possibly be the first- timesubmission.

Reference Books:

1. Goldbort R (2006) Writing for Science, Yale University Press (available on GoogleBooks)

2. Day R (2006) How to Write and Publish a Scientific Paper, Cambridge UniversityPress

3. Highman N (1998), Handbook of Writing for the Mathematical Sciences, SIAM. Highman'sbook.

4. Ian Wallwork , English for Writing Research Papers, Springer New York Dordrecht Heidelberg London, 2011.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

DISASTER MANAGEMENT

Course Code: GR18D5208 **L/T/P/C: 2/0/0/2**

Course Objectives:

- Learn to demonstrate a critical understanding of key concepts in disaster risk reduction and humanitarian response.
- Critically evaluate disaster risk reduction and humanitarian response policy and practice from multiple perspectives.
- Develop an understanding of standards of humanitarian response and practical relevance in specific types of disasters and conflict situations.
- Critically understand the strengths and weaknesses of disaster management approaches,
- Planning and programming in different countries, particularly their home country or the countries they work in.

Course Outcomes:

- Capacity to integrate knowledge and to analyze, evaluate and manage the different public health aspects of disaster events at a local and global levels, even when limited information is available.
- Capacity to describe, analyze and evaluate the environmental, social, cultural, economic, legal and organizational aspects influencing vulnerabilities and capacities to face disasters.
- Capacity to work theoretically and practically in the processes of disaster management (disaster risk reduction, response, and recovery) and relate their interconnections, particularly in the field of the Public Health aspects of the disasters.
- Capacity to manage the Public Health aspects of the disasters.
- Capacity to obtain, analyze, and communicate information on risks, relief needs and lessons learned from earlier disasters in order to formulate strategies for mitigation in future scenarios with the ability to clearly present and discuss their conclusions and the knowledge and arguments behind them.

Unit I

Introduction: Disaster: Definition, Factors and Significance; Difference between Hazard and Disaster; Natural and Manmade Disasters: Difference, Nature, Types and Magnitude.

Unit II

Repercussions of Disasters and Hazards: **Economic Damage**, Loss of Human and Animal Life, Destruction of Ecosystem. **Natural Disasters**: Earthquakes, Volcanisms, Cyclones, Tsunamis, Floods, Droughts and Famines, Landslides and Avalanches, Man-made disaster: Nuclear Reactor Meltdown, Industrial Accidents, Oil Slicks and Spills, Outbreaks of Disease and Epidemics, War and Conflicts.

Unit III

Disaster Prone Areas in India: Study of Seismic Zones; Areas Prone To Floods and Droughts, Landslides and Avalanches; Areas Prone To Cyclonic and Coastal Hazards with Special Reference to Tsunami; Post-Disaster Diseases and Epidemics

Unit IV

Disaster Preparedness and Management: Preparedness: Monitoring Of Phenomena Triggering A Disaster Or Hazard; Evaluation Of Risk: Application Of Remote Sensing, Data From Meteorological And Other Agencies, Media Reports: Governmental And Community Preparedness.

Unit V

Risk Assessment: Disaster Risk: Concept and Elements, Disaster Risk Reduction, Global and National Disaster Risk Situation. Techniques of Risk Assessment, Global Co- Operation in Risk Assessment and Warning, People's Participation in Risk Assessment. Strategies for Survival.

Unit VI

Disaster Mitigation: Meaning, Concept and Strategies of Disaster Mitigation, Emerging Trendsin Mitigation. Structural Mitigation and Non-Structural Mitigation, Programs of Disaster Mitigation in India.

Reference Books:

1. R. Nishith, Singh AK, "Disaster Management in India: Perspectives, issues and strategies "'New Royal bookCompany
2. Sahni, PardeepEt.Al. (Eds.)," Disaster Mitigation Experiences and Reflections", Prentice Hall Of India, NewDelhi.
3. Goel S. L., Disaster Administration And Management Text And Case Studies" ,Deep &Deep Publication Pvt. Ltd., NewDelhi.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

SANSKRIT FOR TECHNICAL KNOWLEDGE

Course Code: GR18D5209 **L/T/P/C: 2/0/0/2**

Course objectives:

- To get a working knowledge in illustrious Sanskrit, the scientific language in the world
- Learning of Sanskrit to improve brain functioning
- Learning of Sanskrit to develop the logic in mathematics, science & other subjects
- Enhancing the memory power
- The engineering scholars equipped with Sanskrit will be able to explore the huge knowledge from ancient literature

Course Outcomes*:*

- Understanding basic Sanskrit alphabets and Understand tenses in Sanskrit Language.
- Enable students to understand roots of Sanskrit language.
- Students learn engineering fundamentals in Sanskrit.
- Students can attempt writing sentences in Sanskrit.
- Ancient Sanskrit literature about science & technology can be understood

Unit I. Alphabets in Sanskrit, Past/Present/Future Tense, Simple Sentences

Unit II. Order, Introduction of roots, Technical information about Sanskrit Literature

Unit III. Technical concepts of Engineering-Electrical,Mechanical, Architecture, Mathematics

Reference Books:

1. "Abhyaspustakam" – Dr.Vishwas, Samskrita-Bharti Publication, NewDelhi
2. "Teach Yourself Sanskrit" PrathamaDeeksha-VempatiKutumbshastri, Rashtriya Sanskrit Sansthanam, New DelhiPublication
3. "India's Glorious Scientific Tradition" Suresh Soni, Ocean books (P) Ltd., NewDelhi.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

VALUE EDUCATION

Course Code: GR18D5210 **L/T/P/C: 2/0/0/2**

Course Objectives:

- Understand value of education and self-development
- Imbibe good values instudents
- Let the should know about the importance ofcharacter
- 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.

Course outcomes: Students will be able to

- Knowledge of self-development
- Learn the importance of Human values
- Developing the overall personality
- 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.

Unit I

Values and self-development –Social values and individual attitudes, Work ethics, Indian vision of humanism, Moral and non- moral valuation, Standards and principles, Value judgment.

Unit II

Importance of cultivation of values, Sense of duty. Devotion, Self-reliance. Confidence, Concentration. Truth fulness, Cleanliness. Honesty, Humanity. Power of faith, National Unity. Patriotism. Love for nature, Discipline

Unit III

Personality and Behavior Development - Soul and Scientific attitude, Positive Thinking, Integrity and discipline, Punctuality, Love and Kindness, Avoid fault Thinking, Free from anger, Dignity of labour, Universal brotherhood and religious tolerance, True friendship, Happiness vs suffering, love for truth, Aware of self-destructive habits, Association and Cooperation, Doing best for saving nature.

Unit IV

Character and Competence –Holy books vs Blind faith. Self-management and Good health. Science ofre incarnation. Equality, Nonviolence, Humility, Role of Women. All religions and same message. Mind your Mind, Self-control. Honesty, Studying effectively

Reference Books:

1. Chakroborty, S.K. "Values and Ethics for organizations Theory and practice", Oxford University Press, New Delhi.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

INDIAN CONSTITUTION

Course Code: GR18D5211 **L/T/P/C: 2/0/0/2**

Course Objectives:

- Understand the premises informing the twin themes of liberty and freedom from a civil rights perspective.
- To address the growth of Indian opinion regarding modern Indian intellectuals'constitutional
- Role and entitlement to civil and economic rights as well as the emergence of nationhood in the early years of Indian nationalism.
- To address the role of socialism in India after the commencement of the Bolshevik Revolution in 1917 and its impact on the initial drafting of the Indian Constitution.
- To understand the role and functioning of Election Commission of India.

Course Outcomes: Students will be able to:

- Discuss the growth of the demand for civil rights in India for the bulk of Indians before the arrival of Gandhi in Indian politics.
- Discuss the intellectual origins of the framework of argument that informed the conceptualization of social reforms leading to revolution in India.
- Discuss the circumstances surrounding the foundation of the Congress Socialist Party [CSP] under the leadership of Jawaharlal Nehru and the eventual failure of the proposal of direct elections through adult suffrage in the Indian Constitution.
- Discuss the passage of the Hindu Code Bill of1956.
- Discuss the significance of Election Commission of India.

Unit I

History of Making of the Indian Constitution: History Drafting Committee, (Composition & Working).

Unit II

Philosophy of the Indian Constitution: Preamble Salient Features.

Unit III

Contours of Constitutional Rights &Duties: Fundamental Rights, Right to Equality, Right to Freedom, Right against Exploitation, Right to Freedom of Religion, Cultural and Educational Rights, Right to Constitutional Remedies, Directive Principles of State Policy,

Fundamental Duties.

Unit IV

Organs of Governance: Parliament-Composition, Qualifications and Disqualifications, Powers and Functions, Executive, President, Governor, Council of Ministers, Judiciary, Appointment and Transfer of Judges, Qualifications, Powers and Functions.

Unit V

Local Administration: District's Administration head: Role and Importance, Municipalities: Introduction, Mayor and role of Elected Representative, CEO of Municipal Corporation. Pachayati raj: Introduction, PRI: Zila Pachayat. Elected officials and their roles, CEO Zila Pachayat: Position and role. Block level: Organizational Hierarchy (Different departments), Village level: Role of Elected and Appointed officials, Importance of grass root democracy.

Election Commission: Election Commission: Role and Functioning, Chief Election Commissioner and Election Commissioners, State Election Commission: Role and Functioning, Institute and Bodies for the welfare of SC/ST/OBC and women.

Reference Books:

1. The Constitution of India, 1950 (Bare Act), Government Publication.
2. Dr. S. N. Busi, Dr. B. R. Ambedkar framing of Indian Constitution, 1st Edition,2015.
3. M. P. Jain, Indian Constitution Law, 7th Edn., Lexis Nexis,2014.
4. D.D. Basu, Introduction to the Constitution of India, Lexis Nexis,2015.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

PEDAGOGY STUDIES

Course Code:GR18D5212 **L/T/P/C: 2/0/0/2**

Course Objectives:

- Review existing evidence on the review topic to inform Programme design and policy making
- Undertaken by the DFID, other agencies and researchers.
- Identify critical evidence gaps to guide the development.
- Establishing coordination among people in order to execute pedagogy methods.
- To study pedagogy as a separate discipline.

Course Outcomes: Students will be able to understand

- What pedagogical practices are being used by teachers in formal classrooms in developing countries?
- What pedagogical practices are being used by teachers in informal classrooms in developing countries?
- Synergy from the work force.
- What is the evidence on the effectiveness of these pedagogical practices, in what conditions, and with what population of learners?
- How can teacher education (curriculum and practicum) and the school curriculum and guidance materials best support effective pedagogy?

Unit I

Introduction and Methodology: Aims and rationale, Policy background, Conceptual framework and terminology Theories of learning, Curriculum, Teacher education. Conceptual framework, Research questions**.** Overview of methodology and Searching.

Unit II

Thematic overview: Pedagogical practices are being used by teachers in formal and informal classrooms in developing countries. Curriculum, Teacher education.

Unit III

Evidence on the effectiveness of pedagogical practices, Methodology for the in-depth stage: quality assessment of included studies. How can teacher education (curriculum and practicum) and the school curriculum and guidance materials best support effective pedagogy? Theory of change. Strength and nature of the body of evidence for effective pedagogical practices. Pedagogic theory and pedagogical approaches. Teachers' attitudes and beliefs and Pedagogic strategies.

Unit IV

Professional development: alignment with classroom practices and follow- up support, Peer support, Support from the head teacher and the community, Curriculum and assessment, Barriers to learning: limited resources and large class sizes

Unit V

Research gaps and future directions: Research design, Contexts, Pedagogy, Teacher education, Curriculum and assessment, Dissemination and research impact.

Reference Books:

1. Ackers J, Hardman F (2001) Classroom interaction in Kenyan primary schools, Compare, 31 (2): 245-261.
2. Agrawal M (2004) Curricular reform in schools: The importance of evaluation, Journal of Curriculum Studies, 36 (3):361-379.
3. Akyeampong K (2003) Teacher training in Ghana - does it count? Multi-site teacher education research project (MUSTER) country report 1. London:DFID.
4. Akyeampong K, Lussier K, Pryor J, Westbrook J (2013) Improving teaching and learning of basic maths and reading in Africa: Does teacher preparation count? International Journal Educational Development, 33 (3):272–282.
5. Alexander RJ (2001) Culture and pedagogy: International comparisons in primary education. Oxford and Boston:Blackwell.
6. Chavan M (2003) Read India: A mass scale, rapid, ‘learning to read’campaign.
7. www.pratham.org/images/resource%20working%20paper%202.pdf.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

STRESS MANAGEMENT BY YOGA

Course Code: GR18D5213 **L/T/P/C: 2/0/0/2**

Course Objectives:

- To achieve overall Good Health of Body and Mind.
- To lower blood pressure and improve heart health.
- To become non-violent and truthfulness.
- To increase the levels of happiness.
- To eliminate all types of body pains.

Course Outcomes: Students will be able to

- Develop healthy mind in a healthy body thus improving social health also improve efficiently.
- Develop body awareness. Learn how to use their bodies in a healthy way. Perform well in sports and academics.
- *Will balance*, *flexibility*, and stamina, strengthen *muscles* and connective tissues enabling good *posture*.
- Manage stress through breathing, awareness, meditation and healthy movement.
- Build concentration, confidence and positive self-image.

Unit I

Definitions of Eight parts of yog. (Ashtanga)

Unit II

Yam and Niyam. Do`s and Don't'sinlife. Ahinsa, satya, astheya, bramhacharya and aparigraha Shaucha, santosh, tapa, swadhyay, ishwar pranidhan

Unit III

AsanandPranayam, Various yog poses and their benefits for mind & body. Regulaization of breathing techniques and its effects-Types of pranayam

Reference Books:

1. 'Yogic Asanas for Group Tarining-Part-I" : Janardan Swami YogabhyasiMandal,Nagpur
2. "Rajayoga or conquering the Internal Nature" by SwamiVivekananda, AdvaitaAshrama(Publication Department),Kolkata

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

PERSONALITY DEVELOPMENT THROUGH LIFE ENLIGHTENMENT SKILLS

Course Code: GR18D5214 **L/T/P/C: 2/0/0/2**

Course Objectives:

- To learn to achieve the highest goal happily
- To become a person with stable mind, pleasing personality and determination
- To awaken wisdom in students
- To differentiate three types of happiness (Sukham)
- To describe the character traits of a spiritual devotee

Course Outcomes:

- Study of Shrimad- Bhagwad-Gita wiil help the student in developing his personality and achieve the highest goal in life
- The person who has studied Geeta will lead the nation and mankind to peace and prosperity
- To develop self-developing attitude towards work without self-aggrandizement
- To develop tranquil attitude in all favorable and unfavorable situations
- To develop high spiritual intelligence

Unit I

Neetisatakam-Holistic development of personality

- Verses- 19,20,21,22 (wisdom)
- Verses- 29,31,32 (pride &heroism)
- Verses- 26,28,63,65 (virtue)
- Verses- 52,53,59 (don’ts)
- Verses- 71,73,75,78 (do’s)

Unit II

Approach to day to day work and duties.

- Shrimad Bhagwad Geeta : Chapter 2-Verses 41,47,48,
- Chapter 3-Verses 13, 21, 27, 35, Chapter 6-Verses 5,13,17, 23,35,
- Chapter 18-Verses 45, 46,48.

Unit III

Statements of basic knowledge.

- Shrimad Bhagwad Geeta: Chapter2-Verses 56, 62,68
- Chapter 12 -Verses 13, 14, 15, 16,17,18
- Personality of Role model. Shrimad Bhagwad Geeta: Chapter2-Verses 17, Chapter 3-Verses36,37,42,
- Chapter 4-Verses 18,38,39
- Chapter18 – Verses37,38,63

Reference Books:

1. “Srimad Bhagavad Gita” by Swami SwarupanandaAdvaita Ashram (Publication Department),Kolkata
2. Bhartrihari’s Three Satakam (Niti-sringar-vairagya) by P.Gopinath, Rashtriya Sanskrit Sansthanam, NewDelhi.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

WASTE TO ENERGY

Course Code: GR18D5206 **L/T/P/C: 2/0/0/2**

Course objectives

- To find or recall the non-Hazardous secondary materials from waste.
- To compare precisely to overcome the cost and most economically attractive course of action for CH4 emission.
- To demonstrate the techno-economic feasibility of replacing.
- To extend the students for possible future activity in a biomass plant.
- To utilization in spark-ignited internal combustion engine.

Course outcomes

- Students are able to make use of energy installation and the small of household bio-waste incineration.
- To develop actual dimension must of course, fit requirement of the masonry block.
- To become capable of analyze and design of energy conversion system.
- Students are to estimate the possibility of invest in biomass generation.
- Students will be able to explain the biogas its uses and benefits.

Unit I

Introduction to Energy from Waste: Classification of waste as fuel – Agro based, Forest residue, Industrial waste - MSW – Conversion devices – Incinerators, gasifiers, digestors

Unit II

Biomass Pyrolysis: Pyrolysis – Types, slow fast – Manufacture of charcoal – Methods - Yields and application – Manufacture of pyrolytic oils and gases, yields and applications.

Unit III

Biomass Gasification: Gasifiers – Fixed bed system – Downdraft and updraft gasifiers – Fluidized bed gasifiers – Design, construction and operation – Gasifier burner arrangement for thermal heating – Gasifier engine arrangement and electrical power – Equilibrium and kinetic consideration in gasifier operation.

Unit IV

Biomass Combustion: Biomass stoves – Improved chullahs, types, some exotic designs, Fixed bed combustors, Types, inclined grate combustors, Fluidized bed combustors, Design, construction and operation - Operation of all the above biomass combustors.

Unit V

Biogas: Properties of biogas (Calorific value and composition) - Biogas plant technology and status - Bio energy system - Design and constructional features - Biomass resources and their classification - Biomass conversion processes - Thermo chemical conversion - Direct combustion - biomass gasification - pyrolysis and liquefaction - biochemical conversion - anaerobic digestion - Types of biogas Plants – Applications - Alcohol production from biomass - Bio diesel production - Urban waste to energy conversion - Biomass energy programme in India.

Reference Books

1. Non Conventional Energy, Desai, Ashok V., Wiley Eastern Ltd., 1990.
2. Biogas Technology - A Practical Hand Book - Khandelwal, K. C. and Mahdi, S. S., Vol. I & II, Tata McGraw Hill Publishing Co. Ltd., 1983.
3. Food, Feed and Fuel from Biomass, Challal, D. S., IBH Publishing Co. Pvt. Ltd., 1991.