MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

Sponsored by CMR Educational Society

(Affiliated to JNTU, Hyderabad, Approved by AICTE - Accredited by NBA & NAAC – 'A' Grade - ISO 9001:2015 Certified)

Maisammaguda, Dhulapally (Post Via. Kompally), Secunderabad – 500100, Telangana State, India.

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BACHELOR OF TECHNOLOGY

COMPUTER SCIENCE AND ENGINEERING

ACADEMIC REGULATIONS

(Batches admitted from the academic year 2020 - 2021)

Note: The regulations hereunder are subject to amendments as may be made by the Academic Council of the College from time to time. Any or all such amendments will be effective from such date and to such batches of candidates (including those already pursuing the program) as may be decided by the Academic Council.

PRELIMINARY DEFINITIONS AND NOMENCLATURES

- ”Autonomous Institution /College” means an institution/college designated as autonomous institute / college by University Grants Commission (UGC), as per the UGC Autonomous College Statutes.
- “Academic Autonomy” means freedom to the College in all aspects of conducting its academic programs, granted by the University for promoting excellence.
- “Commission” means University Grants Commission.
- “AICTE” means All India Council for Technical Education.
- “University” the Jawaharlal Nehru Technological University, Hyderabad.
- “College” means Malla Reddy College of Engineering & Technology, Secunderabad unless indicated otherwise by the context.
- “Program” means:
  - Bachelor of Technology (B.Tech) degree program
  - UG Degree Program: B.Tech
- “Branch” means specialization in a program like B.Tech degree program in Electronics & Communication Engineering, B.Tech degree program in Computer Science and Engineering etc.
- “Course” or “Subject” means a theory or practical subject, identified by its course – number and course-title, which is normally studied in a semester.
- T–Tutorial, P–Practical, D–Drawing, L-Theory, C-Credits

FOREWORD

The autonomy is conferred on Malla Reddy College of Engineering & Technology (MRCET) by UGC based on its performance as well as future commitment and competency to impart quality education. It is a mark of its ability to function independently in accordance with the set norms of the monitoring bodies like UGC and AICTE. It reflects the confidence of the UGC in the autonomous institution to uphold and maintain standards it expects to deliver on its own behalf and thus awards degrees on behalf of the college. Thus, an autonomous institution is given the freedom to have its own curriculum, examination system and monitoring mechanism, independent of the affiliating University but under its observance.

Malla Reddy College of Engineering & Technology (MRCET) is proud to win the credence of all the above bodies monitoring the quality of education and has gladly accepted the responsibility of sustaining, and also improving upon the values and beliefs for which it has been striving for more than a decade in reaching its present standing in the arena of contemporary technical education. As a follow up, statutory bodies like Academic Council and Boards of Studies are constituted with the guidance of the Governing Body of the College and recommendations of the JNTU Hyderabad to frame the regulations, course structure and syllabi under autonomous status.

The autonomous regulations, course structure and syllabi have been prepared after prolonged and detailed interaction with several experts drawn from academics, industry and research, in accordance with the vision and mission of the college which reflects the mindset of the institution in order to produce quality engineering graduates to the society.

All the faculty, parents and students are requested to go through all the rules and regulations carefully. Any clarifications, if needed, are to be sought at appropriate time with principal of the college, without presumptions, to avoid unwanted subsequent inconveniences and embarrassments. The cooperation of all the stakeholders is sought for the successful implementation of the autonomous system in the larger interests of the institution and brighter prospects of engineering graduates.

"A thought beyond the horizons of success committed for educational excellence"

PRINCIPAL

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VISION

- To establish a pedestal for the integral innovation, team spirit, originality and competence in the students, expose them to face the global challenges and become technology leaders of Indian vision of modern society.

MISSION

- To become a model institution in the fields of Engineering, Technology and Management.
- To impart holistic education to the students to render them as industry ready engineers.
- To ensure synchronization of MRCET ideologies with challenging demands of International Pioneering Organizations.

QUALITY POLICY

- To implement best practices in Teaching and Learning process for both UG and PG courses meticulously.
- To provide state of art infrastructure and expertise to impart quality education.
- To groom the students to become intellectually creative and professionally competitive.
- To channelize the activities and tune them in heights of commitment and sincerity, the requisites to claim the never - ending ladder of **SUCCESS** year after year.

For more information: www.mrcet.ac.in

ACADEMIC REGULATIONS FOR B. TECH. (REGULAR)

Applicable for the students of B. Tech. (Regular) from the Academic Year 2020-21 and onwards

The college affiliating to JNTUH, Hyderabad offers a 4-year (8 semesters) Bachelor of Technology (B.Tech.) degree programme, under Choice Based Credit System (CBCS) for the following branches of Engineering.

1.0 Award of B. Tech. Degree

A student will be declared eligible for the award of B. Tech. Degree if he fulfills the following academic regulations:

1.1 The candidate shall pursue a course of study for not less than four academic years and not more than eight academic years.

1.2 After eight academic years of course of study, the candidate is permitted to write the examinations for two more years.

1.3 The candidate shall register for 160 credits and secure 160 credits with compulsory subjects as listed in Table-1.

Table 1: Compulsory Subjects

S.No	Subject Particulars
1	All practical Subjects
2	Mini Project
3	Project Work

1.4 In addition to 1.3, the candidate has to register for Mandatory courses (Non-credit course), in which 50% of scoring is required for the award of the degree.

2.0 The students, who fail to fulfill all the academic requirements for the award of the degree within ten academic years from the year of their admission, shall forfeit their seats in B. Tech. course.

3.0 Courses of study

The following courses of study are offered at present as specializations for the B. Tech. Course:

S.No	Department
01	Aeronautical Engineering
02	Computer Science Engineering
03	Electronics & Communication Engineering
04	Information Technology
05	Mechanical Engineering
06	Electrical and Electronics Engineering

4.0 Credits

Particulars	Semester	
	* Periods per week	Credits
Theory	04	04
	03	03
Practical	03	1.5
	04	02
Drawing	03	1.5
	04	02
Mini Project	--	03
Major Project	18	09

***Duration of each period is 60 minutes.**

5.0 Distribution and Weightage of Marks

5.1 The performance of a student in each semester shall be evaluated subject-wise for a maximum of 100 marks for a theory and 100 marks for a practical subject. In addition, Mini Project and Major Project work shall be evaluated for 100 and 300 marks, respectively.

5.2 For theory subjects the distribution shall be 30 marks for Internal Evaluation and 70 marks for the End-Examination.

5.3 For theory subjects, during a semester there shall be 2 mid-term examinations. Each mid- term examination consists of a descriptive paper and assignment. The descriptive paper shall be for 24 marks with a total duration of 2 hours. The descriptive paper shall contain 6 full questions out of which, the student has to answer 4 questions, each carrying 6 marks. Six (6) marks are allocated for Assignments (as specified by the subject teacher concerned). The first Assignment should be submitted before the conduct of the first mid-examination, and the second Assignment should be submitted before the conduct of the second mid-examination. While the first mid-term examination shall be conducted from 1 to 2 units of the syllabus, the second mid-term examination shall be conducted from 3 to 5 units. The total marks secured by the student in each mid-term examination are evaluated for 30 marks, and the average of the two mid-term examinations shall be taken as the final marks secured by each candidate.

However, if any student is absent/scoring internal marks less than 40% in any subject of a mid-term examination he/she will be given a chance to write the internal exam once again after he/she re-registering for the internal exam in the concerned subject and paying stipulated fees as per the norms.

The end examination will be conducted for 70 marks with 5 questions consisting of two parts each (a) and (b), out of which the student has to answer either (a) or (b), not both and each question carrying 14 marks.

5.4 For practical subjects, there shall be a continuous evaluation during a semester for 30 sessional marks and 70 end semester examination marks. Out of the 30 marks for internal evaluation, day-to-day work in the laboratory shall be evaluated for 15 marks and internal practical examination shall be evaluated for 15 marks conducted by the laboratory teacher concerned. The end semester examination shall be conducted with an external examiner and the laboratory teacher. The external examiner shall be appointed from the clusters of colleges which are decided by the examination branch of the College.

5.5 For the subject having design and/or drawing, (such as Engineering Graphics, Engineering Drawing, Machine Drawing) and Estimation, the distribution shall be 30 marks for internal evaluation (15 marks for day-to-day work and 15 marks for internal tests) and 70 marks for end semester examination. There shall be two internal tests in a Semester and the average of the two shall be considered for the award of marks for internal tests.

5.6 There shall be a Mini Project to be taken in III year II Semester examination which carries 3 credits. The Mini Project shall be submitted in a report form and presented before the committee. It shall be evaluated for 100 marks out of which 30 marks for Internal and 70 marks External evaluation. The committee consists of an External Examiner, Head of the Department, and the Supervisor of the Mini Project and a Senior Faculty member of the department.

5.7 Out of a total of 300 marks for the Major Project work which is implemented in two phases i.e., Project I and Project II out of which Project I has to be implemented in IV Year I Semester for which 100 marks shall be allotted. Out of the 100 marks, 30 marks for Internal and 70 marks for External evaluation. Project I shall carry 3 credits and the Internal evaluation shall be on the basis of one seminar given by each student on the topic of his/her project.

5.8 Project II has to be implemented in IV Year II Semester for which 200 marks shall be allotted. Out of the 200 marks, 60 marks are for Internal and 140 marks are for External evaluation. The End Semester Examination of the Major Project work shall be conducted by the same committee as appointed for the Project I. In addition, the project supervisor shall also be included in the committee. The topics for mini project and project work shall be different from one another. The evaluation of project work shall be made at the end of the IV year. The Internal Evaluation shall be on the basis of two seminars given by each student on the topic of his/her project.

5.9 The Laboratory marks and the sessional marks awarded by the College are subject to scrutiny and scaling by the college wherever necessary. In such cases, the sessional and laboratory marks awarded by the College will be referred to Academic Council. The Academic Council will arrive at a scaling factor and the marks will be scaled accordingly. The recommendations of the Academic Council are final and binding. The laboratory records and internal test papers shall be preserved in the College as per the Affiliation University rules and produced before the Committees/Academic Council as and when asked for.

6.0 Attendance Requirements

6.1 A student is eligible to write the University examinations only if he acquires a minimum of 75% of attendance in aggregate of all the subjects.

6.2 Condonation of shortage of attendance in aggregate up to 10% (65% and above, and below 75%) in each semester may be granted by the College Academic Committee

6.3 Shortage of Attendance below 65% in aggregate shall not be condoned.

6.4 A student who is short of attendance in semester may seek re-admission into that semester when offered within 4 weeks from the date of the commencement of class work.

6.5 Students whose shortage of attendance is not condoned in any semester are not eligible to write their end semester examination of that class and their registration stands cancelled.

6.6 A stipulated fee as determined by the examination branch shall be payable towards condonation of shortage of attendance.

6.7 A student will be promoted to the next semester if he/she satisfies the attendance requirement of the present semester, as applicable, including the days of attendance in sports, games, NCC and NSS activities.

6.8 The candidate fulfills the attendance requirement in the present semester, he/she shall not be permitted for readmission into the same class.

7. Course Registration:

7.1 Every student has to register for a set of Courses in each Semester, with the total number of their Credits being limited by considering the permissible weekly Contact Hours (typically: 30/Week); For this, an average Course Registration of minimum 15 Credits/Semester (e.g., 6-7 Courses) and a maximum of 24 credits are generally acceptable on recommendation of concerned academic advisor by satisfying the pre-requisite conditions.

7.2 Approval of the Course Registration will be informed by the concerned Head of the Department on the beginning of the semester by taking the number of students registered (minimum **one-third** students per class) and availability of the faculty into consideration.

7.3 Dropping of the Course Registration can be permitted up to two weeks from the commencement of the semester. Thereafter no droppings are permitted.

7.4 Interchanging of Course Registrations are not permitted.

7.5 The Pre-requisite conditions for the additional course(s) registration by the students are based on the slots available in the Time Table, Class rooms and Faculty availability.

8.0 Minimum Academic Requirements

The following academic requirements have to be satisfied in addition to the attendance requirements mentioned in item no.6.

8.1 A student is deemed to have satisfied the minimum academic requirements if he has earned the credits allotted to each theory/practical design/drawing subject/project and secures not less than 35% of marks in the mid examination (rounded to 10 marks out of 30 marks) and also not less than 35% in end semester examination and minimum 40% of marks in the sum total of the mid-term and end semester exams put together.

8.2 A student will be eligible to be promoted from I year to II year, upon fulfilling the academic requirements of 50 % credits up to I year II semester examinations and secures prescribed minimum attendance in I year.

8.3 A student will be eligible to be promoted from II year to III year, upon fulfilling the academic requirements of 50 % credits up to II year II semester examinations and secures prescribed minimum attendance in II year.

8.4 A student will be eligible to be promoted from III year to IV year, upon fulfilling the academic requirements of 50 % credits up to III year II semester examinations and secures prescribed minimum attendance in III year.

8.5 A student shall register and put up minimum attendance in all 160 credits and shall earn total 160 credits for the award of B.Tech degree. Further, marks obtained in the 160 credits shall be considered for the calculation of percentage of marks as well as overall CGPA.

8.6 Students who fail to earn 160 credits as indicated in the course structure within ten academic years (8 years of study + 2 years additionally for appearing for exams only) from the year of their admission, shall forfeit their seat in B.Tech course and their admission stands cancelled.

9.0 Course pattern

9.1 The entire course of study is for four academic years. I,II,III and IV years shall be on semester pattern.

9.2 A student, eligible to appear for the end examination in a subject, but absent for it or has failed in the end semester examination, may write the exam in that subject during the period of supplementary exams.

9.3 When a student is detained for lack of credits/shortage of attendance, he/she will not be promoted to the next semester for that particular academic year. However, the academic regulations under which he was first admitted shall continue to be applicable to him.

10.0 Grading Procedure

10.1 Marks will be awarded to indicate the performance of student in each theory subject, laboratory/practicals, seminar, UG mini project and UG major project. Based on the percentage of marks obtained (Continuous Internal Evaluation plus Semester End Examination, both taken grade together) as specified in item 8 above, a corresponding letter shall be given.

10.2 As a measure of the performance of student, a 10-point absolute grading system using the following letter grades (as per UGC/AICTE guidelines) and corresponding percentage of marks shall be followed.

10.3 Letter Grades and Grade Points:

The UGC recommends a 10-point grading system with the following letter grades as given below:

Letter Grade	Points	% of Marks secured in a subject or course (Class Intervals)
O (Outstanding)	10	Greater than or equal to 90
A+(Excellent)	9	80 and less than 90
A(Very Good)	8	70 and less than 80
B+(Good)	7	60 and less than 70
B(Average)	6	50 and less than 60
C(Pass)	5	40 and less than 50
F(Fail)	0	Below 40
Ab (Absent)	0	-

A student obtaining Grade F shall be considered failed and will be required to reappear in the examination

10.4 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):

Credit points (CP) = grade point (GP) x credits …. For a course

i. The SGPA is the ratio of sum of the product of the number of credits with the grade points scored by a student in all the courses taken by a student and the sum of the number of credits of all the courses undergone by a student, i.e

$$SGPA\ (Si) = \Sigma(Ci \times Gi) / \Sigma Ci$$

where Ci is the number of credits of the ith course and Gi is the grade point scored by the student in the ith course.

ii. The CGPA is also calculated in the same manner taking into account all the courses undergone by a student over all the semesters of a programme, i.e.

$$CGPA = \Sigma(Ci \times Si) / \Sigma\ Ci$$

where Si is the SGPA of the ith semester and Ci is the total number of credits in that semester.

iii. The SGPA and CGPA shall be rounded off to 2 decimal points and reported in the transcripts.

10.5. A student obtaining 'F' grade in any subject shall be deemed to have 'failed' and is required to reappear as a 'supplementary student' in the semester end examination, as and when offered. In such cases, internal marks in those subjects will remain the same as those obtained earlier.

10.6 A student who has not appeared for examination in any subject '**Ab'** grade will be allocated in that subject, and student shall be considered **'failed'**. Student will be required to reappear as a 'supplementary student' in the semester end examination, as and when offered.

10.7 A letter grade does not indicate any specific percentage of marks secured by the student, but it indicates only the range of percentage of marks.

10.8 A student earns grade point (GP) in each subject/ course, on the basis of the letter grade secured in that subject/ course. The corresponding 'credit points' (CP) are computed by multiplying the grade point with credits for that particular subject/ course.

Credit points (CP) = grade point (GP) x credits …. For a course

10.9 The student passes the subject/ course only when **GP ⍰ 5 ('C' grade or above)**

Illustration of calculation of SGPA

Course/Subject	Credits	Letter Grade	Grade Points	Credit Points
Course 1	4	A	8	4 x 8 = 32
Course 2	4	O	10	4 x 10 = 40
Course 3	4	C	5	4 x 5 = 20
Course 4	3	B	6	3 x 6 = 18
Course 5	3	A+	9	3 x 9 = 27
Course 6	3	C	5	3 x 5 = 15
	21			152

SGPA = 152/21 = 7.24

Illustration of calculation of CGPA:

Course/Subject	Credits	Letter Grade	Grade Points	Credit Points
I Year I Semester				
Course 1	4	A	8	4 x 8 = 32
Course 2	4	A+	9	4 x 9 = 36
Course 3	4	B	6	4 x 6 = 24
Course 4	3	O	10	3 x 10 = 30
Course 5	3	B+	7	3 x 7 = 21
Course 6	3	A	8	3 x 8 = 24

I Year II Semester				
Course 7	4	B+	7	4 x 7 = 28
Course 8	4	O	10	4 x 10 = 40
Course 9	4	A	8	4 x 8 = 32
Course 10	3	B	6	3 x 6 = 18
Course 11	3	C	5	3 x 5 = 15
Course 12	3	A+	9	3 x 9 = 27
	Total Credits = 42			Total Credit Points = 327

CGPA = 327/42 = 7.79

10.10 For merit ranking or comparison purposes or any other listing, **only** the **'rounded off'** values of the CGPAs will be used.

10.11 For calculations listed in regulations 10.4 to 10.9, performance in failed subjects/ courses (securing **F** grade) will also be taken into account, and the credits of such subjects/courses will also be included in the multiplications and summations. After passing the failed subject(s) newly secured letter grades will be taken into account for calculation of SGPA and CGPA. However, mandatory courses will not be taken into consideration.

11.0 Passing standards

11.1 student shall be declared successful or 'passed' in a semester, if student secures a GP □ 5 ('C' grade or above) in every subject/course in that semester (i.e. when student gets an SGPA □ 5.00 at the end of that particular semester); and a student shall be declared successful or 'passed' in the entire under graduate programme, only when gets a CGPA □ 5.00 for the award of the degree as required.

11.2 After the completion of each semester, a grade card or grade sheet (or transcript) shall be issued to all the registered students of that semester, indicating the letter grades and credits earned. It will show the details of the courses registered (course code, title, no. of credits, and grade earned etc.), credits earned, SGPA, and CGPA.

12.0 Declaration of results

12.1 Computation of SGPA and CGPA are done using the procedure listed in 10.4 to 10.9.

12.2 For final percentage of formula marks equivalent to the computed final CGPA, the following formula maybe used.

% of Marks = (final CGPA – 0.5) x 10

13.0 Award of Degree

In assessing the performance of the students in examinations, the usual approach is to award marks based on the examinations conducted at various stages (sessional, mid-term, end-semester etc.,) in a semester. As per UGC Autonomous guidelines, the following system is implemented in awarding the grades and CGPA under the **Choice Based Credit System (CBCS).**

13.1 A student shall register and put up minimum attendance in all 160 credits and shall earn a total of 160 credits for the award of B.Tech degree. Further, marks obtained in the 160 credits shall be considered for the calculation of percentage of marks as well as overall CGPA ≥ 5.0, within 8 academic years from the date of commencement of the first academic year, shall be declared to have **'qualified'** for the award of the B.Tech. Degree in the chosen branch of Engineering as selected at the time of admission.

13.2 A student who qualifies for the award of the degree as listed in 13.1 shall be placed in the following classes.

13.3 Students with final CGPA (at the end of the under graduate programme) ≥ 7.50, and shall be placed in **'first class with distinction'**.

13.4 Students with final CGPA (at the end of the under graduate programme) ≥ 6.50 but < 7.50, shall be placed in **'first class'**.

13.5 Students with final CGPA (at the end of the under graduate programme) ≥ 5.50 but < 6.50, shall be placed in **'Second class'.**

13.6 All the other students who qualify for the award of the degree (as per item 13.1), with final CGPA (at the end of the under graduate programme) ≥ 5.00 but < 5.50, shall be placed in **'pass class'** provided they secure a total of 160 credits.

13.7 A student with final CGPA (at the end of the under graduate programme) < 5.00 will not be eligible for the award of the degree.

13.8 Students fulfilling the conditions listed under item 13.3 alone will be eligible for award of **'university rank'** and **'gold medal'.**

14.0 Withholding of results

14.1 If the student has not paid the fees to the university/ college at any stage, or has dues pending due to any reason whatsoever, or if any case of indiscipline is pending, the result of the student may be withheld, and student will not be allowed to go into the next higher semester. The award or issue of the degree may also be withheld in such cases.

15.0 Transitory regulations.

15.1 A student who has discontinued for any reason, or has been detained for want of attendance or lack of required credits as specified, or who has failed after having undergone the degree programme, may be considered eligible for readmission to the same subjects/ courses (or equivalent subjects/ courses, as the case may be), and same professional electives/ open electives (or from set/category of electives or equivalents suggested, as the case may be) as and when they are offered (within the time-frame of 8 years from the date of commencement of student's first year first semester).

15.2 After the revision of the regulations, the students of the previous batches will be given two chances for passing in their failed subjects, one supplementary and the other regular. If the students cannot clear the subjects in the given two chances, they shall be given equivalent subjects as per the revised regulations which they have to pass in order to obtain the required number of credits.

15.3 In case of transferred students from other Universities, the credits shall be transferred to JNTUH as per the academic regulations and course structure of the MRCET.

16 Minimum Instruction Days

The minimum instruction days for each semester shall be 90days.

17.0 General

17.1 Wherever the words he, him, his, occur in the regulations, they include she, her, hers.

17.2 The academic regulation should be read as a whole for the purpose of any interpretation.

17.3 In case of any doubt or ambiguity in the interpretation of the above rules, the decision of the Principal is final.

17.4 The regulations hereunder are subject to amendments as may be made by the Academic Council of the College from time to time. Any or all such amendments will be effective from such date and to such batches of candidates (including those already pursuing the program) as may be decided by the Academic Council.

17.5 The students seeking transfer to colleges affiliated to JNTUH from various other Universities/Institutions, have to pass the failed subjects which are equivalent to the subjects of prescribed curriculum of the institute, and also pass the subjects of prescribed curriculum of the institute which the candidates have not studied at the earlier Institution on their own without the right to sessional marks. Further, though the students have passed some of the subjects at the earlier institutions, if the same subjects are prescribed in different semesters of prescribed curriculum of the institute, the candidates have to study those subjects in prescribed curriculum of the institute in spite of the fact that those subjects are repeated.

18.0 Scope

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

18.2 In case of any doubt or ambiguity in the interpretation of the above rules, the decision of the Academic senate is final.

18.3 The college may change or amend the academic regulations, course structure or syllabi at any time, and the changes or amendments made shall be applicable to all students with effect from the date notified by the academic senate of the college.

Academic Regulations for B.Tech. (Lateral Entry Scheme) w.e.f the AY 2020-21

1. **Eligibility for award of B. Tech. Degree (LES)**
The LES students after securing admission shall pursue a course of study for not less than three academic years and not more than six academic years.

2. The student shall register for 120 credits and secure total 120 credits with CGPA ≥ 5 from II year to IV year B.Tech. programme (LES) for the award of B.Tech. degree.

3. The students, who fail to fulfill the requirement for the award of the degree in six academic years from the year of admission, shall forfeit their seat in B.Tech.

4. The attendance requirements of B. Tech. (Regular) shall be applicable to B.Tech. (LES).

5. Promotion rule

5.1 A student is deemed to have satisfied the minimum academic requirements if he has earned the credits allotted to each theory/practical design/drawing subject/project and secures not less than 35% of marks in the mid examination (rounded to 10 marks out of 30 marks) and also not less than 35% in end semester examination and minimum 40% of marks in the sum total of the mid-term and end semester exams put together.

5.2 A student will be eligible to be promoted from II year to III year, upon fulfilling the academic requirements of 60 % credits up to II year II semester examinations and secures prescribed minimum attendance in II year.

5.4 A student will be eligible to be promoted from III year to IV year, upon fulfilling the academic requirements of 60 % credits up to III year II semester examinations and secures prescribed minimum attendance in III year.

6. All the other regulations as applicable to B. Tech. 4-year degree course (Regular) will hold good for B. Tech. (Lateral Entry Scheme).

MALPRACTICES RULES

DISCIPLINARY ACTION FOR IMPROPER CONDUCT IN EXAMINATIONS

S.No	Nature of Malpractices/Improper conduct If the candidate:	Punishment
1. (a)	Possesses or keeps accessible in examination hall, any paper, note book, programmable calculators, Cell phones, pager, palm computers or any other form of material concerned with or related to the subject of the examination (theory or practical) in which he is appearing but has not made use of (material shall include any marks on the body of the candidate which can be used as an aid in the subject of the examination)	Expulsion from the examination hall and cancellation of the performance in that subject only.
(b)	Gives assistance or guidance or receives it from any other candidate orally or by any other body language methods or communicates through cell phones with any candidate or persons in or outside the exam hall in respect of any matter.	Expulsion from the examination hall and cancellation of the performance in that subject only of all the candidates involved. In case of an outsider, he will be handed over to the police and a case is registered against him.
2.	Has copied in the examination hall from any paper, book, programmable calculators, palm computers or any other form of material relevant to the subject of the examination (theory or practical) in which the candidate is appearing.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted to appear for the remaining examinations of the subjects of that Semester/year. The Hall Ticket of the candidate is to be cancelled and sent to the University.
3.	Impersonates any other candidate in connection with the examination.	The candidate who has impersonated shall be expelled from examination hall. The candidate is also debarred and forfeits the seat. The performance of the original candidate who has been impersonated, shall be cancelled in all the subjects of the examination (including practicals and project work) already

		appeared and shall not be allowed to appear for examinations of the remaining subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all University examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat. If the imposter is an outsider, he will be handed over to the police and a case is registered against him.
4.	Smuggles in the Answer book or additional sheet or takes out or arranges to send out the question paper during the examination or answer book or additional sheet, during or after the examination.	Expulsion from the examination hall and cancellation of performance in that subject and all the other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all University examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.
5.	Using objectionable, abusive or offensive language in the answer paper or in letters to the examiners or writes to the examiner requesting him to award pass marks.	Cancellation of the performance in that subject.
6.	Refuses to obey the orders of the Chief Superintendent/Assistant Superintendent / any officer on duty or misbehaves or creates disturbance of any kind in and around the examination hall or organizes a walk out or instigates others to walk out, or threatens the officer-in charge or any person on duty in or outside the examination hall of any injury to his person or to any of his relations whether by words, either spoken or written or by signs or	In case of students of the college, they shall be expelled from examination halls and cancellation of their performance in that subject and all other subjects the candidate(s) has (have) already appeared and shall not be permitted to appear for the remaining examinations of the subjects of that

	by visible representation, assaults the officer-incharge, or any person on duty in or outside the examination hall or any of his relations, or indulges in any other act of misconduct or mischief which result in damage to or destruction of property in the examination hall or any part of the College campus or engages in any other act which in the opinion of the officer on duty amounts to use of unfair means or misconduct or has the tendency to disrupt the orderly conduct of the examination.	semester/year. The candidates also are debarred and forfeit their seats. In case of outsiders, they will be handed over to the police and a police case is registered against them.
7.	Leaves the exam hall taking away answer script or intentionally tears of the script or any part thereof inside or outside the examination hall.	Expulsion from the examination hall and cancellation of performance in that subject and all the other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all University examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.
8.	Possess any lethal weapon or firearm in the examination hall.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred and forfeits the seat.
9.	If student of the college, who is not a candidate for the particular examination or any person not connected with the college indulges in any malpractice or improper conduct mentioned in clause 6 to 8.	Student of the colleges expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including

		practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred and forfeits the seat. Person(s) who do not belong to the College will be handed over to police and, a police case will be registered against them.
10.	Comes in a drunken condition to the examination hall.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year.
11.	Copying detected on the basis of internal evidence, such as, during valuation or during special scrutiny.	Cancellation of the performance in that subject and all other subjects the candidate has appeared including practical examinations and project work of that semester/year examinations.
12.	If any malpractice is detected which is not covered in the above clauses 1 to 11 shall be reported to the University for further action to award suitable punishment.	

Malpractices identified by squad or special invigilators

1. Punishments to the candidates as per the above guidelines.
2. Punishment for institutions: (if the squad reports that the college is also involved in encouraging malpractices)
   i. A show cause notice shall be issued to the college.
   ii. Impose a suitable fine on the college.
   iii. Shifting the examination centre from the college to another college for a specific period of not less than one year.

* * * * *

Department of Computer Science and Engineering

Vision of the Department

- To acknowledge quality education and instill high patterns of discipline making the students technologically superior and ethically strong which involves the improvement in the quality of life in human race.

Mission of the Department

- To achieve and impart holistic technical education using the best of infrastructure, outstanding technical and teaching expertise to establish the students into competent and confident engineers.
- Evolving the center of excellence through creative and innovative teaching learning practices for promoting academic achievement to produce internationally accepted competitive and world class professionals.

Quality Policy of the Department

- To pursue continual improvement of teaching learning process of Undergraduate and Post Graduate programs in Engineering & Management vigorously.
- To provide state of art infrastructure and expertise to impart the quality education.

Program Educational Objectives (PEOs)

PEO1 – ANALYTICAL SKILLS
To facilitate the graduates with the ability to visualize, gather information, articulate, analyze, solve complex problems, and make decisions. These are essential to address the challenges of complex and computation intensive problems increasing their productivity.
PEO2 – TECHNICAL SKILLS
To facilitate the graduates with the technical skills that prepare them for immediate employment and pursue certification providing a deeper understanding of the technology in advanced areas of computer science and related fields, thus encouraging to pursue higher education and research based on their interest.
PEO3 – SOFT SKILLS
To facilitate the graduates with the soft skills that include fulfilling the mission, setting goals, showing self-confidence by communicating effectively, having a positive attitude, get involved in team-work, being a leader, managing their career and their life.
PEO4 – PROFESSIONAL ETHICS
To facilitate the graduates with the knowledge of professional and ethical responsibilities by paying attention to grooming, being conservative with style, following dress codes, safety codes, and adapting themselves to technological advancements.

PROGRAMME OUTCOMES: ENGINEERING GRADUATES WILL BE ABLE TO
PO1: Engineering Knowledge
Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO2:Problem Analysis
Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3: Design / Development of Solutions
Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO4: Conduct Investigations of Complex Problems
Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5: Modern Tool Usage
Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
PO6: The Engineer and Society
Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO7: Environment and Sustainability
Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO8: Ethics

Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO9: Individual and Team Work
Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO10: Communication
Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO11: Project management and finance
Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO12: Life-long learning
Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAM SPECIFIC OUTCOMES (PSOs):

After the completion of the course, B. Tech Computer Science and Engineering, the graduates will have the following Program Specific Outcomes:

1. **Fundamentals and critical knowledge of the Computer System:-** Able to Understand the working principles of the computer System and its components , Apply the knowledge to build, asses, and analyze the software and hardware aspects of it .
2. **The Comprehensive and Applicative knowledge of Software Development:** Able to demonstrate the comprehensive skills of Programming Languages, Software process models, methodologies, and ability to plan, develop, test, analyze, and manage the software and hardware intensive systems in heterogeneous platforms.
3. **Applications of Computing Domain & Research:** Able to use the professional, interdisciplinary skill set, and domain specific tools in development processes, identify the research gaps and provide innovative solutions to them.

MALLA REDDY COLLEGE OF ENGINEERINGANDTECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

B.TECH - COMPUTER SCIENCE & ENGINEERING

COURSE STRUCTURE

I Year B.Tech –I Semester

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	MAX. MARKS	
							INT	EXT
1	R20A0001	English	2	0	0	2	30	70
2	R20A0021	Mathematics – I	3	1	0	4	30	70
3	R20A0201	Basic Electrical Engineering	3	0	0	3	30	70
4	R20A0302	Computer Aided Engineering Graphics	2	0	2	3	30	70
5	R20A0501	Programming for Problem Solving	3	0	0	3	30	70
6	R20A0081	English Language Communication Skills Lab	-	0	4	2	30	70
7	R20A0281	Basic Electrical Engineering Lab	-	0	3	1.5	30	70
8	R20A0581	Programming for Problem Solving Lab	-	0	3	1.5	30	70
9	R20A0003*	Human Values and Professional Ethics	2	0	0	0	100	-
		TOTAL	**15**	**1**	**12**	**20**	**340**	**560**

I Year B. Tech – II Semester

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	MAX. MARKS	
							INT	EXT
1	R20A0002	Professional English	2	0	0	2	30	70
2	R20A0022	Mathematics – II	3	1	0	4	30	70
3	R20A0011	Applied Physics	3	0	0	3	30	70
4	R20A0401	Analog and Digital Electronics	3	0	0	3	30	70
5	R20A0502	Python Programming	3	0	0	3	30	70
6	R20A0082	Applied Physics Lab	-	0	3	1.5	30	70
7	R20A0582	Python Programming Lab	-	0	3	1.5	30	70
8	R20A0083	Engineering and IT Workshop	-	0	4	2	30	70
9*	R20A0064*	Financial Institutions ,Markets and Services	1	-	-	0	100	-
		TOTAL	**16**	**1**	**10**	**20**	**340**	**560**

***Mandatory course: Non-credit course, 50% of scoring is required for the award of the degree**

II Year B. Tech – I Semester

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	MAX. MARKS	
							INT	EXT
1	R20A0503	Data Structures Using Python	3	0	0	3	30	70
2	R20A0504	Operating Systems	3	0	0	3	30	70
3	R20A0505	Design and Analysis of Algorithms	3	0	0	3	30	70
4	R20A0506	Computer Organization	3	0	0	3	30	70
5	R20A0024	Probability and Statistics	3	0	0	3	30	70
6	R20A0061	Managerial Economics and Financial Analysis	3	0	0	3	30	70
7	R20A0583	Data Structures using Python Lab	-	0	3	1.5	30	70
8	R20A0584	Operating Systems Lab	-	0	3	1.5	30	70
9	R20A0004*	Foreign Language: French	2	-	-	0	100	-
		TOTAL	**20**	**0**	**6**	**21**	**340**	**560**

***Mandatory course: Non-credit course, 50% of scoring is required for the award of the degree**

II Year B. Tech – II Semester

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	MAX. MARKS	
							INT	EXT
1	R20A0026	Discrete Mathematics	3	0	0	3	30	70
2	R20A0507	Formal Language and Automata Theory	3	0	0	3	30	70
3	R20A0508	Object Oriented Programming through Java	3	0	0	3	30	70
4	R20A0509	Database Management Systems	3	0	0	3	30	70
5	R20A0510	Computer Networks	3	0	0	3	30	70
6	**OE1**	**Open Elective-I**	3	0	0	3	30	70
7	R20A0585	Object Oriented Programming through Java Lab	-	0	3	1.5	30	70
8	R20A0586	Database Management Systems Lab	-	0	3	1.5	30	70
9	R20A0008*	Global Education & Professional Career	2	-	-	0	100	-
		TOTAL	**20**	**0**	**6**	**21**	**340**	**560**

***Mandatory course: Non-credit course, 50% of scoring is required for the award of the degree**

II Year B. Tech – II Semester OPEN ELECTIVE - I		
S.NO	**SUBJECT CODE**	**SUBJECT**
1	R20A1251	Web Designing Tools
2	R20A0551	Introduction To DBMS
3	R20A0351	Intellectual Property Rights
4	R20A0051	Enterprise Resource Planning
5	R20A0451	Basics Of Computer Organization

III Year B. Tech – I Semester

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	MAX. MARKS	
							INT	EXT
1	R20A0511	Software Engineering	3	0	0	3	30	70
2	R20A0512	Compiler Design	3	0	0	3	30	70
3	R20A0513	Artificial Intelligence	3	0	0	3	30	70
4	R20A6210 R20A7201 R20A0514	**Professional Elective - I** 1.Digital Forensics 2.Text Analytics 3.Optimization Techniques	3	0	0	3	30	70
5	R20A6702 R20A0515 R20A6903	Professional Elective - II 1. Data Handling and Visualization 2. Scripting Languages 3. Embedded Systems Design	3	0	0	3	30	70
6	**OE II**	**Open Elective - II**	3	0	0	3	30	70
7	R20A0587	Compiler Design and Case Tools Lab	0	0	3	1.5	30	70
8	R20A0588	Artificial Intelligence Lab	0	0	3	1.5	30	70
9	R20A0596	Application Development-I	-	-	4	2	30	70
10	R20A0006*	Technical Communication & Soft Skills	2	-	-	0	100	-
		TOTAL	**20**	**0**	**10**	**23**	**370**	**630**

***Mandatory course: Non-credit course, 50% of scoring is required for the award of the degree**

III Year B. Tech – I Semester OPEN ELECTIVE - II		
S.NO	**SUBJECT CODE**	**SUBJECT**
1	R20A1252	Management Information Systems
2	R20A0552	Java Programming
3	R20A1253	Software Project Management
4	R20A0452	Internet Of Things & Its Applications
5	R20A0553	Operating System Concepts
6	R20A0066	Public Policy & Governance

III Year B. Tech – II Semester

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	MAX. MARKS	
							INT	EXT
1	R20A0516	Full Stack Development	3	0	0	3	30	70
2	R20A0518	Machine Learning	3	0	0	3	30	70
3	R20A0517 R20A6612 R20A6609	**Professional Elective-III** 1. Distributed Systems 2. Neural Networks 3. Natural Language Processing	3	0	0	3	30	70
4	R20A6202 R20A0519 R20A1210	**Professional Elective-IV** 1. Cyber Security 2. Parallel and Distributed Computing 3. Augmented and Virtual Reality	3	0	0	3	30	70
5	**OE III**	**Open Elective-III**	3	0	0	3	30	70
6	R20A0589	Full Stack Development Lab	0	0	3	1.5	30	70
7	R20A0590	Machine Learning Lab	0	0	3	1.5	30	70
8	R20A0597	Application Development-II	-	-	4	2	30	70
9*	R20A0007*	Constitution of India	2	-	-	0	100	-
		TOTAL	**17**	**0**	**10**	**20**	**340**	**560**

***Mandatory course: Non-credit course, 50% of scoring is required for the award of the degree**

III Year B. Tech – II Semester OPEN ELECTIVE III		
S.NO	**SUBJECT CODE**	**SUBJECT**
1	R20A0453	Robotics & Automation
2	R20A1254	Big Data Architecture
3	R20A6251	Information Security
4	R20A0554	Cloud Computing Fundamentals
5	R20A0352	Design Thinking
6	R20A0065	Business Analytics

IV Year B. Tech – I Semester

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	MAX. MARKS	
							INT	EXT
1	R20A0520	Big Data Analytics	3	0	0	3	30	70
2	R20A0521	Cloud Computing	3	0	0	3	30	70
3	R20A0522	Block Chain Technology	3	0	0	3	30	70
4	R20A6610 R20A6908 R20A0523	**Professional Elective-V** 1. Deep Learning 2. Adhoc and Sensor Networks 3. Software Testing Methodologies	3	0	0	3	30	70
5	R20A6703 R20A0524 R20A0525	**Professional Elective-VI** 1. Data Science 2. Mobile Computing 3. Agile Software Development	3	0	0	3	30	70
6	R20A0591	Block Chain Technology Lab	-	-	3	1.5	30	70
7	R20A0592	Big Data Analytics Lab	-	-	3	1.5	30	70
8	R20A0598	Mini Project	-	-	6	3	30	70
		TOTAL	**15**	**-**	**12**	**21**	**240**	**560**

IV Year B. Tech – II Semester

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	MAX. MARKS	
							INT	EXT
1	R20A0337	Innovation, Start-up & Entrepreneurship	3	1	-	4	30	70
2	R20A0599	Major Project	-	-	20	10	30	70
		TOTAL	**3**	**1**	**20**	**14**	**60**	**140**

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

B. TECH- I- YEAR- I- SEM –CSE

L/T/P/C **3/-/-/-2**

(R20A0001) ENGLISH

INTRODUCTION

English is a global language, which is a means to correspond globally. Keeping in account of its vital role in the global market, emphasis is given to train the students to acquire language and communication skills. The syllabus is designed to develop and attain the competency in communicative skills.

The lectures focus on the communication skills and the selected excerpts support as resources for the teachers to develop the relevant skills in the students. The lessons stimulate discussions and help in comprehending the content effectively. The focus is on skill development,nurturing ideas and practicing the skills.

COURSE OBJECTIVES

1. To enable students to enhance their lexical, grammatical and communicative competence.
2. To equip the students to study the academic subjects with better perspective through theoretical and practical components of the designed syllabus.
3. To familiarize students with the principles of writing and to ensure error-free writing.
4. To analyze, interpret and evaluate a text and critically appreciate it.
5. To improve the writing and speaking skills, the productive skills.

SYLLABUS

Course Objectives

1. To develop an awareness in the students about the significance of silent reading and comprehension.
2. To augment the ability of students to guess the meanings of words from context and grasp the overall message of the text, draw inferences etc.
   Skimming the text
   Understanding the gist of an argument
   Identifying the topic sentence
   Inferring lexical and contextual meaning
   Understanding discourse features
   - Recognizing coherence/sequencing of sentences
   - Scanning the text NOTE:
3. The students will be trained in reading skills using the prescribed text for detailed study.
4. They will be examined in reading and answering questions using ‘unseen’ passages which may be taken from authentic texts, such as magazines/newspaper articles.

Writing Skills:

Objectives

1. To develop an awareness in the students about basic formal writing skills.
2. To equip students with the components of different forms of writing, beginning with the

a. required ones:

3. Writing sentences
4. Use of appropriate vocabulary
5. Coherence and cohesiveness
6. Formal and informal letter writing.

Unit –I

"The Road not taken"by Robert Frost

Grammar –Tenses and Punctuation (Sequences of Tenses)Vocabulary –Word Formation - Prefixes and Suffixes

Writing –Paragraph Writing (Focusing on Tenses and Punctuations) Reading –The art of skimming and scanning -Reading Exercise Type 1(Match the statements to the text they refer to)

Unit – II

Act II from 'Pygmalion' by G.B. ShawGrammar –Direct and Indirect Speech Vocabulary– Synonyms, Antonyms

Writing –Essay Writing (Introduction, body and conclusion)

Reading –Comprehending the context– Reading Exercise Type 2 (Place the missing statement)

Unit – III

Satya Nadella's Email to His Employees on his First Day as CEO of Microsoft

Grammar – Voices

Vocabulary –One-Word Substitutes, Standard Abbreviations

Writing –E-mail Writing, Letter Writing (complaints, requisitions, apologies). Reading– Reading Comprehension- Reading Exercise Type 3(Reading between the lines)

Unit – IV

J K Rowling's Convocation Speech at HarvardGrammar – Articles, Misplaced Modifiers Vocabulary –Phrasal Verbs

Writing – Précis Writing

Reading –Reading Exercise Type 4(Cloze test)

Unit –V

Abdul Kalam's Biography

Grammar – Subject-Verb Agreement, Noun-Pronoun AgreementVocabulary – Commonly Confused Words

Writing – Memo Writing

Reading –Reading Exercise Type 5(Identifying errors)

* Exercises apart from the textbook shall also be used for classroom tasks.

REFERENCE BOOKS

1. Practical English Usage. Michael Swan. OUP. 1995.

2. Remedial English Grammar. F.T. Wood. Macmillan.2007
3. On Writing Well. William Zinsser. Harper Resource Book. 2001
4. Study Writing. Liz Hamp-Lyons and Ben Heasly. Cambridge University Press. 2006.
5. Communication Skills. Sanjay Kumar and Pushpa Lata. Oxford University Press. 2011.
6. Exercises in Spoken English. Parts. I-III. CIEFL, Hyderabad. Oxford University Press

COURSE OUTCOMES

Students will be able to:

1. Gain competence and proficiency in 'productive' skills, i.e., writing and speaking with the recognition of the need for life-long learning of the same
2. Hone their language abilities in terms of comprehending complex technical texts with a potential to review literature
3. Present ideas clearly and logically to analyze data and provide valid conclusions in written communication
4. Enrich their grammatical accuracy and fluency to be adept at both the active and passive skills
5. Represent old conventions with a set of the new by professional verbal communicative ability.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

I Year B.Tech. CSE- I Sem L/T/P/C 3/1/-/4

(R20A0021)

MATHEMATICS –I

COURSE OBJECTIVES:

1. The concept of a Rank of the matrix and applying the concept to know the consistency and solving the system of linear equations.
2. The concept of Eigen values, Eigen vectors and Diagonolisation.
3. The maxima and minima of functions of several variables.
4. The Applications of first order ordinary differential equations and methods to solve higherorder differential equations.
5. The properties of Laplace Transform, Inverse Laplace Transform and Convolution theorem.

UNIT I: Matrices

Introduction, Rank of a matrix - Echelon form, Normal form, Consistency of system of linear equations (Homogeneous and Non-Homogeneous)-Gauss-Siedel method, Linear dependence and independence of vectors, Eigen values and Eigen vectors and their properties (without proof), Cayley-Hamilton theorem(without proof), Diagonalisation of a matrix.

UNIT II: Multi Variable Calculus (Differentiation)

Functions of two variables, Limit, Continuity, Partial derivatives, Total differential and differentiability, Derivatives of composite and implicit functions, Jacobian-functional dependence and independence, Maxima and minima and saddle points, Method of Lagrange multipliers, Taylors theorem for two variables.

UNIT III: First Order Ordinary Differential Equations

Exact, Equations reducible to exact form, Applications of first order differential equations - Newton's law of cooling, Law of natural growth and decay, Equations not of first degree- Equations solvable for p, equations solvable for y, equations solvable for x and Clairaut's type.

UNIT IV : Differential Equations of Higher Order

Linear differential equations of second and higher order with constant coefficients: Non-homogeneous term of the type f(x) = e^{ax}, sinax, cosax, x^n, e^{ax} V and x^n V - Method of variation of parameters, Equations reducible to linear ODE with constant coefficients- Cauchy's Euler equation and Legendre's equation.

UNIT V: Laplace Transforms

Definition of Laplace transform, domain of the function and Kernel for the Laplace transforms, Existence of Laplace transform, Laplace transform of standard functions, first shifting Theorem,

Laplace transform of functions when they are multiplied and divided by “t”, Laplace transforms
of derivatives and integrals of functions, Unit step function, Periodic function.
Inverse Laplace transform by Partial fractions, Inverse Laplace transform of functions when they are multiplied and divided by ”s”, Inverse Laplace Transforms of derivatives and integrals of functions, Convolution theorem, Solving ordinary differential equations by Laplace transform.

TEXT BOOKS

1. Higher Engineering Mathematics by B V Ramana ., Tata McGraw Hill.
2. Higher Engineering Mathematics by B.S. Grewal, Khanna Publishers.
3. Advanced Engineering Mathematics by Kreyszig ,John Wiley & Sons .

REFERENCE BOOKS

1. Advanced Engineering Mathematics by R.K Jain & S R K Iyenger, Narosa Publishers.
2. Ordinary and Partial Differential Equations by M.D. Raisinghania, S.Chand Publishers
3. Engineering Mathematics by N.P Bali and Manish Goyal.

COURSE OUTCOMES:

After learning, the concepts of this paper the student will be able to

1. Analyze the solutions of the system of linear equations and find the Eigen values and Eigenvectors of a matrix, which are used to analyze the long term behavior of any system.
2. Find the extreme values of functions of two variables with / without constraints.
3. Solve first order, first degree differential equations and their applications.
4. Form a differential equation for typical engineering problems and hence can solve those higher order differential equations.
5. Solve differential equations with initial conditions using Laplace Transformation.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

I Year B.Tech. CSE- I Sem L/T/P/C 3/-/-/3

(R20A0201)

BASIC ELECTRICAL ENGINEERING

COURSE OBJECTIVES:

1. To understand the basic concepts of electrical circuits & networks and their analysis which isthe foundation for all the subjects in the electrical engineering discipline.
2. To emphasize on the basic elements in electrical circuits and analyze Circuits using NetworkTheorems.
3. To analyze Single-Phase AC Circuits.
4. To illustrate Single-Phase Transformers and DC Machines.
5. To get overview of basic electrical installations and calculations for energy consumption.

UNIT –I:

Introduction to Electrical Circuits: Concept of Circuit and Network, Types of elements, R-L-C
Parameters, Independent and Dependent sources, Source transformation and Kirchhoff's Laws

UNIT –II:

Network Analysis: Network Reduction Techniques- Series and parallel connections of resistive networks, Star–to-Delta and Delta-to-Star Transformations for Resistive Networks, Mesh Analysis, and Nodal Analysis,
Network Theorems**:** Thevenin's theorem, Norton's theorem, MaximumPower Transfer theoremand Superposition theorem, Illustrative Problems.

UNIT-III:

Single Phase A.C. Circuits: Average value, R.M.S. value, form factor and peak factor for sinusoidalwave form. Steady State Analysis of series R-L-C circuits. Concept of Reactance, Impedance, Susceptance, Admittance, Concept of Power Factor, Real, Reactive and Complex power and Illustrative Problems.

UNIT –IV:

Electrical Machines (elementary treatment only):

Single phase transformers: principle of operation, constructional features and emf equation. DC.Generator: principle of operation, constructional features, emf equation. DC Motor: principle of operation, Back emf, torque equation.

UNIT –V:

Electrical Installations:

Components of LT Switchgear: Switch Fuse Unit (SFU), MCB, ELCB, Types of Wires and Cables,Earthing. Elementary calculations for energy consumption and battery backup.

TEXT BOOKS:

1. Engineering Circuit Analysis - William Hayt, Jack E. Kemmerly, S M Durbin, Mc Graw HillCompanies.
2. Electric Circuits - A. Chakrabarhty, Dhanipat Rai & Sons.
3. Electrical Machines – P.S.Bimbra, Khanna Publishers.

REFERENCE BOOKS:

1. Network analysis by M.E Van Valkenburg, PHI learning publications.
2. Network analysis - N.C Jagan and C. Lakhminarayana, BS publications.
3. Electrical Circuits by A. Sudhakar, Shyammohan and S Palli, Mc Graw Hill Companies.
4. Electrical Machines by I.J. Nagrath & D. P. Kothari, Tata Mc Graw-Hill Publishers.

COURSE OUTCOMES:

At the end of the course students, would be able to

1. Apply the basic RLC circuit elements and its concepts to networks and circuits.
2. Analyze the circuits by applying network theorems to solve them to find various electricalparameters.
3. Illustrate the single-phase AC circuits along with the concept of impedance parametersand power.
4. Understand the Constructional Details and Principle of Operation of DC Machines andTransformers
5. Understand the basic LT Switch gear and calculations for energy consumption

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

I Year B.Tech. CSE- I Sem **L/T/P/C**
2/-/2/3

(R20A0302) COMPUTER AIDED ENGINEERING GRAPHICS

COURSE OBJECTIVES:

1. To learn basic engineering graphic communication skills & concept.
2. To learn the 2D principles of orthographic projections And Multiple views of the same
3. To know the solid Projection and Its Sectional Views
4. To gain the capability of designing 3D objects with isometric principles by using computeraided sketches
5. To know the conversion of Orthographic Views to isometric Views And isometric to Orthographic views

UNIT-I

Introduction to Computer Aided Engineering Graphics

Introduction, Drawing Instruments and their uses, BIS conventions, lettering Dimensioning & free hand practicing. AutoCAD User Interface – Menu system – coordinate systems, axes, poly-lines, square, rectangle, polygons, splines, circles, ellipse,– tool bars (draw, modify, annotations, layers etc.) – status bar (ortho, grid, snap, iso etc.),

Generation of points, lines, curves, polygons, dimensioning, layers, blocks, electrical symbols.

Geometrical constructions

Curves Used In Engineering Practice

a) Conic Sections (General Method only- Eccentricity Method)

b) Cycloid, Epicycloid and Hypocycloid

UNIT-II:

2D PROJECTIONS

Orthographic Projections: – Conventions – First and Third Angle projections.

Projections of Points, Projections of Lines, Projections of planes, Circuits Designs – Basic Circuit Symbols & Sensors

UNIT– III

Projections of Solids: Projections of regular solids prism and pyramid inclined to both planes. **Sections of solids:** Section planes and sectional view of right regular solids- prism, cylinder,pyramid and cone, True shapes of the sections.

UNIT– IV

3D Projections

Isometric Projections: Principles of Isometric Projection – Isometric Scale – Isometric Views, Commands for 3D UCS, Extrude, revolve, loft, 3D move, 3D rotate, dox, sphere, cone, wedge, cylinder, view ports.

Plane Figures, Simple and Compound Solids.

3D models of electrical components Switch, Diode, Resistor, Battery, Capacitor, Transistor, Motor

UNIT– V

Transformation of Projections: Visualize the 2D &3D View of Engineering Objects for Conversionof Isometric Views to Orthographic Views. Conversion of orthographic views to isometric views

– simple objects in AutoCAD

TEXT BOOKS:

1. Engineering Drawing – N.D. Bhatt & V.M. Panchal, 48th edition, 2005 Charotar PublishingHouse, Gujarat.
2. "Computer Aided Engineering Drawing" by Dr. M H Annaiah, Dr C N Chandrappa and DrB Sudheer Premkumar Fifth edition, New Age International Publishers

REFERENCE BOOKS:

1. Computer Aided Engineering Drawing – S. Trymbaka Murthy, - I.K. InternationalPublishing House Pvt. Ltd., New Delhi, 3rd revised edition-2006.
2. Engineering Graphics - K.R. Gopalakrishna, 32nd edition, 2005- Subash PublishersBangalore.

COURSE OUTCOMES:

After the completion of course the student will be capable to

1. Produce geometric construction, dimensioning & Curves and detail drawings.
2. Compile Projections of points, lines ,planes then create virtual drawing by using computer
3. Sketch the Solid Projections & Sectioning of the solids
4. Develop isometric drawings of simple objects reading the orthographic projections ofthose objects.
5. Understand and visualize the 3-D view of engineering objects. Elaborate the conversionsof 2D -3D and Vice-Versa

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I Year B.Tech. CSE- I Sem L/T/P/C 3/-/-/3

(R20A0501)

PROGRAMMING FOR PROBLEM SOLVING

COURSE OBJECTIVES:

1. Understand the use of computer system in problem solving and to build program logic with algorithms and flowcharts.
2. Explain the features and constructs of C programming such as data types, Expressions Loops, arrays, strings and pointers
3. Learn how to write modular Programs using Functions
4. Understand the use of Structures, Unions and Files
5. Use basic data structures like stacks,queues and linked lists in designing applications

UNIT - I

Introduction to Computing – Computer Systems, Computing Environments, Computer Languages, Algorithms and Flowcharts, Steps for Creating and Running programs.

Introduction to C – History of C, Features of C, Structure of C Program, Character Set, C Tokens - keywords, Identifiers, Constants, Data types, Variables. Operators, Expressions, Precedence and Associativity, Expression Evaluation, Type conversion, typedef, enum

Control Structures- Selection Statements(Decision Making) – if and switch statements, Repetition Statements (Loops) - while, for, do-while statements, Unconditional Statements – break, continue, goto, command line arguments.

UNIT-II

Pointers – Pointer variable, pointer declaration, Initialization of pointer, accessing variables through pointers, pointer arithmetic, pointers to pointers, void pointers
Arrays – Definition, declaration of array, Initialization, storing values in array, two dimensional arrays, Multi-dimensional arrays. Arrays and Pointers, Array of pointers
Strings – Declaration and Initialization, String Input / Output functions, Array of strings,
String manipulation functions, Unformatted I/O functions, strings and pointers

UNIT – III

Designing Structured Programs using Functions - Types of Functions- user defined functions, Standard Functions, Categories of functions, Parameter Passing techniques, Scope – Local Vs Global, Storage classes, Recursive functions. Passing arrays as parameters to functions, Pointers to functions, Dynamic Memory Allocation.

UNIT-IV

Structures and Unions - Declaration, initialization, accessing structures, operations on structures, structures containing arrays, structures containing pointers, nested

structures, self referential structures, array of structures, structures and functions, structures and pointers, unions.
Files – Concept of a file, Streams, Text files and Binary files, Opening and Closing files, File input / output functions. Sequential Access and Random Access Functions

UNIT-V

Basic Data Structures – Linear and Non Linear Structures – Implementation of Stacks, Queues, Linked, Lists and their applications.

Case Studies

Case 1: Student Record Management System

The main features of this project include basic file handling operations; you will learn how to add, list,
modify and delete data to/from file.
Currently, listed below are the only features that make up this project, but you can add new features as
you like to make this project a better one!

Add record
List record
Modify record
Delete record

Case 2: Library Management System

This project has 2 modules.
1. Section for a librarian
2. Section for a student

A librarian can add, search, edit and delete books. This section is password protected. That means you need administrative credentials to log in as a librarian.
A student can search for the book and check the status of the book if it is available.
Here is list of features that you can add to the project.

1. You can create a structure for a student that uniquely identify each student. When a student
borrows a book from the library, you link his ID to Book ID so that librarian can find how
burrowed particular book.
2. You can create a feature to bulk import the books from CSV file.
3. You can add REGEX to search so that a book can be searched using ID, title, author or any of the field.
4. You can add the student login section.

TEXT BOOKS:

1. Mastering C, K.R.Venugopal, S R Prasad, Tata McGraw-Hill Education.
2. Computer Science: A Structured Programming Approach Using C, B.A.Forouzan and R.F. Gilberg, Third Edition, Cengage Learning
3. Data Structures and Algorithms Made Easy by NarasimhaKarumanchi, Career Monk publications, 2017

REFERENCE BOOKS:

1. The C Programming Language, B.W. Kernighan and Dennis M.Ritchie, PHI.
2. Computer Programming, E.Balagurusamy, First Edition, TMH.
3. C and Data structures – P. Padmanabham, Third Edition, B.S. Publications.
4. Programming in C, Ashok Kamthane. Pearson Education India.
5. Let us C ,Yashwanth Kanethkar, 13th Edition, BPB Publications.
6. Data Structures using C by Aaron M. Tenenbaum, Pearson Publications
7. Data Structures using C by Puntambekar

COURSE OUTCOMES:

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

1. Understand a problem and build an algorithm/flowchart to solve it
2. Define variables and construct expressions using C language
3. Construct C programs using various conditional statements and loops
4. Make use of files and file operations to store and retrieve data
5. Design applications using basic data structures like stacks, queues and linked lists

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-/-/4/2

(R20A0081)

ENGLISH LANGUAGE COMMUNICATION SKILLS LAB

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

COURSE OBJECTIVES:

1. To facilitate computer-aided multi-media instruction enabling individualized and independent language learning
2. To sensitize the students to the nuances of English speech sounds, word accent,intonation and rhythm
3. To bring about a consistent accent and intelligibility in their pronunciation, ampules peaking opportunities are provided.
4. To improve the fluency in spoken English and neutralize mother tongue influence
5. To train students to use language appropriately for interviews, group discussions and public speaking

English Language Communication Skills Lab has two parts:

A. Computer Assisted Language Learning (CALL) Lab
B. Interactive Communication Skills (ICS) Lab

The following course content is prescribed for the English Language Communication Skills Lab

UNIT –I
CALL Lab: Introduction to Phonetics –Speech Sounds –Vowels and Consonants-Transcriptions
ICS Lab: Ice-Breaking activity - JAM session

UNIT –II
CALL Lab: Pronunciation: Past Tense Markers and Plural Markers
ICS Lab: Situational Dialogues/Role Plays-–Greetings - Taking Leave – Introducing Oneself and Others - Requests and Seeking Permissions

UNIT–III
CALL Lab: Syllable and Syllabification

ICS Lab: Communication at Workplace- Situational Dialogues/Role Plays – Seeking Clarifications– Asking for and Giving Directions – Thanking and Responding – Agreeing and Disagreeing – Seeking and Giving Advice

UNIT –IV

CALL Lab: Word Stress and Intonation

ICS Lab: Information transfer – from visual to verbal - maps, charts, tables and graphs

UNIT –V

CALL Lab: Errors in Pronunciation- Accent - the Influence of Mother Tongue (MTI)

ICS Lab: Making a Short Speech - Extempore

ELCS Lab:

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

The Computer aided Language Lab for 60 students with 60 systems, one master console, LAN facility and English language software for self-study by learners.

System Requirement (Hardware component):

Computer network with LAN with minimum 60 multimedia systems with the following specifications:

i) P –IV Processora)Speed –2.8 GHZ
b) RAM –512 MB Minimum
c) HardDisk –80 GB
ii) Headphones of High quality

2. **Interactive Communication Skills (ICS) Lab :**

A Spacious room with movable chairs and audio-visual aids with a Public Address System, a T.V., a digital stereo –audio & video system and camcorder etc.

COURSE OUTCOMES:

After completion of the course the students will be able to:

1. Learn with precision through computer-assisted individualized and independent language learning to work independently in an engineering set-up.
2. Improve conversational reception and articulation techniques in the course of repetitive instruction thereby gaining confidence both in institutional and professional environment.
3. Acquire accuracy in pronunciation and restoring Standard English thereby crafting better command in English language so that the students have a cutting edge over others in society.
4. Imbibe appropriate use of language in situations where one works as an individual and as a leader/team player.
5. Display professional behaviors and body language.

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-/-/3/1.5

(R20A0281)

BASIC ELECTRICAL ENGINEERING LAB

COURSE OBJECTIVES:

1. To design electrical systems.
2. To analyze a given network by applying various network theorems.
3. To expose the students to the operation of dc generator.
4. To expose the students to the operation of dc motor and transformer.
5. To examine the self excitation in dc generators.

CYCLE – I

1. Verification of KVL and KCL.
2. Verification of Thevenin's theorem.
3. Verification of Norton's theorem.
4. Verification of Super position theorem.
5. Verification of Maximum power transfer theorem.
6. Verification of Reciprocity theorem.

CYCLE -II

1. Magnetization characteristics of DC shunt generator.
2. Swinburne's test on DC shunt machine.
3. Brake test on DC shunt motor.
4. OC &SC tests on single phase transformer.
5. Load test on single phase transformer.

NOTE: Any 10 of above experiments are to be Conducted

COURSE OUTCOMES:

At the end of the course, students would be able to

1. Calculate the branch currents and mesh voltages by conducting KCL and KVL test on given circuit.
2. Prove the various circuit theorems like Superposition, Thevenin's, Norton's,Maximum power transfer and Reciprocity theorems.
3. Plot the Magnetization characteristics of DC shunt generator.
4. Plot the characteristics of DC shunt motor by conducting Brake Test.
5. Determine the Efficiency of single-phase transformer by conducting OC, SC and Load test.

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-/-/3/1.5

(R20A0581) PROGRAMMING FOR PROBLEM SOLVING LAB

PROGRAM OBJECTIVES:

1. To understand the various steps in Program development.
2. To understand the basic concepts in C Programming Language.
3. To learn how to write modular and readable C Programs.
4. To learn to write programs (using structured programming approach) in C to solve problems.
5. To introduce basic data structures such as lists, stacks and queues.

Week 1:

a) Write a program to find sum and average of three numbers

b) Write a program to calculate simple interest(SI) for a given principal (P), time (T), and rate of interest (R) (SI = P*T*R/100)

Week 2:

a) Write a program to swap two variables values with and without using third variable

b) Write a program to find the roots of a quadratic equation.

Week 3:

a) Write a program to find the sum of individual digits of a given positive integer.

b) Write a program, which takes two integer operands and one operator from the user, performs the operation and then prints the result.
(Consider the operators +,-,*, /, % and use Switch Statement)

Week 4:

a) Write a program to find both the largest and smallest number in a list of integers.

b) Write a program to find the sum of integer array elements using pointers

Week 5:

a) Write a program to perform addition of two matrices.

b) Write a program to perform multiplication of two matrices.

Week 6:

a) Write a program to find the length of the string using Pointer.

b) Write a program to count the number of lines, words and characters in a given text.

Week 7:

a) Write a program to find factorial of a given integer using non-recursive function and recursive function.
b) Write program to find GCD of two integers using non-recursive function and recursive function.

Week 8:
a) Write a program using user defined functions to determine whether the given string is palindrome or not.
b) Write a Program to swap the values of two variables using
i) Call by Value ii) Call by Reference

Week 9:
a) Write a program to find the sum of integer array elements using pointers ,use dynamic memory allocation to allocate memory.
b) Write a program to perform subtraction of two matrices, Design functions to perform read ,display and subtract

Week 10:
a) Write a program to create a structure named book and display the contents of a book.
b) Write a Program to Calculate Total and Percentage marks of a student using structure.

Week 11:
a) Write a program that uses functions to perform the following operations:
i) Reading a complex number ii) Writing a complex number
iii) Addition of two complex numbers iv) Multiplication of two complex numbers
b) Write a program to reverse the first n characters in a file.
(Note: The file name and n are specified on the command line.)

Week 12:
a) Write a program to copy the contents of one file to another.
b) Write a program to merge two files into a third file (i.e., the contents of the first file followed by those of the second are put in the third.

Week 13:
a) Write a program for static implementation of stack
b) Write a program for static implementation of Queue

Week 14:
Write a program to perform various operations on single list

Week 15:
a) Write a program for dynamic implementation of stack
b) Write a program for Dynamic implementation of Queue

PROGRAM OUTCOMES:

At the end of the course

1. Ability to apply solving and logical skills to programming in C language.
2. Able to apply various conditional expressions and looping statements to solve problems associated with conditions.
3. Acquire knowledge about role of Functions involving the idea of modularity.
4. Understand and apply the Concept of Arrays, Strings and pointers dealing with memory management.
5. Acquire knowledge about basic data structures and their implementation.

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2/-/-/-

(R20A0003)

HUMAN VALUES AND PROFESSIONAL ETHICS

COURSE OBJECTIVES:

This introductory course input is intended:

1. To help the students appreciate the essential complementarily between 'VALUES' and 'SKILLS' to ensure sustained happiness and prosperity which are the core aspirations of all human beings.
2. To facilitate the development of a holistic perspective among students towards life, profession and happiness, based on a correct understanding of the Human reality and the rest of Existence.
3. Such a holistic perspective forms the basis of value based living in a natural way.
4. To highlight plausible implications of such a holistic understanding in terms of ethical human conduct.
5. Trustful and mutually satisfying human behavior and mutually enriching interaction with Nature.

UNIT - I:

Course Introduction - Need, Basic Guidelines, Content and Process for Value Education: Understanding the need, basic guidelines, content and process for Value Education.
Self-Exploration - what is it? - its content and process; 'Natural Acceptance' and Experiential Validation - as the mechanism for self-exploration. Continuous Happiness and Prosperity
A look at basic Human Aspirations- Right understanding, Relationship and Physical Facilities - the basic requirements for fulfillment of aspirations of every human being with their correct priority. Understanding Happiness and Prosperity correctly - A critical appraisal of the current scenario. Method to fulfill the above human aspirations: understanding and living in harmony at various levels.

UNIT - II:

Understanding Harmony in the Human Being - Harmony in Myself! : Understanding human beingas a co-existence of the sentient 'I' and the material 'Body'.
Understanding the needs of Self ('I') and 'Body' - Sukh and Suvidha. Understanding the Body asan instrument of 'I' (I being the doer, seer and enjoyer).
Understanding the harmony of I with the Body: Sanyam and Swasthya; correct appraisal Of Physical needs, meaning of Prosperity in detail. Programs to ensure Sanyam and Swasthya.

UNIT - III:

Understanding Harmony in the Family and Society - Harmony in Human - Human Relationship: Understanding harmony in the Family the basic unit of human interaction. Understanding values in human - human relationship; meaning of Nyaya and program for its fulfillment to ensure Ubhay-tripti; Trust (Vishwas) and Respect (Samman) as the foundational values of relationship.
Understanding the meaning of Vishwas; Difference between intention and competence.

Understanding the meaning of Samman, Difference between respect and differentiation; the other salient values in relationship.
Understanding the harmony in the society (society being an extension of family): Samadhan, Samridhi, Abhay, Sah-astiva as comprehensive Human Goals. Visualizing a universal harmoniousorder in society - Undivided Society (Akhand Samaj), Universal Order (Sarvabhaum Vyawastha) - from family to world family!

UNIT - IV:
Understanding Harmony in the nature and Existence - Whole existence as Coexistence: Understanding the harmony in the Nature. Interconnectedness and mutual fulfillment among the four orders of nature - recyclability and self-regulation in nature.
Understanding Existence as Co-existence (Sah-astitva) of mutually interacting units in all-pervasive space. Holistic perception of harmony at all levels of existence.

UNIT - V:
Implications of the above Holistic Understanding of Harmony on Professional Ethics: Natural acceptance of human values, Definitiveness of Ethical Human Conduct, Basic for Humanistic Education, Humanistic Constitution and Humanistic Universal Order. Competence in professionalethics:

a. Ability to utilize the professional competence for augmenting universal human order.
b. Ability to identify the scope and characteristics of people-friendly and eco-friendly production systems.
c. Ability to identify and develop appropriate technologies and management patterns for above production systems.

TEXT BOOKS:

1. R. R. Gaur, R Sangal, G P Bagaria, 2009, A Foundation Course in Human Values and Professional Ethics.
2. Prof. K. V. Subba Raju, 2013, Success Secrets for Engineering Students, Smart Student Publications, 3rd Edition.

REFERENCE BOOKS:

1. Ivan IIlich, 1974, Energy & Equity, The Trinity Press, Worcester, and HarperCollins, USA
2. E. F. Schumancher, 1973, Small is Beautiful: a study of economics as if people mattered.Blond & Briggs, Britain.
3. A Nagraj, 1998 Jeevan Vidya ek Parichay, Divya Path Sansthan, Amarkantak.
4. Sussan George, 1976, How the Other Half Dies, Penguin Press, Reprinted 1986, 1991.
5. P. L. Dhar, R. R. Gaur, 1990, Science and Humanism, Commonwealth Publishers.
6. A. N. Tripathy, 2003, Human Values, New Age International Publishers.
7. Subhas Palekar, 2000, How to practice Natural Farming, Pracheen(Vaidik) Krishi TantraShodh, Amravati.
8. Donella H. Meadows, Dennis L. Meadows, Jorgen Randers, William W. Behrens III, 1972,Limits to Growth - Club of Rome's report, Universe Books.
9. E G Seebauer & Robert L.Berry, 2000, Fundamentals of Ethics for Scientists & Engineers,Oxford University Press.

10. M Govindrajan, S Natrajan & V. S Senthil kumar, Engineering Ethics (including HumnaValues), Eastern Economy Edition, Prentice Hall of India Ltd.

Relevant CDs, Movies, Documentaries & Other Literature:

1. Value Education website, http://www.uptu.ac.in
2. Story of Stuff, http://www.storyofstuff.com
3. Al Gore, An Inconvenient Truth, Paramount Classics, USA
4. Charle Chaplin, Modern Times, United Artists, USA
5. IIT Delhi, Modern Technology - the Untold Story

COURSE OUTCOMES:

1. The students will be able to obtain happiness and prosperity in their life.
2. They will develop harmony at human being levels.
3. Implications of the above Holistic Understanding of Harmony on Professional Ethics.
4. Understanding Harmony in the Family and Society.
5. They can have satisfying human behavior throughout their life.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

I Year B.Tech. CSE- II Sem L/T/P/C 2/-/-/2

(R20A0002)

PROFESSIONAL ENGLISH

INTRODUCTION:

English is a tool for global communication and is the dominant language, which is sweeping almost all the fields in the world. It has become a necessity for people to speak in English comfortably, if they want to enter the global workforce. Hence, the course is designed to help the students to meet the global standards. Each unit focuses on English skill-set to improve: Interview skills, giving presentations and professional etiquette.

COURSE OBJECTIVES:

1. To enrich students to express themselves appropriately and fluently in professional contexts.
2. To enhance their employability through regular participation in group discussions and interview skills.
3. To lay foundation with writing strategies for the future workplace needs.
4. To acquaint students with different components of professional presentation skills.
5. To equip students with necessary training in listening to comprehend dialects of English language.

UNIT-I

Listening - Listening for General Details.

Speaking - Description of Pictures, Places, Objects and Persons

NOTE: Listening and Speaking tasks are solely for lab purpose and not for testing in the examinations.

Extract - The summary of Asimov's *Nightfall*

Grammar - If clauses

Vocabulary - Technical Vocabulary Writing - Paragraph Writing

Unit –II

Listening - Listening for specific Details Speaking - Oral presentations

NOTE: Listening and Speaking tasks are solely for lab purpose and not for testing in the examinations.

Extract - A literary analysis of Asimov's *Nightfall* Grammar - Transformation of Sentences Vocabulary - Idioms

Writing -Abstract Writing

Unit –III

Listening - Listening for GistSpeaking - Mock Interviews

NOTE: Listening and speaking tasks are solely for lab purpose and not for testing in the examinations.

Extract - Character sketches of Asimov's *Nightfall's* - protagonists and antagonists - Dr.Susan Calvin, Mike Donovan, Stephen Byerley, Francis Quinn

Grammar - Transitive and Intransitive Verbs Vocabulary - Standard Abbreviations (Mini Project)Writing - Job Application – Cover letter

Unit – IV

Listening - Listening for Vocabulary

Speaking - Telephonic Expressions

NOTE: Listening and Speaking tasks are solely for lab purpose and not for testing in the examinations.

Extract - Theme of Asimov's *Nightfall*

Grammar - Auxiliary verbs, Degrees of Comparison Vocabulary - Word Analogy Writing - Job Application - Resume

Unit – V

Listening - Critical Listening (for attitude and Opinion)Speaking - Group discussion

NOTE: Listening and Speaking tasks are solely for lab purpose and not for testing in the examinations.

Extract -Asimov's *Nightfall*: A Science Fiction

Grammar - Common Errors, Prepositions

Vocabulary - Homonyms, homophones and homographs Writing - Report Writing

* Isaac Asimov's *Nightfall* for intensive and extensive reading
* Exercises apart from the text book shall also be referred for classroom tasks.

REFERENCE BOOKS:

a. Nightfall, Isaac Asimov; Robert Silverberg, 1990
b. Practical English Usage. Michael Swan. OUP. 1995.
c. Remedial English Grammar. F.T. Wood. Macmillan.2007
d. On Writing Well. William Zinsser. Harper Resource Book. 2001
e. Study Writing. Liz Hamp-Lyons and Ben Heasly. Cambridge University Press. 2006.
f. Communication Skills. Sanjay Kumar and Pushpa Lata. Oxford University Press. 2011.
g. Exercises in Spoken English. Parts. I-III. CIEFL, Hyderabad. Oxford University Press

COURSE OUTCOMES:

Students will be able to:

1. Analyze and interpret a diverse range of engineering concepts through the synthesis ofinformation
2. Understand the impact of professional engineering solutions is societal contexts and demonstrate its knowledge
3. Achieve communicative ability in their personal and professional relations with clarity of speech and creativity in content
4. Function effectively as an individual and a team; and would be able to prepare themselves to be market ready
5. Comprehend and write effective reports and design documentation, manage projects and make effective presentations.

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I Year B.Tech. CSE- II Sem L/T/P/C 3/1/-/4

(R20A0022)

MATHEMATICS-II

COURSE OBJECTIVES:

1. The aim of numerical methods is to provide systematic methods for solving problems in a numerical form using the given initial data,also used to find the roots of an equation and to solve differential equations.
2. The objective of interpolation is to find an unknown function which approximates the given data points and the objective of curve fitting is to find the relation between the variables x and y from given data and such relationships which exactly pass through the data (or) approximately satisfy the data under the condition of sum of least squares of errors.
3. PDE aims at forming a function with many variables and also their solution methods, Method of separation of variables technique is learn to solve typical second order PDE.
4. Evaluation of multiple integrals.
5. In many engineering fields the physical quantities involved are vector valued functions. Hence the vector calculus aims at basic properties of vector-valued functions and their applications to line, surface and volume integrals.

UNIT – I: Solutions of algebraic, transcendental equations and Interpolation

Solution of algebraic and transcendental equations: Introduction, Bisection Method, Method offalse position, Newton-Raphson method and their graphical interpretations.

Interpolation: Introduction, errors in polynomial interpolation, Finite differences - Forward differences, Backward differences, Central differences. Newton's formulae for interpolation, Gauss's central difference formulae, Interpolation with unevenly spaced points - Lagrange's Interpolation.

UNIT – II: Numerical Methods

Numerical integration : Generalized quadrature - Trapezoidal rule, Simpson's 1/3rd and Simpson's 3/8th rules.

Numerical solution of ordinary differential equations: Solution by Taylor's series method,Euler's method, Euler's modified method, Runge-Kutta fourth order method.

Curve fitting : Fitting a straight line, second degree curve, exponential curve, power curve bymethod of least squares.

UNIT III: Partial Differential Equations

Introduction, formation of partial differential equation by elimination of arbitrary constants and arbitrary functions, solutions of first order Lagrange's linear equation and non-linear equations, Charpit's method, Method of separation of variables for second order equations and applicationsof PDE to one dimensional equation (Heat equation).

Unit IV: Double and Triple Integrals

Double and triple integrals (Cartesian and polar), Change of order of integration in double integrals, Change of variables (Cartesian to polar).

Unit V: Vector Calculus

Introduction, Scalar point function and vector point function, Directional derivative, Gradient, Divergence, Curl and their related properties, Laplacian operator, Line integral - work done, Surface integrals, Volume integral. Green's theorem, Stoke's theorem and Gauss's Divergence theorems (Statement & their Verification).

TEXT BOOKS:

1. Higher Engineering Mathematics by B V Ramana ., Tata McGraw Hill.
2. Higher Engineering Mathematics by B.S. Grewal, Khanna Publishers.
3. Mathematical Methods by S.R.K Iyenger, R.K.Jain, Narosa Publishers.

REFERENCE BOOKS:

1. Elementary Numerical Analysis by Atkinson-Han, Wiley Student Edition.
2. Advanced Engineering Mathematics by Michael Greenberg –Pearson publishers.
3. Introductory Methods of Numerical Analysis by S.S. Sastry, PHI

COURSE OUTCOMES:

After learning the concepts of this paper the student will be able to independently

1. Find the roots of algebraic, non algebraic equations and predict the value at an intermediate point from a given discrete data.
2. Find the most appropriate relation of the data variables using curve fitting and this method of data analysis helps engineers to understand the system for better interpretation and decision making.
3. Solve first order linear and non-linear partial differential equations which are very important in engineering field.
4. Evaluate multiple integrals; hence this concept can be used to evaluate Volumes and Areas of an object.
5. Evaluate the line, surface, volume integrals and converting them from one to another using vector integral theorems.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

I Year B.Tech. CSE- II Sem L/T/P/C 3/-/-/3

(R20A0011)

APPLIED PHYSICS

COURSE OBJECTIVES:

1. To analyze the ordinary light with a laser light and realize the transfer of light through optical fibers.
2. To identify dual nature of the matter and behavior of a particle quantum mechanically.
3. To explore band structure of the solids and classification of materials.
4. To acquire the basic knowledge of various types of semiconductor devices and find the applications in science and technology.
5. To Compare dielectric and magnetic properties of the materials and enable them to design and apply in different fields.

UNIT – I

LASERS & FIBER OPTICS

Lasers: Characteristics of lasers, Absorption, Spontaneous and Stimulated emissions, population inversion, meta stable state, types of pumping, lasing action, construction and working of Ruby Laser, Helium-Neon Laser, Semiconductor diode Laser, Applications of lasers.

Fiber Optics: Introduction to optical fiber, Construction and working principle of an Optical Fiber, Acceptance angle and Numerical aperture, Types of Optical fibers - Mode and Propagation through step and graded index fibers ,Losses in optical fiber, Optical Fiber in Communication System, Applications of optical fibers.

UNIT – II

QUANTUM MECHANICS

Wave nature of particles, de Broglie's hypothesis, matter waves, Heisenberg's uncertainty principle, Davisson and Germer's experiment, G.P Thomson experiment, Schrodinger time-independent wave equation-significance of wave function, particle in one dimensional square well potential.

UNIT – III

ELECTRONIC MATERIALS

Free electron theory(Classical & Quantum)- Assumptions, Merits and drawbacks, Fermi level, Density of states, Periodic potential, Bloch's theorem, Kronig – Penny model (qualitative) , E – Kdiagram, Effective mass, Origin of energy bands in solids, Classification of materials : Metals, semiconductors and insulators.

UNIT-IV

SEMICONDUCTOR PHYSICS

Intrinsic and extrinsic semiconductors, Direct and indirect band gap semiconductors, Carrier

concentration in intrinsic and extrinsic semiconductors. Dependence of Fermi level on carrier concentration and temperature, carrier transport: mechanism of diffusion and drift, Formation of PN junction, V-I characteristics of PN diode, energy diagram of PN diode, Hall experiment, semiconductor materials for optoelectronic devices - LED, Solar cell.

UNIT – V:

DIELECTRICS AND MAGNETIC PROPERTIES OF MATERIALS

Dielectrics: Introduction, Types of polarizations (Electronic and Ionic) and calculation of their polarizabilities, internal fields in a solid, Clausius-Mossotti relation.

Magnetism: Introduction, origin of magnetism, Bohr magneton, classification of dia, para and ferro magnetic materials on the basis of magnetic moment, Properties of anti-ferro and ferri magnetic materials, Hysteresis curve based on domain theory, Soft and hard magnetic materials.

TEXT BOOKS:

1. Engineering Physics by Kshirsagar & Avadhanulu, S Chand publications.
2. Engineering Physics- B.K.Pandey, S.Chaturvedi, Cengage Learning.

REFERENCES:

1. Engineering Physics – R.K. Gaur and S.L. Gupta, DhanpatRai Publishers.
2. Engineering Physics, S Mani Naidu- Pearson Publishers.
3. Engineering physics 2nd edition –H.K. Malik and A.K. Singh.
4. Engineering Physics – P.K. Palaniswamy, Scitech publications.
5. Physics by Resnick and Haliday.

COURSE OUTCOMES:

After completion of studying Applied Physics the student is able to

1. Observe the properties of light and its engineering applications of laser in fiber optic communication systems.
2. Apply the basic principles of quantum mechanics and the importance of behavior of a particle.
3. Find the importance of band structure of solids and their applications in various electronic devices.
4. Evaluate concentration & estimation of charge carriers in semiconductors and working principles of PN diode.
5. Examine dielectric, magnetic properties of the materials and apply them in material technology.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

I Year B.Tech. CSE- II Sem L/T/P/C
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(R20A0401)

ANALOG & DIGITAL ELECTRONICS

COURSE OBJECTIVES:

The main objectives of the course are:

1. To familiarize with the principal of operation, analysis and design of pn junction diode.
2. To study the construction of BJT and its characteristics in different configurations.
3. To study the construction and characteristics of JFET and MOSFET.
4. To study basic number systems codes and logical gates.
5. To introduce the methods for simplifying Boolean expressions and design of combinational circuits.

UNIT-I

P-N Junction diode: Qualitative Theory of P-N Junction, P-N Junction as a diode, diode equation, volt-ampere characteristics temperature dependence of V-I characteristic, ideal versus practical,diode equivalent circuits, Zener diode characteristics.

UNIT-II

Bipolar Junction Transistor: The Junction transistor, Transistor construction, Transistor current components, Transistor as an amplifier, Input and Output characteristics of transistor in Common Base, Common Emitter, and Common collector configurations. α and β Parameters and the relation between them, BJT Specifications.

UNIT-III

FIELD EFFECT TRANSISTOR: JFET-Construction, principle of Operation, Volt–Ampere characteristics, Pinch- off voltage. Small signal model of JFET. FET as Voltage Variable Resistor, Comparison of BJT and FET. MOSFET- Construction, Principle of Operation and symbol, MOSFET characteristics in Enhancement and Depletion modes.

UNIT IV:

Number System and Boolean Algebra: Number Systems, Base Conversion Methods, Complements of Numbers, Codes- Binary Codes, Binary Coded Decimal, Unit Distance Code, Digital Logic Gates (AND, NAND, OR, NOR, EX-OR, EX-NOR), Properties of XOR Gates, Universal Gates, Basic Theorems and Properties, Switching Functions, Canonical and Standard Form.

UNIT-V

Minimization Techniques: The Karnaugh Map Method, Three, Four and Five Variable Maps, Prime and Essential Implications, Don't Care Map Entries, Using the Maps for Simplifying, Multilevel NAND/NOR realizations.

Combinational Circuits: Design procedure – Half adder, Full Adder, Half subtractor, Full

subtractor, Multiplexer/Demultiplexer, decoder, encoder, Code converters, Magnitude Comparator.

TEXT BOOKS

1. "Electronic Devices & Circuits", Special Edition – MRCET, McGraw Hill Publications, 2017.
2. Integrated Electronics Analog Digital Circuits, Jacob Millman and D. Halkias, McGrawHill.
3. Electronic Devices and Circuits, S.Salivahanan, N.Sureshkumar, McGrawHill.
4. M. Morris Mano, Digital Design, 3rd Edition, Prentice Hall of India Pvt. Ltd., 2003
5. Switching and Finite Automata Theory- ZviKohavi& Niraj K. Jha, 3rdEdition, Cambridge.

REFERENCE BOOKS

1. Electronic Devices and Circuits,K.Lal Kishore B.SPublications
2. Electronic Devices and Circuits, G.S.N. Raju, I.K. International Publications, New Delhi, 2006.
3. John F.Wakerly, Digital Design, Fourth Edition, Pearson/PHI, 2006
4. John.M Yarbrough, Digital Logic Applications and Design, Thomson Learning, 2002.
5. Charles H.Roth. Fundamentals of Logic Design, Thomson Learning, 2003.

COURSE OUTCOMES

After completion of the course, the student will be able to:

1. Understand the principal of operation, analysis and design of pn junction diode.
2. Understand the construction of BJT and its characteristics in different configurations.
3. Understand the construction and characteristics of JFET and MOSFET.
4. Understand basic number systems codes and logical gates.
5. Understand the methods for simplifying Boolean expressions and design of combinational circuits.

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MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

I Year B.Tech. CSE- II Sem L/T/P/C 3/-/-/3

(R20A0502)

PYTHON PROGRAMMING

COURSE OBJECTIVES:

1. To read and write simple Python programs.
2. To develop Python programs with conditionals and loops.
3. To define Python functions and call them.
4. To use Python data structures –- lists, tuples, dictionaries.
5. To do input/output with files in Python.

UNIT I

Introduction to Python Programming Language: Introduction to Python Language and installation, overview on python interpreters, working with python, Numeric Data Types: int, float, Boolean, complex and string and its operations, Standard Data Types: List, tuples, set and Dictionaries, Data Type conversions, commenting in python.

UNIT II

Variables and Operators: Understanding Python variables, Multiple variable declarations, Python basic statements, Python basic operators: Arithmetic operators, Assignment operators, Comparison operators, Logical operators, Identity operators, Membership operators, Bitwise operators, Precedence of operators, Expressions.

UNIT III

Control Flow And Loops

Conditional (if), alternative (if-else), chained conditional (if- elif -else), Loops: For loop using ranges, string, Use of while loops in python, Loop manipulation using pass, continue and break

UNIT IV

Functions

Defining Your Own Functions, Calling Functions, passing parameters and arguments, Python Function arguments: Keyword Arguments, Default Arguments, Variable-length arguments, Anonymous Functions, Fruitful Functions (Function Returning Values), Scope of the Variables in a Function - Global and Local Variables. Powerful Lambda functions in python.

UNIT V

I/O and Error Handling in Python

Introduction, Access Modes, Writing Data to a File, Reading Data from a File, Additional File Methods introduction to Errors and Exceptions, Handling IO Exceptions, Run Time Errors, Handling Multiple Exceptions.

Introduction to Data Structures: What are Data structures, Types of Data structures,

Introduction to Stacks and Queues.

TEXT BOOKS

1. R. Nageswara Rao, “Core Python Programming”, dream tech
2. Allen B. Downey, ``Think Python: How to Think Like a Computer Scientist‘‘, 2nd edition,Updated for Python 3, Shroff/O‘Reilly Publishers, 2016.
3. Python Programming: A Modern Approach, Vamsi Kurama, Pearson
4. Data Structures and Algorithmic Thinking with Python by Narasimha Karumanchi

REFERENCE BOOKS:

1. Core Python Programming, W.Chun, Pearson.
2. Introduction to Python, Kenneth A. Lambert, Cengage
3. Learning Python, Mark Lutz, Orielly

COURSE OUTCOMES:

Upon completion of the course, students will be able to

1. Read, write, execute by hand simple Python programs.
2. Structure simple Python programs for solving problems.
3. Decompose a Python program into functions.
4. Represent compound data using Python lists, tuples, and dictionaries.
5. Read and write data from/to files in Python Programs

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

I Year B.Tech. CSE- II Sem L/T/P/C
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(R20A0082) APPLIED PHYSICS LAB

COURSE OBJECTIVES:

Students can be able to

1. Identify the specific types of elastic and electrical nature of materials in physics lab.
2. Observe concepts of magnetism in physics lab.
3. Analyze propagation of light in various optical devices practically.
4. Examine various opto electronic devices practically
5. Well-equipped with the properties of semiconductor devices in physics lab.

LIST OF EXPERIMENTS:

1. Torsional pendulum-Rigidity modulus of given wire.
2. Melde's experiment –Transverse and Longitudinal modes.
3. Stewart and Gee's method- Magnetic field along the axis of current carrying coil.
4. Spectrometer-Dispersive power of the material of a prism
5. Diffraction grating-using laser -Wavelength of light.
6. Newton's Rings –Radius of curvature of Plano convex lens.
7. LED -Characteristics of LED.
8. Solar cell -Characteristics of a Solar cell.
9. Optical fiber- Evaluation of numerical aperture of optical fiber.
10. Hall Effect –To study Hall effect in semiconducting samples.

REFERENCE BOOKS:

1. Practical physics by Dr. Aparna, Dr K.V Rao, V.G.S.Publications.
2. Engineering physics practical lab manual – MRCET.

COURSE OUTCOMES:

1. Students are able to measure the elastic constants of the given material of the wire anddetermine the ac frequency of vibrating bar.
2. Students are able to determine the magnetic induction of a circular coil carrying currentby applying the principles of terrestrial magnetism.
3. Students are able to frame relativistic ideas of light phenomenon
4. Students are able to achieve the analysis of V-I characteristics of opto electronic devices
5. Students are able to determine the carrier concentration and identify the given semiconductor material with the help of Hall Effect.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

I Year B.Tech. CSE- II Sem

L/T/P/C
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(R20A0582)

PYTHON PROGRAMMING LAB

COURSE OBJECTIVES:

1. Syntax and Semantics and create Functions in Python.
2. Different data types Lists, Dictionaries in Python.
3. How to execute the programs using loops and control statements
4. Decision Making and Functions in Python
5. Files and exception Handling in Python

Week 1:

A. Write python program to print Hello World

B. Write a python program to get string, int, float input from user

C. Write a python program to add 2 numbers

Week 2:

A. Create a list and perform the following methods

1)insert() 2) remove() 3) append() 4) len() 5) pop() 6) clear()

B. Write a python program to find the length of list?

C. Write a python program to find the smallest and largest number in the list?

Week 3:

A) Create a tuple and perform the following methods

1) Add items 2) len() 3) check for item in tuple 4)Access iems

B) Write a python program using the following methods: 1) count 2) index

C) Write a python program using "+" and "*" operations which resulting a new tuple?

Week 4:

A) Create a dictionary and apply the following methods

1) Print the dictionary items 2) access items 3) use get() 4)change values 5) use len()

B) Write a python code to convert list of tuples into dictionaries?

C) Write python program to store data in list, tuple, set, dictionary and then try to print them.

Week 5:

A) Write a python program to perform arithmetic, assignment, logical and comparison operators?

B) Write a Python program to add two positive integers without using the '+' operator.

(usebitwise operator)

C) Write a Python program to perform the basic four operators (+, -, *, /)

Week 6:

A) Write a simple python program to declare a variable in different possible ways?

B) Write a python program to show precedence of operators using the expression: z = (v+w) * x/ y

C) Write a python program to check whether the values of a list exist or not (use membershipoperator) and also perform identity operation?

Week 7:

A) Write a python program to print a number is positive/negative using if-else.

B) Write a python program to find largest number among three numbers.

C) Write a python Program to read a number and display corresponding day using if_elif_else?

D) Write a python program to print list of numbers using range and for loop

Week 8:

A) Write a python code to print the sum of natural numbers using while loop?

B) Write a python program to print the factorial of given number?

C) Write a python program to find the sum of all numbers stored in a list using for loop?

Week 9:

A) Write a Python function that takes two lists and returns True if they are equal otherwise false

B) Write python program in which an function is defined and calling that function prints HelloWorld

C) Write python program in which an function(with single string parameter) is defined andcalling that function prints the string parameters given to function.

D) Write a python program using with any one of python function argument?

Week 10:

A) Write a program to double a given number and add two numbers using lambda()?

B) Write a program for filter() to filter only even numbers from a given list.

C) Write a program for map() function to double all the items in the list?

D) Write a program to find sum of the numbers for the elements of the list by using reduce()?

Week 11:

A) Write a python program to open and write “hello world” into a file?

B) Write a python program to write the content “hi python programming” for the existing

file.

C) Write a python program to read the content of a file?

Week 12:

A) write a program to implement stack using array.

B) write a program to implement Queue using array.

TEXT BOOKS:

1. R. Nageswara Rao, "Core Python Programming", dream tech
2. Allen B. Downey , " Think Python: How to Think Like a Computer Scientist", Second Edition,Updated for Python 3, Shroff/O'Reilly Publishers, 2016.

COURSE OUTCOMES:

After completion of the course, Students will be able to**:**

1. Evaluate Problem solving and programming capability
2. Describe the Numbers, Math functions, Strings, List, Tuples and Dictionaries in Python
3. Implement conditional and loop for python programs
4. Express different Decision Making statements and Functions
5. Understand and summarize different File handling operations and exceptions

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

I Year B.Tech. CSE- II Sem **L/T/P/C**
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(R20A0083)

ENGINEERING AND IT WORKSHOP LAB

ENGINEERING WORKSHOP:

COURSE OBJECTIVES:

1. To Study of different hand operated power tools, uses and their demonstration.
2. To gain a good basic working knowledge required for the production of various engineering products.
3. To provide hands on experience about use of different engineering materials, tools, equipment's and processes those are common in the engineering field.
4. To develop a right attitude, team working, precision and safety at work place.
5. To understand the construction, function, use and application of different working tools,equipment and machines.

TRADES FOR EXERCISES:

At least two exercises from each trade:

1. Carpentry – (T-Lap Joint, Dovetail Joint, Mortise & Tenon Joint)
2. Fitting – (V-Fit, Dovetail Fit & Semi-circular fit)
3. Tin-Smithy – (Square Tin, Rectangular Tray & Conical Funnel)
4. Foundry – (Preparation of Green Sand Mould using Single Piece and Split Pattern)
5. Welding Practice – (Arc Welding & Gas Welding)
6. House-wiring – (Parallel & Series, Two-way Switch and Tube Light)
7. Black Smithy – (Round to Square, Fan Hook and S-Hook)

COURSE OUTCOMES:

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

1. Every student can study and practice on machine tools and their operations
2. Every Student will have hands-on practice on manufacturing of components using workshop trades including pluming, fitting, carpentry, foundry, house wiring and welding.
3. Identify and apply suitable tools for different trades of Engineering processes includingdrilling, material removing, measuring, chiseling.
4. Apply basic electrical engineering knowledge for house wiring practice.

IT WORKSHOP

COURSE OBJECTIVES: The IT Workshop for engineers is a training lab course spread over 54 hours. The modules include training on PC Hardware, Internet & World Wide Web.

1. PC Hardware introduces the students to a personal computer and its basic peripherals, the process of assembling a personal computer, installation of system software like MS Windows; In addition, hardware and software level troubleshooting process, tips and tricks would be covered.
2. Internet & World Wide Web module introduces the different ways of hooking the PC on to the internet from home and workplace and effectively usage of the internet. Usage of web browsers, email, newsgroups and discussion forums would be covered. In addition, awareness of cyber hygiene, i.e., protecting the personal computer from being infected withthe viruses, worms and other cyber-attacks would be introduced.
3. HTML introduction for creating static web pages.
4. JavaScript Introduction and benefits with Html.
5. Linux programming Introduction to basic commands.

PC HARDWARE

Week 1:

Identify the peripherals of a computer, components in a CPU and its functions. Draw the blockdiagram of the CPU along with the configuration of each peripheral

Week 2:

Assembling and disassembling of PC

Week 3:

Every student should individually install MS windows on the personal computer. Basic DOSCommands

Week 4: HARDWARE TROUBLESHOOTING

Students have to be given a PC which does not boot due to improper assembly or defective peripherals Software Troubleshooting: Students have to be given a malfunctioning CPU due to system software problems. They should identify the problem and fix it to get the computer backto working condition.

Week 5: INTERNET & WEB BROWSERS

Web Browsers, Web Servers, Surfing the Web: Students customize their web browsers with the LAN proxy settings, bookmarks, search toolbars and pop up blockers and what is web servers and its architecture, How to access the websites and email& Search Engines & various threats on the internet and would be asked to configure their computer to be safe on the internet, Antivirus downloads to avoid viruses and/or worms.

WEB DESIGNING

Week 6: **HTML**

Introduction to HTML & Basic HTML Tags: Understand what are the tasks used for creation ofwebsite. Designing a static web page: Understand how to create a webpage.

Week 7: HTML 5

Introduction to HTML 5 with new tags

1. Create an HTML 5 Template
2. Specify page title and Meta tags

Week 8: JAVASCRIPT

1. Create and Assign variables using JavaScript
2. Change style of an HTML elements using JavaScript.
3. Style your website using different types of CSS.

Week 9: **BASIC COMMANDS OF LINUX PROGRAMMING**

1. Installation of Unix/Linux operating system.
2. Study of logging/logout details.
3. Study of Unix/Linux general purpose utility command list obtained from (man, who, cat, cd,cp, ps, ls, mv, rm, mkdir, rmdir, echo, more, date, time, kill, history, chmod, chown, finger, pwd, cal, logout, shutdown) commands.
4. Study of vi editor.
5. Study of Bash shell, Bourne shell and C shell in Unix/Linux operating system.
6. Write a C program to find factorial of a given integer using script language.

TEXT BOOKS:

1. Introduction to Information Technology, ITL Education Solutions limited, Pearson Education
2. PC Hardware and A+ Handbook-Kate J.Chase PHI(Microsoft)
3. Web Development and Design Foundations with HTML 5, pearson Education
4. Web Design with HTML,CSS by Jon Duckett

COURSE OUTCOMES:

1. The Students are able to identify the major components of a computer and its basic peripherals. They are capable of assembling a personal computer, and can perform installation of system software like MS Windows and required device drivers.
2. Students can detect and perform minor hardware and software leveltroubleshooting.
3. The Students are capable of working on Internet & World Wide Web and can make effective usage of the internet for academics.
4. The students are able to create a static webpage‘s using HTML.
5. Students will be able to use new Features of HTML5 and design the Webpage

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

I Year B.Tech. CSE- II Sem L/T/P/C 1/-/-/-

(R20A0064)

FINANCIAL INSTITUTIONS, MARKETS AND SERVICES

COURSE OBJECTIVES:

1. To expose students towards a clear understanding of Financial Markets in India, their operations and relevant development.
2. To lay foundation and equip them with the knowledge of Financial Services, related institutions and their functions.
3. To provide awareness of operations of Financial Markets, Regulators and Shareholders
4. To Provide knowledge in Innovations and technologies of Financial Instruments and Financial Services.
5. To allow them to understand Banking and Non-Banking Institutions operations and their services.

UNIT-I: INTRODUCTION

Financial System and Economic Development - Indicators of Financial Development - Concepts related to Financial Markets, Institutions and Services

Regulatory and Promotional Institutions: Functions and Roles of RBI, IRDA, SEBI.

UNIT II: COMMERCIAL BANKS

Functions of Commercial Banks. Performance and Competition of Public and Private Sector banks- NPA's Non-Banking Financial Institutions- Structure and Functions LIC - GIC & Mutual Funds.

UNIT-III: FINANCIAL AND SECURITIES MARKETS

Structure and Functions of Call Money Market. Government Securities Market: T-bills Market - Commercial Bills Market. Securities Market: Organization and Structure - Listing - Trading and Settlement.

UNIT-IV: ASSET/FUND BASED FINANCIAL SERVICES

Lease Finance - Hire Purchase Finance- Bills Discounting - Housing Finance - Venture Capital Financing. Fee-based Advisory Services: Stock Broking - Credit Rating Agencies.

UNIT-V: INVESTMENT BANKING

Introduction, Functions and activities, underwriting, bankers to an issue, deb enturetrustees, portfolio managers.

REFERENCE BOOKS:

1. L. M. Bhole, Financial Institutions and Markets, TMH.
2. M. Y. Khan, Financial Services, TMH.
3. Vasant Desai: Financial Markets and Financial Services, Himalaya.
4. Justin Paul and Padmalatha Suresh: Management of Banking and Financial Services,Pearson.
5. Gomez, Financial Markets, Institutions and Financial Services, PHI.

COURSE OUTCOMES

1. The students will get enormous knowledge on Financial Institutions, Securities Markets, and Financial Services.
2. It allows clear understandings of Banking and Non-Banking Financial Institutions operations.
3. Adequate knowledge to indulgence in Investments of financial products and services.
4. Comprehend various policy reforms that impact Financial Markets and Investments.
5. Availability of various fund based and Fee based financial services to get more exposure.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

II Year B.Tech.CSE- I Sem **L/T/P/C**

3/-/-/3

(R20A0503)

DATA STRUCTURES USING PYTHON

COURSE OBJECTIVES:

This course will enable students to

1. Implement Object Oriented Programming concepts in Python.
2. Understand Lists, Dictionaries and Regular expressions in Python.
3. Understanding how searching and sorting is performed in Python.
4. Understanding how linear and non-linear data structures works.
5. To learn the fundamentals of writing Python scripts.

UNIT – I

Oops Concepts - class, object, constructors, types of variables, types of methods. **Inheritance:** single, multiple, multi-level, hierarchical, hybrid, **Polymorphism:** with functions and objects, with class methods, with inheritance, **Abstraction:** abstract classes.

UNIT – II

Data Structures – Definition, Linear Data Structures, Non-Linear Data Structures, Python Specific Data Structures, List, Tuples, Set, Dictionaries, Comprehensions and its Types, Strings, slicing.

UNIT - III

Arrays - Overview, Types of Arrays, Operations on Arrays, Arrays vs List.
Searching - Linear Search and Binary Search.
Sorting - Bubble Sort, Selection Sort, Insertion Sort, Merge Sort, Quick Sort.

UNIT - IV

Linked Lists – Implementation of Singly Linked Lists, Doubly Linked Lists, Circular Linked Lists.
Stacks - Overview of Stack, Implementation of Stack (List & Linked list), Applications of Stack
Queues: Overview of Queue, Implementation of Queue(List & Linked list), Applications of Queues, Priority Queues.

UNIT -V

Graphs - Introduction, Directed vs Undirected Graphs, Weighted vs Unweighted Graphs, Representations, Breadth First Search, Depth First Search.

Trees - Overview of Trees, Tree Terminology, Binary Trees: Introduction, Implementation, Applications. Tree Traversals, Binary Search Trees: Introduction, Implementation, AVL Trees: Introduction, Rotations, Implementation.

TEXTBOOKS:

1. Data structures and algorithms in python by Michael T. Goodrich
2. Data Structures and Algorithmic Thinking with Python by Narasimha Karumanchi

REFERENCE BOOKS:

1. Hands-On Data Structures and Algorithms with Python: Write complex and powerful code using the latest features of Python 3.7, 2nd Edition by Dr. Basant Agarwal, Benjamin Baka.
2. Data Structures and Algorithms with Python by Kent D. Lee and Steve Hubbard.
3. Problem Solving with Algorithms and Data Structures Using Python by Bradley N Miller and David L. Ranum.
4. Core Python Programming -Second Edition,R. Nageswara Rao, Dreamtech Press

COURSE OUTCOMES:

The students should be able to:

1. Examine Python syntax and semantics and apply Python flow control and functions.
2. Create, run and manipulate Python Programs using core data structures like Lists.
3. Apply Dictionaries and use Regular Expressions.
4. Interpret the concepts of Object-Oriented Programming as used in Python.
5. Master object-oriented programming to create an entire python project using objects and classes

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

II Year B.Tech. CSE- I Sem **L/T/P/C**

3/-/-/3

(R20A0504)

OPERATING SYSTEMS

COURSE OBJECTIVES:

1. To understand the fundamental concepts and techniques of Operating Systems.
2. To study the concepts of LINUX OS and process scheduling.
3. To understand the concepts in deadlocks and process management.
4. To understand the techniques in memory managements and IPC mechanism.
5. To study file system concepts and sockets.

UNIT - I

Operating System-Introduction, Structures-Simple Batch, Multi-programmed, Time-shared, Personal Computer, Parallel, Distributed Systems, Real-Time Systems, System components, Operating System services.

Introduction to Linux operating system, Linux file system, Linux Utilities

UNIT - II

Linux: Introduction to shell, Types of Shell's, example shell programs.

Process and CPU Scheduling - Process concepts and scheduling, Operations on processes, Cooperating Processes, Threads, Scheduling Criteria, Scheduling Algorithms, Multiple -Processor Scheduling.

UNIT - III

Deadlocks - System Model, Deadlocks Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection and Recovery from Deadlock

Process Management and Synchronization - The Critical Section Problem, Synchronization Hardware, Semaphores, and Classical Problems of Synchronization, Critical Regions, Monitors.

UNIT - IV

Inter process Communication Mechanisms: IPC between processes on a single computer system, IPC between processes on different systems, using pipes, FIFOs, message queues, shared memory implementation in Linux. Corresponding system calls.

Memory Management and Virtual Memory - Logical versus Physical Address Space, Swapping, Contiguous Allocation, Paging, Segmentation, Segmentation with Paging, Demand Paging, Page Replacement, Page Replacement Algorithms.

UNIT - V

File System Interface and Operations -Access methods, Directory Structure, Protection, File System Structure, Allocation methods, kernel support for files, system calls for file I/O operations open, create, read, write, close, lseek, stat, ioctl

Disk Management: Disk Scheduling Algorithms-FCFS, SSTF, SCAN, C-SCAN

TEXT BOOKS:

1. Beginning Linux Programming –Neil Mathew, Richard Stones 4th Edition, Wiley
2. Operating System Principles- Abraham Silberschatz, Peter B. Galvin, Greg Gagne 7th Edition, John Wiley
3. Unix System Programming using C++, T. Chan, PHI.
4. Unix Concepts and Applications, 4th Edition, SumitabhaDas,TMH,2006.
5. Advanced programming in the UNIX environment, W.R. Stevens, Pearson education.

REFERENCE BOOKS:

1. Operating Systems – Internals and Design Principles Stallings, Fifth Edition–2005, Pearson Education/PHI
2. Operating System A Design Approach- Crowley, TMH.
3. Modern Operating Systems, Andrew S. Tanenbaum 2nd edition, Pearson/PHI
4. UNIX programming environment, Kernighan and Pike, PHI/ Pearson Education
5. UNIX Internals -The New Frontiers, U. Vahalia, Pearson Education.

COURSE OUTCOMES:

At the end of the course students should have:

1. Ability to apply concepts of operating system.
2. Ability to write shell programs and simulate process scheduling algorithms.
3. Skills to analyze memory management and deadlocks situations.
4. An ability to develop programs using system calls and utilities.
5. Capability to compare various file systems.

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II Year B.Tech. CSE- I Sem L/T/P/C 3/-/-/3

(R20A0505)

DESIGN AND ANALYSIS OF ALGORITHMS

COURSE OBJECTIVES:

1. To analyze performance of algorithms.
2. To choose the appropriate data structure and algorithm design method for a specified application.
3. To understand how the choice of data structures and algorithm design methods impacts the performance of programs.
4. To solve problems using algorithm design methods such as the greedy method, divide and conquer, dynamic programming, backtracking and branch and bound.
5. To understand the differences between tractable and intractable problems and to introduce P and NP classes.

UNIT I

Introduction: Algorithms, Pseudo code for expressing algorithms, performance analysis- Space complexity, Time Complexity, Asymptotic notation- Big oh notation, omega notation, theta notation and little oh notation.

Divide and Conquer: General method. Applications- Binary search, Quick sort, merge sort, Strassen's matrix multiplication.

UNIT II

Disjoint set operations, Union and Find algorithms, AND/OR graphs, Connected components, Bi-connected components.

Greedy method: General method, applications- Job sequencing with deadlines, Knapsack problem, Spanning trees, Minimum cost spanning trees, Single source shortest path problem.

UNIT III

Dynamic Programming: General method, applications- Matrix chained multiplication, Optimal binary search trees, 0/1 Knapsack problem, All pairs shortest path problem, Traveling sales person problem, Reliability design.

UNIT IV

Backtracking: General method, Applications- n-queue problem, Sum of subsets problem, Graph coloring, Hamiltonian cycles.

UNIT V

Branch and Bound: General method, applications- Travelling sales person problem, 0/1 Knapsack problem- LC branch and Bound solution, FIFO branch and Bound solution.

NP-Hard and NP-Complete Problems: Basic concepts, Non deterministic algorithms, NP-Hard and NP-Complete classes, NP-Hard problems, Cook's theorem.

TEXT BOOKS:

1. Fundamentals of Computer Algorithms, Ellis Horowitz, Satraj Sahni and Rajasekharan, Universities press
2. Design and Analysis of Algorithms, P. h. Dave,2ndedition,Pearson Education.

REFERENCE BOOKS:

1. Introduction to the Design And Analysis of Algorithms A Levitin Pearson Education
2. Algorithm Design foundations Analysis and Internet examples, M.T.Goodrich and R Tomassia John Wiley and sons
3. Design and Analysis of Algorithms, S. Sridhar, Oxford Univ.Press
4. Design and Analysis of Algorithms,Aho , Ulman and Hopcraft , Pearson Education.
5. Foundations of Algorithms, R. Neapolitan and K.Naimipour , 4th edition

COURSE OUTCOMES:

1. Ability to analyze the performance of algorithms.
2. Ability to choose appropriate algorithm design techniques for solving problems.
3. Ability to understand how the choice of data structures and the algorithm design methods to impact the performance of programs.
4. Describe the dynamic programming paradigm and explain when an algorithmic design situation calls for it. Synthesize dynamic programming algorithms and analyze them.
5. Describes the greedy paradigm and explain when an algorithmic design situation calls for it. Synthesize greedy algorithms and analyze them.

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(R20A0506)

COMPUTER ORGANIZATION

COURSE OBJECTIVES:

To expose the students to the following:

1. How Computer Systems work & the basic principles
2. Instruction Level Architecture and Instruction Execution
3. The current state of art in memory system design
4. How I/O devices are accessed and its principles.
5. To provide the knowledge on Instruction Level Parallelism

UNIT I

Basic Functional units of Computers: Functional units, basic Operational concepts, Bus structures. Software, Performance, Multiprocessors, Multicomputer. **Data Representation:** Signed number representation, fixed and floating point Representations.

Computer Arithmetic: Addition and subtraction, multiplication Algorithms, Division Algorithms. Error detection and correction codes.

UNIT II

Register Transfer Language and Micro Operations: RTL- Registers, Register transfers, Bus and memory transfers. Micro operations: Arithmetic, Logic, and Shift micro operations, Arithmetic logic shift unit.

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

UNIT III

Central Processing Unit organization: General Register Organization, Stack organization, Instruction formats, Addressing modes, Data Transfer and Manipulation, Program Control, CISC and RISC processors

Control unit design: Design approaches, Control memory, Address sequencing, micro program example, design of CU, Micro Programmed Control.

UNIT IV

Memory Organization: Semiconductor Memory Technologies**,** Memory hierarchy, Interleaving, Main Memory-RAM and ROM chips, Address map, Associative memory-Hardware organization. Match logic. Cache memory-size vs. block size, Mapping functions-Associate, Direct, Set Associative mapping. Replacement algorithms, write policies. Auxiliary memory- Magnetic tapes etc.

UNIT V

Input –Output Organization: Peripheral devices, Input-output subsystems, I/O device interface, I/O Processor, I/O transfers–Program controlled, Interrupt driven, and DMA, interrupts and exceptions. I/O device interfaces – SCII, USB

Pipelining and Vector Processing: Basic concepts, Instruction level Parallelism Throughput and Speedup, Pipeline hazards.

TEXT BOOKS:

1. Computer Organization – Carl Hamacher, Zvonks Vranesic, SafeaZaky, Vth Edition, McGraw Hill.
2. Computer Systems Architecture – M.Moris Mano, IIIrd Edition, Pearson/PHI

REFERENCE BOOKS:

1. "Computer Architecture and Organization", 3rd Edition by John P. Hayes, WCB/ McGraw-Hill
2. "Computer Organization and Architecture: Designing for Performance", 10th Edition by William Stallings, Pearson Education.
3. "Computer System Design and Architecture", 2nd Edition by Vincent P. Heuring and Harry F. Jordan, Pearson Education.

COURSE OUTCOMES:

After completion of the course, Students will be able to:

1. Student will learn the concepts of computer organization for several engineering applications.
2. Student will develop the ability and confidence to use the fundamentals of computer organization as a tool in the engineering of digital systems.
3. An ability to identify, formulate, and solve hardware and software computer engineering problems using sound computer engineering principle
4. To impart the knowledge on micro programming
5. Comprehend the concepts of advanced pipe lining techniques

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(R20A0024) PROBABILITY AND STATISTICS

COURSE OBJECTIVES:

1. To identify a random variable that describes randomness or an uncertainty in certain realistic situation. It can be either discrete or continuous type.
2. To learn important probability distributions like: in the discrete case, study of the Binomial and the Poisson Distributions and in the continuous case the Normal Distributions.
3. To build the linear relationship between two variables and also to predict how a dependent variable changes based on adjustments to an independent variable.
4. To interpret the types of sampling, sampling distribution of means and variance, Estimations of statistical parameters.
5. To give comprehensive knowledge of probability theory to make inferences about a population from large and small samples.

UNIT – I: Random Variables

Single Random Variables -Discrete and Continuous, Probability distribution function, Probability mass and density functions, mathematical expectation and variance.

Multiple Random variables: Discrete and Continuous, Joint probability distribution, Marginal probability density functions, conditional probability distribution function and density functions.

UNIT-II: Probability Distributions

Binomial distribution – properties, mean, variance and recurrence formula for Binomial distribution, Poisson distribution – Poisson distribution as Limiting case of Binomial distribution, properties, mean variance and recurrence formula for Poisson distribution, Normal distribution– mean, variance, median, mode and characteristics of Normal distribution.

UNIT -III: Correlation and Regression

Correlation -Coefficient of correlation, Rank correlation, Regression- Regression coefficients, Lines of regression.

Multiple correlation and regression- Coefficient of multiple Correlation, multiple regression, multiple linear regression equations.

UNIT –IV: Sampling and Testing of Hypothesis for Large Samples

Sampling: Definitions - Types of sampling - Expected values of sample mean and variance, Standard error - Sampling distribution of means and variance. Estimation - Point estimation and Interval estimation.

Testing of hypothesis: Null and Alternative hypothesis - Type I and Type II errors, Critical region -confidence interval - Level of significance, One tailed and Two tailed test.

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

Unit-V: Testing of Hypothesis for Small Samples

Small samples: Test for single mean, difference of means, paired t-test, test for ratio of variances(F-test),Chi- square test for goodness of fit and independence of attributes.

TEXT BOOKS:

1. Fundamental of Statistics by S.C. Gupta, 7th Edition,2016.
2. Fundamentals of Mathematical Statistics by SC Gupta and V.K.Kapoor
3. Higher Engineering Mathematics by B.S. Grewal, Khanna Publishers,35th Edition,2000.

REFERENCE BOOKS:

1. Introduction to Probability and Statistics for Engineers and Scientists by SheldonM.Ross.
2. Probability and Statistics for Engineers by Dr. J. Ravichandran

COURSE OUTCOMES:

After completion of the course, the student will be able to

1. Evaluate randomness in certain realistic situation which can be either discrete type and compute statistical constants of these random variables.
2. Provide very good insight which is essential for industrial applications by learning probability distributions.
3. Higher up thinking skills to make objective, data-driven decisions by using correlation and regression.
4. Assess the importance of sampling distribution of a given statistic of a random sample.
5. Analyze and interpret statistical inference using samples of a given size which is taken from a population.

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(R20A0061)

MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS

COURSE OBJECTIVES:

1. To enable the student to understand and appreciate, with a practical insight, the importance of certain basic issues governing the business operations that are needed for sound economic decision making.
2. To provide inputs on an overall analysis of an individual firm, its production function, cost analysis and break-even-point
3. To make students understand different market structures, pricing of the product or services and different forms of business organizations.
4. To understand capital requirements of the business and basic rule of accounting of the business.
5. To learn analytical techniques and arriving at conclusions from financial information for the purpose of business decision making.

Unit-I

Introduction to Managerial Economics: Definition, Nature and Scope of Managerial Economics,Micro and Macroeconomic Concepts.

Demand Analysis: Demand Determinants, Law of Demand and exceptions.

Elasticity of Demand: Definition, Types, Measurement and Significance of elasticity of Demand. **Demand Forecasting:** Factors governing Demand Forecasting, Methods of Demand Forecasting (Survey Methods, Expert Opinion, Test Marketing, Controlled Experience, JudgementalApproach, and Time Series Analysis).

Unit-II

Production & Cost Analysis: Production Function- Isocost and Isoquants, MRTS, Least Cost Combination of Inputs, Cobb-Douglas Production Function, Laws of Returns, Internal and ExternalEconomies of Scale.

Cost Analysis: Cost Concepts. Break-Even Analysis (BEA) - Determination of Break-Even Point (Simple Problems)

Unit-III

Markets: Types of Competition and Markets, Features of Perfect Competition, Monopoly and Monopolistic Competition;

Pricing: Objectives, Methods of Pricing;

Business: Features of different forms of Business Organisation (Sole Trader, Partnership, Joint Stock Company, Cooperative Society, and Public Enterprises).

Unit-IV

Introduction to Capital and Financial Accounting: Need for Capital, Types of Capital, Working Capital Analysis, Methods and Sources of raising Finance.

Accounting: Definition, Concepts and Conventions (GAAP); Accounting Cycle; Formats for preparation of Trial Balance and Final Accounts (Trading Account, Profit and Loss Account and Balance Sheet).

Unit-V

Investment Decision: Capital Budgeting - Features, Objectives, and Methods (Payback Method, Accounting Rate of Return and Net Present Value) - advantages & disadvantages. (SimpleProblems)

Financial Analysis: Analysis and Interpretation of Liquidity Ratios, Activity Ratios, Capital Structure Ratios and Profitability Ratios. (Simple Problems)

REFERENCE BOOKS:

1. Managerial Economics & Financial Analysis, Special Edition-MRCET. McGraw Hill Publications, 2017
2. D.N. Dwivedi, Managerial Economics, Vikas Publications.
3. Justin Paul, Leena, Sebastian, Managerial Economics, Cengage
4. P. L. Mehta, Managerial Economics: Analysis, Problems and Cases, Sultan Chand & Sons.
5. S. N. Maheswari & S. K. Maheswari, Financial Accounting, Vikas Publications.
6. M. Y. Khan and P. K. Jain, Financial Management, McGraw Hill

COURSE OUTCOMES:

Following are the course outcomes:

1. Makes students understand the concepts and applications of managerial economics in taking business decisions.
2. Empowers students to comprehend with the production process and technical relationship among factors of production, different cost concepts and optimization of cost.
3. Enables students to know the classification of markets and how firms determine their price output decisions in different kinds of markets with different forms of business.
4. Allows students to know different sources of capital for the business and how financial accounting is done for smooth business functioning.
5. Equips students with different financial analysis tools and techniques to evaluate financial performance of the business.

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(R20A0583)

DATA STRUCTURES USING PYTHON LAB

COURSE OBJECTIVES:

1. To understand a range of Object-Oriented Programming, as well as in-depth data and information processing techniques.
2. To know how linear data structures work
3. To implement non-linear data structures.
4. To simulate searching and sorting techniques.
5. To develop programs for performing operations on Trees and Graphs .

WEEK 1:

Write a Python program for class, Flower, that has three instance variables of type str, int, and float, that respectively represent the name of the flower, its number of petals, and its price. Your class must include a constructor method that initializes each variable to an appropriate value, and your class should include methods for setting the value of each type, and retrieving the value of each type.

WEEK 2:

Develop an inheritance hierarchy based upon a Polygon class that has abstract methods area( ) and perimeter( ). Implement classes Triangle, Quadrilateral, Pentagon, that extend this base class, with the obvious meanings for the area( ) and perimeter( ) methods. Write a simple program that allows users to create polygons of the various types and input their geometric dimensions, and the program then outputs their area and perimeter.

WEEK 3:

Write a python program to implement method overloading and method overriding.

WEEK 4:

Write a Python program to illustrate the following comprehensions:

a) List Comprehensions b) Dictionary Comprehensions

c) Set Comprehensions d) Generator Comprehensions

WEEK 5:

Write a Python program to generate the combinations of n distinct objects taken from the elements of a given list. **Example:** Original list: [1, 2, 3, 4, 5, 6, 7, 8, 9] Combinations of 2 distinct objects: [1, 2] [1, 3] [1, 4] [1, 5] ..... [7, 8] [7, 9] [8, 9].

WEEK 6:

Write a program for Linear Search and Binary search

WEEK 7: Write a program to implement Bubble Sort and Selection Sort

WEEK 8: Write a program to implement Merge sort and Quick sort

WEEK 9: Write a program to implement Stacks and Queues

WEEK 10: Write a program to implement Singly Linked List

WEEK 11: Write a program to implement Doubly Linked list

WEEK 12: Write a program to implement Binary Search Tree

COURSE OUTCOMES:

The students should be able to:

1. Examine Python syntax and semantics and apply Python flow control and functions.
2. Create, run and manipulate Python Programs using core data structures like Lists,
3. Apply Dictionaries and use Regular Expressions.
4. Interpret the concepts of Object-Oriented Programming as used in Python.
5. Master object-oriented programming to create an entire python project using objects and classes

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II Year B.Tech. CSE- I Sem L/T/P/C -/0/3/1.5

(R20A0584)

OPERATING SYSTEMS LAB

(Using UNIX / LINUX)

COURSE OBJECTIVES:

1. To provide an understanding of the design aspects of operating system concepts through simulation
2. Introduce basic Linux commands, system call interface for process management, inter- process communication and I/O in Unix.
3. Student will learn various process and CPU scheduling Algorithms through simulation programs
4. Student will have exposure to System calls and simulate them.
5. Student will learn deadlocks and process management & Inter Process communication and simulate them.

LIST OF EXPERIMENTS:

Week 1:

Practice File handling utilities, Process utilities, Disk utilities, Networking commands, Filters, Text processing utilities and Backup utilities.

Week 2:

Write a shell script that receives any number of file names as arguments checks if every argument supplied is a file or directory and reports accordingly. Whenever the argument is a file it reports no of lines present in it.

Week 3:

Simulate the following CPU scheduling algorithms.

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

Week 4:

Simulate Bankers Algorithm for Dead Lock Avoidance; Simulate Bankers Algorithm for Dead Lock Prevention.

Week 5:

a) Write a C program to simulate the concept of Dining-philosophers problem.

b) Write a C program to simulate producer-consumer problem using Semaphores

Week 6:

a) Write a C program to implement kill(), raise() and sleep()functions.

b) Write a C program to implement alarm(), pause() and abort()functions

c) Write a program that illustrate communication between two process using unnamed pipes

Week 7:

a) Write a program that illustrates communication between two process using named pipes or FIFO.

b) Write a C program that receives a message from message queue and display them.

Week 8:

c) Write a C program that illustrates two processes communicating using Shared memory.

Week 9:

Simulate all page replacement algorithms a) FIFO b) LRU c) OPTIMAL

Week 10:

Write a C program that takes one or more file/directory names as command line input and reports following information

A) File Type B) Number Of Links C) Time of last Access D) Read, write and execute permissions

Week 11:

a) Implement in c language the following UNIX commands using system calls

i) cat ii) ls iii) Scanning Directories (Ex: opendir(),readdir(),etc.)

b) Write a C program to create child process and allow parent process to display "parent" and the child to display "child" on the screen

Week 12:

Write a C program to simulate disk scheduling algorithms. a) FCFS b) SCAN c) C-SCAN

TEXT BOOKS:

1. Operating System Principles- Abraham Silberchatz, Peter B. Galvin, Greg Gagne 7th Edition, John Wiley
2. Advanced programming in the Unix environment, W.R.Stevens, Pearson education.

REFERENCE BOOKS:

1. Operating Systems – Internals and Design Principles, William Stallings, Fifth Edition– 2005, Pearson Education/PHI
2. Operating System - A Design Approach-Crowley, TMH.
3. Modern Operating Systems, Andrew S Tanenbaum, 2nd edition, Pearson/PHI
4. UNIX Programming Environment, Kernighan and Pike, PHI/Pearson Education
5. UNIX Internals: The New Frontiers, U. Vahalia, Pearson Education

COURSE OUTCOMES:

1. To provide an understanding of the design aspects of operating system concepts through simulation
2. Introduce basic Linux commands, system call interface for process management, inter process communication and I/O in Unix.
3. Student will learn various process and CPU scheduling Algorithms through simulation programs
4. Student will have exposure to System calls and simulate them.
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(R20A0004)

FOREIGN LANGUAGE: FRENCH

INTRODUCTION

In view of the growing importance of foreign languages as a communication tool in some countries of the world, French has been identified as one of the most popular languages after English. As a result, French program is introduced to develop the linguistic and communicative skills of engineering students and to familiarize them to the French communication skills. This course focuses on basic oral skills.

COURSE OBJECTIVES

1. To inculcate the basic knowledge of the French language
2. To hone the basic sentence constructions in day to day expressions for communication in their vocation
3. To form simple sentences that aids in day-to-day communication
4. To prepare the students towards DELF A1
5. To develop in the student an interest towards learning languages.

UNIT - I:

Speaking: Introduction to the French language and culture –Salutations - French alphabet -Introducing people
Writing: Understand and fill out a form
Grammar: The verbs “to be ' and “to have '' in the present tense of the indicative
Vocabulary: The numbers from 1 to 20 - Professions- Nationalities

UNIT - II:

Speaking: Talk about one’s family – description of a person - express his tastes and preferences - express possession - express negation
Writing: Write and understand a short message
Grammar: Nouns (gender and number) - Articles - The–erverbs in the present- Possessiveadjectives - Qualifying adjectives
Vocabulary: The family – Clothes-Colors- The numbers from 1 to 100-The classroom

UNIT - III

Speaking: Talk about your daily activities - be in time - ask and indicate the date and time - talk about sports and recreation - express the frequency
Writing: A letter to a friend
Grammar: The expression of time– The –ir verbs in the present- The verbs do, go, take, come,- Adverbs-Reflexive verbs
Vocabulary: The days and months of the year- The sports-Hobbies

UNIT - IV

Speaking: Express the quantity - ask and give the price - express the need, the will and the capacity - compare (adjective) - speak at the restaurant / in the shops

Writing: A dialogue between a vendor and a customer at the market
Grammar: Verbs “to want”, “to can”- Express capacity / possibility- Express will / desire – thefuture tense
Vocabulary: The food – Meals-Fruits and vegetables– The parts of the body

UNIT - V

Speaking: Express the prohibition and the obligation - describe an apartment - talk about the weather / ask the weather - ask the opinion - give your opinion - express your agreement or disagreement
Writing: Descriptions
Grammar: Demonstrative adjectives- Prepositions- The verb 'must' to indicate obligation and necessity in the present
Vocabulary: Seasons – Holidays-The city– Furniture
NOTE: The students are exposed to simple listening and reading activities.

REFERENCE BOOKS

1. Apprenons le Français 1& 2, New Saraswati House, 2015
2. A propos, A1, Langers International, 2010
3. Easy French Step-by-step by Myrna Bell Rochester
4. Ultimate French Beginner-Intermediate (Coursebook) By Livid Language
5. Ã L'Aventure: An Introduction to French Language and Francophone Cultures by EvelyneCharvier-Berman, Anne C. Cummings.

COURSE OUTCOMES

1. The students will be able to communicate in French at A1 level.
2. The student will have an advantage in the competitive job market.
3. This course benefits the graduates when pursuing study *opportunities* in the countries where French is the official language.
4. The students will be able to use proper vocabulary.
5. The students will be able to use Grammar.

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(R20A0026)

DISCRETE MATHEMATICS

COURSE OBJECTIVES:

1. Describe mathematical concepts as applied in computer science for solving logical problems.
2. Understanding the concepts of sets, functions, relations, recurrence relations and Lattices.
3. Understand the concepts on elementary combinations and permutations.
4. To develop the mathematical skills needed for advanced quantitative courses.
5. Analyze the properties of graphs and trees.

UNIT – I:

Mathematical Logic: Statements and notations, connectives, well-formed formulas, truth tables, tautology, equivalence implication; Normal forms: Disjunctive normal forms, conjunctive normalforms, principle disjunctive normal forms, principle conjunctive normal forms.

Predicates : Predicative logic, statement functions, variables and quantifiers, free and bound variables, rules of inference, consistency, proof of contradiction, automatic theorem proving.

UNIT – II:

Posets and Lattices : Relations and their properties, Properties of binary relations, equivalence, compatibility and partial ordering relations, lattices, Hasse diagram; Functions-Inverse function,composition of functions, recursive functions.

Lattices as partially ordered sets; Definition and examples, properties of lattices, sub lattices, some special lattices.

UNIT - III :

Groups :Algebraic structure, Groupoid, Monoid, Semi groups, Group ,Sub groups, Homomorphism and Isomorphism of groups.

Elementary Combinatorics : Basics of counting, The permutations, disarrangements, combinations, permutations and combinations with repetitions, constrained repetitions, the principal of Inclusion-Exclusion, Pigeion hole principle.

UNIT-IV :

Advanced Counting Techniques : Generating Function of Sequences, Recurrence relations,Solving Recurrence Relations by substitution and Generating function ,The method of Characteristic roots, Solutions of Inhomogeneous Recurrence Relations.

UNIT-V :

Graphs Theory : Introduction to Graphs ,Isomorphic graphs, Euler graphs, Hamiltonian graphs, Planar graphs, Graph coloring, Directed graphs, Weighted digraphs, chromatic numbers. Trees and their properties , Spanning trees, Directed trees, Binary trees Minimal

Spanning Trees.

TEXT BOOKS :

1. L. Liu, D. P. Mohapatra, —Elements of Discrete Mathematics, Tata Mcgraw-Hill, India, 3rdEdition,2008.
2. J. P. Tremblay, R. Manohar, Discrete Mathematical Structures with Applications toComputer Science , Tata McGraw Hill, India, 1st Edition,1997.
3. JoeL.Mott, Abraham Kandel, Theodore P.Baker,—Discrete Mathematics for ComputerScientists and Mathematicians, Prentice Hall of India Learning Private Limited, New Delhi, India, 2nd Edition,2010.

REFERENCE BOOKS :

1. Kenneth H. Rosen, —Discrete Mathematics and Its Applications, Tata Mcgraw-Hill, NewDelhi, India, 6thEdition,2012.
2. Ralph P. Grimaldi, B. V. Ramana, —Discrete and Combinatorial Mathematics - AnApplied Introduction, Pearson Education, India, 5th Edition,2011.
3. D. S. Malik, M. K. Sen, —Discrete Mathematical Structures: Theory and Applications,Thomson Course Technology, India, 1st Edition,2004.

COURSE OUTCOMES:

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

1. Understand Set Theory, Venn Diagrams, relations, functions and apply them to Real-world Scenarios.
2. Understand General properties of Algebraic systems and study lattices aspartially ordered sets and their applications.
3. Solve the recurrence relations and can be used to optimize algorithms.
4. Identify the basic properties of graphs and use these concepts to model simple applications.
5. Identify the basic properties of trees and use these concepts to model simple applications

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(R20A0507)

FORMAL LANGUAGE AND AUTOMATA THEORY

COURSE OBJECTIVES:

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

UNIT I

Fundamentals: Strings, Alphabet, Language, Operations, Finite state machine, definitions, finite automaton model, acceptance of strings and languages, deterministic finite automaton and nondeterministic finite automaton, transition diagrams and language recognizers.

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

UNIT II

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

UNIT III

Grammar Formalism: Introduction, **Regular grammars**-right linear and left linear grammars, equivalence between regular grammar and FA, inter conversion, **Context free grammars**-Derivation trees, sentential forms, Right most and leftmost derivation of strings.

UNIT IV

Optimization and Normalization: Ambiguity in context free grammars, optimization of context free grammars, Chomsky normal form, Greibach normal form, Pumping Lemma for Context FreeLanguages, Enumeration of properties of CFL.

Push Down Automata: Push down automata, definition, model, acceptance of CFL, Acceptance by final state and acceptance by empty stack and its equivalence, equivalence of CFL and PDA, inter conversion, Introduction to DCFL and DPDA. **Context sensitive grammars**, languages and Linear bounded Automata.(Definitions)

UNIT V

Turing Machine: Unrestricted grammars, Turing Machine-definition, model, design of TM, computable functions, Turing recognizable (Recursively enumerable) and Turing-decidable (recursive) languages and their closure properties, Church's hypothesis, counter machine, typesof Turing machines.

Computability Theory: Chomsky hierarchy of languages, LR(0) grammar, decidability of problems, Universal Turing Machine, un decidability of posts correspondence problem, Turing reducibility, definition of P and NP problems, NP complete and NP hard problems.

TEXT BOOKS

1. John E. Hopcroft, Rajeev Motwani and Jeffrey D. Ullman, Introduction to Automata Theory,Languages, and Computation, Pearson Education Asia.

REFERENCE BOOKS:

1. Harry R. Lewis and Christos H. Papadimitriou, Elements of the Theory of Computation,Pearson Education Asia.
2. Dexter C. Kozen, Automata and Computability, Undergraduate Texts in Computer Science,Springer.
3. Michael Sipser, Introduction to the Theory of Computation, PWS Publishing.
4. John Martin, Introduction to Languages and The Theory of Computation,Tata McGrawHill.

COURSE OUTCOMES:

By the end of this course, students will be able to

1. Design Finite Automata models for language acceptance.
2. Construct Regular Expressions and equivalent automata models.
3. Formulate Grammars for different types of formal languages.
4. Represent Normal Forms and design Push Down Automata.
5. Experiment with and Analyze different Computational models

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(R20A0508)

OBJECT ORIENTED PROGRAMMING THROUGH JAVA

COURSE OBJECTIVES:

1. To understand object oriented principles like abstraction, encapsulation,inheritance,polymorphism and apply them in solving problems.
2. To understand the implementation of packages and interfaces.
3. To understand the concepts of exception handling, multithreading and collection classes.
4. To understand how to connect to the database using JDBC.
5. To understand the design of Graphical User Interface using applets and swing controls.

UNIT-I

Java Programming- History of Java, comments, Java Buzz words, Data types, Variables, Constants, Scope and Lifetime of variables, Operators, Type conversion and casting, Enumerated types, Control flow- block scope, conditional statements, loops, break and continue statements, arrays, simple java stand alone programs, class, object, and its methods constructors, methods, static fields and methods, access control, this reference, overloading constructors, recursion, exploringstring class, garbage collection.

UNIT – II

Inheritance – Inheritance types, super keyword, preventing inheritance, final classes and methods.

Polymorphism – method overloading and method overriding, abstract classes and methods**. Interfaces-** Interfaces Vs Abstract classes, defining an interface, implement interfaces, accessing implementations through interface references, extending interface, inner class.

Packages- Defining, creating and accessing a package, importing packages.

UNIT-III

Exception handling-Benefits of exception handling, the classification of exceptions - exception hierarchy, checked exceptions and unchecked exceptions, usage of try, catch, throw, throws and finally, creating own exception subclasses.

Multithreading – Differences between multiple processes and multiple threads, thread life cycle,creating threads, interrupting threads, thread priorities, synchronizing threads, inter-thread communication, producer consumer problem.

UNIT-IV

Collection Framework in Java – Introduction to java collections, Overview of java collection framework, Commonly used collection classes- Array List, Vector, Hash table, Stack, Lambda Expressions.

Files- Streams- Byte streams, Character streams, Text input/output, Binary input/output, File management using File class.

Connecting to Database – JDBC Type 1 to 4 drivers, Connecting to a database, querying a database and processing the results, updating data with JDBC,Data Access Object (DAO).

UNIT-V

GUI Programming with Swing - The AWT class hierarchy, Introduction to Swing, Swing Vs AWT, Hierarchy for Swing components, Overview of some Swing components – Jbutton, JLabel, JTextField, JTextArea, simple Swing applications, Layout management – Layout manager types –border, grid and flow.

Event Handling- Events, Event sources, Event classes, Event Listeners, Delegation event model, Examples: Handling Mouse and Key events, Adapter classes.

TEXT BOOK:

1. Java Fundamentals–A Comprehensive Introduction, Herbert Schildt and Dale Skrien,TMH.
2. Core Java: An Integrated Approach – Dr R Nageswara Rao

REFERENCE BOOKS:

1. Java for Programmers, P.J.Deitel and H.M.Deitel, PEA (or) Java: How to Program ,P.J.Deiteland H.M.Deitel,PHI
2. ObjectOrientedProgrammingthroughJava,P.RadhaKrishna,UniversitiesPress.
3. Thinking in Java, Bruce Eckel,PE
4. Programming in Java, S. Malhotra and S. Choudhary, Oxford Universities Press.
5. Design Patterns Erich Gamma, Richard Helm, Ralph Johnson and John Vlissides.

COURSE OUTCOMES:

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

1. Understand the use of OOP's Concepts.
2. Implement Packages and interfaces in java
3. Develop and Understand exception handling ,multithreaded applications with
    a. synchronization
4. Understand the use of Collection Framework
5. Design GUI based applications using AWT and Swings.

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II Year B.Tech. CSE- II Sem L/T/P/C
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(R20A0509)
DATABASE MANAGEMENT SYSTEMS

COURSE OBJECTIVES:

1. To study the physical and logical database designs, database modeling, relational, hierarchical, and networlk models
2. To understand and use data manipulation language to query, update, and manage adatabase
3. To develop an understanding of essential DBMS concepts such as: database security, integrity, concurrency, distributed database, and intelligent database, Client/Server (Database Server), Data Warehousing.
4. To design and build a simple database system and demonstrate competence with the fundamental tasks involved with modeling, designing, and implementing a DBMS.
5. Familiar with basic database storage structures and access techniques: file and page organizations

UNIT I:

Database System Applications, Purpose of Database Systems, View of Data – Data Abstraction – Instances and Schemas – Database Languages – database Access for applications Programs – Database Users and Administrator – Transaction Management – Database Architecture – StorageManager – the Query Processor.

Data Models: Introduction to the Relational Model – Structure – Database Schema, Keys – Schema Diagrams. Database design– Other Models, ER diagrams – ER Model - Entities, Attributesand Entity sets – Relationships and Relationship sets – ER Design Issues – Concept Design – Conceptual Design with relevant Examples. Relational Query Languages, Relational Operations.

UNIT II:

Relational Algebra – Selection and projection set operations – renaming – Joins – Division – Examples of Algebra overviews – Relational calculus – Tuple Relational Calculus (TRC) – Domain relational calculus (DRC).

Overview of the SQL Query Language – Basic Structure of SQL Queries, Set Operations, Aggregate Functions – GROUPBY – HAVING, Nested Sub queries, Views, Triggers, Procedures.

UNIT III:

Normalization – Introduction, Non loss decomposition and functional dependencies, First, Second, and third normal forms – dependency preservation, Boyce/Codd normal form.

Higher Normal Forms - Introduction, Multi-valued dependencies and Fourth normal form, Join dependencies and Fifth normal form

UNIT IV:

Transaction Concept- Transaction State- Implementation of Atomicity and Durability –

Concurrent Executions – Serializability- Recoverability – Implementation of Isolation – Testing forserializability- Lock –Based Protocols – Timestamp Based Protocols- Validation-Based Protocols – Multiple Granularity.

UNIT V:

Recovery and Atomicity – Log – Based Recovery – Recovery with Concurrent Transactions – CheckPoints - Buffer Management – Failure with loss of nonvolatile storage.

TEXT BOOKS:

1. Database System Concepts, Silberschatz, Korth, McGraw hill, Sixth Edition.(All UNITS except III th)
2. Database Management Systems, Raghu Ramakrishnan, Johannes Gehrke, TATA McGrawHill 3rd Edition.

REFERENCE BOOKS:

1. Fundamentals of Database Systems, Elmasri Navathe Pearson Education.
2. An Introduction to Database systems, C.J. Date, A.Kannan, S.Swami Nadhan, Pearson,Eight Edition for UNIT III.

COURSE OUTCOMES:

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

1. Demonstrate the basic elements of a relational database management system
2. Ability to identify the data models for relevant problems
3. Ability to design entity relationship and convert entity relationship diagrams into RDBMS and formulate SQL queries
4. Apply normalization for the given database
5. Understand the various Recovery Mechanisms

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(R20A0510)

COMPUTER NETWORKS

COURSE OBJECTIVES:

1. To understand the fundamentals of computer networks, TCP/IP & OSI model.
2. To analyze Data link layer Issues, Protocols.
3. To explain Network layer Protocols, IP addressing.
4. To identify end to end communication & various things in Transport layer.
5. To describe various user services in a network.

UNIT - I:

Introduction: Network, Uses of Networks, Types of Networks, Reference Models: TCP/IP Model,The OSI Model, Comparison of the OSI and TCP/IP reference model.

Physical Layer: Guided transmission media, Wireless transmission media, Switching

UNIT - II:

Data Link Layer - Design issues, Error Detection & Correction, Elementary Data Link Layer Protocols, Sliding window protocols

Multiple Access Protocols - ALOHA, CSMA, CSMA/CD, CSMA/CA, Collision free protocols, Ethernet- Physical Layer, Ethernet Mac Sub layer.

UNIT - III:

Network Layer: Network Layer Design issues, store and forward packet switching connection less and connection oriented networks, routing algorithms: optimality principle, shortest path, flooding, Distance Vector Routing, Count to Infinity Problem, Link State Routing, Path Vector Routing, Hierarchical Routing; Congestion control algorithms,

IP addresses, CIDR, Sub netting, Super Netting, IPv4, Packet Fragmentation, IPv6 Protocol, Transition from IPv4 to IPv6, ARP, RARP.

UNIT - IV:

Transport Layer: Services provided to the upper layers elements of transport protocol, addressing, connection establishment, Connection release, Error Control & Flow Control, Crash Recovery.

The Internet Transport Protocols: UDP, Introduction to TCP, The TCP Service Model, The TCP Segment Header, The Connection Establishment, The TCP Connection Release, The TCP Sliding Window, The TCP Congestion Control Algorithm.

UNIT - V: Application Layer- Introduction, providing services, Applications layer paradigms: Clientserver model, HTTP, E-mail, WWW, TELNET, DNS.

TEXT BOOKS:

1. Computer Networks - Andrew S Tanenbaum, 4th Edition, PearsonEducation.
2. Data Communications and Networking - Behrouz A. Forouzan, Fifth Edition TMH, 2013.

REFERENCES BOOKS:

1. An Engineering Approach to Computer Networks - S. Keshav, 2nd Edition, Pearson Education.
2. Understanding communications and Networks, 3rd Edition, W. A. Shay, Cengage Learning.
3. Computer Networking: A Top-Down Approach Featuring the Internet, James F. Kurose, K.W. Ross, 3rd Edition, Pearson Education.

COURSE OUTCOMES:

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

1. Understand basics of Computer Networks and Reference Models.
2. Understand the Datalink Layer Concepts
3. Know allotment of IP addresses, best routing path calculations in network.
4. Analyze TCP,UDP working and know how to handle congestion
5. Get an idea of various things in Application Layer.

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OPEN ELECTIVE - I (R20A1251) WEB DESIGNING TOOLS

COURSE OBJECTIVES:

1. To learn the basics of web & html programming
2. To introduce CSS and its style
3. To introduce Java Scripting & Dynamic Html
4. To introduce web server software AJAX & Php
5. Ability to create a own web design using of Ajax

Unit I

Web Basics- Introduction, Concept of Internet- History of Internet, Protocols of Internet, World Wide Web, URL, Web Server, Web Browser,HTML-Introduction HTML-Basic Formatting Tags , HTML- Grouping Using Div Span, HTML-Lists,: HTML-Images, HTML-Hyperlink, HTML-Table, HTML- Iframe,HTML – Form HTML – Headers, HTML-Miscellaneous using tool Dreamweaver/ Visual studio

Unit II

CSS –Introduction, Syntax, CSS-Selectors, CSS-Color Background Cursor, CSS-Text Fonts, CSS-Lists Tables, CSS -Box Model, CSS-Display Positioning, CSS Floats. Using tool Dreamweaver/ Visual studio, Net Bean

Unit III

Introduction of Java Script, JavaScript characteristics, Objects in Java Script, Dynamic HTML with Java Script. XMLHttpRequest- Introduction, XMLHttpRequest, The XMLHttpRequest Object, Events for the XMLHttpRequest Object, Request Object for XMLHttpRequest, Response Objectfor XMLHttpRequest. Using tool Visual studio, Net Bean & Eclipse

Unit IV

AJAX Introduction- Introduction, AJAX Introduction, AJAX Components, Handling Dynamic HTML with Ajax, CSS to Define Look and Feel, Understand the XML Mark-up, XMLHttpRequest. AJAX using XML and XML HttpRequest- Introduction, Ajax Using XML and XMLHttpRequest, Accessing,Creating and Modifying XML Nodes, Loading XML Data into an HTML Page, Receiving XML Responses, Handling Response XML. Using tool Visual studio, Net Bean & Eclipse.

Unit V

PHP Introduction- PHP Introduction, Structure of PHP, PHP Functions, AJAX with PHP, PHP Code and the Complete AJAX Example. AJAX with Database- Introduction, AJAX Database, Working ofAJAX with PHP, Ajax PHP Database Form, AJAX PHP MySQL Select Query. Using tool Visual studio, Net Bean & Eclipse.

TEXT BOOKS:

1. Web Programming ,Building Internet Applications, CHRIS BATES II Edition, WileyDreamtech.
2. Programming world wide web ,SEBESTA,PEARSON.

REFERENCE BOOKS:

1. Internet and World Wide Web – How to program, Dietel and Nieto PHI/Pearson
2. Ajax: The Complete Reference By Thomas Powell
3. PHP: The Complete reference-steven Holzner Tata McGraw-Hill.
4. An Introduction to web Design and Programming –Wang-Thomson
5. Web Warrior Guide to Web Programming -Bai/Ekedaw-Thomas
6. Beginning Web Programming-Jon Duckett WROX

COURSE OUTCOMES:

1. Ability to learn to web application.
2. To develop a own style sheet
3. Ability to create a own java scripting web application.
4. Ability to create a own web design using of Ajax
5. Ability to create a own web design using of Php

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II Year B.Tech. CSE- II Sem **L/T/P/C 3/-/-/3**

OPEN ELECTIVE - I

(R20A0551) INTRODUCTION TO DBMS

COURSE OBJECTIVES:

1. To understand the basic concepts and the applications of database systems
2. To Master the basics of SQL and construct queries using SQL
3. To understand the relational database design principles
4. To become familiar with the basic issues of transaction processing and concurrency control
5. To become familiar with database storage structures and access techniques

UNIT I: INTRODUCTION

Database: Purpose of Database Systems, File Processing System Vs DBMS, History, Characteristic- Three schema Architecture of a database, Functional components of a DBMS,DBMS Languages- Database users and DBA

UNIT II: DATABASE DESIGN

ER Model: Objects, Attributes and its Type. Entity set and Relationship set-Design Issues of ER model-Constraints, Keys-primary key, Super key, candidate keys. Introduction to relational model-Tabular, Representation of Various ER Schemas. ER Diagram Notations-Goals of ER Diagram- Weak Entity Set- Views

UNIT III: STRUCTURED QUERY LANGUAGE

SQL: Overview, The Form of Basic SQL Query -UNION, INTERSECT, and EXCEPT– join operations: equi join and non equi join -Nested queries - correlated and uncorrelated-Aggregate Functions-Null values.Views, Triggers.

UNIT IV - DEPENDENCIES AND NORMAL FORMS

Importance of a good schema design,:- Problems encountered with bad schema designs, Motivation for normal forms- functional dependencies, -Armstrong's axioms for FD's-Closure ofa set of FD's,- Minimal covers-Definitions of 1NF,2NF, 3NF and BCNF-Decompositions and desirable properties

UNIT V:

Transactions: Transaction concept, transaction state, System log, Commit point, Desirable Properties of a Transaction, concurrent executions, serializability, recoverability, implementation of isolation, transaction definition in SQL, Testing for serializability**,** Serializability by Locks- Locking Systems with Several Lock Modes- Concurrency Control by Timestamps, validation.

TEXT BOOKS:

1. Abraham Silberschatz, Henry F. Korth, S. Sudarshan,|| Database System Concepts||, McGraw- Hill, 6th Edition , 2010.
2. Fundamental of Database Systems, by Elmasri, Navathe, Somayajulu, and Gupta, Pearson Education

REFERENCE BOOKS:

1. Raghu Ramakrishnan, Johannes Gehrke, —Database Management System‖, McGraw Hill., 3rd Edition 2007.
2. Elmasri&Navathe,‖Fundamentals of Database System,‖ Addison-Wesley Publishing, 5thEdition, 2008.
3. Date.C.J, —An Introduction to Database, Addison-Wesley Pub Co, 8th Edition, 2006.
4. Peterrob, Carlos Coronel, —Database Systems – Design, Implementation, and Management, 9th Edition, Thomson Learning, 2009

COURSE OUTCOMES:

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

1. Understand the basic concepts and the applications of database systems
2. Master the basics of SQL and construct queries using SQL .
3. Understand the relational database design Principles.
4. Familiarize with the basic issues of transaction processing and concurrency control.
5. Familiarize with database storage structures and access techniques

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II Year B.Tech. CSE- II Sem L/T/P/C 3/-/-/3

OPEN ELECTIVE - I
(R20A0351) INTELLECTUAL PROPERTY RIGHTS

COURSE OBJECTIVES:

1. To understand the concepts IPR
2. To understand Trademarks, Trade Secretes and GI of goods.
3. To understand Copyrights, Patents and Industrial Designs.
4. To learn about how to manage IP rights and legal aspects.
5. To understand the concepts of Cyber laws in IPR.

UNIT – I:

Introduction: Introduction to Intellectual Property Rights, types of intellectual property, importance of intellectual property rights, Evolution of IP acts and treaties (WIPO & TRIPS), Agencies responsible for IPR registrations, Role and value of IP in international commerce, Issues affecting IP internationally.

UNIT – II

Trade Marks: Purpose and function of trademarks, Acquisition of trade mark rights, transfer of rights, Selecting and evaluating trademark, registration of trademarks, claims. **Trade Secrets**: Trade secret law, determination of trade secret status, liability for misappropriation of trade secrets, trade secret litigation.
Geographical Indications of Goods: Basic aspects and need for the registration

UNIT – III

Copyrights: Fundamentals of copyright law, originality of material, right of reproduction, right to perform the work publicly, copyright ownership issues, notice of copyright.
Patents: Foundation of patent law, patent searching process, Basic Criteria of Patentability
Industrial Designs: Kind of protection provided in Industrial design

UNIT – IV:

Managing IP Rights: Acquiring IP Rights: letters of instruction, joint collaboration agreement, **Protecting IP Rights:** non disclosure agreement, cease and desist letter, settlement memorandum. **Transferring IP Rights**: Assignment contract, license agreement, deed of assignment

UNIT- V

Introduction to Cyber law: Information Technology Act, cyber crime and e-commerce,data security, confidentiality, privacy, international aspects of computer and online crime.

TEXT BOOKS:

1. Intellectual property right by Deborah E Bouchoux
2. Cyber law, Text and cases South western special topics collection.
3. Intellectual property rights by N.K Acharya

4. Fundamentals of IPR for engineers, BY komal bansal

REFERENCE BOOKS:

1. Intellectual property rights by P. Radhakrishnan.

COURSE OUTCOMES:

1. Learner should be able to demonstrate understanding of basic concepts of IPR.
2. Able to differentiate between Trademarks, Trade secrets and GI of goods.
3. Able to understand Copyrights, Patents and Industrial Designs..
4. Able to manage and protect IP
5. Will gain Knowledge on Cyber law.

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II Year B.Tech. CSE- II Sem

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OPEN ELECTIVE - I
(R20A0051) ENTERPRISE RESOURCE PLANNING

COURSE OBJECTIVES

1. To know the basics of ERP
2. To understand the key implementation of ERP
3. To know the business modules of ERP
4. To learn about the post implementation of ERP
5. To evaluate the current and future trends in ERP

UNIT 1

INTRODUCTION: Overview and Benefits of ERP, ERP Related Technologies- Business Process Reengineering (BPR), Online Analytical Processing (OLAP), Supply chain Management (SCM). Applications of ERP.

UNIT II

ERP IMPLEMENTATION: Implementation and Product Lifecycle, Implementation Methodology, Planning Evaluation and selection of ERP systems, Organizing the Project Management and Monitoring. Case Study on Manufacturing.

UNIT III

ERP MODULES: Business modules in an ERP Package- Manufacturing, Human Resources, Plant Maintenance, Materials Management, Data Warehousing, Data Mining, Quality Management, Sales and Distribution. Case Study in Banking Sector.

UNIT IV

POST IMPLEMENTATION: Overview of ERP software solution. Maintenance of ERP-Organizational and Industrial impact; Success and Failure factors of ERP Implementation. Case Study of Success Story and Failure of Processing Sector.

UNIT V

EMERGING TRENDS IN ERP: Extended ERP system, ERP add–ons –Customer Relations Management (CRM), Customer satisfaction (CS). Business analytics etc- Future trends in ERP systems-web enabled, Wireless technologies. Case Study in Service Sector.

TEXT BOOKS:

1. Jagan Nathan Vaman, ERP in Practice, Tata McGraw-Hill, 2008
2. Alexis Leon, “ERP Demystified”, Tata McGraw Hill, New Delhi, 2000
3. Mahadeo Jaiswal and Ganesh Vanapalli, ERP Macmillan India, 2009.

REFERENCE BOOKS:

1. Alexis Leon, Enterprise Resource Planning, second edition, Tata McGraw-Hill, 2008.
2. Vinod Kumar Grag and N.K. Venkitakrishnan, ERP- Concepts and Practice, Prentice Hall ofIndia,2 nd edition, 2006.
3. Joseph A Brady, Ellen F Monk, Bret Wagner, "Concepts in Enterprise Resource Planning",Thompson Course Technology, USA, 2001.

COURSE OUTCOMES:

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

1. Understand the basics of ERP
2. Understand the key implementation of ERP
3. Learn the business modules of ERP
4. Learn about the post implementation of ERP
5. Evaluate the current and future trends in ERP

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

II Year B.Tech. CSE- II Sem **L/T/P/C**
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OPEN ELECTIVE - I
(R20A0451) BASICS OF COMPUTER ORGANIZATION

COURSE OBJECTIVES:

1. To understand basic components and operations in asystem.
2. To understand the execution of an instruction in a computer.
3. To acquire the knowledge to design of CPU.
4. To explore the memory organization.
5. To explore I/O organization and parallel processing in depth.

UNIT I

Basic Structure of Computers: Computer Types, Functional Units, Computer Registers, Basic Operational Concepts, Bus Structures, Software, Performance, Multiprocessors and Multi Computers.

Data Representation: Fixed Point Representation, Floating – Point Representation.

Register Transfer Language and Micro Operations: RTL- Register transfers, Bus and MemoryTransfers.

Micro operations: Arithmetic, Logic, Shift micro operations, Arithmetic logic shift unit.

UNIT-II

Computer Arithmetic: Addition and Subtraction, Multiplication Algorithms, Division Algorithms.Error detection and Correction Codes

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

UNIT III

Central Processing Unit organization: General Register Organization, Stack organization**,** Instruction formats, Addressing Modes, Data Transfer and Manipulation, Program Control, **CISC** and **RISC** processors.

Control Unit Design: Control Memory, Address sequencing, Design of CU: Micro Programmed Control, Hardware Control, Micro Program example. **Case Study-** Introduction to x86 architecture.

UNIT IV

Memory Organization: Memory Hierarchy, Memory Interleaving,
Main Memory-RAM and ROMchips,
Associative Memory-Hardware Organization, Match logic. Mapping functions- Associate, Direct, Set Associative Mapping.
Cache Memory: Hit Ratio, Cache Coherence, Cache writes policies.
Auxiliary memory: Magnetic Disks, Magnetic Tapes Optical devices, Page Replacement Algorithms.

UNIT V

Input –Output Organization: Peripheral Devices, Input-Output Subsystems, I/O Device Interface, I/O Processor, I/O Transfers–Program Controlled, Interrupt Driven, and DMA, Interrupts and Exceptions. I/O Device Interfaces – SCII, USB.
Pipelining and Vector Processing: Basic Concepts, Instruction level Parallelism Throughput and Speedup, Pipeline hazards. Vector Processing: Applications, an Example for Vector Processing.

TEXT BOOKS:

1. Computer System Architecture by M. Morris Mano, 3rd Edition.
2. Computer Organization and Design: The Hardware/Software Interface, 5th Edition by David Patterson and John L. Hennessy, Elsevier.
3. Computer Organization and Embedded Systems, 6th Edition by Carl Hamacher, McGraw Hill Higher Education.

REFERENCE BOOKS:

1. Computer Architecture and Organization‖, 3rd Edition by John P. Hayes, WCB/McGraw-Hill
2. Computer Organization and Architecture: Designing for Performance, 10th Edition by William Stallings, Pearson Education.
3. Computer System Design and Architecture‖, 2nd Edition by Vincent P. Heuring and Harry F.Jordan, Pearson Education.

COURSE OUTCOMES:

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

1. Understand functional components and micro operations in a computer.
2. Learn arithmetic operations and computer instructions.
3. Understand CPU organization and design of control unit.
4. Know about the Memory organization.
5. Understand I/O Transfer and Parallel Processing.

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II Year B.Tech. CSE- II Sem **L/T/P/C**

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(R20A0585)

OBJECT ORIENTED PROGRAMMING THROUGH JAVA LAB

COURSE OBJECTIVES:

1. To prepare students to become familiar with the Standard Java technologies ofJ2SE
2. To provide Students with a solid foundation in OOP fundamentals required to solve programming problems and also to learn Advanced Java topics like J2ME, J2EE, JSP, JavaScript
3. To train Students with good OOP programming breadth so as to comprehend, analyze, design and create novel products and solutions for the real life problems.
4. To inculcate in students professional and ethical attitude, multidisciplinary approach and an ability to relate java programming issues to broader application context.
5. To provide student with an academic environment aware of excellence, written ethical codes and guidelines and lifelong learning needed for a successful professional career

Week 1:

a) Write a java program to find the Fibonacci series using recursive and non-recursive functions

b) Write a program to multiply two given matrices.

c) Write a program for Method overloading and Constructor overloading

Week 2:

a) Write a program to demonstrate execution of static blocks ,static variables & static methods.

b) Write a program to display the employee details using Scanner class

c) Write a program for sorting a given list of names in ascending order

Week 3:

a) Write a program to implement single and Multi level inheritance

b) Write a program to implement Hierarchical Inheritance.

c) Write a program to implement method overriding.

Week 4:

a) Write a program to create an abstract class named Shape that contains two integers and an empty method named printArea (). Provide three classes named Rectangle, Triangle and Circle such that each one of the classes extends the class Shape. Each one of the classes contains only the method printArea () that prints the area of the given shape.

b) Write a program to implement Interface .

c) Write a program to implement multiple and Hybrid Inheritance

Week 5:

a) Write a program to create inner classes

b) Write a program to create user defined package and demonstrate various access modifiers.

c) Write a program to demonstrate the use of super and final keywords.

Week 6 :

a) Write a program if number is less than 10 and greater than 50 it generate the exception out of range. else it displays the square of number.
b) Write a program with multiple catch Statements.
c) write a program to implement nested try

Week 7:

a) Write a Program to implement simple Thread by extending Thread class and implementing runnable interface.
b) Write a program that implements a multi-thread application that has three threads
c) write a program to set and print thread priorities

Week 8:

Write a program to implement following collections
a) array List b) Vector c)Hash table d)Stack

Week 9:

a) Write a program to demonstrate lambda expressions.
b) Write a program for producer and consumer problem using Threads

Week 10:

a) Write a program to list all the files in a directory including the files present in all its subdirectories.
b) Write a Program to Read the Content of a File Line by Line

Week 11:

a) Write a program that connects to a database using JDBC display all records in a table.
b) Write a program to connect to a database using JDBC and insert values into it.
c) Write a program to connect to a database using JDBC and delete values from it

Week 12:

Write a program that works as a simple calculator. Use a Grid Layout to arrange Buttons for digits and for the + - * % operations. Add a text field to display the result.

COURSE OUTCOMES:

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

1. Analyze the necessity for Object Oriented Programming paradigm and overstructured programming and become familiar with the fundamental concepts in OOP.
2. Demonstrate an ability to design and develop Java programs, analyze, and interpret objectoriented data and report results.
3. Analyze the distinguish between various types of inheritance.
4. Demonstrate an ability to design an object oriented system, AWT components or multithreaded process as per needs and specifications.
5. Demonstrate an ability to visualize and work on laboratory and multidisciplinary tasks likeconsole and windows applications for standalone programs.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

II Year B.Tech. CSE- II Sem **L/T/P/C**

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(R20A0586) Database Management Systems Lab

COURSE OBJECTIVES:

1. To familiarize database design concepts using ER modeling and Relational model.
2. To enable students to use SQL to query database and perform all types of operations andunderstanding normalization and effective database design principles
3. To enable students to use Non-Relational DBMS and understand the usage of Documentoriented and distributed databases.
4. To enable the students to use TCL and DCL Commands and perform all states of Transaction operations.
5. To familiarize issues of concurrency control and transaction management

A. Practice on SQL Queries to acquire knowledge on RDBMS.

B. Case Study:

Objective: This lab enables the students to practice the concepts learnt in the subject DBMSby developing a database for an example company named "Roadway Travels" whose description is as follows. The student is expected to practice the designing, develop ing and querying a database in the context of example database -Roadway travels". Students are expected to use "Mysql" database.

Roadway Travels: "Roadway Travels" is in business since 1997 with several buses connecting different places in India. Its main office is located in Hyderabad.

The company wants to computerize its operations in the following areas:

Reservations and Ticketing Cancellations

Reservations & Cancellation:

Reservations are directly handled by booking office. Reservations can be made 30 days in advance and tickets issued to passenger. One Passenger/person can book many tickets (to his/her family).

Cancellations are also directly handed at the booking office.

In the process of computerization of Roadway Travels you have to design and develop a Database which consists the data of Buses, Passengers, Tickets, and Reservation and cancellation details. You should also develop query's using SQL to retrieve the data from the database.

The above Process involves many steps like 1. Analyzing the problem and identifying the Entitites and Relationships, 2. E-R Model, 3. Relational Model 4. Normalization 5. Creating the database 6. Querying. Students are supposed to work on these steps week wise and finally create a complete "Database System" to Roadway Travels. Examples are given at every experiment for guidance to students.

WEEK 1: E-R Model

Analyze the problem carefully and come up with the entities in it. Identify what data has to bepersisted in the database. This contains the entities, attributes etc.

Identify the primary keys for all the entities. Identify the other keys like candidate keys,

partialkeys, if any.
Example:

Entities:

1. BUS
2. Ticket
3. Passenger

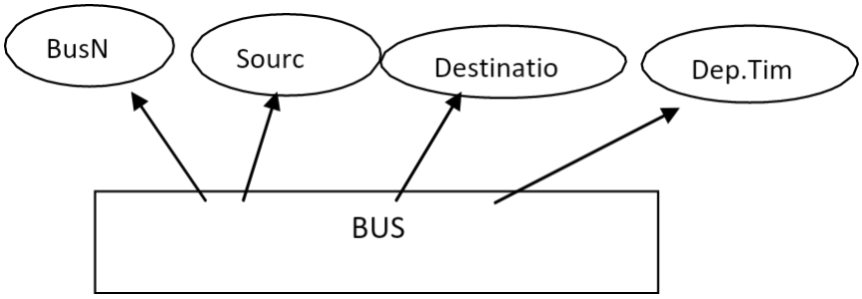
Relationships:

1. Reservation
2. Cancellation

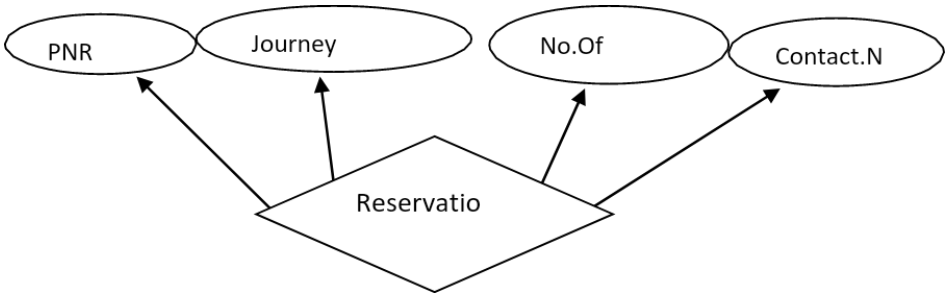
PRIMARY KEY ATTRIBUTES:

1. Ticket ID (Ticket Entity)
2. Passport ID (Passenger Entity)
3. Bus_No(Bus Entity)

Apart from the above mentioned entities you can identify more. The abovementioned are few.



Ex: **Bus Entity**



Ex: **Reservation relationship**

Note: The student is required to submit a document by writing the Entities and Keysto the lab teacher

WEEK 2: Concept design with E-R Model Note: -

Relate the entities appropriately. Apply cardinalities for each relationship. Identify strong entities and weak entities (if any). Indicate the type of relationships (total/partial).Try to incorporate Generalization, Aggregation,
Specialization etc wherever required.
Note: The student is required to submit a document by drawing the E-R diagram to the lab teacher.

WEEK 3: Relational Model

Represent all the entities (Strong, Weak) in tabular fashion.

Represent relationships in a tabular fashion. There are different ways of representing relationships as tables based on the cardinality. Represent attribute as columns in tables or astables based on the requirement. Different types of attributes (Composite, Multi-valued and Derived) have different way of Representation.

Example: The Passenger table looks as like below...

Note: You can add more attributes based on your E-R-ModelThis is not normalized table.

Passenger Name	Age	Gender	Address	Ticket_Id	Passport_Id

Note: *The student is required to submit a document by represent relationships in atabular fashion to the lab teacher.*

WEEK 4: Normalization

Database normalization is a technique for designing relational database tables to minimize duplication of information and, in so doing, to safeguard the database against certain typesof logical or structural problems, namely data anomalies. For example, when multiple instances of a given piece of information occur in a table, the possibility exists that these instances will not be kept consistent when the data within the table is updated, leading to a loss of data integrity. A table that is sufficiently normalized is less vulnerable to problems of this kind, because its structure reflects the basic assumptions for when multiple instances of the sameinformation should be represented by a single instance only.

For the above table in the First normalization we can remove the multi valued attribute Ticket_id and place it in another table along with the primary key of passenger.

First Normal Form: The above table can be divided into two tables as shown below.

Passenger Name	Age	Gender	Address	Passport_Id

Pass	Ti

po rt_ Id	c k e t _ i d

Note: Apply the second and third normal forms for the same example (if required you canconsider more attributes)

WEEK 5: a)Installation of Mysql / MongoDB and practicing DDL, commands

Installation of MySql / MongoDB. In this week you will learn Creating databases, How to create tables, altering the database, dropping tables and databases if not required. You will also try truncate, rename commands etc.

Example for creation of a normalized "Passenger" table. CREATE TABLE Passenger (Passport_id INTEGER PRIMARY KEY, Name VARCHAR (50) Not NULL,Age Integer Not NULL,Sex Char,Address VARCHAR (50) Not NULL);
Similarly create all other tables.
Note: Detailed creation of tables is given at the end**.**

b)Installation of MongoDB

Installation of MongoDB on Windows, MongoDB is a cross-platform, document oriented database that provides, high performance, high availability, and easy scalability. MongoDB works on concept of collection and document. In this week You will Learn with MongoDB. How to create Database, Collection, Document, Field, Embedded Documents. Relationships in MongoDB represent how various documents are logically related to each other. Relationships can be modeled via **Embedded** and **Referenced** approaches.
Eample: MongoDB **db.createCollection(name, options)** is used to create collection.

Basic syntax of createCollection() method

```
>use test
switched to db test
>db.createCollection("mycollection")
{ "ok" : 1 }
>
```

created collection by using the command show collections.

```
>show collectionsmycollection system.indexs
```

WEEK 6: Practicing DML commands

DML commands are used to for managing data within schema objects. Some examples:

- SELECT - retrieve data from the a database
- INSERT - insert data into a table
- UPDATE - updates existing data within a table
- DELETE - deletes all records from a table, the space for The records remain

Inserting values into "Bus" table:

Insert into Bus values(1234,'hyderabad', ‘tirupathi');Insert into Bus values (2345,’hyderabd’ ‘Banglore’); Insert into Bus values (23,'hyderabd','Kolkata'); Insert into Bus values

(45,'Tirupathi,'Banglore'); Insert into Bus values (34,'hyderabd','Chennai'); ***Inserting values into "Passenger" table:***

Insert into Passenger values (1, 45,'ramesh', 45,'M', 'abc123');Insert into Passenger values (2, 78,'geetha', 36,'F','abc124'); Insert into Passenger values (45, 90,' ram', 30,'M','abc12'); Insert into Passenger values (67, 89,' ravi', 50,'M','abc14'); Insert into Passenger values (56, 22,'seetha', 32,'F','abc55');

Few more Examples of DML commands:

Select * from Bus; (selects all the attributes and display) UPDATE BUS SET Bus No = 1 WHEREBUS NO=2;

WEEK 7: Querying

In this week you are going to practice queries (along with sub queries) using ANY,ALL, IN, Exists, NOT EXISTS, UNION, INTERSECT, Constraints etc.

Practice the following Queries:

Display unique PNR_no of all Passengers. Display all the names of male passengers. Displaythe ticket numbers and names of all the passengers.

Find the ticket numbers of the passengers whose name start with 'r' and ends with 'h'.Find the names of passengers whose age is between 30 and 45.

Display all the passengers names beginning with 'A' Display the sorted list ofpassengers names

WEEK 8 and WEEK 9:

1. You are going to practice queries using Aggregate functions (COUNT, SUM, AVG, and MAXand MIN), GROUP BY, HAVING and Creation and dropping of Views.
2. Write a Query to display the Information present in the Passenger and cancellation tables.Hint: Use UNION Operator.
3. Display the number of days in a week on which the 9W01 bus is available.
4. Find number of tickets booked for each PNR_no using GROUP BY CLAUSE. Hint: Use GROUP BY on PNR_No.
5. Find the distinct PNR numbers that are present.
6. Find the number of tickets booked by a passenger where the number of seats is greaterthan 1.Hint: Use GROUP BY, WHERE and HAVING CLAUSES.
7. Find the total number of cancelled seats.

WEEK 10: Triggers

In this week you are going to work on Triggers. Creation of insert trigger, delete trigger, updatetrigger. Practice triggers using the above database.

Eample: CREATE TRIGGER updcheck BEFORE UPDATE ON passenger FOR EACH ROW BEGIN

IF NEW.Tickent N0 > 60 THEN
SET New.Tickent no = Ticket no;ELSE
SET New.Ticket no = 0;END IF;
END;

WEEK 11: STORED PROCEDURES

In this session you are going to learn Creation of stored procedure, Execution of

procedureand modification of procedure. Practice procedures using the above database.

Eample: CREATE PROCEDURE myProc()

BEGIN

SELECT COUNT(Tickets) FROM Ticket WHERE age>=40; End;

WEEK 12: DCL Commands

DCL commands are used to for granting the permissions for security of datawithin the users.

REFERENCE BOOKS:

1. Introduction to SQL,Rick F.Vander Lans,Pearson education..
2. Oracle PL/SQL, B.Rosenzweig and E.Silvestrova,Pearson education.
3. Oracle PL/SQL Programming,Steven Feuerstein,SPD.
4. SQL & PL/SQL for Oracle 10g,B lack Book, Dr.P.S.Deshpande, Dream Tech.
5. Ora cle D atab a se 11 g P L/S QL P ro gra m ming, M .M c Laughlin,TMH.
6. SQL Fundamentals, J.J.Patrick,Pearson Education.

COURSE OUTCOMES:

The students will be able:

1. To design a database based on the requirements by applying ER and Relational model.
2. To use normal forms for Schema Refinement and Transaction Management and SQL to interact with database to perform all types of DB operations.
3. To analyze the business requirements and produce a viable model for the implementation of document oriented and distributed databases.
4. To apply TCL and DCL Commands and to visualize all states of transaction operations.
5. Analyze and Select storage and recovery techniques of database system

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

II Year B.Tech. CSE- II Sem **L/T/P/C**
2-/0/-0

(R20A0008)

GLOBAL EDUCATION AND PROFESSIONAL CAREER

INTRODUCTION

In every era of human life, studying abroad has allowed one to experience another part of oneselfin a different setting. Additionally, if all that hurry is geared towards success in one's career, international education will most definitely be worth one's time. It is not only an expedition of self-discovery but also an investment in one's resume.

The world, today, is redefining knowledge and great leadership to encompass critical values that are key to meeting modern career challenges. To meet the current requirements, a studydelineating Global Education is of utmost importance towards prospective growth.

COURSE OBJECTIVES:

1. To assist students to understand the broad scope of engineering.
2. To equip the students to study the academic subjects with better perspective of the expectations of the international standards
3. To familiarize students with the financial requirements and ways to receive monetary aid
4. To enable students' understanding of the various admission tests.
5. To acquaint them with their own skill set and train the students towards skills development.

UNIT 1

Importance and relevance of Engineering in today's and futuristic contexts.
The jobs that will thrive in the market in the coming decades. For eg., Robot Manufacturer &service Management, Big Data & AI Scientists, Artificial Bodies Manufacturer, Gene Designers, etc

UNIT 2

Countries and their entry requirements
Non-immigrant student visas, Work Permit visas

UNIT 3

Admission tests to colleges and universities world-overPSAT, SAT, TOEFL, AP, IELTS…

UNIT 4

Financial capacity requirements
Scholarships, Full scholarships, merit scholarships, on-campus jobs

UNIT 5

Skills Mapping
Match one's skills with jobs, Skills development

COURSE OUTCOMES:

After completion of the course, the students will be able to:

1. Comprehend the usage of engineering in various fields and disciplines.
2. Identify the right college and country to pursue higher education.
3. Prepare themselves for the skill-oriented academics and prospective growth.
4. Plan for their future education with the precise financial management.
5. Discover and discuss their skill set and the jobs that map their skills.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

III Year B.Tech. CSE- I Sem L/T/P/C 3/-/-/3

(R20A0511) SOFTWARE ENGINEERING

COURSE OBJECTIVES:

1. To provide the idea of decomposing the given problem into Analysis, Design,Implementation, Testing and Maintenance phases
2. To understand software process models such as waterfall and evolutionary models and software requirements and SRS document.
3. To understand different software design and architectural styles & software testing approaches such as unit testing and integration testing.
4. To understand quality control and how to ensure good quality software through quality assurance .
5. To gain the knowledge of how Analysis, Design, Implementation, Testing and Maintenance processes are conducted in an object oriented software projects.

UNIT -I

Introduction to Software Engineering: The evolving role of software, Changing Nature of Software,Software myths.

A Generic view of process: Software engineering- A layered technology, a process framework, The Capability Maturity Model Integration (CMMI), Process patterns, process assessment, personal andteam process models.

Process models: The waterfall model, Incremental process models, Evolutionary process models,The Unified process**.**

UNIT-II

Software Requirements: Functional and non-functional requirements, User requirements, System requirements, Interface specification, the software requirements document.

Requirements engineering process: Feasibility studies, Requirements elicitation and analysis, Requirements validation, Requirements management.

System models: Context Models, Behavioral models, Data models, Object models, structured methods, UML Diagrams.

UNIT-III

Design Engineering: Design process and Design quality, Design concepts, the design model.

Creating an architectural design: Software architecture, Data design, Architectural styles and patterns, Architectural Design.

Performing User interface design: Golden rules, User interface analysis and design, interfaceanalysis, interface design steps, Design evaluation.

UNIT-IV

Testing Strategies: A strategic approach to software testing, test strategies for conventional software, Black-Box and White-Box testing, Validation testing, System testing, the art of Debugging. **Risk management:** Reactive vs. Proactive Risk strategies, software risks, Risk identification, Risk projection, Risk refinement RMMM, RMMM Plan.

UNIT-V

Quality Management: Software Quality, Quality concepts, Software quality assurance, Software Reviews, Formal technical reviews, Statistical Software quality Assurance, Software reliability, The ISO 9000quality standards.

Case Study – ATM Management System.

TEXT BOOKS:

1. Software Engineering A practitioner's Approach, Roger S Pressman, 6thedition. McGraw Hill International Edition.
2. Software Engineering, Ian Sommerville,7th edition, Pearson Education.

REFERENCE BOOKS:

1. Software Engineering, A Precise Approach, Pankaj Jalote,WileyIndia,2010.
2. Software Engineering: A Primer, Waman S Jawadekar, TataMcGraw-Hill,2008
3. FundamentalsofSoftwareEngineering,RajibMall,PHI,2005
4. Software Engineering, Principles and Practices, DeepakJain,Oxford UniversityPress.
5. Software Engineering: Abstraction and modelling, Diner Bjorner,SpringerInternationaledition,2006.
6. Software Engineering2: Specification of systems and languages, Diner Bjorner, SpringerInternationaledition2006.
7. Software Engineering Foundations, YinguxWang,Auerbach Publications,2008.
8. Software Engineering Principles and Practice, Hans Van Vliet, 3rd edition, JohnWiley & Sons Ltd.
9. Software Engineering3: Domains, Requirements, and Software Design, D.Bjorner, Springer International Edition.
10. Introduction to Software Engineering, R.J.Leach, CRC Press.

COURSE OUTCOMES:

After completion of the course, the students will be able to:

1. Identify the minimum requirements for the development of application.
2. Develop, maintain, efficient, reliable and cost effective software solutions.
3. Critically thinking and evaluate assumptions and arguments.
4. Test and maintain process in an object orient software project.
5. Ensure good quality software through quality assurance.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

III Year B.Tech. CSE- I Sem L/T/P/C 3/-/-/3

(R20A0512)

COMPILER DESIGN

COURSE OBJECTIVES:

1.To provide an initial Understanding of language translators
2.The Knowledge of principles, techniques and tools used in compiler construction
3.Use of available automated tools in compilers construction.
4.Knowledge of how to optimize the compilers
5.Provides techniques for generating cross compilers through Bootstrapping

UNIT-I

Language Translation- introduction, basics, steps involved in atypical language processing system, Types of translators, Compilers- overview, phases, Pass and Phases of translation, bootstrapping, data structures in compilation. Lexical Analysis (Scanning)- Functions of scanner, Specification of tokens- Regular expressions and Regular grammars for common PL constructs. Recognition of Tokens- Finite Automata in recognition and generation of tokens. Scanner generators- Lexical analyzer generators, LEX. Syntax Analysis (Parsing)- Functions of a parser, Classification of parsers. Context free grammars in syntax specification, benefits and usage in compilers.

UNIT-II

Top down parsing–Definition, types of top down parsers- Backtracking, Recursive descent, Predictive, LL (1), Preprocessing the grammars used in top down parsing, Error recovery, and Limitations. Bottom up parsing- Definition, Handle pruning. Types of bottom up parsers- Shift Reduce parsers, LR parsers- LR(0), SLR, CALR and LALR parsing, Error recovery, Handling ambiguous grammars, Parser generators- yet another compiler compiler(YACC).

UNIT-III

Semantic analysis-Attributed grammars, Syntax directed definition and Translation schemes, Type checker: functions, type expressions, type systems, types checking of various constructs. Intermediate Code Generation-Functions, intermediate code forms- syntax tree, DAG, Polish notation, and Three address codes. Translation of different source language constructs into intermediate code. Symbol Tables-Definition, contents, and formats to represent names in a Symbol table. Different approaches of symbol table implementation for block structured and non block structured languages, such as Linear Lists, Self Organized Lists, and Binary trees, Hashing based STs.

UNIT-IV

Runtime Environment- Introduction, Activation Trees, Activation Records, and Control stacks. Runtime storage organization- Static, Stack and Heap storage

allocation. Storage allocation for arrays, strings, and records etc. Code optimization- goals and Considerations, and Scope of Optimization, Machine dependent and independent optimizations, Local optimizations, DAGs, Loop optimization, Global Optimizations. Common optimization techniques- Folding, Copy propagation, Common Sub expression eliminations, Code motion, Frequency reduction, Strength reduction etc

UNIT-V

Control flow and Data flow analysis- Flow graphs, Data flow equations, global optimization- Redundant sub expression elimination, Induction variable eliminations, Live Variable analysis. Object code generation- Object code forms, machine dependent code optimization, register allocation and assignment, Algorithms- generic code generation algorithm and other modern algorithms, DAG for register allocation.

TEXT BOOKS:

1. Compilers, Principles, Techniques, and Tools – Alfred.V Aho, Monica S.Lam, Ravi Sethi,Jeffrey D.Ullman ; 2nd or later editions, Pearson Education.
2. Modern Compiler implementation in C - Andrew N.Appel Cambridge University Press.

REFERENCES:

1. lex & yacc , -John R Levine, Tony Mason, Doug Brown; O'reilly.
2. Compiler Construction,- LOUDEN, Thomson.
3. Engineering a compiler – Cooper & Linda, Elsevier
4. Modern Compiler Design – Dick Grune, Henry E.Bal, Cariel TH Jacobs, Wiley Dreamtech

COURSE OUTCOMES :

By the end of the semester, the student will be able to :

1. Understand the essence of different language translators.
2. Design different components (phases) of a compiler by hand.
3. Apply different optimization techniques in compiler construction.
4. Solve problems, Write Algorithms,Programs and test them for the results.
5. Use the compiler construction tools Lex, and Yacc in compiler construction

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

III Year B.Tech. CSE- I Sem L/T/P/C 3/-/-/3

(R20A0513) ARTIFICIAL INTELLIGENCE

COURSE OBJECTIVES:

1. To train the students to understand different types of AI agents.
2. To understand various AI search algorithms.
3. Fundamentals of knowledge representation, building of simple knowledge- based systems and to apply knowledge representation.
4. Fundamentals of reasoning
5. Study of Markov Models enable the student ready to step into applied AI

UNIT - I: Introduction:

AI problems, Agents and Environments, Structure of Agents, Problem Solving Agents Basic Search Strategies: Problem Spaces, Uninformed Search (Breadth-First, Depth-First Search, Depth-first with Iterative Deepening), Heuristic Search (Hill Climbing, Generic Best-First, A*), Constraint Satisfaction (Backtracking, Local Search)

UNIT - II: Advanced Search:

Constructing Search Trees, Stochastic Search, AO* Search Implementation, Minimax Search, Alpha-Beta Pruning Basic Knowledge Representation and Reasoning: Propositional Logic, First-Order Logic, Forward Chaining and Backward Chaining, Introduction to Probabilistic Reasoning, Bayes Theorem

UNIT - III: Advanced Knowledge Representation and Reasoning:

Knowledge Representation Issues, Nonmonotonic Reasoning, Other Knowledge Representation Schemes

Reasoning Under Uncertainty: Basic probability, Acting Under Uncertainty, Bayes' Rule, Representing Knowledge in an Uncertain Domain, Bayesian Networks

UNIT - IV: Learning:

What Is Learning? Rote Learning, Learning by Taking Advice, Learning in Problem Solving, Learning from Examples, Winston's Learning Program, Decision Trees.

UNIT - V: Expert Systems:

Representing and Using Domain Knowledge, Shell, Explanation, Knowledge Acquisition.

TEXT BOOKS:

1. Russell, S. and Norvig, P, Artificial Intelligence: A Modern Approach, Third Edition,PrenticeHall, 2010.

REFERENCES:

1. Artificial Intelligence, Elaine Rich, Kevin Knight, Shivasankar B. Nair, The McGraw Hill publications, Third Edition, 2009.

2. George F. Luger, 2. Artificial Intelligence: Structures and Strategies for Complex Problem Solving, Pearson Education, 6th ed., 2009.

COURSE OUTCOMES:

1. Understand the informed and uninformed problem types and apply search strategies to solve them.
2. Apply difficult real life problems in a state space representation so as to solve those using AI techniques like searching and game playing.
3. Design and evaluate intelligent expert models for perception and prediction from intelligent environment.
4. Formulate valid solutions for problems involving uncertain inputs or outcomes by using decision making techniques.
5. Demonstrate and enrich knowledge to select and apply AI tools to synthesize information and develop models within constraints of application area.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

III Year B.Tech. CSE- I Sem | L/T/P/C 3/-/-/3

(PROFESSIONAL ELECTIVE-I)

(R20A06210) DIGITAL FORENSICS

COURSE OBJECTIVES:

- Provides an in-depth study of the rapidly changing and fascinating field of computer forensics.
- Combines both the technical expertise and the knowledge required to investigate, detect and prevent digital crimes.
- Understand how to manage Evidence & Presentation
- Knowledge on digital forensics legislations, digital crime, forensics processes and procedures, data acquisition and validation, e-discovery tools E-evidence collection and preservation, investigating operating systems and file systems, network forensics, art of steganography and mobile device forensics.
- To gain knowledge on Mobile Forensics.

UNIT - I Digital Forensics Science: Forensics science, computer forensics, and digital forensics. Computer Crime: Criminalistics as it relates to the investigative process, analysis of cybercriminalistics area, holistic approach to cyber-forensics.

UNIT - II Cyber Crime Scene Analysis: Discuss the various court orders etc., methods to search and seizure electronic evidence, retrieved and un-retrieved communications, Discuss the importance of understanding what court documents would be required for a criminal investigation.

UNIT - III Evidence Management & Presentation: Create and manage shared folders using operating system, importance of the forensic mindset, define the workload of law enforcement, Explain what the normal case would look like, Define who should be notified of a crime, parts of gathering evidence, define and apply probable cause.

UNIT - IV Computer Forensics: Prepare a case, Begin an investigation, Understand computer forensics workstations and software, Conduct an investigation, Complete a case, Critique a case. Network Forensics: open-source security tools for network forensic analysis, requirements for preservation of network data.

UNIT - V Mobile Forensics: mobile forensics techniques, mobile forensics tools. Legal Aspects of Digital Forensics: IT Act 2000, amendment of IT Act 2008. Recent trends in mobile forensic technique and methods to search and seizure electronic evidence

TEXT BOOKS:

B. Nelson, A. Phillips, and C. Steuart, Guide to Computer Forensics and Investigations, 4th Edition, Course Technology, 2010

REFERENCE BOOKS:

1. John Sammons, The Basics of Digital Forensics, 2nd Edition, Elsevier, 2014
2. John Vacca, Computer Forensics: Computer Crime Scene Investigation, 2nd Edition, Laxmi Publications, 2005.

COURSE OUTCOMES:

1. Understand relevant legislation and codes of ethics.
2. Investigate computer forensics and digital detective and various processes, policies and procedures data acquisition and validation, e-discovery tools.
3. Analyze E-discovery, guidelines and standards, E-evidence, tools and environment.
4. Apply the underlying principles of Email, web and network forensics to handle real life problems
5. Use IT Acts and apply mobile forensics techniques.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

III Year B.Tech. CSE- I Sem L/T/P/C 3/-/-/3

(PROFESSIONAL ELECTIVE-I)

(R20A7201) TEXT ANALYTICS

COURSE OBJECTIVES

1. Differentiate clustering and classification techniques on text.
2. Analyze visualization methodologies.
3. Illustrate about event detection methods and embedding semantics in models.
4. Compare feature extraction methods.
5. Mulltilingual implementation.

UNIT-I: TEXT EXTRACTION

Text Extraction: Introduction, Rapid automatic keyword extraction: candidate keywords, keyword scores, adjoining keywords, extracted keywords, Benchmark evaluation: precision and recall, efficiency, stop list generation, Evaluation on new articles.

UNIT-II: CLUSTERING

Clustering: Multilingual document clustering: Multilingual LSA, Tucker1 method, PARAFAC2 method, LSA with term alignments, LMSA, LMSA with term alignments.

UNIT-III: CLASSIFICATION

Classification: Content-based spam email classification using machine-learning algorithms, Utilizing nonnegative matrix factorization for email classification problems, Constrained clustering with k- means type algorithms.

UNIT-IV: ANOMALY AND TREND DETECTION

Anomaly and trend detection: Text Visualization techniques such as tag clouds, authorship and change tracking, Data Exploration and the search for novel patterns, sentiment tracking, visual analytics and Future Lens, scenario discovery, adaptive threshold setting for novelty mining.

UNIT-V: TEXT STREAMS

Text streams: Introduction, Text streams, Feature extraction and data reduction, Event detection, Trend detection, Event and trend descriptions, Embedding semantics in LDA topic models: Introduction, vector space modeling, latent semantic analysis, probabilistic latent semantic analysis, Latent Dirichlet allocation, embedding external semantics from Wikipedia, data-driven semantic embedding.

TEXT BOOKS

1. Michael W. Berry & Jacob Kogan ,"Text Mining Applications and Theory", Wiley publications.
2. Aggarwal, Charu C., and Cheng Xiang Zhai, eds. mining text data. Springer Science & BusinessMedia, 2012.

REFERENCE BOOKS

1. Miner, Gary, et al. Practical text mining and statistical analysis for non-structured text dataapplications. Academic Press, 2012.
2. Srivastava, Ashok N., and Mehran Sahami. Text mining: Classification, clustering, andapplications,Chapman and Hall/CRC, 2009.
3. Buitelaar, Paul, Philipp Cimiano, and Bernardo Magnini, eds. Ontology learning from text:methods,evaluation and applications. Vol. 123. IOS press, 2005.

COURSE OUTCOMES

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

1. Design text extraction techniques.
2. Design clustering techniques for text.
3. Design classification techniques for text
4. Practice visualization methodologies using tools.
5. Practice feature extraction using tools.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

III Year B.Tech. CSE- I Sem | L/T/P/C 3/-/-/3

(PROFESSIONAL ELECTIVE-I)

(R20A0514) OPTIMIZATION TECHNIQUES

Course Objectives:

1. To introduce various optimization techniques i.e. classical, linear programming, transportation problem, simplex algorithm, dynamic programming
2. Provide the concepts of various classical and modern methods of for Constrained problems in both single and multivariable.
3. Provide the concepts of various classical and modern methods of for unconstrained problems in both single and multivariable
4. optimization techniques for solving and optimizing computer science and engineering problems in real world situations.
5. To explain the concept of Dynamic programming and its applications for project implementation.

UNIT – I

Introduction and Classical Optimization Techniques: Statement of an Optimization problem – design vector – design constraints – constraint surface – objective function – objective function surfaces – classification of Optimization problems.

Classical Optimization Techniques: Single variable Optimization – multi variable Optimization without constraints – necessary and sufficient conditions for minimum/maximum – multivariable Optimization with equality constraints.Solution by method of Lagrange multipliers – Multivariable Optimization with inequality constraints – Kuhn – Tucker conditions.

UNIT – II

Linear Programming: Standard form of a linear programming problem – geometry of linear programming problems – definitions and theorems – solution of a system of linear simultaneous equations – pivotal reduction of a general system of equations – motivation to the simplex method – simplex algorithm.

Transportation Problem: Finding initial basic feasible solution by north – west corner rule, least cost method and Vogel's approximation method – testing for optimality of balanced transportation problems.

UNIT – III

Unconstrained Nonlinear Programming: One dimensional minimization methods, Classification, Fibonacci method and Quadratic interpolation method Unconstrained Optimization Techniques: Univariant method, Powell's method and steepest descent method.

UNIT – IV

Constrained Nonlinear Programming: Characteristics of a constrained problem - classification - Basic approach of Penalty Function method - Basic approach of Penalty Function method - Basic approaches of Interior and Exterior penalty function methods - Introduction to convex programming problem.

UNIT – V

Dynamic Programming: Dynamic programming multistage decision processes – types – concept of sub optimization and the principle of optimality – computational procedure in dynamic programming – examples illustrating the calculus method of solution - examples illustrating the tabular method of solution.

Course Outcomes:

1. Explain the need of optimization of engineering systems
2. Understand optimization of electrical and electronics engineering problems
3. Apply classical optimization techniques, linear programming, simplex algorithm, transportation problem
4. Apply unconstrained optimization and constrained non-linear programming and dynamic programming
5. Formulate optimization problems.

Text Books:

1. Engineering optimization: Theory and practice-by S.S.Rao, New Age International (P) Limited.
2. Operations Research: An Introduction by H A Taha, 5th Edition, Macmillan, New York.
3. Operations Research by NVR Naidu, G Rajendra, T Krishna Rao, I K International Publishing house, New Delhi.

Reference Books:

1. Optimization Methods in Operations Research and systems Analysis – by K.V. Mittal and C. Mohan, New Age, International (P) Limited, Publishers
2. Operations Research – by S.D.Sharma, KedarnathRamanath& Co
3. Linear programming, G. Hadley, Narosa Publishing House, New Delhi.
4. Industrial Engineering and Production Management, M. Mahajan, DhanpatRai& co

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

III Year B.Tech. CSE- I Sem **L/T/P/C**
3/-/-/3

(PROFESSIONAL ELECTIVE-II)

(R20A6702) DATA HANDLING AND VISUALIZATION

COURSE OBJECTIVES:

1. To learn different statistical methods for Data visualization.
2. To understand the basics of R and Python.
3. To learn usage of Watson studio.
4. To understand the usage of the packages likeNumpy, pandas and matplotlib.
5. To know the functionalities and usages of Seaborn

UNIT I I

Introduction to Statistics :

Introduction to Statistics, Difference between inferential statistics and descriptive statistics, Inferential Statistics- Drawing Inferences from Data, Random Variables, Normal Probability Distribution, Sampling, Sample Statistics and Sampling Distributions. R overview and Installation- Overview and About R, R and R studio Installation, Descriptive Data analysis using R, Description of basic functions used to describe data in R

UNIT II

Data manipulation with R:

Data manipulation packages-dplyr, data.table, reshape2, tidyr, Lubridate, Data visualization with R. Data visualization in Watson Studio: Adding data to data refinery, Visualization of Data on Watson Studio

UNIT III Python:

Introduction toPython, How to Install, Introduction to Jupyter Notebook, Python scripting basics, Numpy and Pandas-Creating and Accessing Numpy Arrays, Introduction to pandas, read and write csv, Descriptive statistics using pandas, Working with text data and date time columns, Indexing and selecting data, groupby, Merge / Join datasets

UNIT IV

Data Visualization Tools inPython-

Introduction to Matplotlib, Basic plots Using matplotlib, Specialized Visualization Tools using Matplotlib, Advanced Visualization Tools using Matplotlib- WaffleCharts, WordClouds.

UNIT V

Introduction to Seaborn:

Seaborn functionalities and usage, Spatial Visualizations and Analysis in Python with Folium, Case Study.

TEXT BOOKS:

1. Core Python Programming - Second Edition,R. Nageswara Rao, Dreamtech Press.

2. Hands on programming with R by Garrett Grolemund,Shroff/O'Reilly; First edition

3. Fundamentals of Mathematical Statistics by S.C. Gupta, Sultan Chand & Sons

REFERENCE BOOKS:

1. Learn R for Applied Statistics: With Data Visualizations, Regressions, and Statistics by Eric Goh Ming Hui, Apress

2. Python for Data Analysis by William McKinney, Second Edition, O'Reilly Media Inc.

3. The Comprehensive R Archive Network- https://cran.r-project.org

4. https://seaborn.pydata.org/

5. https://dataplatform.cloud.ibm.com/

Course Outcomes:

At Completion of this course, students would be able to -

1. Apply statistical methods for Data visualization.
2. Gain knowledge on R and Python
3. Understand usage of various packages in R and Python.
4. Demonstrate knowledge of Watson studio.
5. Apply data visualization tools on various data sets.

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PROFESSIONAL ELECTIVE – II
(R20A0515)
SCRIPTING LANGUAGES

COURSE OBJECTIVES:

Student should be able:

1. To study the basics of scripting languages like Java script, Perl, PHP and Ruby
2. To understand the requirements of Scripting Languages
3. To identify the uses of Scripting Languages
4. To introduce in-depth knowledge of programming features of Perl and PHP.
5. To state the implementation and applications of Scripting.

UNIT- I

Introduction to Scripts and Scripting Languages – Scripts and Programs, Uses for Scripting Languages, Web Scripting.
JavaScript: Variables, Data Types, Operators, Conditional statements, Loops, Arrays, Functions, Objects- Predefined objects, Accessing objects, Object Methods.

UNIT- II

JavaScript programming of reactive web pages elements: JavaScript Events- Mouse events, Keyboard events, Form events, window events, Event handlers, Frames, Form object, JavaScript Form Validation.

UNIT- III

PERL : Data Types, Variables, Scalars, Operators,Conditional statements ,Loops,Arrays , Strings , Hashes , Lists , Built-in Functions, Pattern matching andregular expression operators.

UNIT -IV

PHP : Data Types, Variables, Operators, Conditional statements ,Loops ,Arrays - Indexed Array, Associative Array, String Functions, Functions- Parameterized Function, Call By Value, Call By Reference , File Handling, PHP Form handling.

UNIT- V

Ruby : Data types, Variables, Operators, Conditional statements, Loops, Methods, Blocks, Modules, Arrays, Strings, Hashes, File I/O,Ruby Form handling.

TEXT BOOKS:

1. The World of Scripting Languages, David Barron, Wiley Publications.
2. Learning PHP, MySQL, JavaScript, CSS & HTML5: A Step-by-Step Guide to Creating Dynamic Websites 3rd Edition, O'Reilly Publications

REFERENCE BOOKS:

1. The Ruby Programming Language, David Flanagan and Yukihiro Matsumoto, O'Reilly Publications.
2. Beginning JavaScript with Dom scripting and AJAX, Russ Ferguson, Christian Heilmann, Apress.
3. Programming Perl, Larry Wall, T. Christiansen and J. Orwant, O'Reilly, SPD.
4. Open Source Web Development with LAMP using Linux Apache, MySQL, Perl and PHP, J. Lee and B. Ware (Addison Wesley) Pearson Education.

COURSE OUTCOMES:

The students will be able:

1. Comprehend the differences between typical scripting languages and typical system and application programming languages.
2. To implement the design of programs for simple applications.
3. To write and apply Perl & PHP scripts.
4. Gain knowledge of the strengths and weakness of Perl, and Ruby.
5. To create software systems using scripting languages such as Perl, PHP, and Ruby.

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PROFESSIONAL ELECTIVE – II
(R20A6903) EMBEDDED SYSTEMS DESIGN

COURSE OBJECTIVES:

For embedded systems, the course will enable the students to:

1. To understand micro controllers architecture and it functionalities
2. Understand the core of an embedded system
3. To learn the embedded firmware design and development
4. To understands the embedded programming concepts
5. To understands the Introduction Arduino Programming

UNIT-I:

INTRODUCTION TO MICROCONTROLLERS:

8051 Microcontroller: Overview of 8051 Microcontroller, 8051 Architecture, Pin diagram, Memory Organization, Addressing Modes, Instruction setof8051.

Arduino: Overview of Arduino, Introduction to ATMEGEA 328P, Arduino board. Introduction Arduino Programming: Setup (), loop (), DigitalRead (), DigitalWrite () AnalogRead(), AnalogWrite().

UNIT-II:

INTRODUCTION TO EMBEDDED SYSTEMS:

Definition of Embedded System, Embedded Systems Vs General Computing Systems, History of Embedded Systems, Classification, Major Application Areas, Purpose of Embedded Systems, Characteristics and Quality Attributes of Embedded Systems.

UNIT-III:

TYPICAL EMBEDDED SYSTEM:

Core of the embedded system, Sensors and actuators, Onboard communication interfaces- I2C,SPI,UART,parallelinterface;Externalcommunicationinterfaces RS232,USB,infrared,Bluetooth,Wi-Fi,Zig-Bee,GPRS.

UNIT-IV:

EMBEDDED FIRMWARE DESIGN AND DEVELOPMENT:

Embedded firmware design approaches - super loop-based approach, operating system based approach; embedded firmware development languages- assembly language based development, high-level language based development.

UNIT-V:

EMBEDDED PROGRAMMING:

Assembly language: Interfacing LED, LCD and Keypad to 8051 Microcontroller. Embedded C: Interfacing LED, RGB LED, LCD, switch, Sensors, Buzzer to Arduino uno, serial communication programming with Arduino

TEXTBOOKS:

1. Introduction to Embedded Systems-shibukv, McGraw Hill Education.
2. Kenneth. J.Ayala, The 8051 Microcontroller, 3rd Edition Cengage Learning

REFERENCEBOOKS:

1. The 8051 Microcontroller and Embedded Systems Second Edition Muhammad Ali
2. Mazidi Janice GillispieMazidiRolin D. McKinlay
3. Embedded Systems- An integrated approach - Lyla B Das, Pearsoneducation2012.

COURSE OUTCOMES:

After going through this course, the student will be able to

1. The student will learn the internal organization of popular 8051 microcontrollers.
2. Understand the core of the embedded systems
3. Understand the internal and external communication interface
4. Understand Embedded Firmware design approaches
5. Understand embedded programming concepts.

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OPEN ELECTIVE – II
(R20A1252) MANAGEMENT INFORMATION SYSTEMS

COURSE OBJECTIVES:

1. To understand the importance of MIS, structure and types of MIS
2. To learn business applications of Information Systems
3. To learn about the Management of Information Systems
4. To learn how to build Information Systems
5. To know about Cyber crime

UNIT-I:

Introduction : MIS importance, definition, nature and scope of MIS, Structure and Classification of MIS, Information and Systems Concept, Types of Information, Information systems for competitive advantage.
Case Study: MIS at any business establishment.

UNIT-II:

Business Applications of Information Systems: E-Commerce, ERP Systems, DSS, Business Intelligence and Knowledge Management System.
Case Study: Knowledge Management Systems at an Enterprise.

UNIT-III:

Management of IS: Information system planning, system acquisition, systems implementation, evaluation & maintenance of IS, IS Security and Control.
Effectiveness of MIS: A Case Study.

UNIT-IV:

Building of Information Systems: System Development Stages, System Development Approaches. System Analysis and Design-Requirement Determination, Strategies for Requirement Determination. Structured Analysis Tools, System Design – Design Objectives, Conceptual Design, and Design Methods. Detailed system design.

UNIT-V:

Introduction to Cyber Crime: Cyber Crime Definition and orgin of the word, cyber crime and information security, cyber criminals. Classification of cyber criminals-Legal Perspectives-Indian Perspectives-Cyber crimes and Indian ITA 2000, Global perspective on cybercrime-Cybercrime era.(Refer : Nina Godbole et al)

TEXT BOOK:

1. D P Goyal, Management Information Systems–Managerial Perspective, MacMillan, 3rd Edition, 2010.

REFERENCE BOOKS:

1. Nina Godbole & Sunit Belapure " Cyber Security" Wiley india 2012.
2. Jawadekar, MIS Text and Cases, TMH, 2012.
3. Dr Milind M Oka "Cases in Management Information system 'Everest, 2012.
4. A K Gupta, Sharma "Management of Systems" Macmillan, 2012.
5. Sandra Senf "Information Technology Control and Audit" 3e, CRC Press, 2012.
6. Apache OFBiz for Ecommerce and ERP – https://ofbiz.apache.org/
7. Magneto for Ecommerce (B2B Commerce) – https://magento.com/
8. Adempiere – ERP : http://www.adempiere.net/web/guest/welcome
9. Analytica – DSS – http://www.lumina.com
10. OpenRules – Business Rules and Decision Management system – http://openrules.com/

COURSE OUTCOMES:

1. Understand the importance of MIS, structure and types of MIS
2. Understand business applications of Information Systems
3. Learning about the Management of Information Systems
4. Learning about how to build Information Systems
5. Knowing about Cyber crime

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OPEN ELECTIVE – II (R20A0552)
JAVA PROGRAMMING

COURSE OBJECTIVES:

1. To create Java programs that leverage the object-oriented features of the Java language, such as encapsulation, inheritance and polymorphism; Use data types, arrays and strings.
2. Implement error-handling techniques using exception handling,
3. To know about Applets and Event Handling
4. Create and event-driven GUI using AWT components.
5. To learn Multithreading concepts.

UNIT I:

Java Programming-OOP Concepts, History of Java, Java buzzwords, Data types, Variables, Constants, Scope and Life time of variables, Operators, Type conversion and casting, Control Flow Statements, simple java programs, concepts of classes, objects, arrays, strings, constructors, methods, access control, this keyword, overloading methods and constructors, garbage collection, recursion.

UNIT II:

Inheritance – Types of Inheritance, super keyword, and preventing inheritance: final classes and methods.

Polymorphism – Dynamic binding, method overriding, abstract classes and methods.

Interfaces-Interfaces Vs Abstract classes, defining an interface, implement interfaces, extending interface.

Packages- Defining, creating and accessing a package, importing packages.

UNIT III:

Exception handling - Benefits of exception handling, exception hierarchy, Classification of exceptions - checked exceptions and unchecked exceptions, usage of try, catch, throw, throws and finally, built in exceptions.

Multi-threading- Differences between multi-threading and multitasking, thread life cycle, creating threads, synchronizing threads.

UNIT IV

Applets – Concepts of Applets, differences between applets and applications, life cycle of an applet, types of applets, creating applets, passing parameters to applets.

Event Handling: Events, Handling mouse and keyboard events.

Files- Streams, Byte streams, Character streams, Text input/output.

UNIT V

GUI Programming with Java – AWT class hierarchy, AWT controls - Labels, button, text field, check box, and graphics. Layout Manager – Layout manager types: border, grid and flow. Swing – Introduction, limitations of AWT, Swing vs AWT.

TEXT BOOKS:

1. Java- The Complete Reference, 7th edition, Herbert schildt,TMH.
2. Understanding OOP with Java, updated edition, T. Budd, Pearsoneducation.
3. Core Java an integrated approach, dreamtech publication, Dr. R.NageswaraRao.

REFERENCE BOOKS:

1. Java for Programmers, P.J.Deitel and H.M.Deitel, PEA (or) Java: How to Program,P.J.Deitel and H.M.Deitel, PHI
2. Object Oriented Programming through Java, P. Radha Krishna, Universities Press.

COURSE OUTCOMES:

1. An understanding of the principles and practice of object-oriented programming and design in the construction of robust, maintainable programs which satisfy their requirements;
2. A competence to design, write, compile, test and execute straightforward programs using a high-level language;
3. An awareness of the need for a professional approach to design and the importance of good documentation to the finished programs.
4. Be able to make use of members of classes found in the Java API.
5. Demonstrate the ability to employ various types of constructs and a hierarchy of Java classes to provide solution to a given set of requirements.

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OPEN ELECTIVE – II
(R20A1253) SOFTWARE PROJECT MANAGEMENT

COURSE OBJECTIVES:

The Main goal of software development projects is to create a software system with a predetermined functionality and quality in a given time frame and with given costs. For achievingthis goal, models are required for determining target values and for continuously controlling these values. This course focuses on principles, techniques, methods & tools for model-based management of software projects, assurance of product quality and process adherence (quality assurance), as well as experience - based creation & improvement of models (process management).

The Objectives of the course can be characterized as follows:

1. To understand the specific roles within a software organization as related to project andprocess management
2. To understand the basic infrastructure competences (e.g., process modeling and measurement)
3. To understand the basic steps of project planning, project management, quality assurance, and process management and their relationships
4. To understand the Flow Process and Check points of the process.
5. To understand Project Organizations and Responsibilities

UNIT - I

Conventional Software Management: The waterfall Model, Conventional Software Management Performance, evolution of Software Economics: software Economics. Pragmatic Software Cost Estimation. Improving Software Economics: Reducing Software Product Size, Improving Software Processes, Improving Team Effectiveness, Improving Automation, Achieving Required Quality, Peer Inspections.

UNIT - II

Conventional And Modern Software Management: Principles of Conventional Software Engineering, Principles of Modern Software Management, Transitioning to an interactive Process, Life Cycle Phases: Engineering and Production Stages Inception, Elaboration, Construction, Transition phases.

UNIT – III

Artifacts of the Process: The Artifact Sets. Management Artifacts, Engineering Artifacts, Programmatic Artifacts. Model Based Software Architectures: A Management Perspective and Technical Perspective.

UNIT – IV

Flows of the Process: Software Process Workflows, Iteration workflows. Checkpoints of the Process: Major Mile Stones, Minor Milestones, Periodic Status Assessments. Interactive Process Planning: Work Breakdown Structures, Planning Guidelines, Cocomo Cost Estimation model.

UNIT – V

Project Organizations and Responsibilities: Line-of-Business Organizations, Project Organizations, and Evolution of Organizations. Process Automation Building Blocks, the Project Environment. Project Control and Process Instrumentation: Seven Core Metrics, Management Indicators, Quality Indicators, Life Cycle Expectations Pragmatic Software Metrics Automation.

TEXT BOOKS:

1. Walker Royce, "Software Project Management", 1998, PEA.
2. Henry, "Software Project Management", Pearson.

REFERENCE BOOKS:

1. Richard H.Thayer." Software Engineering Project Management", 1997, IEEE Computer Society.
2. Shere K.D.: "Software Engineering and Management", 1998,PHI.
3. S.A. Kelkar, "Software Project Management: A Concise Study",PHI.
4. Hughes Cotterell, "Software Project Management", 2e, TMH. 88
5. Kaeron Conway,"Software Project Management from Concept toD

COURSE OUTCOMES:

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

1. Understanding the specific roles within a software organization as related to project andprocess management
2. Understanding the basic infrastructure competences (e.g., process modeling and measurement)
3. Understanding the basic steps of project planning, project management, quality assurance, and process management and their relationships
4. Understanding the Flow Process and Check points of the process.
5. Understanding the Project Organizations and Responsibilities.

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OPEN ELECTIVE – II
(R20A0452) INTERNET OF THINGS AND ITS APPLICATIONS

COURSE OBJECTIVES:

1. To study IoT Networking Core
2. To study IoT related network fundamentals
3. To study IoT Architecture.
4. To study IoT Application Development procedure
5. To study various case studies and IoT applications.

UNIT - I :

The IoT Networking Core:

Technologies involved in IoT Development: Internet/Web and Networking Basics OSI Model, Data transfer referred with OSI Model, IP Addressing, Point to Point Data transfer, Point to Multi Point Data transfer & Network Topologies, Sub-netting, Network Topologies referred with Web, Introduction to Web Servers, Introduction to Cloud Computing IoT Platform overview of IoT supported Hardware platforms such as: Raspberry pi, ARM Cortex Processors, Arduino and Intel Galileo boards.

UNIT - II :

Network Fundamentals: Overview and working principle of Wired Networking equipment's – Router, Switches, Overview and working principle of Wireless Networking equipment's– Access Points, Hubs etc. Linux Network configuration Concepts: Networking configurations in Linux Accessing Hardware &Device Files interactions**.**

UNIT - III :

IoT Architecture: History of IoT, M2M–Machine to Machine, Web of Things, IoT protocols Applications: Remote Monitoring & Sensing, Remote Controlling, and Performance Analysis. The Architecture Layering concepts,IoT Communication Pattern, IoT protocol Architecture, The 6LoWPAN Security aspects in IoT

UNIT - IV :

IoT Application Development: Application Protocols MQTT, REST/HTTP, CoAP, MySQL. Back-end Application Designing Apache for handling HTTP Requests, PHP & My SQL for data processing, Mongo DB Object type Database, HTML, CSS & jQuery for UI Designing, JS ON lib for data processing, Security & Privacy during development, Application Development for mobile Platforms: Overview of Android/IOS App Development tools

UNIT – V:

Case Study & IoT Applications: IoT applications in home, infrastructures, buildings, security, Industries, Home appliances, other IoT electronic equipment's. Use of Big Data and Visualization in IoT,Industry concepts. Sensors and sensor Node and interfacing using any Embedded target boards (Raspberry Pi/ Intel Galileo/ARM Cortex/ Arduino)

TEXT BOOKS:

1. 6LoWPAN:TheWirelessEmbeddedInternet,ZachShelby,CarstenBormann,Wiley
2. Internet of Things: Converging Technologies for Smart Environments and Integrated Eco systems, Dr.Ovidiu Vermesan, Dr.Peter Friess, RiverPublishers
3. Interconnecting Smart Objects with IP: The Next Internet, Jean-Philippe Vasseur, Adam Dunkels, Morgan Kuffmann

REFERENCE BOOKS:

1. The Internet of Things: From RFID to the Next-Generation Pervasive Networked Lu Yan, Yan Zhang, Laurence T.Yang, Huansheng Ning
2. Internet of Things (A Hands-on-Approach), Vijay Madisetti, Arshdeep Bahga
3. Designing the Internet of Things, Adrian McEwen (Author),Hakim Cassimally
4. Asoke K Talukder and Roopa R Yavagal, "MobileComputing,"Tata Mc Graw Hill,2010.
5. Vijay Madisetti and Arshdeep Bahga, "Internet of Things (A Hands-on-Approach)", 1st
6. Edition, VPT, 2014
7. Computer Networks; By: Tanenbaum, AndrewS; Pearson Education Pte.Ltd., Delhi, 4thEdition
8. Data and Computer Communications; By: Stallings, William; Pearson Education Pte.Ltd., Delhi, 6thEdition

COURSE OUTCOMES:

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

1. Understand IoT Networking Core
2. Understand IoT related network fundamentals
3. Understand IoT Architecture.
4. Understand IoT Application Development procedure
5. Understand various case studies and IoT applications.

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OPEN ELECTIVE - II
(R20A0553)
OPERATING SYSTEM CONCEPTS

COURSE OBJECTIVES:

1. To understand the basic concepts and functions of operating systems.
2. To understand Processes and Threads
3. To understand the concept of Deadlocks.
4. To analyze various memory management schemes.
5. To understand I/O management and File system

UNIT –I

Introduction: Concept of Operating Systems, OS Services, Structure of an Operating Systems

Processes: Definition, Process Relationship, Different states of a Process, Process State transitions, Process Control Block (PCB), Context switching

Thread: Definition, Various states, Benefits of threads, Types of threads, Concept of Multithreads.

UNIT-II

Process Scheduling: Foundation and Scheduling COURSE OBJECTIVES, Types of Schedulers, Scheduling criteria: CPU utilization, Throughput, Turnaround Time, Waiting Time, Response Time; Scheduling algorithms: Pre-emptive and Non pre-emptive, FCFS, SJF, RR

Inter-process Communication: Critical Section, Race Conditions, Mutual Exclusion. Classical IPC Problems: Reader's & Writer Problem, Dinning Philosopher Problem, The Producer/Consumer Problem, Semaphores, Monitors.

UNIT-III

Memory Management: Basic concept, Logical and Physical address map, Memory allocation: Contiguous Memory allocation – Fixed and variable partition–Internal and External fragmentation; **Paging**: Principle of operation – Page allocation – Hardware support for paging, protection and sharing, Disadvantages of paging.

Virtual Memory: Basics of Virtual Memory, Page fault , Demand paging; **Page Replacement algorithms:** Optimal, First in First Out (FIFO), Second Chance (SC), Not recently used (NRU) and Least Recently used (LRU).

UNIT-IV

File Management: Concept of File, Access methods, File types, File operation, File System structure, Allocation methods (contiguous, linked, indexed), Directory structure, directory implementation (linear list, hash table), efficiency and performance.

UNIT-V

Deadlocks: Definition, Necessary and sufficient conditions for Deadlock, Deadlock Prevention, Deadlock Avoidance: Banker's algorithm, Deadlock detection and Recovery.

Disk Management: Disk structure, Disk scheduling - FCFS, SSTF, SCAN, C-SCAN, Disk

reliability, Disk formatting, Boot-block, Bad blocks.

TEXT BOOKS:

1. Operating System Concepts Essentials, 9th Edition by AviSilberschatz, Peter Galvin,Greg Gagne, Wiley Asia Student Edition.
2. Operating Systems: Internals and Design Principles, 5th Edition, William Stallings, Prentice Hall of India.

REFERENCE BOOKS:

1. Operating System: A Design-oriented Approach, 1st Edition by Charles Crowley, Irwin Publishing
2. Operating Systems: A Modern Perspective, 2nd Edition by Gary J. Nutt, Addison-Wesley
3. Design of the Unix Operating Systems, 8th Edition by Maurice Bach, Prentice- Hall of India
4. Understanding the Linux Kernel, 3rd Edition, Daniel P. Bovet, Marco Cesati, O'Reilly and Associates

COURSE OUTCOMES:

At the end of the course the students are able to:

1. Create processes and threads.
2. Implement algorithms for process scheduling for a given specification of CPU utilization, Throughput, Turnaround Time, Waiting Time, Response Time.
3. Develop the techniques for optimally allocating memory to processes by increasing memory utilization and for improving the access time.
4. Design and implement file management system.
5. Understand and analyze various disk scheduling schemes.

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OPEN ELECTIVE - II

(R20A0066) PUBLIC POLICY & GOVERNANCE

COURSE OBJECTIVES:

1. To make the students understand in-depth analysis of public policy and to solve its ills prevailing in the society.
2. To provide an opportunity for the students to learn the basic areas of public policy analysis, implementation and evaluation.
3. To make understand the process and various approaches in public policy making.
4. To understand the theories and issues of social coordination and the nature of all patterns of rule.
5. To make the students understand the techniques of governance and emerging trends in public and private governance its policy-making and implementation.

Unit-I

Introduction of Public Policy: Definition, Nature, Scope and Importance of Public Policy, Evolution of Public Policy and Policy Sciences, Public Policy and Public Administration. **Approaches to Public Policy Analysis:** The Process Approach, The Logical Positivist Approach, The Phenomenological Approach, The Participatory Approach and Normative Approach

Unit-II

Theories and Process of Public Policy Making: Theories and Models of Policy Making, Perspectives of Policy Making Process, Institutions of Policy Making.

Unit-III

Policy Implementation and Evaluation: Concept of Policy Implementation, Techniques of Policy Implementation, Concept of Policy Evaluation, Constraints of Public Policy Evaluation

Unit-IV

Introduction of Governance: Definitions, Issues and Controversies, Reinventing Government, Reforming Institutions: The State, Market and Public domain. **State and Governance:** Origin and types of State, Democratic State and Democratic Administration, Neo-Liberalism and Rolling Back State and Governance as Government.

Unit-V

Citizen and Techniques of Governance: Rule of Law and Human Rights, Accountability, Participation, Representation. **Techniques of Governance**: Openness and Transparency, Citizen Charter, Social Audit. **Emerging Trends in Public and Private Governance:** An Overview, Market, Civil Society, Information and Communication Technology.

TEXT AND REFERENCE BOOKS:

1. Introduction to Public Policy- Charles Wheelan, Naked Economics 2010.

2. Birkland Thomas A., (2005), An Introduction to The Policy Process: Theories, Concepts, And Models of Public Policy Making, Armonk; M.E. Sharpe.
3. Anderson J.E., (2006) Public Policy-Making: An Introduction, Boston, Houghton
4. Bardach, Eugene (1977), The Implementation Game: What Happens After a Bill Becomes a Law, Cambridge, MA: MIT.
5. Bell, S., and Hind moor, A. (2009) Rethinking Governance: The Centrality of the State in Modern Society, Cambridge: Cambridge University Bell, Stephen and Andrew Hind moor.
6. Joyee M. Mitchell & William C. Mitchell, Political Analysis & Public Policy: An Introduction to Political Science, Thomson Press Limited, New Delhi, 1972.
7. R.K. Sapru, Public Policy, Art and Craft of policy Analysis, PHI learning private limited, New Delhi, 2011.
8. Brian W. Hogwood & Lewis A. Gunn, Policy Analysis for the Real world, Oxford University, Press, 1986.

COURSE OUTCOMES

After completion of the course, student will be able to

1. Understand public policy analysis and they will be able to understand policy evaluation and implementation.
2. Understand the public policy and governance on the largest gamut of its canvas.
3. Students will understand the what are emerging trends in public and private governance.
4. Students can comprehens understanding of public policy formulation, implementation, and evaluation.
5. Students will understand the various theories in public policy making.

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(R20A0587) COMPILER DESIGN AND CASE TOOLS LAB

COURSE OBJECTIVES:

1. To provide an understanding of the language translation peculiarities
2. Writing C Programs for the implementation of FSMs
3. Designing the components of a translator(compiler) for the given(mini) language.
4. Provides knowledge of LEX tools.
5. Knowledge of Yacc tools in compiler component constructions and to draw the UMLdiagrams.

Source Language (A Case Study) :

Consider the following mini language, a simple procedural High Level Language, operating on integer data with a syntax looking vaguely like a simple C crossed with Pascal. The syntax of thelanguage is defined by the following BNF grammar:

<program> ::= <block>
<block> ::= { <variable definition> <slist> }
| { <slist> }
<variable definition> ::= int <vardeflist> ;
<vardeflist> ::= <vardec> | <vardec>, <vardeflist>
<vardec> ::= <identifier> | <identifier> [<constant>]
<slist> ::= <statement> |<statement> ; <slist>
<statement> ::= <assignment> | <ifstatement> | <whilestatement> | <block>
| <printstatement> | <empty>
<assignment> ::= < identifier> = <expression>
| <identifier> [<expression>] = [<expression>
<ifstatement> ::= if <bexpression> then <slist> else <slist> endif
| if <bexpression> then <slist> endif
<whilestatement> ::= while <bexpression> do <slist> enddo
<printstatement> ::= print{ <expression> }
<expression> ::= <expression> <addingop> <term> | <term> | <addingop> <term>
<bexpression> ::= <expression> <relop> <expression>
<relop> ::= < | <= | = = | >= | > |!=
<addingop> ::= + | -
<term> ::= <term> <multop> <factor> | <factor>
<multop> ::= * | /
<factor> ::= <constant> | <identifier> |<identifier> [<expression>
| (<expression>)
<constant> ::= <digit> | <digit> <constant>
<identifier> ::= <identifier> <letterordigit> | <letter>
<letterordigit> ::= a|b|c|….|y|z
<digit> ::= 0|1|2|3|…|8|9
<empty> ::= has the obvious meaning
Comments : zero or more characters enclosed between the standard C/Java style comment brockets

/*…*/. The language has the rudimentary support for 1-Dimensional arrays. Ex: int a[3] declares a as an array of 3 elements, referenced as a[0],a[1],a[2].

Sample Program written in this language is :

```
{ int [3],t1,t2; t1=2;
a[0]=1; a[1]=2; a[t1]=3;
t2= -(a[2]+t1*6) / a[2]-t1);
if t2>5 then print(t2);else
{
 int t3; t3=99; t2=25;}
print(11+t2*t3); /* this is not a comment on two lines */
}
endif
} // End of the program(block)
```

WEEK 1. Write a C Program to Scan and Count the number of characters, words, and lines in a file.

WEEK 2. Write a C Program to implement NFAs that recognize identifiers, constants, and operators of the mini language.

WEEK 3. Write a C Program to implement DFAs that recognize identifiers, constants, and operators of the mini language.

WEEK 4. Design a Lexical analyzer for the above language. { Note-The lexical analyzer should ignore redundant spaces, tabs and newlines. It should also ignore comments. Although the syntax specification states that identifiers can be arbitrarily long, you may restrict the length to some reasonable value.}

WEEK 5. Implement the lexical analyzer using JLex, flex, flex or lex or other lexical analyzer generation tools.

WEEK 6. Design Predictive parser for the given language.

WEEK 7. Design LALR bottom up parser for the above language using tools or C

WEEK 8. Convert the BNF rules into Yacc form and write code to generate abstract syntax tree.

WEEK 9. Write program to generate machine code from the abstract syntax tree generated by the parser.

Following instruction set may be considered as target code.

The following is a simple register-based machine, supporting a total of 17 instructions. It has three distinct internal storage areas. The first is the set of 8 registers, used by the individual instructions as detailed below, the second is an area used for the storage of variables and the third is an area used for the storage of program. The

instructions can be preceded by a label. This consists of an integer in the range 1 to 9999 and the label is followedby a colon to separate it from the rest of the instruction. The numerical label can be used as the argument to a jump instruction, as detailed below.

In the description of the individual instructions below, instruction argument types are specifiedas follows:

R specifies a register in the form R0, R1, R2, R3, R4, R5, R6 or R7 (or r0, r1, etc). L specifies anumerical label (in the range 1 to 9999).
V specifies a "variable location" (a variable number, or a variable location pointed to by a register
- see below).

A specifies a constant value, a variable location, a register or a variable location pointed to by a register (an indirect address). Constant values are specified as an integer value, optionally preceded by a minus sign, preceded by a # symbol. An indirect address is specified by an @ followed by a register.

So, for example an A-type argument could have the form 4 (variable number 4), #4 (the constant value 4), r4 (register 4) or @r4 (the contents of register 4 identifies the variable location to be accessed).

The instruction set is defined as follows: LOAD A, R loads the integer value specified by A into register R. STORE R, V stores the value in register R to variable V. OUT R outputs the value in register R. NEG R negates the value in register R. ADD A, R adds the value specified by A to register R, leaving the result in register R. SUB A, R subtracts the value specified by A from register R, leaving the result in register R. MUL A, R multiplies the value specified by A by register R, leaving the result in register R. DIV A, R divides register R by the value specified by A, leaving the result in register R. JMP L causes an unconditional jump to the instruction with the label L. JEQ R, L jumps to the instruction with the label L if the value in register R is zero. JNE R, L jumps to the instruction with the label L if the value in register R is not zero. JGE R, L jumps to the instruction with the label L if the value in register R is greater than or equal to zero. JGT R, L jumps to the instruction with the label L if the value in register R is greater than zero. JLE R, L jumps to the instruction with the label L if the value in register R is less than or equal to zero. JLTR, L jumps to the instruction with the label L if the value in register R is less than zero. NOP is an instruction with no effect. It can be tagged by a label. STOP stops execution of the machine. All programs should terminate by executing a STOP instruction.

WEEK 10: UML Diagram for ATM Transaction System

WEEK 11: UML Diagram for Library Management System **WEEK 12:** UML Diagram for College Administration System

RECOMMENDED SYSTEM / SOFTWARE REQUIREMENTS:

1. Intel based desktop PC with minimum of 166MHz or faster processor with at least 64MB RAM and 100 MB free disk space.
2. C ++ Compiler and JDK kit, Lex or Flex and YACC tools (Unix/Linux utilities)

USEFUL TEXT BOOKS / REFERECES / WEBSITES:

1. Modern compiler implementation in C, Andrew w.Appel, Revised Edn, Cambridge University Press
2. Principles of Compiler Design. – A.V Aho, J.D Ullman ; Pearson Education.
3. **lex&yacc** , -John R Levine, Tony Mason, Doug Brown; O'reilly.
4. **Compiler Construction**,- LOUDEN, Thomson.
5. Engineering a compiler – Cooper& Linda, Elsevier
6. Modern Compiler Design – Dick Grune,Henry E.Bal, Cariel TH Jacobs, Wiley Dreatech

COURSE OUTCOMES:

By the end of the semester, students will be able to

1. Understand the practical aspects, and approaches of how a compiler works and UML diagrams.
2. Implement Finite state machines in C to recognize various tokens of C language
3. Apply the techniques used in Compiler Construction
4. Construct few phases of the compiler for the mini language using Lex and Yacc tools
5. Optimize the functionality of a compiler

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(R20A0588) ARTIFICIAL INTELLIGENCE LAB

LAB OBJECTIVES:

1. Learning basic concepts of Python through illustrative examples and small exercises
2. To prepare students to become Familiarity with the Python programming in AI environment.
3. To provide student with an academic environment aware of various AI Algorithms.
4. To train Students with python programming as to comprehend, analyze, design and create AI platforms and solutions for the real life problems.
5. To understand data structure concepts in python.

WRITE THE FOLLOWING PROGRAMS USING PYTHON/PROLOG

Week 1

a) Write a program to print the multiplication table for the given number.
b) Write a program to find factorial of a number.
c) Write a program to check whether the given number is prime or not.

Week 2

a) Write a program to implement Simple Calculator program.
b) Write a program to generate Calendar for the given month and year.
c) Write a program to Illustrate Different Set Operations.

Week 3

Write a program to implement simple Chat bot.

Week 4

a) Write a program to remove punctuations from the given string.
b) Write a program to sort the sentence in alphabetical order.

Week 5

Write a program to Implement of Towers of Hanoi Problem.

Week 6

Write a program to Implement Breadth First Search.

Week 7

Write a program to Implement Depth First Search.

Week 8

Write a program to implement Hill Climbing Algorithm.

Week 9

Write a program to implement A* Algorithm.

Week 10

Write a program to implement Tic-Tac-Toe game.

Week 11

Write a program to implement Water Jug Problem.

LAB OUTCOMES:

Upon completion of the course, students will be able to

1. Apply various AI search algorithms (uninformed, informed, heuristic, constraint satisfaction)
2. Understand the fundamentals of knowledge representation, inference.
3. Understand the fundamentals of theorem proving using AI tools.
4. Demonstrate working knowledge of reasoning in the presence of incomplete and/or uncertain information.
5. The students are able to apply various fundamentals of data structure using python.

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(R20A0006) TECHNICAL COMMUNICATION AND SOFT SKILLS

INTRODUCTION:

'Technical Communication and Soft skills' focus on enhancing students' communication skills. Various technical writing styles and skills are developed. Students' placement needs met by giving them an exposure to group discussions and mock interviews. Soft skills such as building positive relationships and teamwork are also emphasized.

The trainee hones these skills under the guidance of the instructor whose constant evaluation helps in the professional development of students. This course fulfills the need of the aspirants in acquiring and refining the skills required for placements and professional success.

COURSE OBJECTIVES:

1. To make the students recognize the role of technical English in their academic and professional fields
2. To improve language proficiency and to develop the required professional ethics
3. To equip students, organize, comprehend, write, and present, short and long forms of any technical work within the broad framework of the Scientific Method
4. To facilitate communication about projects and ideas throughout the industry and also to the non-technical people
5. To display professional behaviors and body language

UNIT I – Effective Presentations

Just-a-Minute sessions, Formal versus informal communication, Non-verbal communication; Concord**:** Subject-verb agreement

UNIT 2 - Professional Communication

Role Plays, Persuasion techniques, Presentation aids, Body language, Importance of listening in effective communication; Email Writing, Business Letter Writing, Letters of complaint, enquiry, responses; Memo Writing; Transformation of Sentences

UNIT 3 – Career Planning

Oral Presentations, Techniques of Listening Skills, types of Group discussions; Etiquette, Protocol;Resume Writing, Cover letter, Writing a statement of purpose; Tenses

UNIT 4 - Technical Writing

Group Discussion, Principles of Effective Writing, Paragraph writing, Advanced Essay Writing, Expansion for or against the essay, Narrative essay, Descriptive essay; Technical Report Writing,Format &Style; Active & Passive Voice

UNIT 5 – Academic Writing

Mock Interview sessions, facing interviews; Correction of Sentences

REFERENCE BOOKS:

1. R.K. Narayan, The Guide, Viking Press, 1958
2. David F. Beer and David Mc Murrey, Guide to writing as an Engineer, John Willey. NewYork, 2004
3. Diane Hacker, Pocket Style Manual, Bedford Publication, New York, 2003. (ISBN0312406843)
4. Shiv Khera, You Can Win, Macmillan Books, New York, 2003.
5. Raman Sharma, Technical Communications, Oxford Publication, London, 2004.
6. Meenakshi Raman, Prakash Singh, Business communication, Oxford Publication, NewDelhi 2012.
7. Dale Jung k, Applied Writing for Technicians, McGraw Hill, New York, 2004. (ISBN:07828357-4)
8. Sharma, R. and Mohan, K. Business Correspondence and Report Writing, TMH New Delhi2002.
9. Xebec, Presentation Book, TMH New Delhi, 2000. (ISBN 0402213)

COURSE OUTCOMES:

After completion of the course, the Students will be able to

1. Understand information which assists in completion of the assigned job tasks more successfully.
2. Communicate his ideas by writing projects, reports, instructions, diagrams and many other forms of professional writing.
3. Adhere to ethical norms of scientific communication.
4. Strengthen their individual and collaborative work strategies.
5. Successfully market themselves and sell themselves to the employer of their choice

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(R20A0516) FULL STACK DEVELOPMENT

COURSE OBJECTIVES:

1. To become knowledgeable about the most recent web development technologies.
2. To acquire Idea for creating two tier and three tier architectural web applications.
3. To Design and Acquire knowledge about real time web applications.
4. To learn how to construct suitable client and server side applications.
5. To learn core concept of both front end and back end programming.

UNIT - I

Web Development Basics: Web development Basics - HTML & Web servers Shell - UNIX CLI Version control - Git & Github HTML, CSS.

UNIT - II

Frontend Development: JavaScript basics, OOPS Aspects of JavaScript, Memory usage and Functions in JS, AJAX for data exchange with server, jQuery Framework, jQuery events, UI components etc. JSON data format.

UNIT - III

REACT JS: Introduction to React, React Router and Single Page Applications, React Forms, Flow Architecture and Introduction to Redux More Redux and Client-Server Communication.

UNIT - IV

Java Web Development: JAVA PROGRAMMING BASICS, Model View Controller (MVC) Pattern MVC Architecture using Spring RESTful API using Spring Framework Building an application using Maven.

UNIT - V

Databases & Deployment: Relational schemas and normalization, Structured Query Language (SQL), Data persistence using Spring JDBC, Agile development principles and deploying application in Cloud.

TEXT BOOKS:

1. Web Design with HTML, CSS, JavaScript and JQuery Set Book by Jon Duckett ProfessionalJavaScript for Web Developers Book by Nicholas C. Zakas
2. Learning PHP, MySQL, JavaScript, CSS & HTML5: A Step-by-Step Guide to CreatingDynamic Websites by Robin Nixon
3. Full Stack JavaScript: Learn Backbone.js, Node.js and MongoDB. Copyright © 2015 BYAZAT MARDAN

REFERENCE BOOKS:

1. Full-Stack JavaScript Development by Eric Bush.

2. Mastering Full Stack React Web Development Paperback – April 28, 2017 by TomaszDyl , Kamil Przeorski , Maciej Czarnecki

COURSE OUTCOMES:

1. Develop a fully functioning website and deploy on a web server.
2. To analyze the front end and back end Tools
3. Find and use code packages based on their documentation to produce working results ina project.
4. To build web pages that function using external data.
5. To Implement web application employing efficient database access.

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(R20A0518) MACHINE LEARNING

COURSE OBJECTIVES:

The students will be able:

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

UNIT – I

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

Feature Selection: Filter, Wrapper, Embedded methods.

Feature Normalization:- min-max normalization, z-score normalization, and constant factor normalization

Introduction to Dimensionality Reduction: Principal Component Analysis (PCA), Linear Discriminant Analysis (LDA)

UNIT – II

Supervised Learning – I (Regression/Classification)

Regression models: Simple Linear Regression, multiple linear Regression. Cost Function, Gradient Descent, Performance Metrics: Mean Absolute Error(MAE),Mean Squared Error(MSE) R-Squared error, Adjusted R Square.

Classification models: Decision Trees-ID3, CART, Naive Bayes, K-Nearest-Neighbours (KNN), Logistic Regression, Multinomial Logistic Regression

Support Vector Machines (SVM) - Nonlinearity and Kernel Methods

UNIT – III

Supervised Learning – II (Neural Networks)

Neural Network Representation – Problems – Perceptrons, Activation Functions, Artificial Neural Networks (ANN) , Back Propagation Algorithm.

Convolutional Neural Networks - Convolution and Pooling layers, , Recurrent Neural Networks (RNN).

Classification Metrics: Confusion matrix, Precision, Recall, Accuracy, F-Score, ROC curves

UNIT - IV

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

UNIT – V

Unsupervised Learning : Clustering-K-means, K-Modes, K-Prototypes, Gaussian Mixture Models, Expectation-Maximization.

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

TEXT BOOKS:

1. Machine Learning –Saikat Dutt, Subramanian Chandramouli, Amit Kumar Das, Pearson .
2. Foundations of Machine Learning, Mehryar Mohri, Afshin Rostamizadeh, Ameet Talwalkar, MIT Press.
3. Kevin Murphy, Machine Learning: A Probabilistic Perspective, MIT Press,2012

REFERENCE BOOKS:

1. Trevor Hastie, Robert Tibshirani, Jerome Friedman, The Elements of Statistical Learning, Springer2009
2. Christopher Bishop, Pattern Recognition and Machine Learning, Springer,2007.
3. Machine Learning Yearning, Andrew Ng.
4. Data Mining–Concepts and Techniques -Jiawei Han and Micheline Kamber,Morgan Kaufmann

COURSE OUTCOMES:

The students will be able:

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

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PROFESSIONAL ELECTIVE – III (R20A0517)

DISTRIBUTED SYSTEMS

COURSE OBJECTIVES:

1. To learn the principles, architectures, algorithms and programming models used in distributed systems.
2. To understand the algorithms of mutual exclusion, election & multicast communication.
3. To learn the different mechanisms for Inter process communication and remote invocations.
4. To acquire knowledge and implement sample distributed systems.
5. To learn transactions and concurrency control mechanisms in different distributed environments.

UNIT - I

Characterization of Distributed Systems: Introduction, Examples of Distributed systems, Resource Sharing and Web, Challenges.

System Models: Introduction, Architectural models, Fundamental models.

UNIT - II

Time and Global States: Introduction, Clocks, Events and Process states, Synchronizing Physical clocks, Logical time and Logical clocks, Global states.

Coordination and Agreement: Introduction, Distributed mutual exclusion, Elections, Multicast Communication, Consensus and Related problems.

UNIT - III

Inter process Communication: Introduction, Characteristics of Inter process communication, External Data Representation and Marshalling, Client-Server Communication, GroupCommunication, Case Study: IPC in UNIX.

Distributed Objects and Remote Invocation: Introduction, Communication between DistributedObjects, Remote Procedure Call, Events and Notifications, Case study: Java RMI.

UNIT - IV

Distributed File Systems: Introduction, File service Architecture,

Case Study: 1: Sun Network FileSystem , Case Study 2: The Andrew File System.

Distributed Shared Memory: Introduction, Design and Implementation issues, Consistency Models.

UNIT - V

Transactions and Concurrency Control: Introduction, Transactions, Nested Transactions, Locks, Optimistic concurrency control, Timestamp ordering, Comparison of methods for concurrency control.

Distributed Transactions: Introduction, Flat and Nested Distributed Transactions, Atomic commit protocols, Concurrency control in distributed transactions, Distributed deadlocks, Transaction recovery.

TEXT BOOKS:

1. Distributed Systems Concepts and Design, G Coulouris, J Dollimore and T Kindberg, FourthEdition, Pearson Education. 2009.

REFERENCES:

1. Distributed Systems, Principles and paradigms, Andrew S.Tanenbaum, Maarten Van Steen, Second Edition,PHI.
2. Distributed Systems, An Algorithm Approach, Sikumar Ghosh, Chapman & Hall/CRC Taylor & Fransis Group,2007.

COURSE OUTCOMES:

1. Able to compare different types of distributed systems and different models.
2. Able to analyze the algorithms of mutual exclusion, election & multicast communication.
3. Able to evaluate the different mechanisms for Interprocess communication and remoteinvocations.
4. Able to design and develop new distributed applications.
5. Able to apply transactions and concurrency control mechanisms in different distributedenvironments.

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PROFESSIONAL ELECTIVE – III
(R20A6612) NEURAL NETWORKS

COURSE OBJECTIVES:

1. To understand the concepts of Artificial Neuron and its architecture.
2. Student will able to implement MLP with Back Propagation Methods
3. Student can able to understand fuzzy logic and its properties.
4. Student can able to implement fuzzy controllers
5. Student will be exposed to genetic algorithm procedures and implementation.

UNIT I

Neural Networks-I (Introduction & Architecture): Neuron, Nerve structure and synapse, Artificial Neuron and its model, activation functions, Neural network architecture: single layer and multilayer feed forward networks, recurrent networks.
Various learning techniques: perception, convergence rule, and Auto-associative, hetro-associative memory.

UNIT II

Neural Networks-II (Back propagation networks): Architecture: Perceptron model, solution, single layer artificial neural network, multilayer perception model; back propagation learning methods, effect of learning rule co-efficient ;back propagation algorithm, factors affecting back propagation training, applications.

UNIT III

Fuzzy Logic-I (Introduction): Basic concepts of fuzzy logic, Fuzzy sets and Crisp sets, Fuzzy set theory and operations, Properties of fuzzy sets, Fuzzy and Crisp relations, Fuzzy to Crisp conversion.

UNIT IV

Fuzzy Logic –II (Fuzzy Membership, Rules) : Membership functions, interference in fuzzy logic, fuzzy if-then rules, Fuzzy implications and Fuzzy algorithms, Fuzzyfications & Defuzzificataions, Fuzzy Controller, Industrial applications.

UNIT V

Genetic Algorithm(GA): Basic concepts, working principle, procedures of GA, flow chart of GA, Genetic representations, (encoding) Initialization and selection, Genetic operators, Mutation, Generational Cycle, applications.

TEXT BOOKS:

a. S. Rajsekaran & G.A. Vijayalakshmi Pai, "Neural Networks, Fuzzy Logic and Genetic Algorithm: Synthesis and Applications" Prentice Hall of India.
b. N.P.Padhy,"Artificial Intelligence and Intelligent Systems" Oxford University Press.

REFERENCE BOOKS:

1. Siman Haykin, ”Neural Networks” Prentice Hall of India
2. Timothy J. Ross, “Fuzzy Logic with Engineering Applications” Wiley India.
3. Kumar Satish, “Neural Networks” Tata Mc Graw Hill

COURSE OUTCOMES:

Students will be able to:

1. Student can Implement artificial neuron with different architectures
2. Student can able to develop a neural network system with back propagation
3. Student can able to implement fuzzy to crisp conversion
4. Student can able to apply fuzzy logic in various applications
5. Student can able to apply genetic algorithm in various applications

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PROFESSIONAL ELECTIVE – III
(R20A6609) NATURAL LANGUAGE PROCESSING

COURSE OBJECTIVES:

1. Introduce to some of the problems and solutions of NLP and their relation to linguistics and statistics.
2. To understand linguistic phenomena and learn to model them with formal grammars.
3. To Understand and carry out proper experimental methodology for training and evaluating empirical NLP systems.
4. To learn how to manipulate probabilities, construct statistical models over strings and trees
5. To estimate parameters using supervised and unsupervised training methods.
6. To design, implement, and analyze NLP algorithms. Able to design different language modelingTechniques.

UNIT – I:

Finding the Structure of Words: Words and Their Components, Issues and Challenges, Morphological Models
Finding the Structure of Documents: Introduction, Methods, Complexity of the Approaches, Performances of the Approaches

UNIT – II:

Lexical syntax: Hidden Markov Models (Forward and Viterbi algorithms and EM training). Syntax Analysis: Parsing Natural Language, Treebanks: A Data-Driven Approach to Syntax, Representation of Syntactic Structure, Parsing Algorithms, Models for Ambiguity Resolution in Parsing, Multilingual Issues

UNIT – III:

Semantic Parsing: Introduction, Semantic Interpretation, System Paradigms, Word Sense Systems, Software.

UNIT – IV:

Predicate-Argument Structure, Meaning Representation Systems, Software.
Discourse Processing: Cohesion, Reference Resolution, Discourse Cohesion and Structure

UNIT – V:

Language Modeling: Introduction, N-Gram Models, Language Model Evaluation, Parameter Estimation, Language Model Adaptation, Types of Language Models, Language-Specific Modeling Problems, Multilingual and Cross lingual Language Modeling

TEXT BOOKS:

1. Multilingual natural Language Processing Applications: From Theory to Practice – Daniel M. Bikel and Imed Zitouni, PearsonPublication.
2. Natural Language Processing and Information Retrieval: Tanvier Siddiqui, U.S. Tiwary.

REFERENCE BOOKS:

1. Speech and Natural Language Processing - Daniel Jurafsky & James H Martin, Pearson Publications.

COURSE OUTCOMES:

1. Show sensitivity to linguistic phenomena and an ability to model them with formal grammars.
2. Understand and carry out proper experimental methodology for training and evaluating empirical NLP systems.
3. Able to manipulate probabilities, construct statistical models over strings and trees
4. Will be able to estimate parameters using supervised and unsupervised training methods.
5. Able to design, implement, and analyze NLP algorithms. Able to design different languagemodeling Techniques.

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PROFESSIONAL ELECTIVE – IV
(R20A6202) CYBER SECURITY

COURSE OBJECTIVES:

This course will enable the students:

1. To familiarize various types of cyber-attacks and cyber-crimes
2. To give an overview of the cyber laws
3. To study the defensive techniques against these attacks
4. To study cyber security challenges and implications.
5. To know about Cyber Security.

UNIT - I

Introduction to Cyber Security: Basic Cyber Security Concepts, layers of security, Vulnerability, threat, Harmful acts, Internet Governance – Challenges and Constraints, Computer Criminals, CIA Triad, Assets and Threat, motive of attackers, active attacks, passive attacks, Software attacks, hardware attacks, Spectrum of attacks, Taxonomy of various attacks, IP spoofing, Methods of defense, Security Models, risk management, Cyber Threats-Cyber Warfare, Cyber Crime, Cyber terrorism, Cyber Espionage, etc., Comprehensive Cyber Security Policy.

UNIT - II

Cyberspace and the Law & Cyber Forensics: Introduction, Cyber Security Regulations, Roles of International Law. The INDIAN Cyberspace, National Cyber Security Policy. Introduction, Historical background of Cyber forensics, Digital Forensics Science, The Need for Computer Forensics, Cyber Forensics and Digital evidence.

UNIT - III

Cybercrime: Mobile and Wireless Devices: Introduction, Proliferation of Mobile and Wireless Devices, Trends in Mobility, Credit card Frauds in Mobile and Wireless Computing Era, Security Challenges Posed by Mobile Devices, Registry Settings for Mobile Devices, Authentication service Security, Attacks on Mobile/Cell Phones, Mobile Devices: Security Implications for Organizations, Organizational Measures for Handling Mobile, Organizational Security Policies and Measures in Mobile Computing Era, Laptops.

UNIT - IV

Cyber Security: Organizational Implications: Introduction, cost of cybercrimes and IPR issues, web threats for organizations, security and privacy implications, social media marketing: securityrisks and perils for organizations, social computing and the associated challenges for organizations.

Cybercrime and Cyber terrorism: Introduction, intellectual property in the cyberspace, the ethical dimension of cybercrimes the psychology, mindset and skills of hackers and other cyber criminals.

UNIT - V

Privacy Issues: Basic Data Privacy Concepts: Fundamental Concepts, Data Privacy Attacks, Data linking and profiling, privacy policies and their specifications, privacy policy languages, privacy indifferent domains- medical, financial ,,etc.

Cybercrime: Examples and Mini-Cases

Mini-Cases: The Indian Case of online Gambling, An Indian Case of Intellectual Property Crime, Financial Frauds in Cyber Domain.

TEXT BOOKS*:*

1. Nina Godbole and Sunit Belpure, Cyber Security Understanding Cyber Crimes, Computer Forensics and Legal Perspectives, Wiley
2. B. Gupta, D. P. Agrawal, Haoxiang Wang, Computer and Cyber Security: Principles, Algorithm, Applications, and Perspectives, CRC Press, ISBN 9780815371335, 2018.

REFERENCE BOOKS:

1. Cyber Security Essentials, James Graham, Richard Howard and Ryan Otson, CRC Press.
2. Introduction to Cyber Security , Chwan-Hwa(john) Wu,J.David Irwin.CRC Press T&FGroup

COURSE OUTCOMES:

Student will be able to

1. Understand basic concepts of Cyber Crimes.
2. Ability to identify the attacks in Cyber Crimes
3. Able to specify the suitable methods used in CyberCrime
4. Ability to face cyber security challenges
5. Understand Cyber laws.

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PROFESSIONAL ELECTIVE – IV

(R20A0519) PARALLEL AND DISTRIBUTED COMPUTING

COURSE OBJECTIVE:

This course will enable the students:

1. To learn the advanced concepts of Parallel and Distributed Computing and its implementation for assessment of understanding the course by the students.
2. To understand the techniques involved in developing parallel algorithms.
3. To acquire knowledge about the performance of parallel algorithms.
4. To perceive the issues in sorting on parallel on parallel computers and avoid it.
5. To acquire knowledge about the searching techniques.

UNIT-I

Introduction: Scope , issues, applications and challenges of Parallel and Distributed Computing

Parallel Programming Platforms: Implicit Parallelism: Trends in Microprocessor Architectures, Dichotomy of Parallel Computing Platforms, Physical Organization, co-processing.

UNIT-II

Principles of Parallel Algorithm Design: Decomposition Techniques, Characteristics of Tasks and Interactions, Mapping Techniques for Load Balancing.

CUDA programming model: Overview of CUDA, Isolating data to be used by parallelized code, API function to allocate memory on parallel computing device, to transfer data.

UNIT-III

Analytical Modeling of Parallel Programs: Sources of Overhead in Parallel Programs, Performance Metrics for Parallel Systems, The Effect of Granularity on Performance, Scalability of Parallel Systems, Minimum Execution Time and Minimum Cost Optimal Execution Time

UNIT-IV

Dense Matrix Algorithms: Matrix-Vector Multiplication, Matrix-Matrix Multiplication, Issues in Sorting on Parallel Computers, Bubble Sort and Variants, Quick Sort Algorithm.

UNIT-V

Search Algorithms for Discrete Optimization Problems: Sequential Search Algorithms, Parallel Depth-First Search, Parallel Best-First Search, Speed up Anomalies in Parallel Search Algorithms

Text Books:

1. A Grama, AGupra, G Karypis, V Kumar. Introduction to Parallel Computing (2nd ed.). Addison Wesley,2003.

2. C Lin, L Snyder. Principles of Parallel Programming. USA: Addison-Wesley Publishing Company,2008.
3. J Jeffers, J Reinders. Intel Xeon Phi Coprocessor High-Performance Programming.Morgan Kaufmann Publishing and Elsevier,2013.
4 T Mattson, B Sanders, B Massingill. Patterns for Parallel Programming. Addison-Wesley Professional

COURSE OUTCOMES:

Student will be able to

1. To apply basic concepts of Parallel Computing.
2. Analyze the Principles of Parallel Computing.
3. Build the Various models of parallel computing.
4. Analyze analytical modeling of parallel programs.
5. Compare various search models optimization problems.

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PROFESSIONAL ELECTIVE – IV

(R20A1210) AUGMENTED AND VIRTUAL REALITY

COURSE OBJECTIVES:

This course will enable the students:

1. To understand the concepts of Virtual Reality and its applications.
2. To perceive the concepts in Augmented Reality and Virtual Reality (AR &VR).
3. To imbibe the basic concept and framework of virtual reality.
4. To gain an understanding in the fundamental issues of virtual reality.
5. To study about Virtual Hardware and Software.

Unit I

Introduction of Virtual Reality: Fundamental Concept and Components of Virtual Reality. Primary Features and Present Development on Virtual Reality.

Multiple Models of Input and Output Interface in Virtual Reality: Input -- Tracker, Sensor, Digital Glove, Movement Capture, Video-based Input, 3D Menus & 3DScanner etc. Output -- Visual /Auditory / Haptic Devices

Unit II

Visual Computation in Virtual Reality: Fundamentals of Computer Graphics. Software and Hardware Technology on Stereoscopic Display.

Advanced Techniques in CG: Management of Large Scale Environments & Real Time Rendering.

Interactive Techniques in Virtual Reality: Body Track, Hand Gesture, 3D Manus, Object Grasp.

Unit III

Development Tools and Frameworks in Virtual Reality: Frameworks of Software Development Tools in VR. X3D Standard; Vega, MultiGen, Virtools etc.

Application of VR in Digital Entertainment: VR Technology in Film & TV Production. VR Technology in Physical Exercises and Games. Demonstration of Digital Entertainment by VR.

Unit IV

Augmented and Mixed Reality, Taxonomy, technology and features of augmented reality, difference between AR and VR, Challenges with AR, AR systems and functionality.

Unit V

Augmented reality methods, visualization techniques for augmented reality, wireless displays in educational augmented reality applications, mobile projection interfaces, marker-less tracking for augmented reality, enhancing interactivity in AR environments,evaluating AR systems.

TEXT BOOKS:

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

REFERENCE BOOKS:

1. Alan Craig, William Sherman and Jeffrey Will, Developing Virtual Realityapplications, Foundations of Effective Design, Morgan Kaufmann, 2009.

COURSE OUTCOMES:

The students will be able:

1. To create geometric modeling and Virtual environment.
2. To realize the virtual reality experience.
3. To develop Virtual Reality applications.
4. To differentiate Augmented Reality and Virtual Reality (AR &VR).
5. To comprehend the Augmented reality methods.

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OPEN ELECTIVE – III
(R20A0453) ROBOTICS AND AUTOMATION

COURSE OBJECTIVES:

This course will enable the students:

1. To study overview of Embedded Systems, Robots, Microprocessors & microcontrollers.
2. To study in detail about Robotics and sensors.
3. To study about AVR RISC Microcontroller architecture in detail.
4. To study about ARM Processor in detail.
5. To study about Artificial Intelligence in Robotics.

UNIT – I

Introduction to Embedded System Design, Categories of ES, Overview of Embedded System Architecture, Recent Trends in Embedded Systems, Hardware Architecture of Embedded System, Real-time Embedded Systems and Robots, Robots and Robotics, Microprocessors and Microcontrollers, Microcontroller or Embedded Controller

UNIT – II

Robotics: Classification of Robots, Degree of freedom, Kinematics; Multidisciplinary approach: Motors-DC motors, Stepper Motors, Servo Motors; Power Transmission-Type of Gears, Gear Assembly, CAM follower, Sensors, Open loop and Closed-loop Controls, Artificial Intelligence.

UNIT – III

The AVR RISC microcontroller architecture: Introduction , AVR family architecture, register file, the ALU, memory access and instruction execution, I/O memory ,EEPROM ,I/O ports, timers, UART, Interrupt structure.

UNIT - IV

ARM Processor: Fundamentals, Registers, current program status register, pipeline concept, Interrupt and the vector table.

UNIT - V

AI IN ROBOTICS: Robotic perception, localization, mapping- configuring space, planning uncertain movements, dynamics and control of movement, Ethics and risks of artificial intelligence in robotics.

TEXT BOOKS:

1. Subrata Ghoshal, "Embedded Systems & Robots", Cengage Learning Stuart Russell, Peter Norvig, “Artificial Intelligence: A modern approch”, Pearson Education, India 2003.
2. ARM System Developer’s Guide: Designing and Optimizing System Software- Andrew N.Sloss, Dominic Symes, Chris Wright, Elsevier Inc., 2007

REFERENCE BOOKS:

1. M.A. Mazidi, J.G. Mazidi, R.D. Mckinlay, "8051 Microcontroller and Embedded Systems",Pearson.
2. Dr. K.V.K. Prasad, "Embedded/Real-Time Systems: Concepts Design & Programming",Dreamtech
3. Microcontrollers and applications, Ajay V Deshmukh , TMGH,2005

COURSE OUTCOMES:

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

1. Understand the overview of Embedded Systems, Robots,Microprocessors & Micro controllers.
2. Understand in detail about Robotics and sensors.
3. Understand AVR RISC Microcontroller architecture in detail.
4. Understand about ARM Processor in detail.
5. Understand about Artificial Intelligence in Robotics

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OPEN ELECTIVE – III (R20A1254) BIG DATA ARCHITECTURE

COURSE OBJECTIVES:

This course will enable the students:

1. To introduce the terminology, technology and its applications
2. To introduce the concept of Analytics and Visualization
3. To demonstrate the Big Data Architecture and its components, tools
4. To provide knowledge about Apache Spark.
5. To provide wild understanding about the databases and Hadoop systems.

UNIT - I:

Big Data Introduction: Classification of Digital Data, Structured and Unstructured Data, Introduction to Big Data: Characteristics – Evolution – Definition - Challenges with Big Data - Other Characteristics of Data , Why Big Data - Traditional Business Intelligence versus Big Data, Importance of Big Data.

UNIT - II:

Big Data Architecture Introduction: Big Data Architecture- Definition, Why Big Data Architecture.Evolution of Big Data Architecture. Market Trends. Big Data Architecture and Its Sources. Big Data Architecture Use Cases.

UNIT - III:

Big Data architecture components: Data ingestion, Data storage, Data Computing, Data Analysis,Data Visualization. Understanding the Lambda architecture, HBase, Spark Libraries, Spark Streaming.

UNIT - IV:

Introducing Apache Spark : Introduction to Spark, Spark Architecture and its components, Features of Spark, Spark vs Hadoop, Challenges of Spark.

UNIT - V:

Introduction To Technology Landscape

NoSQL, Comparison of SQL and NoSQL, Hadoop -RDBMS Versus Hadoop - Distributed Computing Challenges – Hadoop Overview - Hadoop Distributed File System - Processing Data with Hadoop - Managing Resources and Applications with Hadoop YARN - Interacting with Hadoop Ecosystem

TEXT BOOKS:

1. Tom White " Hadoop: The Definitive Guide" Third Edit on, O'reily Media, 2012.
2. Seema Acharya, Subhasini Chellappan, "Big Data Analytics" Wiley 2015.

REFERENCE BOOKS:

1. Michael Berthold, David J. Hand, "Intelligent Data Analysis", Springer, 2007.
2. Jay Liebowitz, "Big Data and Business Analytics" Auerbach Publications, CRC press (2013)
3. Tom Plunkett, Mark Hornick, "Using R to Unlock the Value of Big Data: Big Data Analytics with Oracle R Enterprise and Oracle R Connector for Hadoop", McGraw-Hill/Osborne Media (2013), Oracle press.
4. Glen J. Myat, "Making Sense of Data", John Wiley & Sons, 2007
5. Pete Warden, "Big Data Glossary", O'Reily, 2011.
6. Michael Mineli, Michele Chambers, Ambiga Dhiraj, "Big Data, Big Analytics: Emerging Business Intelligence and Analytic Trends for Today's Businesses", Wiley Publications, 2013.
7. ArvindSathi, "BigDataAnalytics: Disruptive Technologies for Changing the Game", MC Press, 2012
8. Paul Zikopoulos ,Dirk DeRoos , Krishnan Parasuraman , Thomas Deutsch , James Giles ,David Corigan , "Harness the Power of Big Data The IBM Big Data Platform ", Tata McGrawHill Publications

COURSE OUTCOMES:

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

1. Identify Big Data and its Business Implications.
2. Categorize and summarize Big Data and its importance.
3. Acquire fundamental enabling techniques and scalable algorithms like Hadoop, Map Reduce in big data analytics
4. Compare various file systems and use an appropriate file system for storing different types of data.
5. Connect to web data sources for data gathering, Integrate data sources with Hadoop components to process streaming data.

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OPEN ELECTIVE –III
(R20A6251) INFORMATION SECURITY

COURSE OBJECTIVES:

This course will enable the students:

1. To learn the objectives of information security, importance and application of confidentiality, integrity, authentication and availability
2. To understand various cryptographic algorithms and basic categories of threats tocomputers and networks
3. To describe public-key cryptosystem, enhancements made to IPv4 by IPSec
4. To gain knowledge on fundamental ideas of public-key cryptography.
5. To generate and distribute a PGP key pair and use the PGP package to send an encrypted e-mail message.

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, steganography, key range and key size, possible types of attacks.

UNIT - II

Symmetric key Ciphers: Block Cipher principles & Algorithms(DES, AES), 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),Key Distribution.

UNIT-III

Message Authentication Algorithms and Hash Functions: Authentication requirements, Functions,Message authentication codes, Hash Functions, Secure hash algorithm, Whirlpool, HMAC, Digital signatures, **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,4[11]i Edition
2. Cryptography and Network Security : Atul Kahate, Mc Graw Hill, 2" Edition

REFERENCE BOOKS:

1. Cryptography and Network Security:C KShyamala, NHarini, Dr TRPadmanabhan, Wiley India, lst Edition.
2. Cryptography and Network Security : Forouzan Mukhopadhyay, Mc Graw Hill, 2"d 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

COURSE OUTCOMES:

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

1. Student will be able to understand basic cryptographic algorithms, message and web authentication and security issues.
2. Ability to identify information system requirements for both of them such as client and server.
3. Ability to identify and investigate vulnerabilities and security threats and mechanisms to counter them.
4. Ability to understand the current legal issues towards information security.
5. Understand the importance of Web security and Firewalls

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OPEN ELECTIVE – III
(R20A0554) CLOUD COMPUTING FUNDAMENTALS

COURSE OBJECTIVES:

1) To learn various system models for Distributed and Cloud Computing.
2) To understand about Virtual machines, Its Structure and mechanisms.
3) To learn Cloud Computing Paradigm.
4) To introduce the various levels of services that can be achieved by cloud.
5) To describe the security aspects in cloud.

UNIT- I

Systems Modeling: System Models for Distributed and Cloud Computing- Cloud Computing in a Nutshell, Layers and Types of Clouds, Desired Features of a Cloud, Infrastructure as a Service Providers, Platform as a Service Providers, Challenges and Risks.

UNIT- II

Virtualization: Virtual machines, Implementation Levels of Virtualization, Virtualization Structures/Tools and Mechanisms, Virtualization of CPU, Memory, and I/O Devices.

UNIT- III

Foundations: Roots of Cloud Computing, Broad Approaches to migrating into the Cloud, The Seven-Step Model of Migration into a Cloud. Relevant Deployment Models for Enterprise Cloud Computing.

UNIT- IV

Infrastructure as a Service (IAAS) & Platform (PAAS): Virtual machines provisioning and Migration services- Background and Related Work, Virtual Machines Provisioning and Manageability, Virtual Machine Migration Services.

The Anatomy of Cloud Infrastructures, Distributed Management of Virtual Infrastructures. Aneka Cloud Platform.

UNIT- V

Software as a Service (SAAS) &Data Security in the Cloud: Google App Engine, An Introduction to the idea of Data Security- The Current State of Data Security in the Cloud- Cloud Computing and Data Security Risk- Cloud Computing and Identity.

TEXT BOOKS:

1) Distributed and Cloud Computing, Kaittwang Geoffrey C.Fox and Jack J Dongrra, Elsevier India 2012.
2) Cloud Computing Principles and Paradigms- Raj Kumar Buyya, James Broberg, Andrzej Goscinski, A John Wiley & Sons Publication,2011

3) Mastering Cloud Computing- Raj Kumar Buyya, Christian Vecchiola and S.Tanurai Selvi, TMH, 2012.
4) Michael Miller, Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Online, Que Publishing, August 2008.

COURSE OUTCOMES:

1) Understanding various system models for Distributed and Cloud Computing.
2) Understanding about Virtual machines, Its Structure and mechanisms.
3) Learning Cloud Computing Paradigm.
4) Understanding the various levels of services that can be achieved by cloud.
5) Learning about security aspects in cloud.

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OPEN ELECTIVE – III
(R20A0352) DESIGN THINKING

COURSE OBJECTIVES:

This course will enable the students:

1. To understand the engineering design process and identification of customer need.
2. To understand innovative problem solving concepts.
3. To understand the principles of Design for Manufacturing and FMEA.
4. To know about the design for assembly principles.
5. To know about the concepts of design for environment and design for recycling.

UNIT-I

Introduction: Innovations in Design, Engineering Design Process, Prescriptive and integrative models of design, Design Review and societal considerations.

Identification of Customer Need: Evaluating Customer requirements and survey on customer needs, Conversion of customer needs into technical Specifications, Information sources.

UNIT-II

Theory of Inventive Problem solving (TRIZ), Creativity and Problem solving, Functional Decomposition of the problem for innovative concept development, Introduction to Axiomatic Design, Concept evaluation and decision making.

UNIT-III

Design for Manufacturing: Technical estimating, design of experiments, design for manufacturability, statistical process control, Introduction to FMEA (failure modes and effects analysis), and Case study of design for manufacturing: Manufacturing System Design Based on Axiomatic Design: Case of Assembly Line

UNIT-IV

Design for Assembly: Assembly Principles, Process, Worksheet, Assumptions. Case study of design for Assembly: Manufacturing System Design Based on Axiomatic Design: Case of Assembly Line

UNIT-V

Design for Environment: Design for recycling; Design for disassembly, Design for energy Efficiency, Design for remanufacture, Design for disposability, Hazardous material minimization. Case study of design for Environment.

TEXT BOOKS:

1. Nigel Cross, Engineering Design Methods, John Wiley, 2009.
2. George E. Dieter, Engineering Design, McGraw-Hill, 2009.
3. Genrich Alt shuller, The Innovation Algorithm, Technical Innovation Centre, 2011.

REFERENCE BOOKS

1. The Art of Innovation, by Tom Kelley.
2. Design Thinking, by Nigel Cross.
3. The Design of Business: by Roger Martin.

COURSE OUTCOMES:

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

1. The importance of design in innovation.
2. Design tools and processes can generate innovative new ideas.
3. Design and design thinking to innovative in areas such as engineering, software development and business operations.
4. Strengthen students' individual and collaborative capabilities to identify customer needs, create sound concept hypotheses, collect appropriate data, and develop a prototype that allows for meaningful feedback in a real-world environment.
5. To describe the various case studies for design for environment.

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OPEN ELECTIVE – III

(R20A0065) BUSINESS ANALYTICS

COURSE OBJECTIVES:

- To help students in understanding how the managers use business analytics for managerial decision making.
- To help the students to collect the data for business.
- To help the students for data management.
- To find the quality.
- How the data mining is linked with machine learning.

UNIT I

Understanding Business Analytics

Introduction: Meaning of Analytics - Evolution of Analytics - Need of Analytics - Business Analysis vs. Business Analytics - Categorization of Analytical Models - Data Scientist vs. Data Engineer vs. Business Analyst - Business Analytics in Practice - Types of Data - Role of Business Analyst.

UNIT II

Dealing with Data and Data Science

Data: Data Collection - Data Management - Big Data Management - Organization/Sources of Data - Importance of Data Quality - Dealing with Missing or Incomplete Data - Data Visualization - Data Classification.

Data Science Project Life Cycle: Business Requirement - Data Acquisition - Data Preparation

- Hypothesis and Modeling - Evaluation and Interpretation - Deployment - Operations - Optimization - Applications for Data Science

UNIT III

Data Mining and Machine Learning

Data Mining: The Origins of Data Mining - Data Mining Tasks - OLAP and Multidimensional Data Analysis - Basic Concept of Association Analysis and Cluster Analysis.

Machine Learning: History and Evolution - AI Evolution - Statistics vs. Data Mining vs. Data Analytics vs. Data Science - Supervised Learning - Unsupervised Learning - Reinforcement Learning - Frameworks for Building Machine Learning Systems.

UNIT IV

Applications of Business Analytics

Overview of Business Analytics Applications: Financial Analytics - Marketing Analytics - HR Analytics - Supply Chain Analytics - Retail Industry - Sales Analytics - Web & Social Media Analytics - Healthcare Analytics - Energy Analytics - Transportation Analytics -

Lending Analytics - Sports Analytics - Future of Business Analytics.

Unit V:
Ethical, Legal and Organizational Issues
Issues & Challenges: Business Analytics Implementation Challenges - Privacy and Anonymizaiton - Hacking and Insider Threats - Making Customer Comfortable.

REFERENCE BOOKS:

1. James R Evans, Business Analytics, Global Edition, Pearson Education
2. U Dinesh Kumar, Business Analytics, Wiley India Pvt. Ltd., New Delhi
3. Ger Koole, An Introduction to Business Analytics, Lulu.com, 2019
4. J.D. Camm, J.J. Cochran, M. J. Fry, J.W. Ohlmann, D.R. Anderson, D.J. Sweeney, T. A. Williams - Essentials of Business Analytics, 2e; Cengage Learning.
5. Vipin Kumar, Introduction to Data Mining, Pang-Ning Tan, Michael Steinbach, Pearson Education India
6. Bhimasankaram Pochiraju, Sridhar Seshadri, Essentials of Business Analytics: An Introduction to the Methodology and its Application, Springe

COURSE OUTCOMES:

1. The students will be familiar with the practices of analyzing and reporting the business data useful for the insights of business growth and development.
2. To implement how data is collected and sorted as per the requirement.
3. To find the best analytic method to find the data arrangement.
4. To implement various machine learning techniques in sorting the data collected.
5. Challenges the issues of privacy.

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(R20A0589) FULL STACK DEVELOPMENT LAB

COURSE OBJECTIVES:

This course will enable the students:

1. Usage of various front and back end Tools
2. They can understand and create applications on their own
3. Demonstrate and Designing of Websites can be carried out.
4. Develop web based application using suitable client side and server side code.
5. Implement web based application using effective database access.

PROGRAMS:

Week-1. Write a program to create a simple webpage using HTML.

Week-2. Write a program to create a website using HTML CSS and JavaScript?

Week-3. Write a program to build a Chat module using HTML CSS and JavaScript?

Week-4. Write a program to create a simple calculator Application using React JS

Week-5. Write a program to create a voting application using React JS

Week-6. Write a program to create and Build a Password Strength Check using Jquery.

Week-7. Write a program to create and Build a star rating system using Jquery.

Week-8. Create a Simple Login form using React JS

Week-9. Create a blog using React JS Using the CMS users must be able to design a web page using the drag and drop method. Users should be able to add textual or media content into placeholders that are attached to locations on the web page using drag and drop method.

Week-10. Create a project on Grocery delivery application

Assume this project is for a huge online departmental store. Assume that they have a myriad of grocery items at their godown. All items must be listed on the website, along with their quantities and prices.Users must be able to sign up and purchase groceries. The system should present him with delivery slot options, and the user must be able to choose his preferred slot. Users must then be taken to the payment page where he makes the payment with his favourite method.

Week-11. Connecting our TODO React js Project with Firebase

COURSE OUTCOMES:

Students will be able to understand

1. Usage of various front and back end Tools
2. They can understand and create applications on their own
3. Demonstrate and Designing of Websites can be carried out.

4. Develop web based application using suitable client side and server side code.
5. Implement web based application using effective database access.

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(R20A0590) MACHINE LEARNING LAB

COURSE OBJECTIVES:

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

PROGRAMS:

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

Week- 1: Write a python program to import and export data using Pandas library functions.

Week- 2: Demonstrate various data pre-processing techniques for a given dataset.

Week-3: Implement Dimensionality reduction using Principle Component Analysis (PCA) method.

Week- 4: Write a Python program to demonstrate various Data Visualization Techniques.

Week- 5: Implement Simple and Multiple Linear Regression Models.

Week- 6: Develop Logistic Regression Model for a given dataset.

Week- 7: Develop Decision Tree Classification model for a given dataset and use it to classify a new sample.

Week- 8: Implement Naïve Bayes Classification in Python

Week- 9: Build KNN Classification model for a given dataset.

Week- 10: Build Artificial Neural Network model with back propagation on a given dataset.

Week- 11 a) Implement Random forest ensemble method on a given dataset.
b) Implement Boosting ensemble method on a given dataset.

Week- 12 : Write a python program to implement K-Means clustering Algorithm.

REFERENCE BOOKS:

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

COURSE OUTCOMES:

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

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(R20A0007) CONSTITUTION OF INDIA

INTRODUCTION

The Indian judiciary and particularly the Supreme Court of India has played an historic role as theguardian of people. It has been protecting not only basic ideals of the Constitution but also strengthened the same through progressive interpretations of the text of the Constitution. The judicial activism of the Supreme Court of India and its historic contributions has been recognizedthroughout the world and it gradually made it "as one of the strongest court in the world".

This course "Indian Constitution" has been designed to develop understanding of the Indian Constitution among the students.

COURSE OBJECTIVES:

1. To enrich the students' understanding of the constitution's origin and its power
2. To facilitate students to analyze the political principles
3. To assist the students to be aware of their fundamental rights and duties
4. To enable learning about the federal structure Parliamentary form of government
5. To be acquainted with the historical perspectives of the constitutional amendments

The following course content is prescribed for this course.

UNIT –I

Meaning of constitution law and constitutionalism Historical perspective of the constitution of India Salient features and characteristics of the constitution of India

UNIT –II

Scheme of fundamental rights
The scheme of the fundamental duties and its legal status
The Directive Principles of State Policy-its importance and implementation

UNIT–III

Federal structure and distribution of legislative and financial powers between the Union and the States, Parliamentary Form of Government in India-the constitution powers and status of the president of India, Amendment of the Constitutional Powers and Procedure.

UNIT –IV

The historical perspectives of the constitutional amendments in India., Emergency provisions: National Emergency, President Rule, Financial Emergency, Local self government-Constitutional scheme in India

UNIT –V

Scheme of fundamental Right to Equality
Scheme of fundamental Right to certain Freedom under Article 19
Scope of the Right to Life and Personal Liberty under Article 21

COURSE OUTCOMES:

After completion of the course, Students will be able to:

1. Improve their knowledge about Indian constitution
2. Value their identity and exercise their fundamental rights
3. Comprehend how differently government bodies function
4. Define their rights as voters of the country
5. Analyze the constitution and become responsible citizens

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(R20A0520) BIG DATA ANALYTICS

COURSE OBJECTIVES:

The objectives of this course are,

1. To learn the need of Big Data and the various challenges involved and to acquire Knowledge about different analytical architectures.
2. To understand Hadoop Architecture and its ecosystems.
3. To acquire knowledge about the various databases such as NoSQL, MongoDB, Cassandra.
4. To imbibe the processing of Big Data with advanced architectures like Spark.
5. To perceive the various algorithms used in Machine learning along with Data Analytics

UNIT – I

Introduction to big data: Data, Characteristics of data and Types of digital data: Unstructured, Semi-structured and Structured - Sources of data. Big Data Evolution - Definition of big data-Characteristics and Need of big data-Challenges of big data. Big data analytics, Overview of business intelligence.

UNIT – II

Big data technologies and Databases: Hadoop – Requirement of Hadoop Framework - Design principle of Hadoop –Comparison with other system SQL and RDBMS- Hadoop Components – Architecture -Hadoop 1 vs Hadoop 2.

UNIT – III

MapReduce and YARN framework: Introduction to MapReduce , Processing data with Hadoop using MapReduce, Introduction to YARN, Architecture, Managing Resources and Applications with Hadoop YARN.

Big data technologies and Databases: NoSQL: Introduction to NoSQL - Features and Types- Advantages & Disadvantages -Application of NoSQL.

UNIT - IV

New SQL: Overview of New SQL - Comparing SQL, NoSQL and NewSQL.

Mongo DB: Introduction – Features – Data types – Mongo DB Query language – CRUD operations – Arrays – Functions: Count – Sort – Limit – Skip – Aggregate – Map Reduce. Cursors – Indexes – Mongo Import – Mongo Export.

Cassandra: Introduction – Features – Data types – CQLSH – Key spaces – CRUD operations – Collections – Counter – TTL – Alter commands – Import and Export – Querying System tables.

UNIT - V

(Big Data Frame Works for Analytics) Hadoop Frame Work: Map Reduce Programming: I/O formats, Map side join-Reduce Side Join-Secondary Sorting-Pipelining MapReduce jobs

Spark Frame Work: Introduction to Apache spark-How spark works, Programming with RDDs: Create RDDspark Operations-Data Frame.

TEXT BOOKS:

1. Seema Acharya and Subhashini Chellappan, "Big Data and Analytics", Wiley India Pvt. Ltd., 2016.
2. Mike Frampton, "Mastering Apache Spark", Packt Publishing, 2015.

REFERENCE BOOKS:

1. Tom White, "Hadoop: The Definitive Guide", O"Reilly, 4th Edition, 2015.
2. Mohammed Guller, "Big Data Analytics with Spark", Apress, 2015
3. Donald Miner, Adam Shook, "Map Reduce Design Pattern", O"Reilly, 2012

COURSE OUTCOMES:

On successful completion of the course, students will be able to,

1. Demonstrate knowledge of Big Data, Data Analytics, challenges and their solutions in Big Data.
2. Analyze Hadoop Framework and eco systems.
3. Compare and work on NoSQL environment and MongoDB and cassandra.
4. Apply the Big Data using Map-reduce programming in Both Hadoop and Spark framework.
5. Analyze the data Analytics algorithms in Spark

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(R20A0521) CLOUD COMPUTING

COURSE OBJECTIVES

1. To understand the cloud computing fundamentals and evolving computing paradigms
2. To realize the reasons for migrating into cloud
3. To gain knowledge in virtualization of computer resources
4. To introduce the various levels of services that can be achieved by a cloud.
5. To describe the security aspects in cloud and the services offered by a cloud.

UNIT- I Cloud Computing Fundamentals: Definition of Cloud computing, Roots of Cloud Computing , Layers and Types of Clouds, Desired Features of a Cloud, Cloud Infrastructure Management, Infrastructure as a Service Providers, Platform as a Service Providers.
Computing Paradigms: Parallel Computing, Distributed Computing, Cluster Computing, Grid Computing, Quantum Computing.

UNIT- II Migrating into a Cloud: Introduction, Broad Approaches to Migrating into the Cloud, the Seven-Step Model of Migration into a Cloud.
Virtualization: Virtual Machines and Virtualization of Clusters and data centers-Implementation Levels of Virtualization -Virtualization Structures/Tools and Mechanisms-Virtualization of CPU, Memory, and I/O Devices-Virtual Clusters and Data Centers

UNIT- III Infrastructure as a Service (IAAS) & Platform (PAAS): Virtual machines provisioning and Migration services - Virtual Machines Provisioning and Manageability - Virtual machine Migration Services - VM Provisioning and Migration in Action.
On the Management of Virtual machines for Cloud Infrastructures. Aneka—Integration of Private and Public Clouds.

UNIT- IV Software as a Service (SAAS) & Data Security in the Cloud: Software as a Service SAAS), Google App Engine – Centralizing Email Communications- Collaborating via Web-Based Communication Tools-An Introduction to the idea of Data Security. The Current State of Data Security in the Cloud - Cloud Computing and Data Security Risk -Cloud Computing and Identity.

UNIT- V SLA Management in cloud computing: Traditional Approaches to SLO Management, Types of SLA, Life Cycle of SLA, SLA Management in Cloud.

TEXT BOOKS:

1. Cloud Computing Principles and Paradigms, by Rajkumar Buyya
2. Essentials of cloud Computing: K. Chandrasekhran, CRC press, 2014
3. Michael Miller, Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Online, Que Publishing, August 2008.

4. Cloud Computing, A Practical Approach, Anthony T Velte, Toby J Velte, Robert Elsenpeter, TMH

REFERENCE BOOKS:

1. Cloud Computing : A Practical Approach, Anthony T.Velte, Toby J.Velte, Robert Elsenpeter, Tata McGraw Hill,rp2011.
2. Enterprise Cloud Computing, Gautam Shroff, Cambridge University Press,2010.
3. Cloud Computing: Implementation, Management and Security, John W.Rittinghouse, James F.Ransome, CRC Press,rp2012.
4. Cloud Application Architectures: Building Applications and Infrastructure in the Cloud, George Reese, O'reilly, SPD,rp2011.
5. Cloud Security and Privacy: An Enterprise Perspective on Risks and Compliance, Tim Mather, Subra Kumaraswamy, Shahed Latif, O'Reilly, SPD, rp2011.

COURSE OUTCOMES:

1. Ability to analyze various service delivery models of cloud computing
2. Ability to interpret the ways in which the cloud can be programmed and deployed.
3. Ability to comprehend the virtualization and cloud computing concepts
4. Assess the comparative advantages and disadvantages of Virtualization technology
5. Analyze security issues in cloud computing.

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(R20A0522) BLOCKCHAIN TECHNOLOGY

COURSE OBJECTIVES:

This course will enable the students:

1. To enable the student to understand and appreciate, the importance of fundamentals of blockchain technology
2. To enable the student to understand and appreciate, the importance of fundamentals of blockchain technology application of cryptography in blockchain
3. To gain the awareness about the concepts of various implementations of blockchain technology such as bitcoin, Ethereum, and Hyper ledger.
4. To gain the awareness about the concepts of various implementations of cryptography blockchain .
5. Students will enable the concepts of Smart Contract and Hyper ledger.

UNIT-I

Introduction to Blockchain Technology – Distributed systems – The history of blockchain – Introduction to blockchain – CAP theorem and blockchain – Benefits and limitations of blockchain – Decentralization using blockchain - Methods of decentralization – Routes to decentralization

UNIT-II

Cryptography in Blockchain: Introduction – cryptographic primitives – Assymetric cryptography – public and private keys -line interface – Bitcoin improvement proposals (BIPs) – ConsensusAlgorithms.

UNIT-III

BitCoin Introduction – Transactions – Structure - Transactions types – The structure of a block– The genesis block – The bitcoin network– Wallets and its types– Bitcoin payments– Bitcoin investment and buying and selling bitcoins – Bitcoin installation – Bitcoin programming and the command-line interface – Bitcoin improvement proposals (BIPs).

UNIT-IV

Ethereum - Ethereum block chain- Elements of the Ethereum block chain– Precompiled contracts – Accounts and its types – Block header- Ether – Messages – Mining - Clients and wallets – Trading and investment – The yellow paper - The Ethereum network - Applications developed on Ethereum - Scalability and security issues

UNIT-V

Smart Contract and Hyper ledger – History of Smart Contract – Ricardian contracts - The DAO. Hyper ledger projects – Hyperledger as a protocol – Fabric - Hyperledger Fabric - Sawtooth lake – Corda Architecture.

TEXT BOOKS:

1. Bashir, Mastering Blockchain: Distributed ledger technology, decentralization, and smart contracts explained, 2nd Edition, 2nd Revised edition edition. Birmingham: Packt Publishing, 2018.

REFERENCE BOOKS:

1. A. M. Antonopoulos, Mastering bitcoin, First edition. Sebastopol CA: O'Reilly,2015.

2. Z. Zheng, S. Xie, H. Dai, X. Chen, andH. Wang, —An Overviewof Blockchain Technology: Architecture, Consensus, and Future Trends,‖ in 2017 IEEE International Congress on Big Data (BigData Congress), 2017, pp.557–564.

Course Outcomes:

1. Student will be able to to understand the fundamentals of blockchain technology.
2. Apply knowledge of implementations of Bitcoin, Ethereum and Hyperledger to develop solutions in the appropriate domains.
3. Students will be able to implement cryptography.
4. Students will be able to implement Smart Contract and Hyper ledger.
5. Students will be able to implement bitcoin using blockchain technology.

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PROFESSIONAL ELECTIVE –V
(R20A6610) DEEP LEARNING

COURSE OBJECTIVES:

This course will enable the students:

1. To acquire the knowledge of Deep Learning Concepts
2. To gain knowledge to apply Optimization strategies.
3. To be capable of performing experiments in deep learning using real world data
4. To improve the performance of the deep learning.
5. To learn supervised and unsupervised models.

UNIT-I

INTRODUCTION TO DEEP LEARNING : Historical Trends in Deep Learning, Deep Feed- forward networks, Gradient –Based learning, Hidden Units ,Architecture Design, Back- Propagation and other Differentiation Algorithms.

UNIT-II

DEEP NETWORKS: History of Deep Learning-A Probabilistic Theory of Deep Learning- Back propagation and regularization, batch normalization-VC Dimension and Neural Nets- Deep Vs Shallow Networks –Conventional Networks-Generative Adversarial Networks (GAN), Semi-Supervised Learning.

UNIT-III

DIMENSIONALITY REDUCTION LINEAR (PCA, LDA) manifolds, metric learning-Auto encoders and dimensionality reduction in networks-Introduction to convert- architectures -AlexNet, VGG, Inception, ResNet-Training a convert: weights initialization ,batch normalization, hyperparameter optimization.

UNIT- IV

OPTIMIZATION AND GENERALIZATION : Optimization in Deep Learning-Non –convex optimization for deep networks-stochastic optimization Generalization in neural networks-spatial transformer networks-recurrent networks, LSTM-recurrent neural network language models-world-level RNNs & deep Reinforcement learning-computational & artificial neuroscience.

UNIT- V

CASE STUDY AND APPLICATIONS : Imagenet- Detection –Audio WaveNet-Natural Language Processing Word2Vec-joint Detection-Bioinformatics-Face Recognition-Scene Understanding-Gathering Image Captions.

TEXT BOOKS:

1. Cosma Rohilla Shalizi,Advanced Data Analysis from an ElementaryPoint of View,2015.
2. Deng & Yu,Deep Learning:Methods and Applications,Now Publishers,2013
3. Deep Learning : An MIT Press Book by Ian Goodfellow and Yoshua Bengio Aaron Courville.
4. Michael Nielson,Neural Networks and Deep Learning,Determination Press,2015.
5. Satish kumar,Neural networks:A classroom Approach,Tata McGraw-Hill Education,2004

COURSE OUTCOMES:

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

1. Ablity to select the Learning Networks in modeling real world systems.
2. Build own deep learning project.
3. Differentiate between machine learning, deep learning and artificial Intelligence.
4. Ability to use an efficient algorithm for Deep Models.
5. Ability to learn deep neural network implementation using the TensorFlow and Keras.

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Professional Elective –V
(R20A0523) Software Testing Methodologies

COURSE OBJECTIVES

This course will enable the students:

1. To understand the purpose of testing and its methodology.
2. To learn the process of path and flow testing using flowgraphs.
3. To know the applications of Data flow and Domain testing
4. To learn the concept of logic testing and state graphs
5. To learn and understand the tools and techniques of software testing and its practice in the industry.

UNIT I

Introduction: Purpose of testing, Software Testing Life Cycle, Software Testing Methodology, Dichotomies, model for testing, consequences of bugs, taxonomy of bugs

UNIT II

Flow graphs and Path testing: Basics concepts of path testing, predicates, path predicates and achievable paths, path sensitizing, path instrumentation, application of path testing.

Transaction Flow Testing: Transaction flows, transaction flow testing techniques

UNIT III

Dataflow testing: Basics of dataflow testing, strategies in dataflow testing, application of dataflow testing. **Domain Testing:-**domains and paths, Nice & ugly domains, domain testing, domains and interfaces testing, domain and interface testing, domains and testability.

UNIT IV

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

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

UNIT V

State, State Graphs and Transition Testing : State graphs, good & bad state graphs, state

testing, Testability tips. Graph Matrices and Application: Motivational overview, matrix of graph, relations, power of a matrix, node reduction algorithm, Automation and testing tools: Need for Automation, Categorization of testing tools, Overview of Tools like WinRunner, LoadRunner, Jmeter,JUnit.

TEXT BOOKS:

1. Software Testing techniques - Boris Beizer, Dreamtech, second edition.
2. Software Testing Tools – Dr.K.V.K.K.Prasad, Dreamtech.

REFERENCE BOOKS:

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

COURSE OUTCOMES:

Students will be able to:

1. To compare and contrast the various testing strategies
2. To apply Path and transaction flow testing
3. To analyze the various domains and interfaces and test them.
4. To detect anomalies and build decision tables and KV charts.
5. To select an appropriate testing tool for a given application.

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PROFESSIONAL ELECTIVE –VI
(R20A6703) DATA SCIENCE

COURSE OBJECTIVES:

The students should be able to:

1. Understand the data science process.
2. Conceive the methods in R to load, explore and manage large data.
3. Choose and evaluate the models for analysis.
4. Describe the regression analysis.
5. Select the methods for displaying the predicted results.

UNIT I: Introduction to Data Science and Overview of R Data Science Process: Roles in a data science project, Stages in a data science project, Setting expectations. Basic Features of R, R installation, Basic Data Types: Numeric, Integer, Complex, Logical, Character. Data Structures: Vectors, Matrix, Lists, Indexing, Named Values, Factors. Subsetting R Objects: Sub setting a Vector, Matrix, Lists, Partial Matching, Removing NA Values. Control Structures: if-else, for Loop, while Loop, next, break. Functions: Named Arguments, Default Parameters, Return Values.

UNIT II: Loading, Exploring and Managing Data Working with data from files: Reading and Writing Data, Reading Data Files with read.table (), Reading in Larger Datasets with read.table. Working with relational databases. Data manipulation packages: dplyr, data.table, reshape2, tidyr, lubridate.

UNIT III:Modelling Methods-I: Choosing and evaluating Models Mapping problems to machine learning tasks: Classification problems, Scoring problems, Grouping: working without known targets, Problem-to-method mapping, Evaluating models: Over fitting, Measures of model performance, Evaluating classification models, Evaluating scoring models, Evaluating probability model.

UNIT IV: Modelling Methods-II: Linear and logistic regression Using linear regression: Understanding linear regression, Building a linear regression model, making predictions. Using logistic regression: Understanding logistic regression, Building a logistic regression model, making predictions.

UNIT V: Data visualization with R:Introduction to ggplot2: A worked example, Placing the data and mapping options, Graphs as objects, Univariate Graphs: Categorical, Quantitative. Bivariate Graphs- Categorical vs. Categorical, Quantitative vs Quantitative, Categorical vs. Quantitative, Multivariate Graphs :

Grouping, Faceting.

TEXT BOOKS:

1. Practical Data Science with R, Nina Zumel & John Mount , Manning PublicationsNY, 2014.
2. Beginning Data Science in R-Data Analysis, Visualization, and Modelling for the Data Scientist - Thomas Mailund –Apress -2017.

REFERENCE BOOKS:

1. The Comprehensive R Archive Network- https://cran.r-project.org.
2. R for Data Science by Hadley Wickham and Garrett Grolemund , 2017 , Published by OReilly Media, Inc.
3. R Programming for Data Science -Roger D. Peng, 2015 , Lean Publishing.
4. https://rkabacoff.github.io/datavis/IntroGGPLOT.html.

COURSE OUTCOMES:

The students will be able to:

1. Analyze the basics in R programming in terms of constructs, control statements,Functions.
2. Implement Data Preprocessing using R Libraries.
3. Apply the R programming from a statistical perspective and Modeling Methods.
4. Build regression models for a given problem.
5. Illustrate R programming tools for Graphs.

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PROFESSIONAL ELECTIVE -VI
(R20A0524) MOBILE COMPUTING

COURSE OBJECTIVES

This course will enable the students:

1. To make the student understand the concept of mobile computing paradigm, its applications and limitations.
2. To understand the typical mobile networking infrastructure through a popular GSMprotocol.
3. To understand the issues and solutions of various layers of mobile networks, namely MAClayer, Network Layer & Transport Layer
4. To understand the database issues in mobile environments & data delivery models.
5. To understand the platforms and protocols used in mobile environment.

UNIT I

Introduction: Mobile Communications, Mobile Computing – Paradigm, Promises/Novel Applications and Impediments and Architecture; Mobile and Handheld Devices, Limitations of Mobile and Handheld Devices. GSM – Services, System Architecture, Radio Interfaces, Protocols, Localization, Calling, Handover, Security, New Data Services, GPRS, CSHSD, DECT.

UNIT II

(Wireless) Medium Access Control (MAC): Motivation for a specialized MAC (Hidden and exposed terminals, Near and far terminals), SDMA, FDMA, TDMA, CDMA, Wireless LAN/(IEEE 802.11) Mobile Network Layer: IP and Mobile IP Network Layers, Packet Delivery and Handover Management, Location Management, Registration, Tunneling and Encapsulation, Route Optimization, DHCP.

UNIT III

Mobile Transport Layer: Conventional TCP/IP Protocols, Indirect TCP, Snooping TCP, Mobile TCP,Other Transport Layer Protocols for Mobile Networks.
Database Issues: Database Hoarding & Caching Techniques, Client-Server Computing & Adaptation, Transactional Models, Query processing, Data Recovery Process & QoS Issues.

UNIT IV

Data Dissemination and Synchronization: Communications Asymmetry, Classification of Data Delivery Mechanisms, Data Dissemination, Broadcast Models, Selective Tuning and Indexing Methods, Data Synchronization –

Introduction, Software, and Protocols.

UNIT V

Mobile Adhoc Networks (MANETs): Introduction, Applications & Challenges of a MANET, Routing, Classification of Routing Algorithms, Algorithms such as DSR, AODV, DSDV, etc. , MobileAgents, Service Discovery. Protocols and Platforms for Mobile Computing: WAP, Bluetooth, XML, J2ME, Java Card, Palm OS, Windows CE, Symbian OS, Linux for Mobile Devices, Android.

TEXT BOOKS:

1. Jochen Schiller, —Mobile Communications‖, Addison-Wesley, Second Edition, 2009.
2. Raj Kamal, —Mobile Computing‖, Oxford University Press, 2007, ISBN: 0195686772.

REFERENCE BOOKS:

1. Jochen Schiller, —Mobile Communications, Addison-Wesley, Second Edition, 2004.
2. Stojmenovic and Cacute, —Handbook of Wireless Networks and Mobile Computing,Wiley, 2002, ISBN 0471419028.
3. Reza Behravanfar, —Mobile Computing Principles: Designing and Developing Mobile Applications with UML and XML, ISBN: 0521817331, Cambridge University Press, Oct 2004.

COURSE OUTCOMES:

Students will be able to:

1. Understand the concept of mobile computing and the working of GSM architecture
2. Identify the issues in the mobile networks layers and to provide solutions.
3. Understand the issues in database mobile environment.
4. Understand the data delivery mechanism broadcasting models and data synchronization .
5. Develop a routing algorithms or protocol in mobile adhoc networks.

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PROFESSIONAL ELECTIVE –VI
(R20A0525) AGILE SOFTWARE DEVELOPMENT

COURSE OBJECTIVES:

This course will enable the students:

1. To learn the concept of agile software development.
2. To understand the core methodologies of agile project planning.
3. To learn the project design and SMM Model.
4. To understand the usage of design methods and Scrum.
5. To know the functionalities and usages of Seaborn.

UNIT I

Introduction: Need of Agile software development, agile context– Manifesto, Principles, Methods, Values, Roles, Artifacts, Traditional Model vs. Agile Model, Classification of Agile Methods, Stakeholders, and challenges. Business benefits of software agility.

UNIT II

Project Planning: Recognizing the structure of an agile team– Programmers, Managers, Customers. User stories– Definition, Characteristics and content. Estimation– Planning poker, Prioritizing, and selecting user stories with the customer, projecting team velocity for releases and iterations.

UNIT III

Project Design: Fundamentals, Design principles–Single responsibility, Open-closed, Liskov substitution, Dependency-inversion, Interface-segregation, Agile Knowledge Sharing, Role of Story-Cards, Story-Card Maturity Model (SMM).

UNIT IV

Design Methodologies: Need of scrum, Scrum practices –Working of scrum, Project velocity, Burn down chart, Sprint backlog, Sprint planning and retrospective, Daily scrum, Scrum roles– Product Owner, Scrum Master, Scrum Team. Extreme Programming- Core principles, values and practices. Kanban, Feature-driven development, Lean software development.

UNIT V

Testing: The Agile lifecycle and its impact on testing, Test driven development– Acceptance tests and verifying stories, writing a user acceptance test, Developing effective test suites, Continuous integration, Code refactoring. Risk based testing, Regression tests, Test automation.

TEXT BOOKS:

1. Ken Schawber, Mike Beedle, “Agile Software Development with Scrum”, International Edition, Pearson.
2. Robert C. Martin, “Agile Software Development, Principles, Patterns and Practices”, First International Edition, Prentice Hall.
3. Pedro M. Santos, Marco Consolaro, and Alessandro Di Gioia, “Agile Technical Practices Distilled: A learning journey in technical practices and principles of software design”, First edition, Packt Publisher.

REFERENCE BOOKS:

1. Lisa Crispin, Janet Gregory, “Agile Testing: A Practical Guide for Testers and Agile Teams”, International edition, Addison Wesley.
2. Alistair Cockburn, “Agile Software Development: The Cooperative Game”, 2nd Edition, Addison-Wesley.
3. “Agile Software Development”, https://www.edx.org/course/agile-software-development.
4. “Agile Software Development”, https://www.coursera.org/learn/agile-software-development.

COURSE OUTCOMES:

At Completion of this course, students would be able to -

1. Interpret the concept of agile software engineering and its advantages in software development.
2. Analyze the core practices behind several specific agile methodologies.
3. Identify the roles and responsibilities in agile projects and their difference from projects following traditional methodologies.
4. Access implications of functional testing, unit testing, and continuous integration.
5. Determine the role of design principles in agile software design.

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(R20A0591) BLOCK CHAIN TECHNOLOGY LAB

COURSE OBJECTIVES:

This course will enable the students:

1. Understanding Block chain Fundamentals and creating basic blocks.
2. Able to Design Block chain Applications in a structured manner
3. Ability to create own crypto currency and get familiarity with future currencies.
4. Able to Evaluate and Analyze Block chain Systems
5. Able to Evaluate and Analyze Block chain Systems in Lendger.

LIST OF EXPERIMENTS

Week 1: Creating Merkle tree

Week 2: Creation of Block

Week 3: Block chain Implementation Programming code

Week 4: Creating ERC20 token

Week 5: implement blockchain in Merkle

Trees Week 6: implement Mining using block

chain Week 7: implement peer-to-peer using

block chain Week 8: Creating a Crypto-

currency Wallet

Course Outcomes:

1. Knowledge of Blockchain Concepts and creating basic blocks.
2. Proficiency in Blockchain Development.
3. Ability to Design and Implement Blockchain Applications.
4. Evaluation and Analysis of Blockchain Systems.
5. Knowledge of crypto currency and creating a basic form of it.

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(R20A0592) BIG DATA ANALYTICS LAB

COURSE OBJECTIVES:

The objectives of this course are,

1. To implement MapReduce programs for processing big data.
2. To realize storage of big data using MongoDB.
3. To analyze big data using machine learning techniques.
4. To analyze Decision tree classification and clustering.
5. To understand how sql is linked with bigdata

LIST OF EXPERIMENTS:

1. Install, configure and run python, numPy and Pandas.
2. Install, configure and run Hadoop and HDFS.
3. Visualize data using basic plotting techniques in Python.
4. Implement NoSQL Database Operations: CRUD operations, Arrays using MongoDB.
5. Implement Functions: Count – Sort – Limit – Skip – Aggregate using MongoDB.
6. Implement word count / frequency programs using MapReduce.
7. Implement a MapReduce program that processes a dataset.
8. Implement clustering techniques using SPARK
9. Implement an application that stores big data in MongoDB / Pig using Hadoop / R.

TEXT BOOKS:

1. Mike Frampton, “Mastering Apache Spark”, Packt Publishing, 2015.
2. TomWhite, “Hadoop:TheDefinitiveGuide”, O‟Reilly, 4thEdition, 2015.
3. NickPentreath, “Machine Learning with Spark”, PacktPublishing, 2015.

4. Mohammed Guller, “Big Data Analytics with Spark”, Apress, 2015
5. Donald Miner, Adam Shook, “Map Reduce Design Pattern”, O‟Reilly, 2012

COURSE OUTCOMES:

On successful completion of the course, students will be able to,

1. Understand Configuration of various big data Frame Works.
2. Apply various visualization techniques to explore data.
3. Demonstrate data base operations using MongoDB.
4. Process big data using Hadoop framework.
5. Build and apply Map-Reduce & NoSQL Concepts.

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(R20A0337) INNOVATION, STARTUPS AND ENTERPRENEURSHIP

COURSE OBJECTIVES:

1. Understand the meaning and levels of innovation, explore ideation methods, and recognize the role of entrepreneurship in economic development.
2. Develop key entrepreneurial skills, decision-making abilities, and creative thinking while managing stress and overcoming startup challenges.
3. Learn to assess business ideas, conduct market research, create a business plan, and understand financial feasibility and fundraising strategies.
4. Gain knowledge of legal requirements, intellectual property rights, financial management, capital structure, and taxation for startups.
5. Explore funding options, business incubation benefits, IPO processes, government initiatives, and intellectual property protection in modern entrepreneurship.

UNIT-I

Introduction: Meaning and Concept of Innovation, Levels of Innovation- Incremental Vs Radical Innovation-Inbound and Outbound Ideation- Open and Other Innovative Ideation Methods.
Entrepreneurship- Role-models of Entrepreneurship- Common Entrepreneurial characteristics, Role of Entrepreneurship in economic development- Entrepreneurship in the new millennium.

UNIT-II

The Entrepreneur and Mindset: Meaning – The skills required being an Entrepreneur and entrepreneurial decision process- Entrepreneurial stress - Challenges of start-ups- Entrepreneurial Motivation, Innovation, Imagination & Creativity.

UNIT-III

Business Planning and Fund Raising: Identifying, assessing and validation of the idea, Identifying the target segment and market share, creating an effective B-Plan, Market research, Financial, Market and Technical feasibility, Fund raising and valuation, Idea pitching.

UNIT-IV

Legal and Financial Aspects: Legal aspects: Permits, Registrations and compliances, Intellectual Property Rights, Contracts.
Financial aspects: Working capital management- Financial management and long-term investments, Capital structure and taxation, Brake even analysis.

UNIT-V

Contemporary Issues: Legal forms of entrepreneurial organizations- Debt, Equity, Angle and Venture Capital markets for Start-ups, Growth and Development stages- new venture finance- Initial Public Offer (IPO) Governmental initiatives to encourage startups - Business Incubations and its benefits- Protection of Intellectual Property.

TEXT BOOKS:

1. Kathleen R Allen, Launching New Ventures, An Entrepreneurial Approach, Cengage Learning,

2016 Anjan Raichaudhuri, Managing New Ventures Concepts and Cases, Prentice Hall International, 2010.
2. Innovation Management, C.S.G. Krishnamacharyulu, R. Lalitha, Himalaya Publishing House, 2010.
3. S. R. Bhowmik & M. Bhowmik, Entrepreneurship, New Age International, 2007.

REFERENCE BOOKS

1. Stuart Read, Effectual Entrepreneurship, Routledge, 2013
2. Rajeev Roy, Entrepreneurship, 2e, Oxford publications, 2012.
3. Nandan .H, Fundamentals of Entrepreneurship, PHI, 2013

COURSE OUTCOMES:

1. Students will be able to understand a) Startup opportunities b) Legal and other requirements for new ventures.
2. Students understand a) Financial Issues of startups b) Sustainability and growth of startups c)Exit strategies.
3. Students will be able to understand a) mindset of the entrepreneurs, b) identify ventures for launching,
4. Students develop an idea on the legal framework
5. Students will be able to strategic perspectives in entrepreneurship.