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 2022 - 23)

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 Councilfor 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:
  - Bachelorof 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.

“Athought beyond the horizons of success committed for educational excellence”

PRINCIPAL

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

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INSTITUTE VISION

a. 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.

INSTITUTE MISSION

b. To become a model institution in the fields of Engineering, Technology and Management.

c. To impart holistic education to the students to render them as industry ready engineers.

d. To ensure synchronization of MRCET ideologies with challenging demands of International Pioneering Organizations.

QUALITY POLICY

e. To implement best practices in Teaching and Learning process for both UG and PG courses meticulously.

f. To provide state of art infrastructure and expertise to impart quality education.

g. To groom the students to become intellectually creative and professionally competitive.

h. 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 2022-23 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.

- **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:

- The candidate shall pursue a course of study for not less than four academic years and not more than eight academic years.
- After eight academic years of course of study, the candidate is permitted to write the examinations for two more years.
- **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

- 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.

a. **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

b. **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.**

c. **Distribution and Weightage of Marks**

- 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.

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

- 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.

- 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.

- 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.

- 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.

- 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.

- 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.

- 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.

d. **Attendance Requirements**

- 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.

- 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
- **Shortage of Attendance below 65% in aggregate shall not be condoned.**
- 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.
- **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.**
- A stipulated fee as determined by the examination branch shall be payable towards condonation of shortage of attendance.
- **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.**
- **The candidate fulfills the attendance requirement in the present semester, he/she shall not be permitted for readmission into the same class.**

a. **Course Registration:**

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.

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.

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

4. Interchanging of Course Registrations are not permitted.

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.

1. **Minimum Academic Requirements**

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

2. 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.

3. 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.

4. 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.

5. 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.

6. 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.

7. 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.

- **Course pattern**

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

- 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.

- 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.

- **Grading Procedure**

- 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.

- 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.

- **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

- **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

a. 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.

b. 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.

c. 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.

- 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.

- 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.
- 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.

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

- Thestudent passes the subject/ course onlywhen **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

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

- 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.

- **Passing standards**

- 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.
- 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.

- **Declaration of results**

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

- **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).**

- 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 $\geq$ 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.

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

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

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

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

- 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) $\geq$ 5.00 but < 5.50, shall be placed in **'pass class'** provided they secure a total of 160 credits.

- 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.

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

- **Withholding of results**

- 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.

- **Transitory regulations.**

- 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).

- 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.
- 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.

1. **General**
2. Wherever the words he, him, his, occur in the regulations, they include she, her, hers.
3. The academic regulation should be read as a whole for the purpose of any interpretation.
4. In case of any doubt or ambiguity in the interpretation of the above rules, the decision of the Principal is final.
5. 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.
6. 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.

- **Scope**

- The academic regulations should be read as a whole, for the purpose of any interpretation.
- In case of any doubt or ambiguity in the interpretation of the above rules, the decision of the Academic senate is final.
- 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

a. **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.

b. 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.

c. 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.

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

e. **Promotion rule**

i) 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.

ii) 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.

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

* * * * *

DEPARTMENT OF COMPUTER SCIENCE & 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.

PROGRAMME OUTCOMES:
ENGINEERING GRADUATES WILL BE ABLE TO
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)

BTECH – COMPUTER SCIENCE AND ENGINEERING- R22 - COURSESTRUCTURE

I Year B.Tech - CSE – I Semester

S.No	Subject Code	SUBJECT (S)	L	T	P	C	MAX. MARKS	
							INT	EXT
1	R22A0001	English	2	0	0	2	40	60
2	R22A0023	Mathematics – I	3	1	0	4	40	60
3	R22A0201	Principles of Electrical and Electronics Engineering	3	0	0	3	40	60
4	R22A0301	Computer Aided Engineering Graphics	2	0	3	4	40	60
5	R22A0501	Programming for Problem Solving	3	0	0	3	40	60
6	R22A0081	English Language and Communication Skills Lab	-	0	2	1	40	60
7	R22A0281	Principles of Electrical and Electronics Engineering Lab	-	0	3	1.5	40	60
8	R22A0581	Programming for Problem Solving Lab	-	0	3	1.5	40	60
9	R22A0004	Environmental Science	2	0	0	0	40	60
		Total	**15**	**1**	**11**	**20**	**360**	**540**

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

I Year B. Tech - CSE – II Semester

S.No	Subject Code	SUBJECT(S)	L	T	P	C	MAX. MARKS	
							INT	EXT
1	R22A0002	Professional English	2	0	0	2	40	60
2	R22A0024	Mathematics – II	3	1	0	4	40	60
3	R22A0021	Applied Physics	3	1	0	4	40	60
4	R22A0022	Engineering Chemistry	3	0	0	3	40	60
5	R22A0502	Python Programming	3	0	0	3	40	60
6	R22A0082	Applied Physics/Engineering Chemistry Lab	-	0	3	1.5	40	60
7	R22A0582	Python Programming Lab	-	0	3	1.5	40	60
8	R22A0083	Engineering and Computing Hardware Workshop	-	0	2	1	40	60
9	R22A0003	Human Values and Professional Ethics	2	0	0	0	40	60
		Total	**16**	**2**	**8**	**20**	**360**	**540**

***Mandatory course: Non-credit course, 50% of scoring is requiredfortheawardof thedegree**

MALLA REDDY COLLEGE OF ENGINEERINGANDTECHNOLOGY

(Autonomous Institution – UGC,Govt. of India)

BTECH – COMPUTER SCIENCEAND ENGINEERING- R22 - COURSESTRUCTURE

II Year B. Tech - CSE – I Semester

S.No	Subject Code	SUBJECT	L	T	P	C	MAX. MARKS	
							INT	EXT
1	R22A0503	Data Structures	3	0	0	3	40	60
2	R22A0504	Database Management Systems	3	0	0	3	40	60
3	R22A0505	Software Engineering	3	0	0	3	40	60
4	R22A0506	Design and Analysis of Algorithms	3	1	0	4	40	60
5	R22A0026	Probability, Statistics and Queueing Theory	3	1	0	4	40	60
6	R22A0583	Data Structures Lab	-	0	2	1	40	60
7	R22A0584	Database Management Systems Lab	-	0	2	1	40	60
8	R22A0585	Software Engineering Lab	-	0	2	1	40	60
9	R22A0061	Public Policy and Governance	2	0	0	0	100	-
		Total	**17**	**2**	**6**	**20**	**420**	**480**

***Mandatory course: Non-credit course, 50% of scoring is required fortheaward of thedegree**

II Year B. Tech - CSE – II Semester

S.No	Subject Code	SUBJECT	L	T	P	C	MAX. MARKS	
							INT	EXT
1	R22A0028	Discrete Mathematics	3	0	0	3	40	60
2	R22A0507	Object Oriented Programming through Java	3	0	0	3	40	60
3	R22A0508	Computer Organization	3	0	0	3	40	60
4	R22A0509	Operating Systems	3	0	0	3	40	60
5	R22A0510	Formal Languages and Automata Theory	3	1	0	4	40	60
6	R22A0586	Object Oriented Programming through Java Lab	-	0	2	1	40	60
7	R22A0587	Operating Systems Lab	-	0	2	1	40	60
8	R22A0593	Industry Oriented Project	0	0	4	2	40	60
9	R22A0005	Foreign Language: French	2	0	0	0	100	-
		Total	**17**	**1**	**8**	**20**	**420**	**480**

***Mandatory course: Non-credit course, 50% of scoring is required fortheaward of thedegree**

MALLA REDDY COLLEGE OF ENGINEERINGANDTECHNOLOGY

(Autonomous Institution – UGC,Govt. of India)

BTECH – COMPUTER SCIENCE AND ENGINEERING- R22 - COURSESTRUCTURE

III Year B. Tech - CSE – ISemester

S.No	Subject Code	SUBJECT	L	T	P	C	MAX. MARKS	
							INT	EXT
1	R22A0511	Compiler Design	3	0	0	3	40	60
2	R22A6601	Artificial Intelligence	3	0	0	3	40	60
3	R22A0513	Full Stack Development	3	0	0	3	40	60
4		Open Elective-I	3	0	0	3	40	60
5	R22A05xx	CBCS POOL	3	0	0	3	40	60
6	R22A0588	Compiler Design Lab	-	0	2	1	40	60
7	R22A0589	Full Stack Development Lab	-	0	2	1	40	60
8	R22A0592	Application Development-I	0	0	4	2	40	60
9	R22A0084	Professional Development Skills -I	0	0	2	1	40	60
		Total	**15**	**0**	**10**	**20**	**360**	**540**

III Year B.Tech - CSE–II Semester

S.No	Subject Code	SUBJECT	L	T	P	C	MAX. MARKS	
							INT	EXT
1	R22A0512	Computer Networks	3	0	0	3	40	60
2	R22A6602	Machine Learning	3	0	0	3	40	60
3	R22A0517	Big Data Analytics	3	0	0	3	40	60
4		Open Elective -II	3	0	0	3	40	60
5	R22A05xx	CBCS POOL	3	0	0	3	40	60
6	R22A6684	Artificial Intelligence and Machine Learning Lab	-	0	2	1	40	60
7	R22A0590	Big Data Analytics Lab	-	0	2	1	40	60
8	R22A0594	Application Development-II	0	0	4	2	40	60
9	R22A0085	Professional Development Skills -II	0	0	2	1	40	60
		Total	**15**	**0**	**10**	**20**	**360**	**540**

MALLA REDDY COLLEGE OF ENGINEERINGANDTECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

BTECH – COMPUTER SCIENCEAND ENGINEERING- R22 - COURSESTRUCTURE

IV Year B.Tech - CSE – I Semester

S.No	Subject Code	SUBJECT	L	T	P	C	MAX. MARKS	
							INT	EXT
1	R22A0521	Dev Ops	3	0	0	3	40	60
2	R22A6706	Data Science & Its Modeling Methods	3	1	0	4	40	60
3	R22A0522	Cloud Computing	3	0	0	3	40	60
4	R22A05xx	CBCS POOL	3	0	0	3	40	60
5	R22A05xx	CBCS POOL	3	0	0	3	40	60
6	R22A6784	Data Science Lab	-	0	2	1	40	60
7	R22A0595	Project Phase-I	-	0	6	3	40	60
		Total	**15**	**1**	**8**	**20**	**280**	**420**

IV Year B.Tech - CSE– II Semester

S.No	Subject Code	SUBJECT	L	T	P	C	MAX. MARKS	
							INT	EXT
1	R22A0336	Innovation, Start-Up & Entrepreneurship	4	0	0	4	40	60
2	R22A05xx	CBCS POOL	3	0	0	3	40	60
3	R22A05xx	CBCS POOL	3	0	0	3	40	60
4	R22A0596	Project Phase-II	0	0	20	10	80	120
		Total	**10**	**0**	**20**	**20**	**200**	**300**

CBCS POOL

S.NO	SUBJECT CODE	SUBJECT NAME	YEAR/SEM
1	R22A0514	Distributed Systems	III/I
2	R22A0515	Image Processing	
3	R22A6201	Cyber Security Essentials	
4	R22A0516	Agile Methodology	
5	R22A0518	Scripting Languages	III/II
6	R22A6202	Cryptography & Network Security	
7	R22A0519	Digital Forensics	
8	R22A0520	Embedded Systems	
9	R22A6603	Natural Language Processing	IV/I
10	R22A0523	Design Patterns using Python	
11	R22A6705	Data Visualization Techniques	
12	R22A0524	Information Storage and Management	
13	R22A0525	Augmented Reality and Virtual Reality	IV/I
14	R22A6608	Text Analytics	
15	R22A0526	Distributed Databases	
16	R22A0527	Block Chain Technology	
17	R22A0528	Quantum Computing	IV/II
18	R22A0529	Deep Learning and Its Applications	
19	R22A6621	Generative AI	
20	R22A6606	Computer Vision	
21	R22A6611	Soft Computing	IV/II
22	R22A0530	Game Theory	
23	R22A0531	Software Quality Assurance and Testing	
24	R22A0532	Adhoc and Sensor Networks	

LIST OF OPEN ELECTIVES

III Year B. Tech - CSE – I Semester OPEN ELECTIVE – I		
S.NO	**SUBJECT CODE**	**SUBJECT NAME**
1	R22A0551	Java Programming
2	R22A1251	Web Development
3	R22A2151	Intellectual Property Rights
4	R22A0351	Robotics & Automation
5	R22A0451	Electronics for Health Care
6	R22A0251	Renewable Energy Sources
7	R22A6751	Principles of Data Science
8	R22A6752	Business Analytics

III Year B. Tech - CSE – II Semester OPEN ELECTIVE – II		
S.NO	**SUBJECT CODE**	**SUBJECT NAME**
1	R22A0553	Database Systems
2	R22A6753	Big Data Architecture
3	R22A0352	Design Thinking
4	R22A0552	Principles of Cloud Computing
5	R22A6951	Internet of Things & its Applications
6	R22A2152	Nano Technology
7	R22A0252	Electrical and Hybrid Vehicles
8	R22A6251	Cyber Governance

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

I Year B.TECH -I-SEM **L/T/P/C**

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(R22A0001) 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 sharpen the speaking skills of learners by involving them in diverse activities such as group discussions, debates, conversations and role plays.
5. To train students in soft skills with the help of case studies.

SYLLABUS

READINGSKILLS:

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:

The students will be trained in reading skills using the prescribed text for detailed study. 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 writingskills.
2. To equip students with the components of different forms ofwriting, beginning with the required ones:
   - Writing sentences
   - Use of appropriate vocabulary
   - Coherence and cohesiveness
   - Formaland informal letterwriting

UNIT –I

J KRowling's Convocation Speech at Harvard

Grammar – Tenses and Question Tags
Vocabulary – wordFormation - Affixes Writing
Writing – Paragraph Writing
Reading –Theart of skimming and scanning-
Reading Exercise Type 1
(Match the statements tothe text they refer to)

UNIT – II

"The Road not taken" by Robert Frost

Grammar –Directand IndirectSpeech
Vocabulary – One-Word Substitutes, Standard Abbreviations, Synonyms and Antonyms
Writing – Essay Writing (Introduction, body and conclusion)
Reading – Reading –The art of Intensive and Extensive -Reading Exercise Type 2

UNIT – III

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

Grammar – Voices
Vocabulary – Transitive and Intransitive
Writing – E-mail Writing, Letter Writing (complaints, requisitions, apologies).
Reading – Reading Comprehension- Reading Exercise Type3 (Reading between the lines)

UNIT – IV

"Abraham Lincoln's Letter to His Son's Teacher"

Grammar – Articles, Punctuation
Vocabulary – PhrasalVerbs
Writing – PrécisWriting
Reading – Reading Exercise Type4 (Clozetest)

UNIT –V

Abdul Kalam's Biography

Grammar – Subject-Verb Agreement, Noun-Pronoun Agreement Vocabulary– Commonly Confused Words
Writing – MemoWriting
Reading - Reading Exercise Type5 (Identifyingerrors)

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

REFERENCE BOOKS:

1. Practical English Usage. Michael Swan. OUP.1995.
2. Remedial English Grammar. F.T. Wood.Macmillan.2007
3. https://www.britannica.com/biography/A-P-J-Abdul-Kalam
4. Study Writing. Liz Hamp-Lyons and Ben Heasly. Cambridge University Press.2006.
5. CommunicationSkills.SanjayKumarandPushpaLata.OxfordUniversityPress.2011.

COURSE OUTCOMES:

After completion of the course students will be able to:

1. Gaincompetence 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 ofcomprehending 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. Enrichtheirgrammatical accuracy and fluency to be adept at both the active and passive skills
5. Represent old conventions with aset of the new by professional verbal communicative ability.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

I Year B. TECH -I-SEM **L/T/P/ C**

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(R22A0023) MATHEMATICS -I

COURSE OBJECTIVES:

- The concept of a Rank of the matrix and applying the concept to know the consistency and solving the system of linear equations.
- Theconcept of Eigen values, Eigen vectors and Diagonolisation.
- The maxima and minima of functions of several variables.
- The Applications of first order ordinary differential equations.
- The methods to solve higher order differential equations.

UNIT I:

MATRICES

Introduction, Types of matrices, Rank of a matrix - Echelon form and Normal form, Consistency of system of linear equations (Homogeneous and Non-Homogeneous)-Gauss elimination method and Gauss-Siedel iteration method.

UNIT II:

EIGEN VALUES AND EIGEN VECTORS

Linear dependence and independence of vectors, Eigen values and Eigen vectors and their properties, Diagonalization of a matrix. Cayley-Hamilton theorem (without proof), finding inverse and power of a matrix by Cayley-Hamilton Theorem; Quadratic forms and Nature of the Quadratic Forms; Reduction of Quadratic form to canonical forms by Orthogonal Transformation.

UNIT III:

MULTI VARIABLECALCULUS (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 IV:

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 V :

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 linear ODE with constant coefficients-Cauchy's Euler equation and Legendre's equation.

TEXT BOOKS

i) Higher Engineering Mathematics by B V Ramana ., Tata McGraw Hill.
ii) Higher Engineering Mathematics by B.S. Grewal, Khanna Publishers.
iii) Advanced Engineering Mathematics by Kreyszig ,John Wiley & Sons .

REFERENCE BOOKS

i) AdvancedEngineering Mathematics by R.K Jain & S R K Iyenger, Narosa Publishers.
ii) Ordinary and Partial Differential Equations by M.D. Raisinghania, S.Chand Publishers
iii) Engineering Mathematics by N.P Baliand Manish Goyal.

COURSE OUTCOMES:

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

1. Analyze the solution of the system of linear equations and to find the Eigen values and Eigen vectors of a matrix.
2. Reduce the quadratic form to canonical form using orthogonaltransformations.
3. Findthe extreme values of functions of twovariables with/ without constraints.
4. Solve first order, first degree differential equations and their applications.
5. Solve higher order differential equations.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

I Year B. TECH -I-SEM **L/T/P/C**

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(R22A0201)

PRINCIPLES OF ELECTRICAL AND ELECTRONICS ENGINEERING

COURSE OBJECTIVES:

1. To understand the basic concepts of electrical circuits and analzse Circuits using Network Theorems.
2. To get overview of single phase A.C. circuits and three phase A.C. circuits.
3. To introduce the concept of DC Machines and Single-Phase Transformers.
4. To study the concepts of p-n diodes, rectifiers and Zener diodes.
5. To study the concepts of BJTs, JFET and MOSFETs.

UNIT –I:

INTRODUCTION TO ELECTRICAL CIRCUITS: Concept of Circuit and Network, R-L-C Parameters, Ohms law and its limitations, Kirchhoff's Laws-KVL, KCL.

NETWORK ANALYSIS (D.C EXCITATION): Series and parallel connections of Resistive Networks, voltage division and current division, Mesh analysis, Nodal analysis

NETWORK THEOREMS: Thevenin's Theorem, Norton's Theorem and Superposition Theorem (for independent sources).

UNIT–II:

SINGLE PHASE A.C. CIRCUITS: Average value, R.M.S. value, form factor and peak factor for sinusoidal wave form. Concept of phase, phasor representation of sinusoidal quantities phase difference, Sinusoidal response of pure R, L, C.

THREE PHASE A.C. CIRCUITS: Advantages of Three phase over single phase, Voltage and Current relationship in star and delta connections.

UNIT-III:

MACHINES:

DCGenerator: principle of operation and working, Action of commutator, constructional features, basic concept of Lap and wave windings, emf equation.

DCMotor: principle of operation, Back emf and its significance, torque equation-Gross torque and Shaft torque.

Single Phase Transformer: principle of operation, emf equation, problems on emf equation.

UNIT–IV:

P-**N JUNCTION DIODE:** P-N junction diode, symbol and forward biased and reverse biased

Q-conditions, V-I characteristics of P-N junction diode, Half wave, Full wave and Bridge rectifiers.
ZENERDIODE: Symbol, construction, principle of operation and its applications.

UNIT–V:

BIPOLAR JUNCTION TRANSISTOR: Symbols, types, Construction and Principle of Operation of N-P-N and P-N-P transistors, Amplifying Action, Common Emitter, Common Base and Common Collector configurations.
JFET, Symbol, Construction, Principle of operation, and its Characterstics, MOSFET (Enhancement and Depletion mode) Symbol, Construction, Principle of Operation and its Characteristics.

TEXTBOOKS:

1. Engineering Circuit Analysis-William Hayt, Jack E.Kemmerly, SMDurbin, McGraw Hill Companies.
2. Electric Circuits-A. Chakrabarhty, Dhanipat Rai &Sons.
3. Electrical Machines–P.S.Bimbra, Khanna Publishers.
4. "Electronic Devices & Circuits", SpecialEdition–MRCET, McGraw Hill Publications,2017.
5. Integrated Electronics Analog Digital Circuits, Jacob Millman and D.Halkias, McGrawHill.
6. Electronic Devices and Circuits, S.Salivahanan, N.Sureshkumar, McGrawHill.

REFERENCE BOOKS

1. Network analysis by M.E VanValkenburg, PHI learning publications.
2. Network analysis-N. C Jagan and C. Lakhminarayana, BS publications.
3. Electrical Circuits by A.Sudhakar, Shyam mohan and S Palli, Mc Graw Hill Companies.
4. ElectricalMachinesbyI.J.Nagrath&D.P.Kothari,TataMcGraw-HillPublishers.
5. Electronic Devices and Circuits, K.LalKishore, B.S Publications
6. Electronic Devices and Circuits,G.S.N.Raju, I.K.International Publications, NewDelhi,2006.

COURSE OUTCOMES:

After the course completion the students will be able to

1. Apply the basic RLC circuit element sand its concepts tonetworks and circuits.
2. Analyze the circuits by applying network theorems to solve them to find various electrical parameters.
3. Illustrate the single-phase AC circuits along with the concept of impedance parameters and power.
4. Understand the Constructional Details and Principle of Operation of DC Machines and Transformers
5. To understand the concepts of p-n diode, rectifiers and Zener diode

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

I Year B. TECH -I-SEM **L/T/P/C**
2/-/3/4

(R22A0301)

COMPUTER AIDED ENGINEERING GRAPHICS

COURSEOBJECTIVES:

1. To learn basic engineering graphics and Auto CAD concepts.
2. To learn the 2D principles of orthographic projections and Multiple views of the same
3. To know the planes and solid Projection
4. To gain the capability of designing 3D objects with isometric principles by using computer aided sketches
5. To know the conversion of Orthographic Views to isometric Views and isometric to Orthographic views

UNIT I

Introduction to Auto CAD: Introduction to software interface Standard toolbar/menu, Understanding the co-ordinate systems-2D and 3D Visualisation, Setting the Paper sizes and title block importance, printing and plotting. **Draw commands:** line, arc, circle, rectangle, polygons, ellipse, polyline, splines, text. **Modify commands:** copy, mirror, offset, arrays, move, extend, break, trim, lengthen, chamfer, fillet.etc., **Constraints:** horizontal, vertical, parallel, concentric, perpendicular, symmetric, equal, collinear. **Dimensioning Commands:** Dimensioning and Dimension Style. **Division:** Line division, and circle division. **Polygons:** Constructing regular polygons - inscribed and circumscribed methods and general method.

UNIT II

Projection of Points: Introduction to reference planes, four quadrants, importance of reference lines. Projection of points in all the four quadrants

Projection of Lines: Parallel to both the reference planes, Parallel to one plane and perpendicular to other plane, Inclined to one plane and parallel to other plane, Inclined to both planes

UNIT III

Projections of Planes: Introduction toRegular planes. Parallel/Perpendicular to one reference plane, Inclined to one plane and Inclined to both the reference planes.

Projections of Solids: Introduction - Prisms, Pyramids, Cone and Cylinder, Axis parallel and perpendicular to one reference plane, Axis inclined to one reference plane.

UNIT IV

Isometric Projection: Introduction, Isometric projection of simple plane figures, Solids - right

regular prisms, pyramids, cylinder, cone – H.P, V.P

UNIT V

Conversions: Conversion of Isometric Views to Orthographic Views and Orthographic Views to Isometric Views

TEXT BOOKS:

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

REFERENCE BOOKS:

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

COURSE OUTCOMES:

After the completion of course the student will be capable to

1. To produce geometric construction, dimensioning & Curves and detail drawings.
2. To compile Projections of points, lines, then create virtual drawing by using computer
3. To sketch the Planes and Solid Projections
4. To develop isometric drawings of simple objects reading the orthographic projections of those objects.
5. To understand and visualize the 3-D view of engineering objects. Elaborate the conversions of 2D-3D and Vice-Versa.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

I Year B. TECH -I-SEM **L/T/P/C**

3/-/-/3

(R22A0501) PROGRAMMING FOR PROBLEM SOLVING

COURSE OBJECTIVES:

1. To understand the use of computer system in problem solving and to build program logic with algorithms and flowcharts.
2. To learn the syntax and semantics o Fc programming language.
3. To learn the usage of structured programming approach in solving problems.
4. To learn the usage of strings and pointers.
5. Understand the usage of structures and files.

UNIT-I:

Introduction to Programming:

Computer Languages, Compilers, Compiling and executing a program, Representation of Algorithms and Flowcharts with examples.

Introduction to C Programming Language:

Structure of a C Program**,** I/O: Simple input and output with scanf() and printf(), C Tokens- Keywords, Identifiers, Constants, Variables, Data types, Operators, Expressions and precedence, Expression evaluation, Type conversion.

UNIT-II:

Conditional Branching and Arrays:

Control Structures – Selection Statements (Decision Making)- if and switch statements, nested if-else, Iteration and loops: use of while, do-while and for loops, nested loops, use of goto, break and continue statements.

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

UNIT-III:

Designing Structured Programs using Functions:

Functions: Declaring a function, Categories of functions, passing parameters to functions: call by value, call by reference, passing arrays to functions, Scope- Local Vs Global, Storage classes, Recursion with example programs.

UNIT-IV:

Strings and Pointers:

Strings: Introduction to strings, Declaration and Initialization, String input/output functions, String manipulation functions with example programs, Array of Strings.

Pointers: Defining pointers, Declaration and Initialization, accessing variables through pointers,

Pointers to arrays, Pointers to functions, Pointers to structures, Command line arguments, Enumeration data type, Dynamic Memory Management Functions: malloc(), calloc(), realloc() and free().

UNIT-V:

Structures and Filehandling in C:

Structures: Defining structures, Declaration and Initialization, Array of structures, unions.

Files: Text and Binary files, Opening and Closing files, File input /output functions, Creating and Reading and writing text files, Appending data to existing files.

TEXTBOOKS:

1. Jeri R.Hanly and Elliot B.Koffman, Problem solving and Program Designing 7thEdition, Pearson.
2. Mastering C, K.R.Venugopal, S R Prasad, Tata McGraw-Hill Education.
3. ComputerProgramming, E.Balagurusamy, First Edition, TMH.
4. Computer Science: A Structured Programming Approach Using C, B.A.Forouzan and R.F. Gilberg, Third Edition, Cengage Learning.

REFERENCE BOOKS:

1. Brian W.Kernighan and Dennis M.Ritchie,The C Programming Language,Prentice Hall of India.
2. YashavantKanetkar,LetUsC,18thEdition,BPB.
3. Programming in C, Stephen G.Kochan, Fourth Edition, Pearson Education.
4. Herbert Schildt,C: The CompleteReference,McGrawHill,4thEdition.

COURSE OUTCOMES:

Thestudent will be able

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

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

I Year B. TECH -I-SEM **L/T/P/C**

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(R22A0081) ENGLISH LANGUAGE AND 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, ample speaking 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 and Communication Skills Labs 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 and 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 –IVProcessor
   a) Speed –2.8 GHZ
   b) RAM –512 MB Minimum
   c) Hard Disk –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.

DISTRIBUTION AND WEIGHTAGEOF MARKS

English Language Laboratory Practical Examination:

1. The practical examinations for the English Language Laboratory shall be conducted as per the University norms prescribed for the core engineering practical sessions.
2. For the Language lab sessions, there shall be a continuous evaluation during the year for 30 marks and 70 year-end Examination marks. Of the 30 marks, 20 marks shall be awarded for day-to-day work and 10 marks to be awarded by conducting Internal Lab Test(s). The year-end Examination shall be conducted by the teacher concerned with the help of another member of the staff of the same department of the other institution.

COURSE OUTCOMES:

1. Learning with precision through computer-assisted individualized and independent language learning to work independently in engineering set up.
2. Improved conversational reception and articulation techniques in the course of repetitive instruction thereby gaining confidence both in institutional and professional environment.
3. 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. Imbibing appropriate use of language in situations to work as an individual and as o leader in diverse teams
5. Equip themselves with the pre-requisites, and relevant techniques to effectively attend corporate interviews.

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I Year B. TECH -I-SEM **L/T/P/C**

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(R22A0281) PRINCIPLES OF ELECTRICAL AND ELECTRONICS ENGINEERING LAB

COURSE OBJECTIVES:

1. To design an electrical system.
2. To analyze a given network by applying various circuit laws and network theorems.
3. Toexpose the students tothe operation of DC machine and transformer.
4. Toexhibit the students tothe operation of PN junction diode and Zener diode.
5. To expose the students to the operation of Rectifier.

Among thefollowing experiments any 10 are to beconducted

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. Magnetization characteristics of DC shunt generator.
6. Speed control of DC shunt motor using armature controlmethod.
7. Speed control of DC shunt motor using flux control method
8. Load test on single phase transformer.
9. PN Junction diode characteristics.
10. Zener diode characteristics.
11. Half wave rectifier.
12. Full wave rectifier.

COURSE OUTCOMES:

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

1. Explain the concept of circuit laws and network theorems and apply them to laboratory measurements.
2. Be able tosystematically obtainthe equations that characterize the performance of an electric circuit as well as solving them.
3. Perform the required tests on transformers and DC motors.
4. Plot the characteristics of Zener diodes.
5. Determine the working of rectifiers in detail.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

I Year B. TECH -I-SEM **L/T/P/C**

-/-/3/1.5

(R22A0581) PROGRAMMING FOR PROBLEM SOLVING LAB

COURSE OBJECTIVES:

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

Practice Sessions:

i. Write a simple program that prints the results of all the operators available in C (including pre/post increment, bitwise and/or/not, etc.).Read required operand values from standard input.

ii. Write a simple program that converts one given data type to another using auto conversion and casting. Take the values from standard input.

Simple numeric problems:

A. Write a program for finding the max and min from the three numbers.

a. Write the program forthe simple, compound interest.

b. Write a program that declares Class awarded for a given percentage of marks, where mark <40%= Failed, 40% to<60% = Second class, 60% to <70%=First class, >= 70% = Distinction. Read percentage from standard input.

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

5x1=5

5x2=10

5x3=15

Expression Evaluation:

A. A building has 10 floors with a floor height of 3 meters each. A ball is dropped from the top of the building. Find the time taken by the ball to reach each floor.(Use the formulas=ut+(1/2)at^2whereuand are the initial velocity in m/sec(=0)and acceleration in m/sec^2 (=9.8m/s^2)).

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

use Switch Statement).

C. Write a C program to find the factorial of a given number.

D. Write a C program to find the sum of individual digits of a positive integer and test given number is palindrome.

E. A Fibonacci sequence is defined as follows: the first and second terms in the sequence are 0and 1. Subsequent terms are found by adding the preceding two terms in the sequence. Write a C program to generate the first n terms of the sequence.

F. Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.

G. Write a C program to find the roots of a Quadratic equation.

Arrays, Functions and Pointers:

a. Write a C program to find the minimum, maximum and average in an array of integers.

a. Write a C program that uses functions to perform the following:
   1. Addition of Two Matrices
   2. Multiplication of Two Matrices

b. Write a C program tofind the Transpose of a matrix.

c. Write a function toswap the values of twovariables using call by value.

d. Write a function to swap the values of twovariables using call by reference.

e. Write C programs that use both recursive andnon-recursive functions
   1. To findthe factorial of a given integer.
   2. To find the GCD (greatest common divisor) of two given integers.

f. Write a program for reading elements using a pointerinto an array and display the values using the array.

g. Write a program fordisplay values reverse order from an array using a pointer.

h. Write a program through a pointer variable to sum of n elements from an array.

Strings:

A. Write a C program that uses functions to perform the following operations:
   i. To insert a sub-string into a given main string from a given position.
   ii. To delete n Characters from a given position in a given string.

a. Write a C program to determine if the given string is a palindrome ornot(Spelled same in both directions with or without a meaning like madam, civic, noon, abcba, etc.)

b. Write a C program that displays the position of a characterch in the string Sor–1ifS doesn't contain ch.

c. Write a C program to count the lines, words and characters in a given text.

Structures:

A. Write a C program to create a structure named book and display the contents of a book.

a. Write a C program to create a structure named student and display the details of 5 students using array of structures.

b. Writea C program tocalculate total and percentage marks of a student using structure.

Files:

A. Write a C program to display the contents of a file tostandard output device.

a. Write a C program which copies one file toanother file.

b. Write a C program to count the number of times a character occurs ina text file. The file name and the character are supplied as command line arguments.

c. Write a C program to merge two files into a third file (i.e., the contents of the first file followed by those of the second are put in the third file).

Miscellaneous:

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

B. Write a C program to construct a pyramid of numbers as follows:

```
1          *          1
12         * *        22
123        * **       333
1 2 3 4    * * * *    4444
```

TEXT BOOKS:

1. Jeri R. Hanly and Elliot B.Koffman, Problem solving and Program Design in C 7th Edition,Pearson.

1. B.A. Forouzan and R.F. Gilberg C Programming and Data Structures, Cengage Learning, (3rdEdition).

REFERENCE BOOKS:

1. BrianW.Kernighan and DennisM.Ritchie,The CProgramming Language,PHI.

1. E.Balagurusamy,Computer fundamentals andC,2nd Edition,McGraw-Hill.

2. Yashavant Kanetkar,Let Us C,18thEdition,BPB.

3. R.G.Dromey, How tosolve it by Computer, Pearson(16thImpression).

4. Programming in C, Stephen G.Kochan, Fourth Edition, Pearson Education.

5. Herbert Schildt,C: The CompleteReference,McGrawHill,4thEdition.

6. Byron Gottfried, Schaum's Outline of Programming with C, McGraw-Hill.

COURSE OUTCOMES:

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

- Formulate the algorithms forsimple problems.
- Identify and correct logical errors encountered during execution.
- Represent and manipulated with arrays, strings,structures and pointers.
- create, read and write to and from simple text and binary files.
- Modularize the code with functions sothat they can be reused.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

I Year B. TECH -I-SEM **L/T/P/C**

2/-/-/-

(R22A0004) ENVIRONMENTAL SCIENCE

COURSE OBJECTIVES:

On successful completion of this course, students will be able:

1. To distinguish the inter relationship between living organism and environment.
1. To categorize various types of natural resources available on the earth surface.
2. To detect the causes, and control measures of various types of environmental pollution.
3. To articulate the issues related to solid waste and its management.
4. To explain and understand the importance of Sustainable development.

UNIT-I

ECOSYSTEMS (6 hours)

Definition, Scope and Importance of Ecosystem; Structure of an Ecosystem - abiotic and biotic component; Functions of an ecosystem- food chains, food webs and ecological pyramids.

Activities: **Activities**:Case studies, poster making, Essays on biotic components.

UNIT-II

NATURAL RESOURCES (6hours)

Classification of Resources: Definition of natural resource - renewable and non -renewable resources. Forest resources - functions and uses of forests, Deforestation - causes and consequences. Water resources – Dams - benefits and environmental problems over dams. Renewable resources - solar energy (solar cells), hydro power, biogas and bio-fuel.

Activities: Case studies, seminars, Group Project works, to prepare rain water harvesting models, to demonstrate the generation of electricity with the utilization of non-conventional energy resources.

UNIT-III

ENVIRONMENTAL POLLUTION AND TECHNIQUES (6 hours)

Definition, Types of pollution- Air pollution- causes, effects, control measures of air pollution and prevention techniques. Water pollution- causes, effects, control measures and techniques.

Activities: Work sheets, Debate, seminars, surrounding case studies.

UNIT-IV

SOLID WASTE MANAGEMENT (5 hours)

Definition of Solid waste, characteristics of solid waste; Solid waste management- collection, transportation, processing treatment and disposal methods; e-waste management; 3R techniques- reduce, reuse and recycle.

Activities: Quiz, Puzzles, Seminars, Case studies.

UNIT-V

SUSTAINABLE DEVELOPMENT (4 hours)

Definition of sustainable development, sustainable development goals, threats to sustainability, strategies to achieve sustainable development.

Activities: Worksheets, seminars, slogans, group projects.

TEXT BOOKS

1. Textbook of Environmental Studies for Undergraduate Courses by ErachBharucha for University Grants Commission
1. EnvironmentalStudies by R. Rajagopalan, Oxford University Press.
2. Textbook of Environmental Science and Technology - Dr. M. Anji Reddy 2007, BS Publications
3. Dr. P. D Sharma, "Ecology and Environment", Rastogi Publications, New Delhi, 12 Edition, 2015

REFERENCE BOOKS

1. EnvironmentalStudies by Anubha Kaushik, 4 Edition, New age international publishers
1. Environmental Science: towards a sustainable future by Richard T. Wright. 2008 PHL Learning Pvt. Ltd, New Delhi
2. Environmental Engineering and science by Gilbert M. Masters and Wendell P. Ela. 2008 PHL Learning Pvt. Ltd, New Delhi
3. EnvironmentalScience by Daniel B. Botkin & Edward A. Keller, Wiley INDIA edition.

COURSE OUTCOMES:

The basic concepts included in this course will help the student to:

1. Differentiate between various biotic and abiotic components of ecosystem.
2. Describe the various types of natural resources.
3. Examine the problems associated with waste management.
4. Evaluate the causes, and apply control measures of various types of environmental pollutions.
5. Develop technologies on the basis of ecological principles on environment which in turn helps in sustainable development.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

I Year B. TECH -II-SEM **L/T/P/C**

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(R22A0002) 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 work place 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

"Mokshagundam Visvesvaraya"

Speaking	- Description of Pictures, Places, Objects and Persons
Grammar	- 'If' Clauses
Vocabulary	-Homonyms, homophones and homographs
Writing	- Paragraph Writing

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

UNIT –II

Speaking	- Small Talks
Grammar	- Finite and Non-finite verbs
Vocabulary	- Standard Abbreviations (Mini Project)
Writing	- Job Application – Cover letter

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

UNIT –III

Speaking	-Oralpresentations
Grammar	-Transformation ofSentences
Vocabulary	-Idioms
Writing	-AbstractWriting

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

UNIT – IV

'How a Chinese Billionaire Built Her Fortune'

Speaking	-	TelephonicExpressions and Conversations
Grammar	-	Auxiliaryverbs & model
Verbs, Degrees ofComparison		
Vocabulary	-	WordAnalogy
Writing	-	JobApplication -Resume

NOTE: Listening andspeakingtasks are solely for labpurpose and not for testing in the examinations.

UNIT – V

Speaking	-	Groupdiscussion
Grammar	-	Common Errors,Prepositions
Vocabulary	-	TechnicalVocabulary
Writing	-	ReportWriting

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

REFERENCE BOOKS:

1. Practical English Usage. Michael Swan. OUP.1995.
1. Remedial English Grammar. F.T. Wood.Macmillan.2007
2. Skills Annexe& Epitome of Wisdom - B.Tech 1st Year English Study Material, JNTUH.
3. Study Writing. Liz Hamp-Lyons and Ben Heasly. Cambridge University Press.2006.
4. CommunicationSkills.SanjayKumarandPushpaLata.OxfordUniversityPress.2011.
5. ExercisesinSpokenEnglish.Parts.I-III.CIEFL,Hyderabad.OxfordUniversityPress
6. 'English for Engineers'. Cambridge University Press

COURSE OUTCOMES:

- Analyze and interpret a diverse range of engineering concepts through

the synthesis of information

- Understand the impact of professional engineering solutions is societal contexts and demonstrate its knowledge
- Achieve communicative ability in their personal and professional relations with clarity of speech and creativity in content
- Function effectively as an individual and a team; and would be able to prepare themselves to be market ready
- Comprehend and write effective reports and design documentation, manage projects and make effective presentations.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

I Year B. TECH -II-SEM **L/T/P/C**

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(R22A0024) MATHEMATICS-II

COURSE OBJECTIVES:

- 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.
- 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.
- PDE aims at forming a function with many variables and also their solution methods, Method of separation of variables technique is learnt to solve typical second order PDE.
- Evaluation of multiple integrals.
- 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:

Interpolation

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

UNIT – II:

Numerical Methods

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

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

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 applications of 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). Applications: Areas (by double integrals) and volumes (by double integrals and triple).

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:

- Higher Engineering Mathematics by B V Ramana ., Tata McGraw Hill.
- Higher Engineering Mathematics by B.S. Grewal, Khanna Publishers.
- MathematicalMethods by S.R.KIyenger, R.K.Jain, Narosa Publishers.

REFERENCE BOOKS:

i) Elementary NumericalAnalysis by Atkinson-Han, Wiley Student Edition.
ii) AdvancedEngineering Mathematics by Michael Greenberg –Pearson publishers.
iii) Introductory Methods of Numerical Analysis by S.S. Sastry, PHI

COURSE OUTCOMES:

After learning the contents of this paper the student will be able to

- 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.
- Find the roots of algebraic, non algebraic equations.
- Solve first orderlinear and non-linear partial differential equations.
- Evaluate multiple integrals.
- Evaluate the line, surface, volume integrals and converting them from one to another using vector integral theorems.

MALLA REDDY COLLEGE OF ENGINEERING ANDTECHNOLOGY

I Year B. TECH -II-SEM **L/T/P/C**

3/1/-/4

(R22A0021) APPLIED PHYSICS

COURSE OBJECTIVES:

1. To understand the basic principles of lasers and optical fibers.
2. To interpret dual nature of the matter and behavior of a particle quantum mechanically.
1. To classify the solids depending upon electrical conductivity.
2. To understand the concepts of semiconductors and devices.
3. To analyze dielectric and magnetic properties of the materials.

UNIT – I

LASERS & FIBER OPTICS

Lasers: Characteristics of lasers, Absorption, Spontaneous and stimulated emissions, Einstein'sCoefficients,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 index profile,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

FREE ELECTRON THEORY OF METALS

Free electron theory (Classical & Quantum)- Assumptions, Merits and drawbacks, Fermi level, Density of states, Periodic potential, Bloch's theorem, Kronig – Penny model (qualitative) , E –k diagram, 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, Formation of PN Junction, V-I characteristics of PN Junction diode, Energy Diagram of PN diode, Hall effect, semiconductor materials for optoelectronic devices - LED, Photo diode, Solar cell.

UNIT – V:

DIELECTRICS AND MAGNETICPROPERTIES OF MATERIALS (12Hours)

Dielectrics: Introduction, Types of polarizations – Electronic, Ionic and Orientation polarization (qualitative) and calculation of polarizabilities, Internal fields in Solid, Clausius-Mossotti relation, Piezo-electricity and Ferro-electricity.

Magnetism: Introduction, Classification of Dia, Para, Ferro magnetic materials based on magnetic moment, Properties of Anti-Ferro and Ferri magnetic materials, Hysteresis curve based on domain theory, Soft and Hard magnetic materials.

TEXT BOOKS:

a. Engineering Physics by Kshirsagar&Avadhanulu, S. Chand publications.
b. Modern Engineering Physics-Dr K Vijaya Kumar& Dr S Chandralingam, S. Chand Publications.
c. 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:

- Basic principles of quantum mechanics can be used to analyze the microscopic behavior of a particle.
- Canapply the principles of laser to understand various lasers and fiber optic systems.
- Classification of solids can be made by understanding the band structure of solids.
- Concepts of semiconductors can be applied to predict the importance of electronic devices relevant to engineering domains.
- Examine dielectric, magnetic properties of the materials and apply them in material technology.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

I Year B. TECH -II-SEM **L/T/P/C**

3/-/-/3

(R22A0022) ENGINEERING CHEMISTRY

COURSE OBJECTIVES:

The students will be able to

1. Acquire the knowledge of electro chemistry and batteries which are essential for the engineers and in industry.
2. Analyze engineering problems related tocorrosion and develop different corrosion control techniques.
3. Identify different types of polymers, composites and their applications in various engineering fields.
4. Gainknowledge on wide variety of advanced materials like nano and smart materials which have excellent engineering properties.
5. Analyze water for its various parameters and its significance in industrial and domestic applications.

UNIT I

Electrochemistry

Introduction - Types of cells - Electrolytic and Electrochemical cells (construction and working of Galvanic Cell) - Electrode potential- Cell potential (EMF); Nernst equation and its applications; Electrochemical series and its applications. Batteries - Classification of batteries - primary, secondary and fuel cells with examples. Primary cells - Lithium cells; Secondary cells - Lead acid battery and Lithium ion battery; Fuel cells - Differences between battery and a fuel cell; Construction, working and applications of H_2-O_2 fuel cell.

UNIT II

Corrosion

Causes and effects of corrosion – Theories of corrosion - Chemical (oxidation) and Electrochemical corrosion – mechanism of electrochemical corrosion (Evolution of Hydrogen and Absorption of Oxygen); Corrosion control methods - Cathodic protection - Sacrificial anode and Impressed current cathodic methods; Surface coatings – methods of application - Electroplating (Cu-plating) and Electroless plating (Ni-plating) - advantages and applications of electroplating/electroless plating.

UNIT III

Water and its treatment

Introduction – hardness of water – causes of hardness; Types of hardness - temporary and permanent – expression and units of hardness-numerical problems; Potable water and its

specifications; Disinfectation of water by chlorination and ozonization. Boiler troubles - caustic embrittlement, scales and sludges; External treatment of water – Ion exchange process; Desalination of water – Reverse osmosis.

UNIT IV

Polymers

Introduction - Classification of polymers; Types of polymerization - addition and condensation polymerisation with examples. **Plastics** - thermoplastic and thermosetting resins; preparation, properties and engineering applications of Polyvinylchloride (PVC), Teflon (PTFE), and Bakelite. **Rubbers -** Natural rubber and its vulcanization. **Conducting polymers** - classification of conducting polymers – mechanism of conduction in trans-Polyacetylene and applications of conducting polymers. **Bio-degradable polymers** – preparation, properties and applications of Poly-Lactic acid.**Composite materials:** Introduction - Fibre reinforced plastics (FRPs) - Glass fibre reinforced, Carbon fibre reinforced plastics and their applications.

UNIT V

Advanced Materials

Nanomaterials: Introduction and classification of nanomaterials; preparation of nanomaterials - Sol-gel method; applications of nanomaterials (industrial and medicinal); Carbon nanotubes (CNTs)- applications.

Smart materials: Introduction - Types of smart materials - examples and applications of piezoelectric materials and shape memory alloys.

SUGGESTED TEXT BOOKS:

1. Engineering Chemistry by P.C. Jain & M. Jain: Dhanpat Rai Publishing Company (P) Ltd, New Delhi. 16th Edition.
2. Engineering Chemistry by Prasanta Rath, B. Rama Devi, C. H. Venkata Ramana Reddy, Subhendu Chakroborty, Cengage Learning Publication, India Private Limited, 2018.
3. Engineering Analysis of Smart Material Systems by Donald J. Leo, Wiley, 2007.

REFERENCE BOOKS:

1. Engineering Chemistry by Shashi Chawla, Dhanpat Rai Publishing Company (P) Ltd, New Delhi.
2. Engineering Chemistry, by S. S. Dara, S. Chand & Company Ltd, NewDelhi.
3. P.W. Atkins, J.D. Paula, "Physical Chemistry", Oxford, 8th edition (2006).
4. B.R. Puri, L.R. Sharma and M.S. Pathania, "Principles of Physical Chemistry", S. Nagin Chand & Company Ltd., 46th edition (2013).

COURSE OUTCOMES:

The student will be able to

1. Relate the knowledge of operating principles of various types of electrochemical cells, including batteries, to optimize the need for sustainable development.
2. Analyze and develop technically sound, economic andsustainable solutions for complex engineering problems related to corrosion and its effects.
3. Identify, formulate and develop polymeric compounds used in various engineering materials for futuristic engineering applications.

4. Apply the knowledge of nanotechnology and smart materials to find solutions for various engineering problems.
5. Familiarize with the fundamentals of water treatment technologies and the considerations for its design and implementation in water treatment plants.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

I Year B. TECH -II-SEM **L/T/P/C**

3/-/-/3

(R22A0502) PROBLEM SOLVING USING PYTHON PROGRAMMING

COURSE OBJECTIVES:

This course will enable students

1. To read and write simple Python programs.
2. To develop Python programs with conditionals and loops.
3. To develop Python programs with using arrays and functions.
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, Features of Python, Python Installation, Python Input and Output Statements, Numeric Data Types: int, float, boolean, complex and string and its operations, Standard Data Types: List, Tuples, Sets and Dictionaries, Data Type conversions, Comments in Python.

UNIT-II

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

Control Flow and Loops: Indentation, if statement, if-else statement, chained conditional if- elif - else statement, Loops: While loop, for loop using ranges, Loop manipulation using break, continue and pass.

UNIT- III

Arrays: Advantages of Arrays, Creating an Array, Importing the Array Module, Indexing and Slicing on Arrays, Types of arrays, working with arrays using numpy.

UNIT-IV

Functions: Defining a function, Calling Functions, Passing parameters and arguments, Python Function arguments: Positional Arguments, Keyword Arguments, Default Arguments, Variable-length arguments, Scope of the Variables in a Function–Local and Global Variables, Fruitful Functions, Anonymous functions or Lambda functions, Powerful Lambda functions in Python.

UNIT-V

File Handling in Python: Introduction to files, Text files and Binary files, Access Modes, Writing

Data to a File, Reading Data from a File, File input / output functions.

Error Handling in Python: Introduction to Errors and Exceptions: Compile-Time Errors, Logical Errors, Runtime Errors, Types of Exceptions, Python Exception Handling Using try, except and finally statements.

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 intoarrays and functions.
4. Represent compound data using Python lists, tuples, dictionaries.
5. Read and write data from/to files in Python programs.

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 Python3, Shroff/O'Reilly Publishers,2016.
3. PythonProgramming: A Modern Approach,VamsiKurama,Pearson.

REFERENCEBOOKS:

1. Core Python Programming,W.Chun,Pearson.
2. Introductionto Python,Kenneth A. Lambert, Cengage.
3. Learning Python,MarkLutz,Orielly.

MALLA REDDY COLLEGE OF ENGINEERING ANDTECHNOLOGY

I Year B. TECH -II-SEM **L/T/P/C**

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(R22A0082) APPLIED PHYSICS LAB/ENGINEERING CHEMISTRY LAB

COURSE OBJECTIVES:

1. Toexperience the mechanical oscillations and resonance phenomena.
2. Toverify the concepts of light.
3. Toanalyze voltage/current phase behavior of RC and LCR circuits.
4. Tostudy the characteristics of semiconductor devices.
5. To understand the concepts of laser.

LIST OF EXPERIMENTS:

1. Melde's experiment –Frequency of electricalvibrator.
2. Newton's Rings –Radius of curvature of Plano convex lens.
3. Laser -Wave length of light by using Diffraction grating.
4. CRcircuit – Time constant of RC circuit.
5. LCRCircuit- Quality factor and resonance frequency of LCR circuit.
6. LED -Characteristics of LED.
7. Solar cell -Characteristics of Solar cell.
8. Optical fiber- Numerical aperture of an optical fiber.
9. Torsionalpendulum- Rigidity modulus of given wire (demonstrative).
10. Hall Effect – Hall coefficient of semiconducting samples (demonstrative).

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 can compare the elastic constants of different metallic wires, and also determine the ac frequency of vibrating bar.
2. Students can illustrate the interference of light phenomena.
3. Wavelength of the given laser can be determined by using diffraction phenomenon
4. By understanding electrical principles, Time constant of RC and resonance phenomenon of LCR circuits can be analyzed.
5. V-I characteristics of various semiconductor devices can be illustrated.

MALLA REDDY COLLEGE OF ENGINEERING ANDTECHNOLOGY

I Year B. TECH -II-SEM **L/T/P/C**

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(R22A0582) PROBLEM SOLVING USING PYTHON PROGRAMMING LAB

COURSE OBJECTIVES

This course will enable the students:

1. AbletounderstandSyntax and Semantics and create Arrays and Functions in Python.
2. Able to learn different data types Lists, Dictionaries in Python.
3. Able to know how to execute the programs using loops and control statements.
4. Able to learn decision making and Functions in Python.
5. Able to know how to handle Files and exceptions in Python.

WEEK 1:

A) Write pythonprogram to print Hello World.

B) Write a python program toget 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 items

B) Write a pythonprogram using the following methods:1) count2)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 tostore 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 toadd twopositive integers without using the '+' operator. (use bitwise operator)

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

Week 6:

A) Write a simple python program todeclare 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 membership operator) 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 toprint 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) Using a numpy module create an arrayand check the following:

1. Type ofarray 2. Axes ofarray 3. Shape ofarray 4. Type ofelements in array

B) Using a numpy module create arrayand check the following:

1. List withtype float 2. 3*4 arraywith all zeros 3. Fromtuple 4. Randomvalues

Week 10:

A) Write python program in which a function is defined and calling that function prints Hello World.

B) Write python program in which a function (with single string parameter) is defined and calling that function prints the string parameters given to function.

C) Write a python program using with any one of python function argument.

Week 11:

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 findsum of the numbers for the elements of the list by using reduce().

Week12:

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

B) Write a python program towrite the content “hi python programming” forthe existing file.

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

Week 13:

A) Write a python programto append datato an existing file and then displaying the entire file.

B) Write a python programto open a new file, add some data into it and displaythe contents ofthat file.

Week 14:

A) Write a python programto handle the Zero Divison Error exception.

B) Write a python programto demonstrate multiple except block with a single tryblock.

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,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, Mathfunctions, Strings, List,Tuples and Dictionaries in Python.
3. Implement conditional and loop for python programs.
4. Express different Decision Making statements, Arrays andFunctions.
5. Understandand summarize different File handling operations and exceptions.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

I Year B. TECH -II-SEM **L/T/P/C**

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(R22A0083) ENGINEERING AND COMPUTING HARDWARE WORKSHOP

It is consisting of 2 parts: Part I: Computing Hardware Workshop

Part II: Engineering Workshop

COURSE OBJECTIVES:

- Understand the internal structure of computer system and learn to diagnose minor problems with the computer functioning.
- Know the proper usage and threats of the World Wide Web & Study in detail about the various features of Ms-Word, Excel, PowerPoint and Google Forms
- To obtain the knowledge about Electrical wiring and Soldering – Desoldering procedures.
- To provide hands on experience in usage of different engineering materials, tools equipments and processes which are common in the engineering field.
- To develop professional attitude, team work, precision and safety practices at work place.

Part I: COMPUTINGHARDWARE WORKSHOP

TASK-1: PCHARDWARE

Identification of the peripherals of a computer, components in a CPU and its functions. Block diagram of the CPU along with the configuration of each peripheral. Functions of Motherboard. Assembling and Disassembling of PC. Installation of OS. Basic Linux commands.

TASK-2: TROUBLESHOOTING

Hardware Troubleshooting: Students are to be given a PC which does not boot due to proper assembly or defective peripherals and the students should be taught to identify and correct the problem.

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 back to working condition.

TASK 3: INTERNET

Web Browsers, Access of websites, Surfing the Web, Search Engines, Customization of web browsers, proxy settings, bookmarks, search toolbars, pop-up blockers. Antivirus downloads, Protection from various threats.

MS OFFICE

TASK 4: MICROSOFT WORD

Overview of MS word features. Usage of Hyperlink, Symbols, Spell Check, Track Changes. Table of Content, Newspaper columns, Images from files and clipart, Drawing toolbar and Word Art,

Formatting Images, Textboxes, Paragraphs and Mail Merge in word. Using Word to create Project Certificate, Project Abstract, News Letter, Resume.

TASK 5: MICROSOFT EXCEL

Overview of Excel Features Excel formulae & Functions, conditional formatting, Charts, Hyper linking, Renaming and Inserting worksheets, Data Analysis functions.
Creating a Scheduler (Features: -Gridlines, Format Cells, Summation, auto fill, Formatting)
Calculating GPA (Features: - Cell Referencing, Formulae and functions in excel

TASK 6: MICROSOFT POWER POINT

Overview of PowerPoint features, Insertion of images, slide transition, Custom animation, Hyperlinks.

TASK 7: GOOGLEFORMS

Google forms introduction, opening Google forms, editing forms, add questions, copy duplicate questions, delete questions, required questions, more button, form color and themes, preview form, advance form settings, send form, view responses, close form

PART II: ENGINEERINGWORKSHOP

A. Listof Experiments:

1. Residential house wiring using switches, fuse, indicator, lamp and energy meter.
2. Fluorescent lamp wiring
3. Staircase wiring
4. Soldering andDesoldering practice – components, devices and circuits using general

1. Purpose PCB.

Note: Minimum ONE experiment need to be conducted in each trade

A. TRADES FOR EXERCISES:

At least two exercises from each trade:

1. Carpentry:

To prepare T-Lap Joint, Dovetail Joint.
To prepare Mortise & Tenon Joint.

2. Fitting:

To prepare V-Fit, Dovetail Fit & Semi-circular fit.

3. Tin-Smithy:

To make Square Tin, Rectangular Tray & Conical Funnel.

Note:Minimum ONE experiment need to be conducted in each trade

Trades to demonstrate:

1. Plumbing
2. Foundry
3. Welding
4. Black smithy
5. Metalcutting (Water Plasma)

Note: Minimum a total of 3 trades to be demonstrated.

TEXT BOOKS – IT WORKSHOP

1. Introductionto Information Technology,ITL Education Solutions limited, Pearson Education
2. Excel Functions and Formulae, Bernd held, TheodorRichardson, Third Edition

TEXT BOOKS – ENGINEERING WORKSHOP

1. Workshop Manual, P. Kannaiah and K. L. Narayana, 3rd Edition, Scitech,2015
2. Printed Circuit Boards - Design, Fabrication, Assembly and Testing, R. S. Khandpur, Tata McGraw-Hill Education, 2005.

COURSE OUTCOMES:

- Ability to identify, assemble and troubleshoot the major components of a computer and perform the installation of Operating System.
- Capacity tomake effective usage ofthe internet for academics and develop professional documents, spreadsheets and presentations.
- Students will be able to understand the domestic, illumination, stair-case wiring procedures and soldering de soldering practice
- The student will have hands-on experience on manufacturing of components using different trades of engineering processes
- The student will be able to perform in a team, adhering to industrial safety practices and follow professional working standards.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

I Year B. TECH - II-SEM **L/T/P/C**

2/-/ - /0

(R22A0003) 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. To facilitate the development of 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 ProsperityA 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 being as 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 as an instrument of 'I' (I being the doer, seer andenjoyer).

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 inrelationship.

Understanding the harmony in the society (society being an extension of family):Samadhan, Samridhi, Abhay, Sah-astiva as comprehensive Human Goals. Visualizing a universal harmonious order in society - Undivided Society (Akhand Samaj), Universal Order (SarvabhaumVyawastha) - from family to worldfamily!

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 professional ethics:

a. Ability toutilize 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 toidentify and develop appropriate technologies and management patterns forabove production systems.

TEXT BOOKS:

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

REFERENCE BOOKS:

1. Ivan Illich, 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, CommonwealthPublishers.
   A. N. Tripathy, 2003, Human Values, New Age InternationalPublishers.
6. Subhas Palekar, 2000, How to practice Natural Farming, Pracheen(Vaidik) Krishi Tantra Shodh,Amravati.
7. Donella H. Meadows, Dennis L. Meadows, Jorgen Randers, William W. Behrens III,1972, Limits to Growth - Club of Rome's report, UniverseBooks.
8. EG Seebauer& Robert L.Berry, 2000, Fundamentals of Ethics for Scientists & Engineers, Oxford UniversityPress.
9. M Govindrajan, S Natrajan& V. S Senthilkumar, Engineering Ethics (includingHumna Values), Eastern Economy Edition, Prentice Hall of IndiaLtd.

Relevant CDs, Movies, Documentaries & Other Literature:

1. Value Educationwebsite, 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. IITDelhi, Modern Technology - the UntoldStory

COURSE OUTCOMES:

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

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

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

(R22A0503) DATA STRUCTURES

COURSEOBJECTIVES:

This course will enable students to

1. Learn Object Oriented Programming concepts in Python.
2. Illustrate how searching andsorting is performed inPython.
3. Understanding how lineardata structures works.
4. Implement Dictionaries andgraphs in Python.
5. Understanding how Non linear data structures works.

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

Searching - Linear Search and Binary Search.
Sorting - Bubble Sort, Selection Sort, Insertion Sort, Merge Sort, Quick Sort.

UNIT – III

Data Structures –Definition, Linear Data Structures, Non-Linear Data Structures,
Stacks - Overview of Stack, Implementation of Stack (List), Applications of Stack
Queues: Overview of Queue, Implementation of Queue (List), Applications of Queues, Priority Queues
Linked Lists – Implementation of Singly Linked Lists, Doubly Linked Lists, Circular Linked Lists. Implementation of Stack and Queue using Linked list.

UNIT – IV

Dictionaries: linear list representation, skip list representation, operations - insertion, deletion and searching.
Graphs - Introduction, Directed vs Undirected Graphs, Weighted vs Unweighted Graphs, Representations, Breadth First Search, Depth First Search.

UNIT -V

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

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:

Thestudents should be able to:

1. Interpret the concepts of Object-Oriented Programming as used in Python.
2. Know the usage of various searching and sorting techniques
3. Implement Linear data structures like stack ,Queue and Linked Lists
4. Illustrate the concepts of Dictionaries and graphs
5. Implement various types of trees.

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II Year B.Tech.CSE- I Sem **L/T/P/C**
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(R22A0504) DATABASE MANAGEMENT SYSTEMS

COURSE OBJECTIVES:

- To study the physical and logical database designs, database modeling, relational, hierarchical, and network models
- To understand and use data manipulation language to query, update, and manage a database
- 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.
- To design and build a simple database system and demonstrate competence with the fundamental tasks involved with modeling, designing, and implementing a DBMS.
- 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–Storage Manager–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, Attributes and 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 Subqueries, 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 – Testingforserializability-Lock–BasedProtocols–TimestampBasedProtocols-Validation-BasedProtocols–MultipleGranularity.

UNIT V:

Recovery and Atomicity– Log– Based Recovery – Recovery with ConcurrentTransactions– CheckPoints-BufferManagement– Failurewithlossofnonvolatilestorage.

TEXTBOOKS:

1. DatabaseSystemConcepts,Silberschatz,Korth,McGrawhill,SixthEditi on.(All units except IIIrd)
2. Database Management Systems, Raghu Ramakrishnan, Johannes Gehrke, TATA McGraw Hill 3rd Edition.

REFERENCEBOOKS:

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 UNITIII.

COURSE OUTCOMES:

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

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II Year B.Tech.CSE- I Sem **L/T/P/C**
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(R22A0505) SOFTWARE ENGINEERING

COURSE OBJECTIVES

- The aim of the course is to provide an understanding of the working knowledge of the techniques to understand Software development as a process.
- Various software process models and system models.
- Various software designs, Architectural, object oriented, user interface etc.
- Software testing methodologies overview: various testing techniques including white box testing black box testing regression testing etc.
- Software quality: metrics, risk management quality assurance etc.

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 models: The waterfall model, Spiral model and Agile methodology

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.

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, conceptual model of UML, basic structural modeling, class diagrams, sequence diagrams, collaboration diagrams, usecase diagrams, component diagrams.

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.

Metrics for Process and Products: Software measurement, metrics forsoftware quality.

UNIT-V

Risk management: Reactive Vs proactive risk strategies, software risks, risk identification, risk

projection, risk refinement,RMMM.

Quality Management: Quality concepts, software quality assurance, software reviews, formal technical reviews, statistical software quality assurance, software reliability, the ISO 9000 quality standards.

TEXTBOOKS:

1. SoftwareEngineering,Apractitioner'sApproach-RogerS.Pressman,6thedition,McGrawHillInternationalEdition.
2. SoftwareEngineering-Sommerville,7thedition,PearsonEducation.

COURSE OUTCOMES

- Understand software development life cycle Ability to translate end-user requirements into system and software requirements.
- Structure the requirements in a Software Requirements Document and Analyze Apply various process models for a project, Prepare SRS document for a project
- Identify and apply appropriate software architectures and patterns to carry out high level design of a system and be able to critically compare alternative choices.
- Understand requirement and Design engineering process for a project and Identify different principles to create an user interface
- Identify different testing methods and metrics in a software engineering project and Will have experience and/or awareness of testing problems and will be able to develop a simple testing report

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(R22A0506) 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 suchas 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, Pseudocode 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.

UNIT IV

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

UNIT V

Branch and Bound: General method, applications- Travelling sales person problem,0/I k 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'stheorem.

TEXTBOOKS:

1. Fundamentals of Computer Algorithms, Ellis Horowitz, Satraj Sahni and Rajasekharan, Universities press
2. DesignandAnalysis of Algorithms, P.h.Dave,2ndedition,PearsonEducation.

REFERENCES:

1. Introductionto the Design And Analysis of Algorithms ALevitin 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.NeapolitanandK.Naimipour,4thedition

COURSE OUTCOMES:

1. Ability to analyze the performance of algorithms.
2. Ability to choose appropriate algorithm designtechniques 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 NP hard and NP complete classes and also about the importance of Cook's theorem.

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

(R22A0026) PROBABILITY, STATISTICS AND QUEUEINGTHEORY

COURSE OBJECTIVES:

- To understand a random variable that describes randomness or an uncertainty in certain realistic situation. It can be either discrete or continuous type.
- 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.
- To Understand linear relationship between two variables and also to predict how a dependent variable changes based on adjustments to an independent variable.
- To learn the types of sampling, sampling distribution of means and variance, Estimations of statisticalparameters.
- Use of probability theory to make inferences about a population from large and small samples.

UNIT – I:

Basic Probability and Random Variables

Basic Probability: Definition,The axioms ofprobabilityand basic problems.

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

Multiple Random variables: Discrete and Continuous, Joint probability distributions-Joint probability mass and density functions, Marginal probability mass 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:

Testing of Hypothesis

Sampling: Definitions ,Standard error . Estimation - Point estimation and Intervalestimation.

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, difference of proportions.

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

UNIT V:

Queuing Theory

Queuing theory –Structure of a queuing system and its characteristics-Arrival pattern and service pattern- Pure birth and Death process.

Terminology of Queuing systems-queuing models and its types - M/M/1 Model of infinite queue(without proofs) and M/M/1 Modelof finite queue(without proofs).

SUGGESTED TEXT BOOKS:

Fundamental of Statistics by S.C. Gupta,7thEdition,2016.

Fundamentals of Mathematical Statistics by SC Gupta and V.K.Kapoor

Higher Engineering Mathematics by B.S. Grewal, Khanna Publishers, 35th Edition,2000.

R. A. Johnson, Miller and Freund's "Probability and Statistics for Engineers", Pearson Publishers, 9th Edition, 2017.

REFERENCES :

Introduction to Probability and Statistics for Engineers and Scientists by SheldonM.Ross.

Probability and Statistics for Engineers by Dr. J. Ravichandran.

COURSE OUTCOMES:

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

1. Describe randomness in certain realistic situation which can be either discrete or continuous 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. Make objective, data-driven decisions by using correlation and regression.
4. *Draw statistical inference* using samples of a given size which is taken from a population.
5. To design balanced systems that serve customers quickly and efficiently but it is not cost effective.

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

-/0/2/1

(R22A0583) DATA STRUCTURES LAB

COURSE OBJECTIVES:

1. To understand a range of Object-Oriented Programming, as well as in-depth data and information processing techniques.
2. Toknow how linear data structures work
3. To illustrate non-linear data structures.
4. To simulate searching andsorting 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 methodoverloading and method overriding.

WEEK 4: Write a program for Linear Search and Binary search

WEEK 5: Write a program to implement Bubble Sort and Selection Sort

WEEK 6: Write a program to implement Merge sort and Quick sort

WEEK 7: Write a program to implement Stacks and Queues.

WEEK 8: Write a program to implement Singly Linked List

WEEK 9: Write a program to implement Doubly Linked List

WEEK 10: Write a python program to implement DFS & BFS graph traversal Techniques.

WEEK 11: Write a program to implement Binary Search Tree

WEEK 12: Write a program to implement B+ Tree

COURSE OUTCOMES:

The students should be able to:

1. Interpret the concepts of Object-Oriented Programming as used in Python.
2. Illustrate how searching and sorting can be done.
3. Implement stacks , queues and linked list.
4. Implement Non-Linear data structures like graphs
5. Solve problems using various trees .

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II Year B.Tech.CSE- I Sem **L/T/P/C -/0/2/1**

(R22A0584) DATABASE MANAGEMENT SYSTEMS LAB

COURSE OBJECTIVES:

1. Introduce ER data model, database design and normalization
2. Learn SQL basics for data definition and data manipulation
3. To enable students to use Non-Relational DBMS and understand the usage of document oriented 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

LIST OF EXPERIMENTS:

1. Concept design with E-R Model
2. Relational Model
3. Normalization
4. Practicing DDL commands
5. Practicing DML commands
6. A. Querying (using ANY, ALL, UNION, INTERSECT, JOIN, Constraints etc.)
   B. Nested, Correlated subqueries
7. Queries using Aggregate functions, GROUP BY, HAVING and Creation and dropping of Views.
8. Triggers (Creation of insert trigger, delete trigger, update trigger)
9. Procedures
10. Usage of Cursors
11. Installation of MySQL / MongoDB and practicing DDL, commands

TEXT BOOKS:

1. Database Management Systems, Raghurama Krishnan, Johannes Gehrke, Tata Mc Graw Hill, 3 rd Edition

2. Database System Concepts, Silberschatz, Korth, McGraw Hill, V edition.

REFERENCE BOOKS:

1. Database Systems design, Implementation, and Management, Peter Rob & Carlos Coronel 7th Edition.
2. Fundamentals of Database Systems, Elmasri Navrate, Pearson Education

3. Introductionto Database Systems, C.J. Date, Pearson Education
4. Oracle for Professionals, The X Team, S. Shah and V. Shah, SPD.
5. Database Systems Using Oracle: A Simplified guide to SQL and PL/SQL, Shah, PHI.
6. Fundamentals of Database Management Systems, M. L. Gillenson, Wiley Student Edition.

COURSE OUTCOMES:

1. Designdatabase schema for a given application and apply normalization
2. Acquire skills in using SQL commands for data definition and data manipulation.
3. Develop solutions for database applications using procedures.
4. Develop solutions for database applications using cursors ..
5. Develop solutions for database applications using triggers.

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II Year B.Tech.CSE- I Sem **L/T/P/C 0/0/2/1**

(R22A0585) SOFTWARE ENGINEERING LAB

PREREQUISITES

- A course on "Programming for Problem Solving".

CO-REQUISITE

- A Course on "Software Engineering".

COURSE OBJECTIVES:

- Discuss and Analyses how todevelop software requirements specifications for a given problem.
- To understand Software development as a process
- To implement Various software designs, data flow diagram models.
- various testing techniques including white box testing black box testing regression testing
- To have hands on experience in developing a software project by using various software engineering principles and methods in each of the phases of software development.

LIST OF EXPERIMENTS

DOTHE FOLLOWINGS even exercises for any two projects given in the list of sample projects or any other Projects:

1. Development of problem statements.
2. Preparation of Software Requirement Specification Document, Design Documents and Testing Phase related documents.
3. Preparation of Software Configuration Management and Risk Management related documents.
4. Study and usage of any Design phase CASE tool
5. Performing the Design by using any Design phase CASE tools.
6. Develop testcases forunit testing and integration testing
7. Developtest cases forvarious white box and black box testing techniques.

SAMPLEPROJECTS:

1. Passport automation System
2. Book Bank

3. Online Exam Registration
4. Stock Maintenance System
5. Online course reservation system
6. E-ticketing
7. Software Personnel Management System
8. Credit Card Processing
9. E-book management System.
10. Recruitment system

TEXT BOOKS:

1. Software Engineering, A practitioner's Approach- Roger S. Pressman, 6th edition, McGraw Hill International Edition.
2. SoftwareEngineering-Sommerville,7thedition,PearsonEducation.
3. The unified modeling language userguide Grady Booch, James Rambaugh, Ivar Jacobson, Pearson Education.

REFERENCE BOOKS:

1. Software Engineering, an Engineering approach- James F. Peters, Witold Pedrycz, John Wiley.
2. Software Engineering principles and practice-Waman SJawadekar

COURSE OUTCOMES:

- Ability totranslate end-user requirements intosystem and software requirements
- Ability togenerate a high-level design of the system from the software requirements
- Will have experience and/or awareness of testing problems and will be able to develop a simple testing report
- Understand and develop various structure and behavior UML diagrams.
- Explain the knowledge of project management tool Demonstrate how to manage file using Project Libre project management tool.

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(R22A0061) 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 understandthe 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 ofgovernance 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. Introductionto 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. AndersonJ.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 will understand various theories in public policy making.
5. Students will understand Rule of Law and Human Rights.

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II Year B.Tech. CSE- II Sem **L/T/P/C**
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(R22A0028) DISCRETE MATHEMATICS

COURSE OBJECTIVES:

- Introduces elementary discrete mathematics for computer science and engineering.
- Topics include formal logic notation,
- Introduces methods of proof, induction, sets, relations, algebraic structures,.
- Introduces elementary graph theory, permutations and combinations, counting principles;
- Introduces recurrence relations and generating functions.

UNIT – I

Mathematical logic: Introduction, Statements and Notation, Connectives, Truth tables, Well formed formulas, Tautology, Contradiction, Contingency, Logical equivalence, Normal Forms, Theory of Inference for the Statement Calculus, The Predicate Calculus, Inference Theory of the Predicate Calculus.

UNIT – II

Set theory: Introduction, Basic Concepts of Set Theory, Representation of Discrete Structures, Relations, Types of relations, Partial order relation, POSET, External elements in POSET, Lattices, Functions, Types of functions, inverse of functions, invertible functions and Composition of functions

UNIT – III

Algebraic Structures: Introduction, Algebraic Systems, Semi groups, Monoids, Group, Abelian group, Some particular Groups-Klein 4- group, Additive group of modulo n, Multiplicative group of modulo p. Homomorphism and isomorphism in Groups.

UNIT – IV

Combinatorics: . Permutation and combination, Principle of Inclusion and Exclusion. Recurrence relations, Generating functions,Solving of recurrence relations of first,second and higher order Homogeneous and Non homogeneous using characteristic equation and generating functions.

UNIT-V

Graph Theory: Basic Concepts, Types of graphs, Sub graphs, Isomorphism, Walk, Trail and Path, Hamiltonial and Eulerian Graphs, Planar Graphs, Euler's Formula, Multi-graph, Chromatic Numbers, The Four-Color Problem. Trees and their Properties, Spanning Trees, Directed Trees, Binary Trees.

TEXT BOOKS:

1. Discrete Mathematical Structures with Applications to Computer Science: J.P. Tremblay, R. Manohar, McGraw-Hill, 1st ed.
2. Discrete Mathematics for Computer Scientists & Mathematicians: Joe l. Mott, Abraham Kandel, Teodore P. Baker, Prentis Hall of India, 2nd ed.

REFERENCE BOOKS:

1. Discrete and Combinatorial Mathematics - an applied introduction: Ralph.P. Grimald, Pearson education, 5th edition.
2. Discrete Mathematical Structures: Thomas Kosy, Tata McGraw Hill publishing co.

COURSE OUTCOMES:

- Understand and construct precise mathematical proofs
- Apply logic and set theoryto formulate precise statements
- Analyze and solve counting problems on finite and discrete structures
- Describe and manipulate sequences
- Applygraph theory in solving computing problems

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

3/-/-/3

(R22A0507) OBJECT ORIENTED PROGRAMMING THROUGH JAVA

COURSEOBJECTIVES:

1. To understand object oriented principles like abstraction, encapsulation,inheritance,polymorphism and apply them in solving problems.
2. Tounderstand the implementation of packages andinterfaces.
3. To understand the concepts of exception handling, multithreading and collection classes.
4. Tounderstand how to connect tothe 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, exploring string class, garbage collection.

UNIT – II

Inheritance – Inheritance types, super keyword, preventing inheritance, final classes andmethods.

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 andfinally, 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 forProgrammers, P.J.Deitel andH.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 synchronization
4. Understandthe use of Collection Framework
5. Design GUI based applications using AWT and Swings

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

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

(R22A0508) COMPUTER ORGANIZATION

COURSE OBJECTIVES:

Toexpose the students tothe 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. ComputerSystems 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. Anability to identify, formulate, and solve hardware and software computer engineering problems using sound computer engineering principle
4. Toimpart the knowledge on micro programming
5. Comprehendthe concepts of advanced pipelining techniques

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

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

3/-/-/3

(R22A0509) 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. UNIXInternals -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 towrite shellprograms 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.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

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

(R22A0510) FORMAL LANGUAGE AND AUTOMATA THEORY

COURSE OBJECTIVES:

1. Understandmathematical models (finite automata) for language processing.
2. Explain Regular Expressions and Finite Automata Conversions.
3. UnderstandGrammars for Regular and Context Free Languages.
4. LearnContext Free Grammar Normal Forms and Push Down Automata.
5. Explain Computational theory anddifferent 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, types of 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 McGraw Hill.

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

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

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

/-/-2/1

(R22A0586) OBJECT ORIENTED PROGRAMMINGTHROUGH 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 tomultiply twogiven 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) Writea 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 print Area (). 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 print Area () 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 finalkeywords.

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 allthe files ina directory including the files present in all its sub directories.
b) Write a Program to Read the Content of a File Line by Line

WEEK 11:

a) Write a program that connects toa database using JDBC display all records in a table.
b) Write a program toconnect toa 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 forthe + - * % operations. Add a text field to display the result.

COURSE OUTCOMES:

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

1. Analyze the necessity for Object Oriented Programming paradigm and over structured programming and become familiarwith the fundamental concepts in OOP.
2. Demonstrate anability todesign 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 ormultithreaded process as per needs and specifications.
5. Demonstrate an ability tovisualize 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**

-/-/2/1

(R22A0587) OPERATING SYSTEMS LAB

COURSE OBJECTIVES:

1. Introduce basic Linux commands, system call interface for process management, inter-process communication and I/O in Unix.
2. Students will learn to simulate CPU scheduling, deadlock avoidance and prevention algorithms
3. Students will learn to simulate process synchronization and Inter Process communication through named pipes, message queues and shared memory
4. Gain knowledge on memory management techniques
5. Students will learn to implement disk scheduling algorithms

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 Deadlock Prevention.

WEEK 5:

a) Writea C programtosimulate the concept of Dining-philosophers problem.
b) Write a C program to simulate producer-consumerproblem using Semaphores

WEEK 6:

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

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

WEEK 7:

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

WEEK 8:

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

WEEK 9:

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 10:

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. UNIXInternals: The New Frontiers, U. Vahalia, Pearson Education

COURSE OUTCOMES :

1. Learn essential Linux commands and the system call interface for process management.
2. Master various CPU scheduling and deadlock algorithms through hands-on simulation programs
3. Acquire knowledge on process synchronization and Inter Process communication
4. Learn to simulate memory management algorithms.
5. Implement disk scheduling algorithms

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

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

(R22A0005) 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 today 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 ofthe 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-Possessive adjectives - 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 letterto 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 betweena vendor and a customer at the market
Grammar: Verbs "to want", "tocan"- Express capacity / possibility- Express will / desire – the future 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 tosimple 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 FrenchBeginner-Intermediate (Coursebook) By Livid Language
5. Ã L'Aventure: An Introduction to French Language and Francophone Culturesby EvelyneCharvier-Berman, Anne C. Cummings.

COURSE OUTCOMES

1. Thestudents will be able to communicate in French at A1 level.
2. Thestudent 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 are able to simple listening and reading activities.
5. The students will learning Speaking: Express the prohibition and the obligation

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

III Year B.Tech. CSE- I Sem **L/T/P/C 3/0/0/3**

(R22A0511) 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- code generation algorithm 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 Compilerimplementation inC -Andrew N.AppelCambridge 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 Dream tech

COURSE OUTCOMES :

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

1. Understandthe essence of different language translators.
2. Design different components (phases) ofa compilerby hand.
3. Demonstrate an understanding of semantic analysis in the context of compiler construction.
4. Apply storage allocation strategies for arrays, strings, and records.
5. Understand and generate object code for various target architectures.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

III Year B.Tech. CSE- I Sem **L/T/P/C**
3/0/0/3

(R22A6601) ARTIFICIAL INTELLIGENCE

COURSE OBJECTIVES:

1. To learn about Intelligent Agents and environments.
2. To acquire knowledge about uninformed and informedsearch algorithms.
3. To understand knowledge-based systems using First order logic and Uncertain Domains.
4. To comprehend knowledge acquisition throughvarious learning techniques.
5. To understand the purpose and concepts of Expert Systems.

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, Non monotonic 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 BOOK:

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

REFERENCE BOOKS:

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:

Students should be able to:

1. Apply search strategies to solve problems.
2. Represent real- life problems ina state space representation and devise solutions.
3. Deviseknowledge representation frameworks forsystems and games.
4. Formulate valid solutions for problems involving uncertain inputs oroutcomes.
5. Designand evaluate expert models for perceptionand prediction from intelligent environment.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

III Year B.Tech. CSE- I Sem **L/T/P/C 3/0/0/3**

(R22A0513) Full Stack Development

COURSE OBJECTIVES:

1. To become knowledgeable about the most recent web development technologies.
2. Idea for creating two tier and three tier architectural web applications.
3. Students will become familiar to implement fast, efficient, interactive and scalable web applications using run time environment provided by the full stack components
4. Design and Analyze real time web applications. and Constructing suitable client and server side applications.
5. To learn core concept of both front end and back endprogramming.

UNIT - I

Web Development Basics: Understanding the Basic Web Development Framework- User, Browser, Webserver, Backend Services, **HTML Basics:** Headings, Paragraphs, Links, Images, Lists, Tables, Div Element, Forms, **Cascading Style Sheets**: Syntax, Types, Selectors, Background, Border, Font, Text, Table**,** box model, **Version Control:** Getting Started with Git, Git Basics, Git Branching and Merging, working with remote repositories.

UNIT - II

JavaScript and jQuery: JavaScript basics, Functions, form validation, OOPS Aspects of JavaScript, JQuery Framework, jQuery events, AJAX for data exchange with server, JSON data format.

UNIT - III

Angular: importance of Angular, Understanding Angular, creating a Basic Angular Application, Angular Components, Expressions, Data Binding, Built-in Directives, Custom Directives, Implementing AngularServices in Web Applications.

React:

Need of React, Simple React Structure, The Virtual DOM, React Components, Introducing React Components, Creating Components in React, Data and Data Flow in React, Rendering and Life Cycle Methods in React, Working with forms in React, integrating third party libraries, Routing in React.

UNIT – IV

Node js: Getting Started with Node.js, Using Events, Listeners, Timers, and Callbacks in Node.js, Handling Data I/O in Node.js, Accessing the File System from Node.js, Implementing Socket Services in Node.js.

UNIT -V

MongoDB:

Understanding NoSQL and MongoDB**,** Getting Started with MongoDB**,** Getting Started with MongoDB and Node.js**,** Manipulating MongoDB Documents from Node.js**,** Accessing MongoDB from Node.js**,** Using Mongoose for Structured Schema and Validation**,** Advanced MongoDB Concepts.

TEXT BOOKS:

1. Web Design with HTML, CSS, JavaScript and JQuery Set Book by Jon Duckett Professional JavaScript for Web Developers Book by Nicholas C. Zakas. **(Unit-I, II).**
2. ProGit, 2nd Edition, Apress publication by Scott Chacon and Straub. **(Unit I).**
3. Mark Tielens Thomas, React in Action, 1st Edition, Manning Publications. **(Unit-III).**
4. Brad Dayley, Brendan Dayley, Caleb Dayley., Node.js, MongoDB and Angular Web Development, 2nd Edition, Addison-Wesley, 2019. **(Unit-III, Unit-IV, Unit-V)**.

REFERENCE BOOKS:

1. Vasan Subramanian, Pro MERN Stack, Full Stack Web App Development with Mongo, Express, React, and Node, 2nd Edition, Apress, 2019.
2. Chris Northwood, The Full Stack Developer: Your Essential Guide to the Everyday Skills Expected of a Modern Full Stack Web Developer', 1st edition, Apress, 2018.
3. Kirupa Chinnathambi, Learning React: A Hands-On Guide to Building Web Applications Using React and Redux, 2nd edition, Addison-Wesley Professional, 2018.

COURSE OUTCOMES:

1. UnderstandFullstack components for developing web application.
2. Students are able to develop a dynamic webpage by the use of java script and jQuery.
3. Design faster and effective single page applications using Angular and Create interactive user interfaces with react components
4. Apply packages of NodeJS to work with Data, Files, Http Requests and Responses.
5. Use MongoDB data base for storing and processing huge data and connects with NodeJS application.

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OPEN ELECTIVE – I

(R22A0551) 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 tomake use ofmembers of classes found inthe 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 – I
(R22A1251) WEB DEVELOPMENT

COURSEOBJECTIVES:

1. To learn the basics of web & html programming
2. To understand CSS and its style
3. To know about Java Scripting & Dynamic Html
4. To understand the concepts of XML
5. To gain knowledge about web server software PHP.

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- Frames, HTML – Forms, Form Elements, HTML – Meta Tags, HTML-Miscellaneous using tool Dreamweaver/ Visual studio.

UNIT II

CSS –Introduction, Syntax, CSS and page layout, CSS-Selectors, CSS-Attribute selectors, CSS-Color Background Cursor, CSS-Text Fonts, CSS-Lists Tables, CSS -Box Model, CSS-Display Positioning, CSS Floats. Using tool Visual studio, Net Beans.

UNIT III

Java Script: JavaScript characteristics, Objects in Java Script, Events-Handlers, Event objects, DOM, Advanced Java script and HTML Forms, Form Validation, Dynamic HTML with Java Script, DHTM- Events, CSS with JavaScript in DHTML.

UNIT IV

XML: Introduction to XML, Benefits, Holding Data, XML-DOM, Document Type Definition - DTD, XML Schema, Separates Structure from Formatting, Data Sharing XM, , XML HTTP Request, Accessing, Creating and Modifying XML Nodes, Loading XML Data into an HTML Page, Receiving XML Responses, Handling Response XML.

UNIT V

PHP: PHP Introduction, Structure of PHP, PHP Namespace, PHP Functions, PHP-File Handling, PHP Form-handling, PHP Form-validation, Connecting to database, Simple AJAX application.

TEXT BOOKS:

1. Web Programming, Building Internet Applications, CHRIS BATES II Edition, Wiley Dreamtech.
2. Programming worldwide web, SEBESTA, PEARSON.

REFERENCE BOOKS:

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

COURSEOUTCOMES:

1. Ability to design a web application.
2. Ability todevelop a specific style sheet.
3. Ability tobuild a java scripting web application.
4. Ability tocreate a web design using XML.
5. Ability to develop web pages using PHP.

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OPEN ELECTIVE – I

(R22A2151) 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. Intellectualproperty right by Deborah E Bouchoux
2. Cyberlaw, 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 andIndustrial Designs..
4. Able to manage and protect IP.
5. gain Knowledge on Cyber law

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OPEN ELECTIVE – I
(R22A0351) ROBOTICS AND AUTOMATION

COURSEOBJECTIVES:

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, Robots and Robotics, Microprocessors and Microcontrollers, Microcontroller or Embedded Controller

UNIT - II

Robotics: Classification of Robots, Links and Joint, Degree of freedom, Motors-DC motors, Stepper Motors, Servo Motors; Power Transmission-Type of Gears, Robotic Sensors, Applications of Robot, S/w used for Robot programming.

UNIT- III

The AVR RISC microcontroller architecture: Introduction, AVR family architecture, register file, Pin diagram of AVR, memory organization, I/O ports, timers, USART, 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. SubrataGhoshal, "Embedded Systems &Robots", Cengage Learning
2. Stuart Russell, Peter Norvig, “Artificial Intelligence: A modern approch”, Pearson Education,India2003.

3. ARM System Developer's Guide: Designing and Optimizing System SoftwareAndrew 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. Understandthe overview of Embedded Systems, Robots, Microprocessors & Microcontrollers.
2. Understand in detail about Robotics and sensors.
3. UnderstandAVR 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 – I

(R22A0451) ELECTRONICS FOR HEALTH CARE

COURSE OBJECTIVES:

1. To understand x-ray generation and biological effects.
2. To study different x-ray diagnostic methods.
3. To study CT imaging concepts, fundamental of Magnetic resonance imaging..
4. To study Generation and detection of ultrasound and its techniques.
5. To study the principles of Radio nuclide imaging

UNIT-I

X-RAY IMAGING: Generation and Detection of X-rays – X-ray generation, X-ray generators, Filters, Beam restrictors and grids, Intensifying screens, fluorescent screens, and image intensifiers, X-ray detectors, X-ray image characteristics – Spatial resolution, Image noise, Image contrast, Biological effects of ionizing radiation.

UNIT-II

X-RAY DIAGNOSTIC METHODS: Conventional X-ray radiography, Fluoroscopy, Angiography, Mammography and Xeroradiography, Image subtraction.

COMPUTED TOMOGRAPHY: Conventional tomography, Computed tomography, Algorithms for image reconstruction: parallel and Fan beam data, Spiral CT. Recent developments – Digital radiography.

UNIT-III

ULTRASOUND IMAGING: Generation and detection of Ultrasound- Piezoelectric effect, Ultrasonic transducers,

ULTRASONIC DIAGNOSTIC METHODS : Pulse echo systems- Amplitude mode(A-mode),Brightness mode(B-mode), Motion mode (M- mode), Constant depth mode (C-mode), Doppler methods, Duplex imaging, Tissue characterization, Colour Doppler flow imaging, Image characteristics – Ultrasonic texture or speckle, Speckle reduction, Compensation of phase aberration, Biological effects of ultrasound

UNIT-IV

RADIO NUCLIDE IMAGING: Generation & Detection of Nuclear Emission – Radionuclide generators, nuclear radiation detectors, Collimators, Radionuclide imaging systems-Gamma Camera, SPECT, PET.

BASICS OF MAGNETIC RESONANCE IMAGING: fundamentals of nuclear magnetic resonance-Angular momentum, magnetic dipole moment, magnetization, Larmor frequency, Rotating frame of reference and RF magnetic field, Free induction decay (FID), Fourier spectrum of the NMR signal, Spin density, Relaxation times, Pulse sequences.

UNIT-V

MRI SYSTEM & IMAGING METHODS : Magnetic field gradients, NMR Coil/Probe, Transmitter, Receiver, Data acquisition. Imaging Methods- Introduction, slice selection, frequency encoding, phase encoding, Spin-Echo imaging- Characteristics of MRI images- spatial resolution, image contrast. Functional MRI.

TEXTBOOKS:

1. **Principles of Medical Imaging**, Kirk Shung, Michael B. Smithand Banjamin Tsui, Academic Press, 1992.
2. **Handbookof Biomedical Instrumentation**,R.S.Khandpur,TataMcGrawHill,2nd Edition,2003.

REFERENCE BOOK:

1. Fundamentals of Medical Imaging, Paul Suetens,Cambridge UniversityPress, 2002

COURSE OUTCOMES:

On the completion of the course, the students will be able to

1. Understandthe X-ray fundamentals and its characteristics.
2. Understandthe X-ray diagnostic methods and CT imaging.
3. Understandthe Ultra sound imaging and diagnostics methods.
4. Understandthe properties of radio nuclides and its applications.
5. Understand the MRI system and imaging methods.

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OPEN ELECTIVE – I

(R22A0251) RENEWABLE ENERGY SOURCES

Pre-requisites: None

COURSE OBJECTIVES:

- To recognize the awareness of energy conservation in students
- To identify the use of renewable energy sources for electrical power generation
- To collect different energy storage methods and detect about environmental effects of energy conversion
- To learn about the Solar Energy
- To learn about the fuel cell.

UNIT-I

Introduction

Renewable Sources of Energy- Grid- Supplied Electricity- Distributed Generation-Renewable Energy **Economics**- Calculation of Electricity Generation

Wind Power Plants:

Appropriate Location -Evaluation of Wind Intensity -Topography -Purpose of the Energy Generated – General Classification of Wind Turbines- Rotor Turbines- Multiple-Blade Turbines Drag Turbines- Lifting Turbines- Generators and Speed Control used in Wind Power Energy Analysis of Small Generating Systems.

UNIT-II

Photo voltaic Power Plants

Solar Energy- Generation of Electricity by Photo voltaic Effect- Dependence of a PV Cell Characteristic on Temperature- Solar cell Output Characteristics-Equivalent Models and Parameters for Photo voltaic Panels- Photo voltaic Systems-Applications of Photo voltaic Solar Energy- Economical Analysis of Solar Energy.

Fuel Cells: The Fuel Cell- Low and High Temperature Fuel Cells- Commercial and Manufacturing Issues Constructional Features of Proton Exchange- Membrane Fuel Cells– Reformers- Electrolyzer Systems and Related Precautions- Advantages and Disadvantages of Fuel Cells-Fuel Cell Equivalent Circuit-Practical Determination of the Equivalent Model Parameters -Aspects of Hydrogen as Fuel.

UNIT-III

Induction Generators

Principles of Operation-Representation of Steady- State Operation-Power and Losses Generated-Self-Excited Induction Generator-Magnetizing Curves and Self-Excitation Mathematical Description of the Self-Excitation Process-Interconnected and Stand-alone operation-Speed and Voltage Control - Economical Aspects.

UNIT-IV

Storage Systems

Energy Storage Parameters-Lead-Acid Batteries-Ultra Capacitors-Flywheels–Super conducting Magnetic Storage System-Pumped Hydroelectric Energy Storage- Compressed Air Energy Storage-Storage Heat-Energy Storage as an Economic Resource.

UNIT-V

Integration of Alternative Sources of Energy

Principles of Power Injection-Instantaneous Active and Reactive Power Control Approach Integration of Multiple Renewable Energy Sources-Islanding and Interconnection Control-DG Control and Power Injection.

Inter connection Of Alternative Energy Sources with the Grid:

Inter connection Technologies-Standards and Codes for Inter connection-Inter connection Considerations-Inter connection Examples for Alternative Energy Sources.

TEXTBOOKS:

1. Felix A. Farret, M. Godoy Simoes, "Integration of Alternative Sources of Energy", John Wiley& Sons, 2006.
2. Solanki: Renewable Energy Technologies: Practical Guide For Beginners, PHI Learning Pvt. Ltd., 2008.

REFERENCE BOOKS:

1. D.Mukherjee: Fundamentals of Renewable Energy Systems, New Age International publishers, 2007.
2. Remus Teodorescu, Marco Liserre, PedroRodríguez: Grid Converters for Photo voltaic and Wind Power Systems, John Wiley & Sons, 2011.
3. Gilbert M.Masters: Renewable and Efficient Electric Power Systems, John Wiley& Sons, 2004.

COURSE OUTCOMES:

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

1. Students Explain renewable energy sources, grid-supplied electricity, distributed generation, and wind power plant classification and operation.
2. Students Understand photovoltaic power generation, solar cell characteristics, fuel cell technology, and hydrogen as a fuel source.
3. Students can analyze the working principles, operation, and control of induction generators for renewable energy applications.
4. Students can Evaluate different energy storage systems, including batteries, supercapacitors, flywheels, and hydroelectric storage.
5. Students can examine the integration of multiple renewable energy sources, power injection techniques, and distributed generation control.

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OPEN ELECTIVE – I

(R22A6751) PRINCIPLES OF DATA SCIENCE

Course Objectives:

1. To gain knowledge in the basic concepts of Data Analysis
2. To acquire skills in data preparatory and preprocessing steps.
3. To understand the mathematical skills in statistics.
4. To understand the concepts of Artificial Intelligence Roles and Skills in Data Science.
5. To understand the role of Data Science in Real-time applications.

UNIT I

INTRODUCTION Need for data science – benefits and uses – facets of data – data science process – setting the research goal – retrieving data – cleansing, integrating, and transforming data – exploratory data analysis – building the models – presenting and building applications.

UNIT II

DESCRIBING DATA - I Frequency distributions – Outliers – relative frequency distributions cumulative frequency distributions – frequency distributions for nominal data – interpreting distributions – graphs – averages – mode – median – mean – averages for qualitative and ranked data – describing variability – range – variance – standard deviation – degrees of freedom – interquartile range – variability for qualitative and ranked data.

UNIT III

DESCRIBING DATA - II Normal distributions – z scores – normal curve problems – finding proportions – finding scores – more about z scores – correlation – scatter plots – correlation coefficient for quantitative data – computational formula for correlation coefficient – regression – regression line – least squares regression line – standard error of estimate – interpretation of r2 – multiple regression equations – regression toward the mean.

UNIT IV

AI ROLES AND SKILLS AI Cognitive Computing: Learning Perceptions – Terminologies - Machine Learning – Neural Networks – Deep Learning - NLP – Speech Processing – Big Data and AI – Ethics in AI Research - Advanced Applications – AI Myths – Data Science Roles Data Scientist, Data Architect, Data Analyst – Machine Learning Engineer – Skills.

UNIT V

DATA SCIENCE USE CASES Data Science Use cases Specifications and Discussion – Data Sources Identification – Data Types –Data Classification – Data Characteristics of Big V‟s – Data Science P‟s – Applications of AI: Domains: Customer Insights – Behavioral Analysis –- Marketing – Retails – Insurance – Risk and Security – Health care – Supply Chain Logistics.

TEXT BOOKS:

1. David Cielen, Arno D. B. Meysman, and Mohamed Ali, "Introducing Data Science", Manning Publications, 2016. (first two chapters for Unit I)
2. Robert S. Witte and John S. Witte, "Statistics", Eleventh Edition, Wiley Publications, 2017. (Chapters 1–7 for Units II and III)
3. Joel Grus, "Data Science from Scratch", 2nd Edition, O'Reilly Publisher, ISBN: 9781492041139, May 2019 (for Unit IV and V)

REFERENCE BOOKS:

1. Lillian Pierson, Jake Porway, "Data Science for Dummies", Second Edition, John Wiley & Sons, Publishers, ISBN: 9781119327639, 2017 (EBook)
2. Sinan Ozdemir, Sunil Kakade, "Principles of Data Science", Second Edition (EBook)

ELearning Resources:

- Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]

COURSE OUTCOMES:

On successful completion of this course, students would be able to

1. Understandthe foundational concepts of Data Science.
2. Understand the nature of Data.
3. Determine the relationship between data dependencies using statistics.
4. Understandthe concepts of Artificial Intelligence Roles and Skills in Data Science.
5. Understand the concepts of Data Science uses.

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BUSINESS ANALYTICS
(R22A6752)OPEN ELECTIVE -I

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.
- To help students in understanding how the managers use business analytics for managerial decision making.

Unit-I

Understanding Business Analystics

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 Sata 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 Analystics

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 Organization Issues

Issues & Challenges: Business Analytics Implementation Challenges - Privacy and Anonymizaiton - Hacking and Insider Threats - Making Customer Comfortable.

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.

REFERENCES:

- James R Evans, Business Analytics, Global Edition, Pearson Education
- U Dinesh Kumar, Business Analytics, Wiley India Pvt. Ltd., New Delhi
- Ger Koole, An Introduction to Business Analytics, Lulu.com, 2019
- 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.
- Vipin Kumar, Introduction to Data Mining, Pang-Ning Tan, Michael Steinbach, PearsonEducation India
- Bhimasankaram Pochiraju, Sridhar Seshadri, Essentials of Business Analytics: An Introduction to the Methodology and its Application, Springer

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CBCS POOL
Professional Elective-I

(R22A0514) DISTRIBUTED SYSTEMS

COURSE OBJECTIVES:

1. To learn the principles, architectures, algorithms and programming models usedin 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, Group Communication

Distributed Objects and Remote Invocation: Introduction, Communication between Distributed Objects, Remote Procedure Call, Events and Notifications

UNIT - IV

Distributed File Systems: Introduction, File service Architecture,

Case Study: 1:Sun Network File System , 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 andDesign,G Coulouris, J Dollimore and T Kindberg,Fourth Edition, Pearson Education. 2009.

REFERENCES:

1. Distributed Systems, Principles and paradigms, Andrew S.Tanenbaum, Maarten Van Steen, Second Edition, PHI.
2. Distributed Systems,AnAlgorithm Approach,Sikumar Ghosh,Chapman & Hall/CRC Taylor& Fransis Group,2007.

COURSE OUTCOMES:

1. Able tocompare different types of distributed systems and different models.
2. Able toanalyze the algorithms of mutual exclusion, election & multicast communication.
3. Able toevaluate the different mechanisms for Interprocess communication and remote in vocations.
4. Able todesign and develop new distributed applications.
5. Able to apply transactions and concurrency control mechanisms in different distributed environments.

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CBCS POOL
Professional Elective-I

(R22A0515) IMAGE PROCESSING

COURSEOBJECTIVES:

1. Provide a theoretical and mathematical foundation of fundamental Digital Image Processing concepts.
2. Provides the knowledge of image acquisition; sampling and quantization.
3. Preprocessing and enhancement.
4. Image restoration, and segmentation.
5. Knowledge of different image compression techniques.

UNIT - I

Digital Image Fundamentals: Digital Image through Scanner, Digital Camera. Concept of Gray Levels, Gray Level to Binary Image Conversion, Sampling and Quantization, Relationship between Pixels. Imaging Geometry. 2D Transformations-DFT, DCT, KLT and SVD.

UNIT - II

Image Enhancement in Spatial Domain Point Processing, Histogram Processing, Spatial Filtering, Enhancement in Frequency Domain, Image Smoothing, Image Sharpening.

UNIT - III

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

UNIT - IV

Image Segmentation Detection of Discontinuities, Edge Linking and Boundary Detection, Thresholding, Region Oriented Segmentation.

UNIT - V

Image Compression Redundancies and their Removal Methods, Fidelity Criteria, Image Compression Models, Source Encoder and Decoder, Error Free Compression, Lossy Compression.

TEXT BOOKS:

1. Digital Image Processing: R.C. Gonzalez & R. E. Woods, Addison Wesley/ Pearson Education, 2 Ed,2004.

REFERENCES:

1. Fundamentals of Digital Image Processing: A. K. Jain ,PHI.
2. Digital Image Processing using MAT LAB: Rafael C. Gonzalez, Richard E. Woods, Steven L. Eddins: Pearson Education India,2004.
3. Digital Image Processing: William K. Pratt, John Wilely, 3 rdEdition,2004.
4. Image Processing, Analysis and Machine Vision, Second Edition, Milan Sonka, aclav Hlavac and Roger Boyle, Cengage learning.
5. Digital Image Processing, W.K.Pratt, 4th edition John wiley &sons.
6. Digital Image Processing, S.Jayaraman, S.Esakkirajan, T.Veera kumar, TMH.
7. Digital Image Processing, S.Sridhar, Oxford University Press

COURSEOUTCOMES:

1. Understandthe theoretical and mathematical foundations of Digital Image Processing.
2. Explain different image acquisition, sampling and quantization methods;
3. Perform Preprocessing and image enhancement operations on given images
4. Apply different Image restoration, and segmentation techniques.
5. Perform different image compression techniques.

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CBCS POOL

Professional Elective-I

(R22A6201) CYBER SECURITY ESSENTIALS

COURSE OBJECTIVES:

1. To understand various types of cyber-attacks and cyber-crimes
2. To learn threats and risks within context of the cyber security
3. To have an overview of the cyber laws & concepts of cyber forensics
4. To study the defensive techniques against these attacks
5. To understand various cyber security privacy issues

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, 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, Forensics Analysis of Email, Digital Forensics Lifecycle, Forensics Investigation, Challenges in Computer Forensics

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, 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: security risks and perils for organizations, social computing and the associated challenges for organizations

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 in different domains- medical, financial, etc

TEXT BOOKS:

1. Nina Godbole and Sunit Belpure, Cyber Security Understanding Cyber Crimes, Computer Forensics and Legal Perspectives, Wiley
2. B.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, CRCPress T&F Group.

COURSE OUTCOMES:

1. Analyze and evaluate the cyber security needs of an organization.
2. Understand Cyber Security Regulations and Roles of International Law.
3. Design and develop a security architecture for an organization.
4. Understand fundamental concepts of data privacy attacks
5. Understand fundamental concepts of cyber crime and cyber issues.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

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CBCS POOL **3/0/0/3**

Professional Elective-I

(R22A0516) AGILE METHODOLOGY

Course Objectives:

- Knowledge on concepts of agile development, releasing, planning and developing
- Understanding Agile principles
- Project planning in Agile
- Team colloboration
- Agile ceremonies.

UNIT - I

Introduction Extreme Programming (XP) - Agile Development

Why Agile?, Understanding Success, Beyond Deadlines, Importance of Organizational Success, Introduction to Agility, Agile methods-Scrum and XP, Manifesto for Agile Software Development, Principles of Agile Process. Understanding XP (Extreme Programming) - XP life cycle, XP team, XP Concepts, Adopting XP - Knowing whether XP is suitable, Implementing XP, assessing Agility, Practicing XP - Thinking, Pair Programming, Energized work, Informative Workspace, Root cause Analysis, Retrospectives.

UNIT – II

Collaborating

Trust, Sit together, Real customer involvement, Ubiquitous language, Stand-Up meetings, coding standards, Iteration demo, Reporting.

UNIT - III

Releasing

Bugfree Release, Version Control, Ten-Minute Build, continuous integration, Collective ownership and Documentation.

UNIT – IV

Planning

Version, Release Planning, The Planning Game, Risk Management, Iteration Planning, Slack, Stories, and Estimating

UNIT - V

Developing

Incremental requirements, Customer tests, Test driven development, Refactoring, Incremental design and architecture, spike solutions, Performance optimization, Exploratory testing.

TEXT BOOK:

1. The art of Agile Development, James Shore and Shane Warden, 11th Indian Reprint, O'Reilly, 2018.

REFERENCE BOOKS:

1. Learning Agile, Andrew Stellman and Jennifer Greene, O'Reilly, 4th Indian Reprint, 2018
2. Practices of an Agile Developer, Venkat Subramaniam and Andy Hunt, SPD, 5th Indian Reprint, 2015 3. Agile Project Management - Jim Highsmith, Pearson Low price Edition 2004

COURSE OUTCOMES:

- Identify basicconcepts of agile methodology and Extreme programming
- Analyze real customer involvement in collaboration
- Discuss risk management and iterationplanning
- Analyze the bug free release of the project
- Understanding incremental requirements, refactoring, incremental design and architecture

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(R22A0588) COMPILER DESIGN LAB

COURSEOBJECTIVES:

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. Providesknowledge of LEX tools.
5. Knowledge of Yacctools incompiler component constructions and to draw the UML diagrams.

WEEK1. Write a C Program to Scan and Count the number of characters, words, and lines ina file.

WEEK 2. Write a C Program to implement DFAs thatrecognize identifiers, constants,

and operators of the mini language

WEEK 3.Write a lex program to implementsimple calculator.

WEEK 4. Design a Lexical analyzer for the given 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.

WEEK6. write a yaccprogram to acceptgiven Grammer s- >aA|a,A->a.

WEEK7. Write a Program for construction of LR Parsing table using C

WEEK 8. Design a Predictive Parser for the following grammar G:{E->TE', E' -> +TE' | 0,

T->FT' , T'-> *FT'|0 , F-> (E) | id }

WEEK9. Design LALR bottom-up parser for the above language using tools or C

WEEK 10. Write program to generate machine code from the abstract syntax tree generated by the parser. The following instruction set may be considered as target code

COURSEOUTCOMES: 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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(R22A0589) 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 andDesigning of Websites can be carried out.
4. Developweb based application using suitable client side and server side code.
5. Implement web based application using effective database access.

PROGRAMS:

Week-1. Designing following static WebPages required foran Online Book Store website.

Week-2. Designing a webpage using CSS Which includes different styles.

Week-3. Write a JavaScript to implement the following various events.

Week-4. Write a program tocreate and Builda Password Strength Check using JQuery.

Week-5. Write a program to create and Build a star rating system using JQuery.

Week-6. Write a program for sending request to a server by using AJAX.

Week-7. Develop an Angular JS application that displays a list of shopping items. Allow users to add and remove items from the list using directives and controllers. Note: The default values of items may be included in the program.

Week-8. Write a program to create a simple calculator Application using React JS.

Week-9. Write a program to create a voting application using React JS.

Week-10. Write a serverside program for Accessing MongoDB from Node.js.

Week-11. Write a serverside program for Manipulating MongoDB from Node.js.

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 andDesigning of Websites can be carried out.
4. Develop web based application using suitable client side and serverside code.
5. Implement web based application using effective database access.

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(R22A0084) PROFESSIONAL DEVELOPMENT SKILLS-I

COURSE OBJECTIVES:

1. To strengthen the students with the professional skill set.
2. To make the students recognize the role of technical English in their academic and professional fields.
3. To improve language proficiencyand to develop the required professional ethics.
4. To equipstudents, organize, comprehend, write, and present, short and long forms of any technical work within the broad framework of the Scientific Method.
5. To facilitate communication about projects and ideas throughout the industry and also to the non-technical people.

UNIT- I:

- Communication Skills: Verbal & Non-verbal communication
- Body Language: Facial expressions, Gestures, Eye Contact, Shrugging, and Standing Postures
- Writing: Letter Writing: requisition, complaint, Enquiry and response
- Exploring Career Opportunities

UNIT-2:

- Self-Introduction
- Ice-Breaking
- Writing: E-Mail Writing, Email Etiquette
- Social and Cultural Etiquette

UNIT-3:

- OralPresentation Skills: PPTs, Paper Presentation, Poster Presentation etc.,
- JAM Session
- Writing: Paragraph writing and Types of Paragraph Writing (descriptive, narrative, expository, and persuasive)
- Ethics and Integrity

UNIT-4:

- Describing People, Places, things etc.
- Telephonic Conversation: Telephonic Expressions, and Etiquette
- Writing: Essay writing and Types of Essay Writing
- Digital Literacy and Social Media

UNIT-5:

- Extempore
- Role play and Situational dialogues
- Writing: Memo Writing
- DigitalEthics and Cyber Security

REFERENCE BOOKS:

1. Curriculumand Guide line for Life Skills, By UGC, August 2023
2. David F. Beer and David McMurrey, Guide to writing as an Engineer, John Willey. New York, 2004
3. Diane Hacker, Pocket Style Manual, Bedford Publication, New York, 2003. (ISBN 0312406843)
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, New Delhi 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 Delhi 2002.
9. Xebec, Presentation Book, TMH New Delhi, 2000. (ISBN 0402213)

COURSE OUTCOMES:

Students will be able to

1. Understand information which assists in completion of the assigned job tasks more successfully
2. Market them withthe rich professional skills that they acquire.
3. Adhere to ethical norms ofscientific communication
4. Strengthen their individual and collaborative work strategies
5. Successfully market them and sell themselves to the employer of their choice.

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(R22A0512) COMPUTERNETWORKS

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.

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, Subnetting, SuperNetting, 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: Client server** model, HTTP, E-mail, WWW, TELNET, DNS.

TEXT BOOKS:

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

REFERENCE 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.

COURSEOUTCOMES:

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

1. Understandbasics of Computer Networks and Reference Models.
2. Understand the Data link 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 anidea of various things in Application Layer.

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(R22A6602) MACHINE LEARNING

Course Objectives:

1. Recognize the basicterminology and fundamental concepts of machine learning.
2. Understandthe concepts of Supervised Learning models witha focus on recent advancements.
3. Relatethe Concepts of Neural Networks Models of supervised Learning
4. Discover unsupervised learning paradigms of machine learning
5. Understandthe 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. 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 Book(s)

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

Reference Books

1. TrevorHastie, Robert Tibshirani,Jerome Friedman, The Elements of Statistical Learning, Springer2009
2. Christopher Bishop, Pattern Recognition and Machine Learning, Springer,2007.
3. Machine Learning Yearning,AndrewNg.
4. Data Mining–Concepts and Techniques -Jiawei Han and Micheline Kamber,Morgan Kaufmann

Course Outcome:

1. Explainthe concepts andable toprepare the dataset for different Machine learning models.
2. Identify andApply appropriate Supervised Learning models.
3. Design Neural Network models for the given data.
4. Perform Evaluation of Machine Learning algorithms andModel Selection.
5. Devise un-supervised and Reinforcement learning models

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(R22A0517) BIG DATA ANALYTICS

COURSEOBJECTIVES:

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 HadoopArchitecture and its ecosystems.
3. To acquire knowledge about the various databases suchas NoSQL, MongoDB, Cassandra.
4. To imbibe the processing of Big Datawith advancedarchitectures like Spark.
5. To perceive the various algorithms usedin 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

NewSQL: 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 RDD spark 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. MohammedGuller, "Big Data Analytics with Spark",Apress, 2015
3. DonaldMiner, Adam Shook, "Map Reduce Design Pattern", O"Reilly, 2012

COURSE OUTCOMES:

On successfulcompletion 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. Compareand 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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OPEN ELECTIVE – II

(R22A0553) DATABASE SYSTEMS

COURSE OBJECTIVES:

1. To understand the basic concepts and the applications of database systems
2. To Masterthe basics of SQL and construct queries using SQL
3. To understand the relationaldatabase designprinciples
4. To become familiar withthe basic issues of transaction processing and concurrency control
5. To become familiarwith 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 NotationsGoals 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 uncorrelatedAggregate 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'sClosure ofa set of FD's,- Minimal covers-Definitions of 1NF,2NF, 3NF and BCNFDecompositions 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 ofthis course, students will be able to :

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

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OPEN ELECTIVE – II

(R22A6753) BIGDATA ARCHITECTURE

Prerequisite: DBMS,DWDM

COURSE OBJECTIVES:

1. The purpose of this course is to provide the students with the knowledge of Big data Analytics principles and techniques.
2. This course is also designed to give anexposure of the frontiers of Big data Analytics
3. To Understand the knowledge of Hadoop, HDFC and MapReduce Techniques
4. To gain the acknowledge on Hadoop Architecture.
5. To learn the machine learning approaches using R

UNIT -I

Introduction to Big Data: Big Data and its Importance – Four V's of Big Data – Drivers for Big Data –Introduction to Big Data Analytics – Big Data Analytics applications.

UNIT -II

Big Data Technologies: Hadoop's Parallel World – Data discovery – Open source technology for Big Data Analytics – cloud and Big Data –Predictive Analytics – Mobile Business Intelligence and Big Data

UNIT -III

Introduction Hadoop: Big Data – Apache Hadoop & Hadoop Eco System – Moving Data in and out of Hadoop – Understanding inputs and outputs of MapReduce - Data Serialization

UNIT -IV

Hadoop Architecture: Hadoop: RDBMS Vs Hadoop, Hadoop Overview, Hadoop distributors, HDFS, HDFS Daemons, Anatomy of File Write and Read., Name Node, Secondary Name Node, and Data Node, HDFS Architecture, Hadoop Configuration, Map Reduce Framework, Role of HBase in Big Data processing, HIVE, PIG.

UNIT -V

Data Analytics with R Machine Learning: Introduction, Supervised Learning, Unsupervised Learning, Collaborative Filtering, Social Media Analytics, Mobile Analytics, Big Data Analytics with BigR.

TEXT BOOKS:

1. Big Data Analytics, Seema Acharya, Subhasini Chellappan, Wiley 2015.
2. Big Data, Big Analytics: Emerging Business Intelligence and Analytic Trends for Today's

3. Business, Michael Minelli, Michehe Chambers, 1st Edition, Ambiga Dhiraj, Wiely CIO Series, 2013
4. Hadoop: The Definitive Guide, Tom White, 3rd Edition, O"Reilly Media, 2012.

REFERENCE BOOKS

1. Big Data and Business Analytics, Jay Liebowitz, Auerbach Publications, CRC press (2013).
2. Professional Hadoop Solutions, Boris lublinsky, Kevint. Smith, Alexey Yakubovich, Wiley, ISBN: 9788126551071, 2015.
3. Understanding Big data, Chris Eaton, Dirk deroos et al. McGraw Hill, 2012.

COURSE OUTCOME:

1. Ability to explain the foundations, definitions, and challenges of Big Data and various Analytical tool
2. Ability toprogram using HADOOP and Map reduce, NOSQL
3. Ability tounderstand the importance of Big Data in Social Media and Mining.
4. Ability to analyze data through machine learning
5. Abe to structure the data using Hadoop.

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OPEN ELECTIVE – II

(R22A0352) DESIGN THINKING

COURSE OBJECTIVES:

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 integrativemodels 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. GenrichAltshuller, 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:

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 – II

(R22A0552) PRINCIPLES OF CLOUD COMPUTING

COURSE OBJECTIVES:

1. To understand the various distributed system models and evolving computing paradigms
2. To gain knowledge in virtualization of computer resources
3. To realize the reasons for migrating into cloud
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**: High-Performance Computing, Parallel Computing, Distributed Computing, Cluster Computing, Grid 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.

UNIT- V

SLA Management in cloud computing: Traditional Approaches to SLO Management, Typesof 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.

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.

COURSEOUTCOMES:

- Ability to analyze various service delivery models of cloud computing
- Ability tointerpret the ways in which the cloud can be programmed and deployed.
- Ability tocomprehendthe virtualization and cloud computing concepts
- Assess the comparative advantages and disadvantages of Virtualization technology
- Analyze security issues in cloud computing

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OPEN ELECTIVE – II

(R22A6951) INTERNET OF THINKING & 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 IoTApplication Development procedure
5) To study various case studies and IoT applications.

UNIT I:

FUNDAMENTALS OF IoT- Evolution of Internet of Things, Enabling Technologies, M2M Communication, IoT World Forum (IoTWF) standardized architecture, Simplified IoT Architecture, Core IoT Functional Stack, Fog, Edge and Cloud in IoT, Functional blocks of an IoT ecosystem, Sensors, Actuators, Smart Objects and Connecting Smart Objects.

UNIT II:

IoT PROTOCOLS- IoT Access Technologies: Physical and MAC layers, topology and Security of IEEE 802.15.4, 802.11ah and Lora WAN, Network Layer: IP versions, Constrained Nodes and Constrained Networks,6LoWPAN, Application Transport Methods: SCADA, Application Layer Protocols: CoAP and MQTT.

UNIT III:

DESIGN AND DEVELOPMENT- Design Methodology, Embedded computing logic, Microcontroller, System on Chips, IoT system building blocks IoT Platform overview: Overview of IoT supported Hardware platforms such as: Raspberry pi, Arduino Board details

UNIT IV:

DATA ANALYTICS AND SUPPORTING SERVICES: Data Analytics:
Introduction, Structured Versus Unstructured Data, Data in Motion versus Data at Rest, IoT Data Analytics Challenges, Data Acquiring, Organizing in IoT/M2M, Supporting Services: Computing Using a Cloud Platform for IoT/M2M Applications/Services, Everything as a service and Cloud Service Models.

UNIT V:

CASE STUDIES/INDUSTRIAL APPLICATIONS: IoT applications in home, infrastructures, buildings, security, Industries, Home appliances, other IoT electronic equipments, Industry 4.0 concepts.

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

REFERENCES:

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 Edition,VPT, 2014
6. Computer Networks; By: Tanenbaum, AndrewS; Pearson Education Pte.Ltd., Delhi, 4thEdition
7. 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) UnderstandIoT Architecture.
4) Understand IoT Application Development procedure
5) Understand various case studies and IoT applications.

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(OPEN ELECTIVE-II)
(R22A2152) NANO TECHNOLOGY

COURSE OBJECTIVES:

1. To provide a comprehensive overview of synthesis and characterization of nano particles

2. To provide Nano composites and hierarchical materials with Nano scale features.

3. To provide the engineering students with necessary back ground for understanding various nano material's characterization techniques.

4. To develop an understanding of the basis of the choice of material for device applications.

5. To give an insight into complete systems where nano technology can be used to improve our everyday life.

UNIT I:

Introduction to Nanomaterials Nanotechnology, Frontier of future-an overview, Length Scales, Variation of physical properties from bulk to thin films to nano materials, Confinement of electron in 0D, 1D, 2D and 3D systems, Synthesis of Nano materials: Bottom – Up approach: Chemical Routes for Synthesis of nano materials - Sol-gel, Precipitation, Solution Combustion synthesis, Hydro thermal, Top – Down approach – Ball milling technique, Sputtering, Laser Ablation.

UNIT II:

Characterization of Nanomaterials Basic principles and instrumentations of Electron Microscopy – Transmission Electron Microscope, ScanningElectron Microscope, Scanning Probes- Scanning Tunneling microscope, Atomic Force Microscope –different imaging modes, comparison of SEM and TEM, AFM and STM, AFM and SEM.

UNIT III:

Carbon Based Materials Introduction, Synthesis, Properties (electrical, Electronic and Mechanical), and Applications of Graphene, SWCNT, MWCNT, Fullerenes and other Carbon Materials: Carbon nano composites, nano fibers, nano discs, nano diamonds.

UNIT IV:

Nano technology in Energy storage and conversion Solar cells: First generation, Second generation and third generation solar cells: Construction and working of Dye sensitized and Quantum dot sensitized solar cells. Batteries: Nano technology in Lithium ion battery - working, Requirements of anodic and cathodic materials. Fuel Cells: Introduction, construction, working of fuel cells and nanotechnology in hydrogen storage and proton exchange membranes.

UNIT V:

Applications of Nano technology Nano tech Applications and Recent Breakthroughs: Introduction, Significant Impact of Nano technology and Nanomaterial, Electronic Applications (Nano electronics), Computing Applications (Nano computers), ChemicalApplications (Nano chemistry), Optical Applications (Nano photonics).

TextBooks :

1. Nano Materials – A.K.Bandyopadhyay/New Age Publishers

2. 2. Nanocrystals: Synthesis, Properties and Applications – C.N.R. Rao, P. John Thomas and G. U. Kulkarni, Springer Series in Materials Science 3. NanoEssentials-T.Pradeep/TMH.

References :

1. Introduction to Nanotechnology, C.P.Poole and F.J.Owens,Wiley,2003

2. 2. Understanding Nanotechnology, Scientific American 2002

3. 3. Nanotechnology, M. Ratner and D.Ratner, Prentice Hall 2003

COURSE OUTCOMES:

1. Demonstrate the synthesis of nano particles by various techniques.

2. Explain working of basic instruments used in characterization of nano particles.

3. Discuss the application of nanotechnology to mechanical and civil domains

4. Classify the nano materials based on the dimensions.

5. Assess the suitability of nano materials for various device applications.

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OPEN ELECTIVE – II

(R22A0252) ELECTRICAL AND HYBRID VEHICLES

COURSE OBJECTIVES:

1. Gain an overview of India's EV landscape, including policies, charging infrastructure, and key EV subsystems.
2. Understand vehicle dynamics, forces affecting EV movement, and energy consumption based on drive cycles.
3. Learn about EV powertrains, lithium-ion battery technology, battery management systems, and cost estimation.
4. Explore EV motors, controllers, power conversion, thermal management, and advanced control techniques.
5. Analyze EV charging technologies, battery swapping, standardization, public charging infrastructure, and economic feasibility.

UNIT-I:

Introduction Overview of Electric Vehicles in India, India's EV program, Charging and Swapping Infrastructure, brief introduction of batteries, Lithium for batteries, EV Subsystems.

UNIT-II:

Vehicle Dynamics: Forces acting when a vehicle move, Aerodynamic drag, Rolling Resistance and Uphill Resistance, Power and Torque to accelerate. Drive Cycle: Concept of Drive Cycle, Drive Cycles and Energy used per km.

UNIT-III:

EV Power train: Design of EV Drive Train, Introduction to Battery Parameters, Why Lithium Ion Battery? Batteries in Future, Li-Ion Battery Cells, SoH and SoC estimation and Self Discharge, Battery Pack Development, Computation of Effective cost of battery, Charging Batteries. Fundamentals of EV Battery Pack design: Mechanical, Thermal and Electrical Design, BMS Design of Electric Vehicle.

UNIT-IV:

EV Motors and Controllers: Fundamentals and Design, Understanding Flow of Electricity, Magnetism and Heat, Power and Efficiency, Torque Production, Speed and Back EMF, the d-q Equivalent circuit, Field-oriented Control, Understanding Three phase AC and DC to AC conversion systems, Understanding the thermal design of the motors, Engineering Considerations, Future Frontiers.

UNIT-V:

EV Charging: Introduction, Slow or Fast EV Chargers, Battery Swapping, Standardization and On board Chargers, Public Chargers, Bulk Chargers/Swap Stations, Economics of Public Chargers in context, Analytics and Tools for EV systems.

TEXT BOOKS:

1. Electric Power train- Energy Systems, Power electronics and drives for Hybrid, electric and fuel cell

vehicles by John G. Hayes and A. Goodarzi, Wiley Publication
2. MehrdadEhsani,YimiGao,SebastianE.Gay,AliEmadi,ModernElectric,Hy brid Electric and Fuel Cell Vehicles: Fundamentals, Theory and Design, CRC Press, 2004
3. Iqbal Hussein, Electric and Hybrid Vehicles: Design Fundamentals, CRCPress,2003

REFERENCE BOOKS:

1. James Larminie, John Lowry, Electric Vehicle Technology Explained, Wiley,2003
2. Chris Mi, M.Abul Masrur, David Wenzhong Gao, Hybrid Electric Vehicles:Principles and Applications with Practical Perspectives, John Wiley & Sons Ltd., 2011
3. Fundamentals of Electric Vehicles: technology and economics
https://onlinecourses.nptel.ac.in/noc20_ee99/previewhttps://archive.npt el.ac.in/courses/108/106/108106170/

COURSE OUTCOMES:

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

- Students will Explain the fundamentals of electric vehicles, including India's EV policies, charging infrastructure, and battery technologies.
- Students Analyze the forces affecting EV motion, drive cycles, and energy consumption to optimize vehicle performance.
- Students Design and evaluate EV powertrains, battery management systems, and lithium-ion battery efficiency.
- Students Understand the working principles of EV motors, controllers, power electronics, and thermal management.
- Students Assess different EV charging technologies, battery swapping methods, and the economic feasibility of public charging infrastructure.

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OPEN ELECTIVE – II

(R22A6251) CYBER GOVERNANCE

COURSE OBJECTIVES:

:

1. To learn Principles of Cyber Security.
2. To learn various types of attacks and the precautions.
3. To gain the knowledge of security and governance measurements
4. To learn the analyticals and various security compliance in Cyber Security through
5. governance.

UNIT - I

Principles of cyber-security governance, Assessment of cyber security maturity, Theories of governance – introduction, Governance – definitions and typologies, Tools, methods and processes

UNIT - II

Vulnerability management, Threat management, Endpoint management , Intrusion detection and prevention (IDPS), Security incident management, Security operations center (SOC) and related concepts.

UNIT - III

Measurement of governance: Metrics – concepts, Application security metrics, Network security metrics, Security incident metrics, Vulnerability metrics, Service level objectives / agreement (SLO / SLA), NIST metrics

UNIT - IV

Basics of security analytics, Threat intelligence and governance, Data driven security governance, Impact of cognitive security on security governance, Industry specific security compliance

UNIT - V

Cyber security governance India and Other countries, NIST mandates for compliance, Security reporting basics, CISO – role and organization structure

TEXT BOOKS:

1. Hayden, Lance. ITSecurity Metrics: A Practical Framework for Measuring Security & Protecting Data. McGraw-Hill Education Group, 2010.
2. Jacobs, Jay, and Bob Rudis. Data-driven security: analysis, visualization and dashboards. John Wiley & Sons, 2014
3. Collins, Michael. Network Security Through Data Analysis: From Data to Action. " O'Reilly Media, Inc.", 2017.
4. Jaquith, Andrew. Security metrics: replacing fear, uncertainty, and doubt. Pearson Education, 2007.

REFERENCE BOOKS:

1. Cybersecurity, Critical Infrastructure. "Framework for Improving Critical Infrastructure Cybersecurity." Framework 1 (2014): 11.

Course Outcomes:

1. Students will be able to understand the basis of cyber-security.
2. Students will be able toknow various governance principles
3. Students will learn about various types of attacks and threats in Security
4. Students will gain the knowledge of other countries standards, methods in governance
5. Students gain the knowledge of various countries Cyber Security Principles and Governance.

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CBCSPOOL

PROFESSIONAL ELECTIVE-II

(R22A0518) SCRIPTINGLANGUAGES

COURSEOBJECTIVES:

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-depthknowledge of programming features of Perl and PHP.
5. To statethe 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

JavaScriptprogramming 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 and regular 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 : Introduction to Ruby, Feature of Ruby,Data types,Variables, Operators, Conditional statements, Loops, , Arrays, Strings, Hashes, working on Methods, Blocks, and Modules.

TEXT BOOKS:

1. TheWorld of Scripting Languages, David Barron, Wiley Publications.
2. Learning PHP, MySQL, JavaScript, CSS & HTML5: A Step-by-StepGuideto Creating Dynamic Websites 3rd Edition, O'Reilly Publications

REFERENCE BOOKS:

1. The Ruby Programming Language,David Flanagan andYukihiroMatsumoto, O'Reilly Publications.
2. Beginning JavaScript with Dom scripting andAJAX, Russ Ferguson,Christian Heilmann, Apress.
3. Programming Perl, Larry Wall, T. Christiansen andJ. 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.

COURSEOUTCOMES:

Thestudents will be able:

1. Comprehendthe differences betweentypical scripting languages and typical system and application programming languages.
2. Toimplementthe design of programs forsimple applications.
3. To write and apply Perl & PHP scripts.
4. Gainknowledge of the strengths and weakness of Perl, and Ruby.
5. Tocreate software systems using scripting languages suchas Perl, PHP, and Ruby.

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CBCS POOL

Professional Elective-II

(R22A6202) CRYPTOGRAPHYANDNETWORK SECURITY

Course Objectives:

- Explain the objectives of information security
- Explain the importance and application of each of confidentiality, integrity, authentication and availability
- Understandvarious cryptographic algorithms.
- Understandthe basic categories of threats tocomputers and networks
- Describe public-key cryptosystem.

Course Outcomes:

- Student will be able to understand basic cryptographic algorithms, message and web authentication and securityissues.
- Ability toidentify information system requirementsfor both of them such as client and server.
- Ability tounderstand the current legal issues towards information security.
- Ability to enhancementsmade to IPv4 by IPSec
- Ability to UnderstandIntrusions and intrusion detection

UNIT - I

Security Concepts: 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, substitutiontechniques, transposition techniques, encryption and decryption, symmetric and asymmetric keycryptography, steganography, key range and key size, possible types of attacks.

UNIT - II

Symmetric key Ciphers: Block Cipher principles, DES, AES, Blowfish, RC5, IDEA, Block cipheroperation, Stream ciphers, RC4.

Asymmetric key Ciphers: Principles of public key cryptosystems, RSA algorithm, Elgamal Cryptography, Diffie-Hellman Key Exchange, Knapsack Algorithm.

UNIT - III

Cryptographic Hash Functions: Message Authentication, Secure Hash Algorithm (SHA-512), **Message authentication codes:** Authentication requirements, HMAC, CMAC, Digital signatures, Elgamal Digital Signature Scheme.

Key Management and Distribution: Symmetric Key Distribution Using Symmetric & Asymmetric Encryption, Distribution of Public Keys, Kerberos, X.509 Authentication Service, Public – Key Infrastructure

UNIT - IV

Transport-level Security: Web security considerations, Secure Socket Layer and Transport Layer Security, HTTPS, Secure Shell (SSH)

Wireless Network Security: Wireless Security, Mobile Device Security, IEEE 802.11 Wireless LAN,IEEE 802.11i Wireless LAN Security

UNIT - V

E-Mail Security: Pretty Good Privacy, S/MIME **IP Security:** IP Security overview, IP Security architecture, Authentication Header, Encapsulating security payload, Combining security associations, Internet Key Exchange

Case Studies on Cryptography and security: Secure Multiparty Calculation, Virtual Elections, Singlesign On, Secure Inter-branch Payment Transactions, Cross site Scripting Vulnerability.

TEXT BOOKS:

1. Cryptography and Network Security - Principles and Practice: William Stallings, PearsonEducation, 6th Edition
2. Cryptography and Network Security: Atul Kahate, Mc Graw Hill, 3rd Edition

REFERENCE BOOKS:

1. Cryptography and Network Security: C K Shyamala, N Harini, Dr T R Padmanabhan, WileyIndia, 1st Edition.
2. Cryptography and Network Security: Forouzan Mukhopadhyay, McGraw Hill, 3rd Edition
3. Information Security, Principles, and Practice: Mark Stamp, Wiley India.
4. Principles of Computer Security: WM. Arthur Conklin, Greg White, TMH
5. Introductionto Network Security: Neal Krawetz, CENGAGE Learning
6. Network Security and Cryptography: BernardMenezes, 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 tounderstandthe current legalissues towards informationsecurity.
5. Ability to understandthecurrent legal issues towards informationsecurity.

Understand the importance of Web security and Firewalls.

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CBCS POOL
PROFESSIONAL ELECTIVE-II
(R22A0519) DIGITALFORENSICS

COURSE OBJECTIVES:

1. This course will cover the fundamentals of digital forensics.
2. Provides an in-depth study of the rapidly changing and fascinating field of computer forensics.
3. Combines both the technical expertise and the knowledge required to investigate, detect and prevent digital crimes.
4. Knowledge on digital forensics legislations, digital crime, forensics processes and procedures, data acquisition and validation, e-discovery tools E-evidence collection
5. It provides preservation, investigating operating systems and file systems, network forensics, art of steganography and mobile device 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 cyber-criminalistics area, challenges faced by digital forensics.

UNIT – II:

Cyber Crime Scene Analysis: Identifying digital evidence, collecting evidence in private-sector incident scenes, processing law enforcement crime scenes, preparing for a search, securing a computer incident or crime scene, seizing digital evidence at the scene.

UNIT – III:

Evidence Management & Presentation: Create and manage shared folders using operating system, importance of the forensic mindset, define the workload of law enforcement, Types of Evidence, Define who should be notified of a crime, parts of gathering evidence.

UNIT – IV:

Computer Forensics: Preparing a computer case investigation, Procedures for corporate hi-tech investigations, conducting an investigation, Complete and critiquing the case.

Network Forensics: Overview of network forensics, open-source security tools for network forensic analysis.

UNIT – V:

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

TEXT BOOKS:

1. 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 ITActs and apply mobile forensics techniques

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PROFESSIONAL ELECTIVE-II

(R22A0520) EMBEDDEDSYSTEMS

COURSE OBJECTIVES:

For embedded systems, the course will enable the students to:

1. To understand the basics of microprocessors and micro controllers architecture and its functionalities
2. Understand the core of an embedded system
3. To learn the design process of embedded system applications.
4. To understands the RTOS and inter-process communication.
5. To understand the programming for Embedded systems

UNIT-I:

INTRODUCTION TO MICROPROCESSORS AND MICROCONTROLLERS: 8086 Microprocessor: Architecture of 8086, Register Organization, Programming Model, Memory Segmentation, Signal descriptions of 8086, Addressing modes, Instruction Set. 8051 Microcontroller: 8051 Architecture, I/O Ports, Memory Organization, Instruction set of 8051.

UNIT-II:

INTRODUCTION TO EMBEDDED SYSTEMS: History of embedded systems, Classification of embedded systems based on generation and complexity, Purpose of embedded systems, Applications of embedded systems, and characteristics of embedded systems, Operational and Non-operational attributes of embedded systems.

UNIT-III:

TYPICAL EMBEDDED SYSTEM: Core of the embedded system, Sensors and actuators, Onboard comm interfacesI2C, SPI, parallel interface; External communication interfaces-RS232, USB, infrared, Bluetooth, Wi-Fi GPRS.

UNIT-IV:

EMBEDDED FIRMWARE DESIGN AND DEVELOPMENT: Embedded firmware design approaches-super loo approach, operating system based approach; embedded firmware development languages-assembly langua development, high level language based development.

UNIT-V:

EMBEDDED PROGRAMMING CONCEPTS Data types, Structures, Modifiers, Loops and Pointers,

Macros and F object-oriented Programming, Embedded Programming in C++ &JAVA

TEXT BOOKS:

1. Embedded Systems, Raj Kamal, Second EditionTMH.

2. Kenneth. J. Ayala, The 8051 Micro controller, 3rd Ed., Cengage Learning

3. Introduction to Embedded Systems - shibuk v, Mc Graw HillEducation.

REFERENCE BOOKS:

1. Advanced Microprocessors and Peripherals – A. K. Ray and K.M. Bhurchandi, TMH, 2nd Edition2006

2. Embed Systems- An integrated approach - Lyla B Das, Pearson education2012.

COURSE OUTCOMES:

After going throughthis course, the student will be able to

1. The student will learn the internal architecture of popular 8086/8051 microprocessors/microcontrollers.
2. UnderstandIntroduction to Embedded systems
3. Understand Typical Embedded& its components
4. Understand Embedded Firmware design approaches and development languages
5. Understand Embedded programming concepts

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(R22A6684) Artificial Intelligence and Machine Learning Lab

LAB OBJECTIVES:

1. Toprovide studentwith an academic environment aware of various AI Algorithms.
2. To train Students with python programming as to comprehend, analyze, design and create AI platforms and solutions for the real life problems.
3. Learnusage of Libraries for Machine Learning in Python
4. Demonstrate Dimensionality reduction methods
5. Describe appropriate supervised/Unsupervised learning algorithms for a given problem.

WRITETHEFOLLOWING PROGRAMS USING PYTHON

WEEK 1

a) Write a program toImplement BreadthFirst Search.
b) Write a program toImplement Depth First Search.

WEEK 2

Write a program toimplement Hill Climbing Algorithm.

WEEK 3

Write a program toimplement A* Algorithm.

WEEK 4

Write a program to implement Tic-Tac-Toe game.

WEEK 5

Write a program toimplement Water Jug Problem.

WEEK 6

a) Write a pythonprogram toimport and export data using Pandas library functions.
b) Demonstrate various data pre-processing techniques for a given dataset.

WEEK 7

a) Implement Dimensionality reduction using Principle ComponentAnalysis (PCA) method.
b) Write a Pythonprogram todemonstrate various Data Visualization Techniques.

WEEK 8

a) Implement Simple and Multiple Linear Regression Models.
b) Develop Logistic Regression Model for a given dataset.

WEEK 9

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

WEEK 10

a) Implement Naïve Bayes Classification in Python

b) Build KNN Classification model for agiven dataset.

WEEK 11

BuildArtificial Neural Network model with back propagation on a given dataset.

WEEK 12

Write a pythonprogram toimplement K-Means clustering Algorithm.

LAB OUTCOMES:

Upon completion of the course, students will be able to

1. Apply various AI searchalgorithms (uninformed, informed, heuristic, constraint satisfaction)
2. Understandthe fundamentals of knowledge representation, inference.
3. Illustrate the applications ofPython Machine Learning Libraries.
4. Apply Dimensionality reductionmethods for Machine Learning Tasks.
5. Designandanalyze various supervised/unsupervised learning mechanisms.

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(R22A0590) Big Data Analytics Lab

Course Objectives:

The objectives of this course are,

1. To implement MapReduce programs for processing big data.
2. To Install, configure and run python, numPy and Pandas.
3. To Visualize data using basic plotting techniques in Python.
4. To realize storage of big data using MongoDB.
5. To analyze big data using machine learning techniques such as Decision tree classification and clustering.

LIST OF EXPERIMENTS:

WEEK 1 &2.

Install, configure and run python, numPy and Pandas.

WEEK 3.

Install,configure and run Hadoop and HDFS.

WEEK 4.

Visualize data using basic plotting techniques in Python.

WEEK 5 & 6.

Implement NoSQLDatabase Operations: CRUD operations, Arrays using MongoDB.

WEEK 7.

Implement Functions: Count – Sort – Limit – Skip – Aggregate using MongoDB.

WEEK 8.

Implement word count / frequency programs using MapReduce.

WEEK 9.

Implement a MapReduce program that processes a dataset.

WEEK 11.

Implement clustering techniques using SPARK

WEEK 12.

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. UnderstandConfiguration of various big data Frame Works.
2. Apply various visualization techniques to explore data.
3. Demonstrate database operations using MongoDB.
4. Process big data using Hadoop framework.
5. Build and apply Map-Reduce & NoSQL Concepts.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

III Year B.Tech. CSE- II Sem **L/T/P/C**
0/0/2/1

(R22A0085) PROFESSIONAL DEVELOPMENT SKILLS -II

COURSE OBJECTIVES:

1. To strengthen the students with the professional skill set.
2. To make the students recognize the role of technical English in their academic and professional fields.
3. To improve language proficiencyand to develop the required professional ethics.
4. To equip students, organize, comprehend, write, and present, short and long forms of any technical work within the broad framework of the Scientific Method.
5. To facilitate communication about projects and ideas throughout the industry and also to the non-technical people.

UNIT- I:

- Inter-personal & Intra-Personal Communication
- Sub Skill of Reading: Skimming
- Writing: Resume Writing: Functional, Chronological, Targeted
- Innovative Leadership and Design Thinking

UNIT-2:

- Group Discussion: Factual, Opinion-Based, Abstract
- Sub Skill of Reading: Scanning
- Writing: Cover Letter
- Trust and Collaboration

UNIT-3:

- Debate
- Sub Skill of Reading: Intensive Reading
- Writing: Report Writing: Research Report, Analyticaland Projects
- Managing Personal Finance

UNIT-4:

- Interview skills
- Sub Skill of Reading: Extensive reading
- Writing: PrécisWriting
- Leadership and Managerial Skills

UNIT-5:

- Mock Interviews
- Reading: Cloze-Test
- Writing: Mini Projects
- Entrepreneurial Skills

REFERENCE BOOKS:

1. Curriculumand Guide line for Life Skills, By UGC, August 2023
2. David F. Beerand David McMurrey, Guide towriting as an Engineer, John Willey. New York, 2004
3. Diane Hacker, Pocket Style Manual, Bedford Publication, New York, 2003. (ISBN 0312406843)
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, New Delhi 2012.
7. Dale Jung k, Applied riting for Technicians, McGraw Hill, New York, 2004. (ISBN: 07828357-4)
8. Sharma, R. and Mohan, K. Business Correspondence and Report Writing, TMH New Delhi 2002.
9. Xebec, Presentation Book, TMH New Delhi, 2000. (ISBN 0402213)

COURSE OUTCOMES:
Students will be able to

1. Understand information which assists in completion of the assigned job tasks more successfully
2. Market themwith the rich professional skills that they acquire
3. Adhere to ethical norms ofscientific communication
4. Strengthen their individual and collaborative work strategies
5. Successfully market themand sell themselves to the employer oftheir choice.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

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

(R22A0521) DEV OPS

Course Objectives:

The main objectives of this course are to:

1. Describe the agile relationship between developmentand IToperations.
2. Understand the skill sets and high-functioning teams involved in DevOps and related methods to reach a continuous delivery capability.
3. Implement automated system update and DevOps lifecycle.
4. Describe about the Agile development model.
5. Describe about the Project management.

UNIT - I

Introduction: Introduction, Agile development model, DevOps, and ITIL. DevOps process and Continuous Delivery, Release management, Scrum, Kanban, delivery pipeline, bottlenecks, examples

UNIT - II

Software development models and DevOps: DevOps Lifecycle for Business Agility, DevOps, and Continuous Testing. DevOps influence on Architecture: Introducing software architecture, The monolithic scenario, Architecture rules of thumb, The separation of concerns, Handling database migrations, Microservices, and the data tier, DevOps, architecture, and resilience.

UNIT - III

Introduction to project management: The need for source code control, The history of source code management, Roles and code, source code management system and migrations, Shared authentication, Hosted Git servers, Different Git server implementations, Docker intermission, Gerrit, The pull request model, GitLab.

UNIT - IV

Integrating the system: Build systems, Jenkins build server, Managing build dependencies, Jenkins plugins, and file system layout, The host server, Build slaves, Software on the host, Triggers, Job chaining and build pipelines, Build servers and infrastructure as code, Building by dependency order, Build phases, Alternative build servers, Collating quality measures.

UNIT - V

Testing Tools and automation: Various types of testing, Automation of testing Pros and cons, Selenium - Introduction, Selenium features, JavaScript testing, Testing backend integration points, Test-driven development, REPL-driven development Deployment of the system: Deployment systems, Virtualization stacks, code execution at the client, Puppet master and agents, Ansible, Deployment tools: Chef, Salt Stack and Docker

TEXT BOOKS:

1. Joakim Verona. Practical Devops, Second Edition. Ingram short title; 2ndedition (2018). ISBN10: 1788392574
2. Deepak Gaikwad,Viral Thakkar. DevOps Tools from Practitioner's Viewpoint. Wiley publications. ISBN: 9788126579952

REFERENCE BOOK:

1. Len Bass,Ingo Weber, Liming Zhu. DevOps:A Software Architect's Perspective. Addison Wesley; ISBN-10.

CourseOutcomes: On successful completion ofthis course,students will be able to:

1. Identify components of Devops environment.
2. Describe Software developmentmodels andarchitectures of DevOps.
3. Apply different project management, integration, testing and code deployment tool.
4. Investigate different DevOps Software development models.
5. Assessvarious Devops practices.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

IV Year B.Tech. CSE- ISem **L/T/P/C**
3/1/0/4

(R22A6706) DATA SCIENCE & ITS MODELING METHODS

COURSE OBJECTIVES:

Thestudents should be able to:

1. Understandthe datascience process.
2. Conceivethe 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 fordisplaying 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. Rfor Data Science by Hadley Wickham and Garrett Grolemund , 2017 , Published by OReilly Media, Inc.
3. RProgramming for Data Science -Roger D. Peng, 2015 , Lean Publishing.
4. https://rkabacoff.github.io/datavis/IntroGGPLOT.html.

COURSE OUTCOMES:

Thestudents will be able to:

1. Analyze the basics in R programming in terms of constructs, controlstatements, Functions.
2. Implement Data Preprocessing using RLibraries.
3. Apply the R programming from a statistical perspective and Modelling Methods.
4. Buildregression models fora given problem.
5. Illustrate R programming tools for Graphs.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

IV Year B.Tech. CSE- ISem **L/T/P/C**
3/0/0/3

(R22A0522) CLOUD COMPUTING

COURSEOBJECTIVES

1. Tounderstandthe cloud computing fundamentals andevolving computing paradigms
2. Torealize the reasons for migrating intocloud
3. Togainknowledge invirtualization of computer resources
4. To introduce the various levels ofservices that can be achieved by a cloud.
5. Todescribe the security aspects in cloud and theservices 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. CloudComputing Principles andParadigms, by Rajkumar Buyya
2. Essentials of cloudComputing: 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. EnterpriseCloud 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:

- Ability to analyze various service delivery models of cloud computing
- Ability to interpret the ways in which the cloud can be programmed and deployed.
- Ability to comprehend the virtualization and cloud computing concepts
- Assess the comparative advantages and disadvantages of Virtualization technology
- Analyze security issues in cloud computing

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

IV Year B.Tech. CSE- ISem **L/T/P/C 3/0/0/3**

CBCS POOL

PROFESSIONAL ELECTIVE-III

(R22A6603) NATURAL LANGUAGE PROCESSING

COURSEOBJECTIVES:

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.

UNIT –I:

Natural Language processing (NLP) : Introduction, Applications or Use cases of NLP, Components of NLP, Steps in NLP, Finding the Structure of Words: Words and Their Components, Lexemes, Morphemes, Morphology, Problems in morphological processing, Typology, Morphological Typology, **Natural Language Processing with python NLTK package (Text Preprocessing Tasks):** Word Tokenization, Sentence Tokenization, Filtering Stop words, Stemming, Tagging Parts of Speech, Lemmatization, Chunking, Chinking, Named Entity Recognition.

UNIT–II:

Syntax Analysis: Parsing Natural Language, Tree banks: A Data-Driven Approach to Syntax, **Representation of Syntactic Structure:** Syntax Analysis using Dependency Graph, Syntax Analysis using Phrase Structure Trees, **Parsing Algorithms:** Shift Reduce Parsing, Hyper Graphs and Chart Parsing (CYK Parsing), **Models for ambiguity Resolution in Parsing**: Probabilistic Context Free Grammar, Generative Models, Discriminative models for Parsing.

UNIT-III:

Language Modeling: Introduction, N-Gram Models, Language Model Evaluation, Parameter Estimation, Language Model Adaptation, Types of Language Models, Language-Specific ModelingProblems.

Word Embedding techniques: Bag of words (BOW), Continuous Bag of Words (CBOW), Term Frequency and Inverse Document Frequency (TF-IDF).

UNIT–IV:

Semantic Parsing: Introduction, Semantic Interpretation, System Paradigms, Word Sense Systems, Software.

Word Embedding Techniques for semantic analysis: Word2Vec, Global Vector for word representation (GloVe),Bidirectional encoder representations from transformers (BERT).

UNIT–V:

Predicate- Argument Structure, Meaning Representation Systems, Software.

Discourse Processing: Cohesion, Reference Resolution, Discourse Cohesion and Structure.

TEXTBOOKS:

1. MultilingualnaturalLanguageProcessingApplications:FromTheorytoPractice–DanielM.Bikel and Imed itouni, Pearson Publication.
2. Speech and Natural Language Processing-Daniel Jurafsky& JamesH Martin, Pearson Publications.

REFERENCEBOOKS:

1. Natural Language Processing andInformation Retrieval: Tanvier Siddiqui,U.S.Tiwary.

COURSEOUTCOMES:

1. Showsensitivity 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 tomanipulate probabilities, construct statistical models overstrings and trees
4. Will be able toestimate parameters using supervised and unsupervised training methods.
5. Able to design, implement, and analyze NLP algorithms. Able to design different language modeling Techniques.

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IV Year B.Tech. CSE- ISem **L/T/P/C**

3/0/0/3

CBCS POOL

PROFESSIONAL ELECTIVE-III

(R22A0523) DESIGN PATTERNS USING PYTHON

Course Objectives:

1. Understandthe python programming concepts
2. Understand the concept of Design patterns and its importance .
3. Understandthe behavioural knowledge of the problem and solutions.
4. Relate the Creational, Structural , behavioural Design patterns.
5. Apply the suitable design patterns to refine the basic design for given context.

UNIT I:

A Brief Introduction to Python : Variables and Syntax in Python , Making Decisions in Python , Development Environments , Python Collections and Files , Functions , Running Python programs Introduction: Introduction to Objects, Visual Programming in Python, Visual Programming of Tables of Data, What Are Design Patterns

UNIT II

Creational Patterns: The Factory Pattern, the Factory Method Pattern, the Abstract Factory Pattern, the Singleton Pattern, the Builder Pattern, the Prototype Pattern

UNIT III

Structural Patterns: The Adapter Pattern , The Bridge Pattern , The Composite Pattern , The Decorator Pattern , The Façade Pattern , The Flyweight Pattern , The Proxy Pattern ,

UNIT IV

Behavioural Patterns I: Chain of Responsibility Pattern , The Command Pattern , The Interpreter Pattern , The Iterator Pattern , The Mediator Pattern , The Memento Pattern

UNIT V

Behavioural Patterns II: The Observer Pattern, the State Pattern, the Strategy Pattern, the Template Pattern, the Visitor Pattern

TEXT BOOK:

1. PythonProgramming with Design Patterns BY James W. Cooper, Addison- Wesley publisher

REFERENCES:

1. Designpatterns by Erich gamma, Pearson Education publisher
2. Mastering Python Design Patterns: A Guide to Creating Smart, Efficient, and Reusable Software, 2nd Edition by Kamon Ayeva and Sakis Kasampalis

Course Outcomes:

1. Demonstrate python programming concepts
2. Identify the appropriate design patterns to solve object oriented design problems.
3. Developdesignsolutions using creational patterns.
4. Apply structural patterns to solve design problems.
5. Construct design solutions by using behavioral patterns.

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IV Year B.Tech. CSE- ISem **L/T/P/C 3/0/0/3**

CBCS POOL

PROFESSIONAL ELECTIVE-III

(R22A6705) DATA VISUALIZATION TECHNIQUES

COURSE OBJECTIVES:

- To learn differentstatistical methods for Data visualization.
- To understand the basics of Python.
- To understand the usage of the Matplotlib, Seaborn Packages
- To Learn about Excel and various operations using Excel
- To understand visualization using KNIME

UNIT I (Introduction)

Introduction to Data

Visualization

Overview of data visualization - Data Abstraction - Task Abstraction, - Analysis: Four Levels for Validation

Visualization Techniques:

Scalar and point techniques, – vector visualization techniques – multidimensional techniques – visualizing cluster analysis – matrix visualization in Bayesian data analysis

UNIT II (Python-PANDAS)

Getting Started with Pandas: Arrays and vectorized conputation, Introduction to pandas Data Structures, Essential Functionality, Summarizing and Computing Descriptive Statistics. Data Loading, Storage and File Formats. Reading and Writing Data in Text Format, Web Scraping, Binary Data Formats, Interacting with Web APIs, Interacting with Databases Data Cleaning and Preparation. Handling Missing Data, Data Transformation, String Manipulation

UNIT III (Data Visualization Using Matplotlib)

Data Visualization Tools in Python- Introduction to Matplotlib, Basic plots Using matplotlib, Specialized Visualization Tools using Matplotlib, Advanced Visualization Tools using Matplotlib-WaffleCharts, WordClouds.

Introduction to Seaborn: Seaborn functionalities and usage, Spatial Visualizations and Analysis in Python with Folium, Case Study.

UNIT-IV (Working With Excel)

Introduction: Data Analysis, Excel Data analysis. Working with range names. Tables. Cleaning Data. Conditional formatting, Sorting, Advanced Filtering, Lookup functions, Pivot tables, Data

Visualization, Data Validation. Understanding Analysis tool pack: Anova, correlation, covariance, moving average, descriptive statistics, exponential smoothing, fourier Analysis, Random number generation, sampling, t-test, f-test, and regression.

UNIT-V(Working with KNIME)

KNIME : Organizing your work, Nodes, Meta nodes, Ports, Flow variables, Node views. User Interface. Data Preparation: Importing Data-Database, tabular files, web services. Transforming the Shape- Filtering rows, Appending tables ,Less columns, More columns, Group By, Pivoting and Unpivoting, One2Many and Many2One,Cosmetic transformations. Transforming values: Generic transformations, Conversion between types, Binning, Normalization, Multiple columns, XML transformation, Time transformation, Smoothing, Data generation, Constraints ,Loops, Workflow customization.

TEXT BOOKS:

1. Core Python Programming - Second Edition,R. Nageswara Rao, Dreamtech Press.
2. A To Z Of MS EXCEL: A Book For Learners & Trainers (MS Excel Comprehensive Guide 1) by Rinkoo Jainn
3. Data Analysis with Excel by Manish Nigam. bpb Publications
4. KNIMEEssentials, by Gábor Bakos,2013
5. DataScience Tools by Christopher Greco,2020

REFERENCE BOOKS:

1. Introduction to Data Science a Python approach to concepts, Techniques and Applications, Igual, L;Seghi', S. Springer, ISBN:978-3-319-50016-4.
2. ALL-IN-ONE-EXCEL 2022 BIBLE FOR DUMMIES BY Bryant Shelton
3. Excel® 2019 BIBLE BY Michael Alexander ,Dick Kusleika
4. Python for Data Analysis by William McKinney, Second Edition, O'Reilly Media Inc.
5. https://seaborn.pydata.org/
6. https://dataplatform.cloud.ibm.com/

Course Outcomes:

At Completion of this course, students would be able to -

- Apply statistical methods for Data visualization on Various Datasets
- Gainknowledge on various visualization techniques using Python
- Understand usage of various packages in Python.
- Understandthe concept of Excel, Visualization using Excel
- Apply KNIMEprinciples to fetch the data visualization

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

IV Year B.Tech. CSE- ISem **L/T/P/C**

CBCS POOL **3/0/0/3**

PROFESSIONAL ELECTIVE-III

(R22A0524) INFORMATION STORAGE AND MANAGEMENT

COURSE OBJECTIVES:

1. To understandthe basiccomponents of Storage System Environment.
2. To understandthe Storage Area Network Characteristics and Components.
3. To examine emergingtechnologiesincluding IP-SAN.
4. To describe the different backup and recovery topologies and their role in providing disaster recovery and business continuity capabilities.
5. To understandthelocal and remote replicationtechnologies.

UNIT -I

Introduction to Storage Technology: Data proliferation and the varying value of data with time & usage, Sources of data and states of data creation, Data center requirements and evolution to accommodate storage needs, Overview of basic storage management skills and activities, The five pillars of technology, Overview of storage infrastructure components, Evolution of storage, Information Lifecycle Management concept, Data categorization within an enterprise, Storage and Regulations.

UNIT -II

Storage Systems Architecture: Intelligent disk subsystems overview, Contrast of integrated vs. Modular arrays, Component architecture of intelligent disk subsystems, Disk physical structure-components, properties, performance, and specifications, Logical partitioning of disks, RAID & parity algorithms, hot sparing, Physical vs. logical disk organization, protection, and back end management, Array caching properties and algorithms, Front end connectivity and queuing properties, Front end to host storage provisioning, mapping, and operation, Interaction of file systems with storage, Storage system connectivity protocols.

UNIT -III

Introduction to Networked Storage: JBOD, DAS, SAN, NAS, & CAS evolution, Direct Attached Storage (DAS) environments: elements, connectivity, & management, Storage Area Networks (SAN): elements & connectivity, Fibre Channel principles, standards, & network management principles, SAN management principles, Network Attached Storage (NAS): elements, connectivity options, connectivity protocols (NFS, CIFS, ftp), & management principles, IP SAN elements, standards (iSCSI, FCIP, iFCP), connectivity principles, security, and management principles, Content

Addressable Storage (CAS): elements, connectivity options, standards, and management principles, Hybrid Storage - solutions overview including technologies like virtualization & appliances.

UNIT -IV

Introductions to Information Availability: Business Continuity and Disaster Recovery Basics, Local business continuity techniques, Remote business continuity techniques, Disaster Recovery principles & techniques. **Managing & Monitoring:** Management philosophies (holistic vs. system & component), Industry management standards (SNMP, SMI-S, CIM), Standard framework applications, Key management metrics (thresholds, availability, capacity, security, performance), Metric analysis methodologies & trend analysis, Reactive and proactive management best practices, Provisioning & configuration change planning, Problem reporting, prioritization, and handling techniques, Management tools overview.

UNIT - V

Securing Storage and Storage Virtualization: Define storage security. List the critical security attributes for information systems, describe the elements of a shared storage model and security extensions, Define storage security domains, List and analyze the common threats in each domain, Identify different virtualization technologies, describe block-level and file level virtualization technologies and processes.

TEXT BOOKS:

1. MarcFarley Osborne, “Building Storage Networks'',Tata McGraw Hill, 2001.
2. Robert Spalding and Robert Spalding, “Storage Networks: The Complete Reference”, Tata McGraw Hill, 2003.
3. MeetaGupta, “Storage Area Network Fundamentals”, Pearson Education Ltd., 2002.

REFERENCE BOOKS:

1. Gerald J Kowalski and Mark T Maybury,” Information Storage Retrieval Systems theory & Implementation”, BS Publications, 2000.
2. Thejendra BS, “Disaster Recovery & Business continuity”, Shroff Publishers & Distributors, 2006.

COURSE OUTCOMES:

1. Understandthe logical and physical components of a Storage infrastructure.
2. Evaluatestorage architectures, including storagesubsystems, DAS, SAN, NAS, and CAS.
3. Understandthevariousforms and types of Storage Virtualization.
4. Describethe different roles in providing disaster recovery and business continuity capabilities.
5. Distinguish different remote replicationtechnologies.

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IV Year B.Tech. CSE- ISem **L/T/P/C 3/0/0/3**

CBCS POOL

PROFESSIONALELECTIVE-IV

(R22A0525) AUGMENTED REALITY AND VIRTUAL REALITY

COURSEOBJECTIVES:

This course willenable the students:

1. Tounderstandthe concepts of VirtualReality and its applications.
2. Toperceive the concepts in Augmented Reality andVirtual Reality (AR &VR).
3. Toimbibe the basic concept and framework ofvirtual reality.
4. Togain anunderstanding inthe fundamental issues of virtual reality.
5. Tostudy 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 ARsystems.

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 Reality Applications, Foundations of Effective Design, Morgan Kaufmann, 2009.

COURSE OUTCOMES:

Thestudents willbe able:

1. Tocreate geometric modeling andVirtual environment.
2. Torealize the virtualreality experience.
3. Todevelop Virtual Reality applications.
4. Todifferentiate Augmented Reality andVirtual Reality (AR &VR).
5. Tocomprehend the Augmented reality methods.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

IV YEAR B.TECH. CSE- ISEM **L/T/P/C 3/0/0/3**

CBCS POOL

PROFESSIONAL ELECTIVE-IV

(R22A6608) TEXT ANALYTICS

COURSEOBJECTIVES

1. Describe text extraction techniques.
2. Differentiate clustering and classification techniques on text.
3. Analyze visualization methodologies.
4. Illustrate about event detection methods and embedding semantics in models.
5. Compare feature extraction methods

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 modelling, latent semantic analysis, probabilistic latent semantic analysis, Latent Dirichlet allocation, embedding external semantics from Wikipedia, data-driven semantic embedding.

TEXTBOOKS

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 & Business Media, 2012.

REFERENCE BOOKS

1. Miner, Gary, et al. Practical text mining and statistical analysis for non-structured text data applications. Academic Press, 2012.
2. Srivastava, Ashok N., and Mehran Sahami. Text mining: Classification, clustering, and applications, 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.

COURSEOUTCOMES

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

1. Designtext 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

IV YEAR B.TECH. CSE- ISEM **L/T/P/C 3/0/0/3**

CBCS POOL

PROFESSIONALELECTIVE-IV

(R22A0526) DISTRIBUTED DATABASES

COURSE OBJECTIVES:

1. The purpose of the course is to enrich the previous knowledge of database systems and exposing the need for distributed database technology to confront with the deficiencies of the centralized database systems.
2. Introduce basic principles and implementation techniques of distributed database systems.
3. Equipstudents with principles and knowledge of parallel and object-oriented databases.
4. Topics include distributed DBMS architecture and design; query processing and optimization.
5. Tropics related to distributed transaction management and reliability; parallel and object database management systems.

UNIT - I

Introduction: Distributed Data Processing, Distributed Database System, Promises of DDBSs, Problem areas.

Distributed DBMS Architecture: Architectural Models for Distributed DBMS, DDMBS Architecture. **Distributed Database Design:** Alternative Design Strategies, Distribution Design issues, Fragmentation, Allocation.

UNIT - II

Query processing and decomposition: Query processing objectives, characterization of query processors, layers of query processing, query decomposition, localization of distributed data.

Distributed query Optimization: Query optimization, centralized query optimization, distributed query optimization algorithms.

UNIT - III

Transaction Management: Definition, properties of transaction, types of transactions, distributed concurrency control: serializability, concurrency control mechanisms & algorithms, time - stamped & optimistic concurrency control Algorithms, deadlock Management.

UNIT - IV

Distributed DBMS Reliability: Reliability concepts and measures, fault-tolerance in distributed systems, failures in Distributed DBMS, local & distributed reliability protocols, site failures and network partitioning.

Parallel Database Systems: Parallel database system architectures, parallel data placement, parallel query processing, load balancing, database clusters.

UNIT - V

Distributed object Database Management Systems: Fundamental object concepts and models, object distributed design, architectural issues, object management, distributed object storage, object query Processing.

Object Oriented Data Model: Inheritance, object identity, persistent programming languages, persistence of objects, comparison OODBMS and ORDBMS

TEXT BOOKS:

1. M. Tamer OZSU and Patuck Valduriez: Principles of Distributed Database Systems, Pearson Edn. Asia, 2001.
2. Stefano Ceri andGiuseppe Pelagatti: Distributed Databases, McGraw Hill.

REFERENCE BOOK:

1. Hector Garcia-Molina, Jeffrey D. Ullman, Jennifer Widom: "Database Systems: The Complete Book", Second Edition, Pearson International Edition

Course Outcomes:

1. Understandtheoretical and practical aspects of distributed database systems.
2. Study and identify various issues related to the development of distributed database system.
3. Understand the design aspects of object-oriented database system and related development.
4. Students can analyze the database query.
5. Students can Distributed object Database Management Systems.

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IV YEAR B.TECH. CSE- I Sem **L/T/P/C 3/0/0/3**

CBCS Pool

PROFESSIONALELECTIVE-IV

(R22A0527) BLOCKCHAIN TECHNOLOGY

COURSE OBJECTIVES:

1. Analyze and solve Two General and Byzantine General problems in distributed systems.
2. ExploreCryptography basics, including Hash functions and Digital Signatures (ECDSA).
3. Introduce the concept of Blockchain and its advantages over conventional distributed databases.
4. Analyze the difficulty level in consensus algorithms.
5. Investigate DAO(Decentralized Autonomous Organization) and its implications.

UNIT I: Basics:

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

UNIT II: Blockchain:

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

UNIT III: Distributed Consensus:

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

UNIT IV: Cryptocurrency:

History, Distributed Ledger, Bitcoin protocols - Mining strategy and rewards, Ethereum - Construction, DAO, Solidity- Smart Contract, Truffle, GHOST, Vulnerability, Attacks, Sidechain, Namecoin comparing Bitcoin scripting vs. Ethereum Smart Contracts

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. Beginning Blockchain – A beginner's guide to building blockchain solutions by Bikramaditya Singhal, Gautam Dhameja and Priyanshu Sekhar Panda. Publisher : Apress (2023)
2. Blockchain Technology by Chandramouli Subramanian, Asha A George, Abhilash K A and Meena Karthikeyan. Publisher : University Press (2021)
3. Draft version of "S. Shukla, M. Dhawan, S. Sharma, S. Venkatesan, 'Blockchain Technology: Cryptocurrency and Applications', Oxford University Press, 2019.

REFERENCE BOOKS:

1. Antonopoulos,Mastering Bitcoin: Unlocking DigitalCryptocurrencies
2. SatoshiNakamoto, Bitcoin: A Peer-to-Peer Electronic Cash System
3. DR. Gavin Wood, "ETHEREUM: A Secure Decentralized Transaction Ledger,"Yellow paper.2014.
4. Nicola Atzei, Massimo Bartoletti, and Tiziana Cimoli, A survey of attacks on Ethereum smart contracts

COURSE OUTCOMES:

- Evaluatethe concept of Fault Tolerance in distributed computing.
- Explorethe architecture and functioning of Hadoop Distributed File System.
- UnderstandDigital Signatures, specifically ECDSA (Elliptic Curve Digital Signature Algorithm).
- Analyze the difficulty level in consensus algorithms.
- Analyze The DAOincident and its impact on the cryptocurrency community.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

IV Year B.Tech I Sem – CSE **L/T/P/C**
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(R22A6784) DATASCIENCE LAB

COURSE OBJECTIVES:

1. To understand a range of R Programming Concepts with various methods and data processing techniques.
2. To know how data will be manipulated in R
3. To implement various data frames and working on datasets developing programs.
4. To implement R Data types for developing programs.
5. To Understand Various Tools & Techniques of Data Science.

Listof Experiments:

WEEK1.
Download and install R-Programming environment and install basic packages using install packages () command in R.

WEEK 2.

Learn all the basics of R-Programming (Data types, Variables, Operators etc.)

WEEK 3.

Implement R-Loops with different examples.

WEEK 4.
Learn the basics of functions in R and implement with examples

WEEK 5.
Write R programs using Matrices, Arrays,Lists,Vectors and Factors.

WEEK 6.
Write R programs using Data frames.

WEEK 7.
Write R programs to read a file into a data frame and Display it(CSV and Excel).

WEEK 8.
Write R programs to write a data frame to a file and Display it(CSV and Excel)

WEEK 9.

Write an R program to Connect to a database and read the data.

WEEK 10.

Implement a) Linear regression model and b) Logistic regression model of any data set and print confusion matrix, precision recall, F1 score, AUC curve.

WEEK 11.

Write R script to plot Bar Chart, Pie Chart, Histogram, Box plot, Dot plot.

WEEK 12.

Use ggplot2 and implement 1) Univariate, 2) Bivariate graphs

COURSE OUTCOMES:

At the end of the Course, the Student will be able to:

- Show the installation of R Programming Environment.
- Utilize and R Data types for developing programs.
- Implement solutions to the given assignments in Python.
- Use various Python packages for solving different programming problems.
- Evaluate the output of data analysis

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IV Year B.Tech. CSE- II Sem **L/T/P/C 3/0/0/3**

CBCS POOL

Professional Elective-V

(R22A0528) QUANTUM COMPUTING

COURSE OBJECTIVES:

1. Tointroduce the fundamentals of quantum computing
2. The problem-solving approach using finite dimensional mathematics
3. To understand the Quantum computing
4. To understand the quantum algorithm
5. To understand Asymmentric Algorithms.

UNIT - I

Introduction to Essential Linear Algebra: Some Basic Algebra, Matrix Math, Vectors and Vector Spaces, Set Theory. Complex Numbers: Definition of Complex Numbers, Algebra of Complex Numbers, Complex Numbers Graphically, Vector Representations of Complex Numbers, Pauli Matrice, Transcendental Numbers.

UNIT - II

Basic Physics for Quantum Computing: The Journey to Quantum, Quantum Physics Essentials, Basic Atomic Structure, Hilbert Spaces, Uncertainty, Quantum States, Entanglement.

Basic Quantum Theory: Further with Quantum Mechanics, Quantum Decoherence, Quantum Electrodynamics, Quantum Chromodynamics, Feynman Diagram Quantum Entanglement and QKD, Quantum Entanglement, Interpretation, QKE.

UNIT - III

Quantum Architecture: Further with Qubits, Quantum Gates, More with Gates, Quantum Circuits, The D-Wave Quantum Architecture. Quantum Hardware: Qubits, How Many Qubits Are Needed? Addressing Decoherence, Topological Quantum Computing, Quantum Essentials.

UNIT - IV

Quantum Algorithms: What Is an Algorithm? Deutsch's Algorithm, Deutsch-Jozsa Algorithm, Bernstein- Vazirani Algorithm, Simon's Algorithm, Shor's Algorithm, Grover's Algorithm.

UNIT - V

Current Asymmetric Algorithms: RSA, Diffie-Hellman, Elliptic Curve. The Impact of Quantum Computing on Cryptography: Asymmetric Cryptography, Specific Algorithms, Specific Applications.

TEXT BOOKS:

1. Nielsen M. A.,Quantum Computation and Quantum Information,Cambridge University Press
2. Dr. Chuck Easttom,Quantum Computing Fundamentals,Pearson

REFERENCE BOOKS:

1. QuantumComputing for Computer Scientists by Noson S. Yanofsky and Mirco A. Mannucci
2. Benenti G., Casati G. and Strini G., Principles of Quantum Computation and Information, Vol. Basic Concepts. Vol. Basic Tools and Special Topics, World Scientific.
3. Pittenger A. O.,An Introduction to Quantum Computing Algorithms.

COURSEOUTCOMES:

1. Understandbasics of quantum computing
2. Understand physical implementation of Qubit
3. UnderstandQuantum algorithms andtheir implementation
4. Understandthe Impact of Quantum Computing on Cryptography

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CBCS POOL

Professional Elective-V

(R22A0529) DEEP LEARNING AND ITS APPLICATIONS

COURSE OBJECTIVES:

1. To understand the basic concepts and techniques of Deep Learning and the need of Deep Learning techniques in real-world problems
2. Tounderstand CNN algorithms andthe way to evaluate performance of the CNN architectures.
3. To apply RNN and LSTM to learn, predict and classify the real-world problems in the paradigms of Deep Learning.
4. To understand, learn and design GANs for the selected problems.
5. To understand the concept of Auto-encoders and enhancing GANs using auto-encoders.

UNIT-I:

INTRODUCTION TO DEEP LEARNING: Historical Trends in Deep Learning, Why DL is Growing, Artificial Neural Network, Non-linear classification example using Neural Networks: XOR/XNOR, Single/Multiple Layer Perceptron, Feed Forward Network, Deep Feed- forward networks, Stochastic Gradient –Based learning, Hidden Units, Architecture Design, Back- Propagation.

[Note: Theory Questions on any of the above topic, Numerical type question on Backpropagation algorithm's weight updates]

UNIT-II:

CONVOLUTION NEURAL NETWORK (CNN): Introduction to CNNs and their applications in computer vision, CNN basic architecture, Activation functions-sigmoid, tanh, ReLU, Leaky ReLU, Softmax layer, Types of pooling layers, Training of CNN in TensorFlow, various popular CNN architectures: VGG, Google Net, ResNet etc, Dropout, Normalization, Data augmentation.

[Note: Theory Questions on any of the above topic, Numerical type question on Convolutional operation, pooling operation (avg, min, max pooling)]

UNIT-III

RECURRENT NEURAL NETWORK (RNN): Introduction to RNNs and their applications in sequential data analysis, Back propagation through time (BPTT), Vanishing Gradient Problem, gradient clipping Long Short Term Memory (LSTM) Networks, Gated Recurrent Units, Bidirectional LSTMs, Bidirectional RNNs.

[Note: Theory Questions only]

UNIT- IV

GENERATIVEADVERSARIAL NETWORKS (GANS): Generative models, Concept and principles of GANs,

Architecture of GANs (generator and discriminator networks), Comparison between discriminative and generative models, Generative Adversarial Networks (GANs), Applications of GANs

[Note: Theory Questions only]

UNIT- V

Applications: Detection and Segmentation: Discussion on detection, segmentation problem definition, challenges, Evaluation, Datasets and Localization by regression. Discussion on detection as classification, region proposals, RCNN and YOLO architectures, fully convolutional segmentations, Mask-RCNNs.

TEXT BOOKS:

1. Deep Learning : An MIT Press Book by Ian Goodfellow and Yoshua Bengio Aaron Courville.
2. Michael Nielson,Neural Networks and Deep Learning, Determination Press,2015.
3. Satish kumar,Neural networks:A classroom Approach,Tata McGraw-Hill Education,2004

REFERENCES:

1. Deep Learning with Python, Francois Chollet, Manning publications 2018
2. Advanced Deep Learning with Keras, Rowel Atienza, PACKT Publications 2018

COURSE OUTCOMES:

1. Identify the features of deep learning models that are helpful in resolving practical issues.
2. Choose and use the best deep learning algorithms to analyze the data for a range of issues.
3. Use various deep learning algorithms
4. Create the test protocols toevaluate the developedmodel's effectiveness.
5. Integrate many models to achieve superior outcomes.

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IV Year B.Tech. CSE- II Sem **L/T/P/C 3/0/0/3**

CBCS POOL

Professional Elective-V

(R22A6621) GENERATIVE AI

COURSE OBJECTIVES:

1. To familiarize students on the concept of Generative Modelling
2. To understand the encoding & decoding mechanisms in Variational Autoencoders.
3. To gain knowledge on Generative Adversarial Networks.
4. To learn the fundamentals of Autoregressive models & Transformers.
5. To assess the emerging market of Generative Artificial Intelligence.

UNIT I

Generative Modeling

Generative Modeling, Generative Versus Discriminative Modeling, The rise of Generative Modeling, Generative Modeling and AI, Building a Generative Model, Core Probability Theory, Generative Model Taxonomy, **Case Study**: The Generative Deep Learning Codebase, Cloning the Repository, Using Docker, Running on a GPU.

UNIT II

Variational Autoencoders (VAE)

Introduction, **Autoencoders**: Architecture, The Encoder, The Decoder, Joining the Encoder to the Decoder, Training & Analysis of the Auto Encoder, Case Study – The Variational Art Exhibition, **VAE:** Building a VAE, Analysis of the VAE, Case Study – Using VAE to generate faces.

UNIT III

Generative Adversarial Networks (GAN)

Introduction, **Deep Convolutional GAN (DC-GAN)**: Discriminator, Generator, Training & Analysis of DCGAN, Case Study - Wasserstein GAN with Gradient Penalty (WGAN - GP): Wasserstein Loss, The Lipschitz Constraint, Weight Clipping, The Gradient Penalty (GP) Loss, Training & Analysis of the WGAN - GP.

UNIT IV

Autoregressive Models &Transformers

Introduction, **Long Short-Term Memory Network (LSTM)**: The Recipes Dataset, Working with Text Data, Tokenization, Creating the Training Set, The LSTM Architecture, The Embedding Layer, The LSTM Layer, The LSTM Cell, Training & Analysis of the LSTM, **Transformers –** Introduction, GPT: The Wine Reviews, Dataset, Attention, Queries, Keys, and Values, Multihead Attention, Causal Masking, The Transformer Block, Positional Encoding, Training & Analysis of GPT.

UNIT V

Timeline & Future Scope of Generative AI

2014–2017: The VAE and GAN Era, 2018–2019: The Transformer Era, 2020–2022: The Big Model Era, **The Current State of Generative AI**: Large Language Models (LLM's), Text-to-Code Models, Text-to-Image Models, Other Applications, **The Future of Generative AI**: Generative AI in Everyday Life, Generative AI in the Workplace, Generative AI in Education, Generative AI Ethics and Challenges.

TEXT BOOK

1. GENERATIVE DEEP LEARNING Teaching Machines to Paint, Write, Compose and Play - David Foster - O'Reilly - 2nd Edition

REFERENCE BOOKS

1. Generative AI in Practice – Bernard Marr – Wiley

COURSEOUTCOMES

1. Understand the core concepts of Generative AI.
2. Build a Variational Auto Encoder architecture.
3. Differentiate between the Generator and Discriminator neural networks in GAN.
4. Gainknowledge on Transformers in building Launguage Learning Models (LLM).
5. Estimate the future scope of Generative AI.

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IV Year B.Tech. CSE- II Sem **L/T/P/C 3/0/0/3**

CBCS POOL

Professional Elective-V

(R22A6606) COMPUTER VISION

COURSE OBJECTIVES:

1. Tointroduce various components of image processing techniques for computer vision.
2. Tounderstand filters andcomputing Image Gradient.
3. Tounderstand segmentation,model fitting and tracking
4. Toimpartknowledge about object registration andobject matching
5. Toimplement various techniques available forobject recognition.

UNIT-I

IMAGE FORMATION: Geometric Camera Models, Intrinsic and Extrinsic Parameters, Geometric Camera Calibration – Linear and Non – linear approach, Light and Shading - Inference from, Modeling Inter reflection, Human Color Perception.

UNIT-II

EARLY VISION: Linear Filters - Convolution, Fourier Transforms, Sampling and Aliasing, Filters as Templates, Correlation, Local Image Features - Computing the Image Gradient, Gradient-Based Edge Detectors, Orientations, Texture - Local Texture Representations Using Filters, Shape from Texture.

UNIT-III

MID-LEVEL VISION: Segmentation by Clustering - Basic Clustering Methods, The Watershed Algorithm, Segmentation Using K-means, Grouping and Model Fitting - Fitting Lines with the Hough Transform, Fitting Curved Structures, Tracking - Tracking by Detection, Tracking Translations by Matching, Tracking Linear Dynamical Models with Kalman Filters.

UNIT-IV

HIGH-LEVEL VISION: Registration, Registering Rigid and Deformable Objects, Smooth Surfaces and Their Outlines - Contour Geometry, Koenderink's Theorem, The Bitangent Ray Manifold, Object Matching using Interpretation Trees and Spin Images, Classification, Error, and Loss.

UNIT-V

OBJECT DETECTION AND RECOGNITION: Detecting Objects in Images - The Sliding Window Method,Face Detection, Detecting Humans, Boundaries and Deformable Objects, Object

Recognition – Categorization, Selection, Applications – Tracking People, Activity Recognition.

TEXT BOOKS:

1. Forsyth, Jean Ponce David A. "Computer Vision: A Modern Approach", Second Edition, Pearson Education Limited 2015.
2. Szeliski, Richard, “Computer vision: algorithms and applications”, Springer Science &Business Media, 2010.

REFERENCE BOOKS:

1. Hau, Chen Chi, “Handbook of pattern recognition and computer vision”, World Scientific, FifthEdition, 2015.
2. Muhammad Sarfraz, “Computer Visionand Image Processing in Intelligent Systems and Multimedia Technologies”, IGI Global, 2014.
3. Theo Gevers, ArjanGijsenij, Joost van de Weijer, Jan-Mark Geusebroek “Color in Computer Vision: Fundamentals and Applications”, Wiley, 2012.
4. Kale, K. V, Mehrotra S.C, Manza. R.R., “Advances in Computer Vision and Information Technology”,IK International Pvt Ltd, 2013.

COURSE OUTCOMES:

1. Understandvarious image formation models.
2. Extract shape,texture and edge based features.
3. Detect regionofinterest using image segmentationand object localization techniques.
4. Identify and recognize objects using image registration and classification.
5. Explore various case studies onvision based applications.

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CBCS POOL

Professional Elective-VI

(R22A6611) SOFT COMPUTING

COURSE OBJECTIVES:

1. Familiarize withsoft computing concepts
2. Introduce and use the idea of fuzzy logic and use of heuristics based on human experience
3. Familiarize the Neuro-Fuzzy modeling using Classification and Clustering techniques
4. Learn the concepts of Genetic algorithm and its applications
5. Acquire the knowledge of Rough Sets.

UNIT -I

Introduction to Soft Computing: Evolutionary Computing, "Soft" computing versus "Hard" computing, Soft Computing Methods, Recent Trends in Soft Computing, Characteristics of Soft computing, Applications of Soft Computing Techniques.

UNIT-II

Fuzzy Systems: Fuzzy Sets, Fuzzy Relations, Fuzzy Logic, Fuzzy Rule-Based Systems

UNIT-III

Fuzzy Decision Making, Particle Swarm Optimization

UNIT-IV

Genetic Algorithms: Basic Concepts, Basic Operators for Genetic Algorithms, Crossover and Mutation Properties, Genetic Algorithm Cycle, Fitness Function, Applications of Genetic Algorithm.

UNIT-V

Rough Sets, Rough Sets, Rule Induction, and Discernibility Matrix, Integration of Soft Computing Techniques.

TEXT BOOK:

1. Soft Computing – Advances and Applications - Jan 2015 by B.K. Tripathy and J. Anuradha – Cengage Learning

REFERENCE BOOKS:

1. S. N. Sivanandam & S. N. Deepa, "Principles of Soft Computing", 2nd edition, Wiley India, 2008.
2. David E. Goldberg, "Genetic Algorithms-InSearch, optimization and Machine learning", Pearson Education.
3. J. S. R. Jang, C.T. Sun and E.Mizutani, "Neuro-Fuzzy and Soft Computing", Pearson Education, 2004.
4. G.J. Klir& B. Yuan, "Fuzzy Sets & Fuzzy Logic", PHI, 1995.
5. Melanie Mitchell, "An Introduction to Genetic Algorithm", PHI, 1998.
6. Timothy J. Ross, "Fuzzy Logic with Engineering Applications", McGraw- Hill International editions, 1995

COURSE OUTCOMES:

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

1. Identify the difference between Conventional Artificial Intelligence to Computational Intelligence.
2. Understand fuzzy logic and reasoning to handle and solve engineering problems
3. Apply the Classification and clustering techniques onvarious applications.
4. Understandthe advanced neural networks and its applications
5. Perform various operations of genetic algorithms, Rough Sets.

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IV Year B.Tech. CSE- II Sem **L/T/P/C 3/0/0/3**

CBCS POOL

Professional Elective-VI

(R22A0530) GAME THEORY

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.

UNIT – I:

Introduction:

Game Theory, Games and Solutions Game Theory and the Theory of Competitive Equilibrium, Rational Behavior, The Steady State and Deductive Interpretations, Bounded Rationality Terminology and Notation Nash Equilibrium- Strategic Games, Nash Equilibrium Examples Existence of a Nash Equilibrium, Strictly Competitive Games, Bayesian Games: Strategic Games with Imperfect Information

UNIT – II:

Mixed, Correlated, and Evolutionary Equilibrium -Mixed Strategy Nash Equilibrium Interpretations of Mixed Strategy Nash Equilibrium Correlated Equilibrium Evolutionary Equilibrium Rationalizability and Iterated Elimination of Dominated Actions-Rationalizability Iterated Elimination of Strictly Dominated Actions, Iterated Elimination of Weakly Dominated Actions

UNIT– III:

Knowledge and Equilibrium – A Model of Knowledge Common Knowledge, Can People Agree to Disagree? , Knowledge and Solution Concepts, The Electronic Mail Game

UNIT – IV:

Extensive Games with Perfect Information – Extensive Games with Perfect Information Subgame Perfect Equilibrium Two Extensions of the Definition of a Game The Interpretation of a Strategy , Two Notable Finite Horizon Games , Iterated Elimination of Weakly Dominated Strategies Bargaining Games -Bargaining and Game Theory , A Bargaining Game of Alternating Offers Subgame Perfect Equilibrium Variations and Extensions

UNIT – V:

Repeated Games – The Basic Idea Infinitely Repeated Games vs.\ Finitely Repeated Games Infinitely

Repeated Games: Definitions Strategies as Machines Trigger Strategies: Nash Folk Theorems Punishing for a Limited Length of Time: A Perfect Folk Theorem for the Limit of Means Criterion Punishing the Punisher: A Perfect Folk Theorem for the Overtaking Criterion Rewarding Players Who Punish: A Perfect Folk Theorem for the Discounting Criterion The Structure of Subgame Perfect Equilibria Under the Discounting Criterion Finitely Repeated

TEXT BOOKS:

1. M. J. Osborne and A. Rubinstein, A course in Game Theory, MITPress
2. Roger Myerson, Game Theory, Harvard University Press
3. D. Fudenberg and J. Tirole, Game Theory, MITPress

REFERENCE BOOKS:

1. J. von Neumann and O. Morgenstern, Theory of Games and Economic Behavior, New York:n John Wiley and Sons.
2. R.D. Luce and H. Raiffa, Games and Decisions, New York: John Wiley and Sons.,
3. G. Owen, Game Theory, (Second Edition), New York: Academic Press,

COURSEOUTCOMES:

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 language modeling Techniques.

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CBCS POOL

Professional Elective-VI

(R22A0531) SOFTWARE QUALITY ASSURANCE AND TESTING

COURSE OBJECTIVES:

The student should be able to:

1. To understand software testing and quality assurance as a fundamental component of software life cycle
2. To define the scope of SW T & QA projects
3. To efficiently perform T & QA activities using modern software tools
4. To estimate cost of a T & QA project and manage budgets and to prepare test plans and schedules for a T&QA project
5. To develop T & QA project staffing requirements and to effectively manage a T& QA project

UNIT – I:

Software Quality Assurance & Quality Management Standards: The Software Quality challenge, What is Software Quality, Software Quality factors, The components of Software Quality Assurance system, Software Quality Metrics, Costs of Software Quality, Quality Management Standards, Management and its role in Software Quality Assurance, SQA unit and other actors in SQA system.

UNIT – II :

Software Testing Strategy and Environment: Minimizing Risks, Writing a Policy for Software Testing, Economics of Testing, Testing-an organizational issue, Management Support for Software Testing, Building a Structured Approach to Software Testing, Developing a Test Strategy Building

UNIT – III:

Software Testing Process: Software Testing Guidelines, workbench concept, Customizing theSoftware Testing Process, Process Preparation checklist –Software Testing Techniques: DynamicTesting – Black Box testing techniques, White Box testing techniques, Static testing, Validation Activities, Regression testing.

UNIT – IV:

Testing Process: Seven Step Testing Process – I: Overview of the Software TestingProcess, Organizing of Testing, Developing the Test Plan, Verification Testing, Validation Testing.

UNIT-V:

Quality Control and Reliability & Quality Standards: Tools for Quality – Ishikawa's basic tools – CASE tools Defect prevention and removal – Reliability models, Rayleigh model – Reliability growth models for quality assessment.

Quality Standards: ISO 9000 and Companion ISO Standards, CMM, CMMI, PCMM, Malcom Balridge, 3 Sigma, 6 Sigma and other latest quality standards

TEXT BOOKS:

1. Effective Methods for Software Testing, Third edition, William E. Perry, Wiley India, 2009
2. Software Testing – Principles and Practices, Naresh Chauhan, Oxford University Press, 2010.
3. Software Quality Assurance – From Theory to Implementation, Daniel Galin, Pearson Education, 2009.
4. AllanC. Gillies, "Software Quality: Theory and Management", Thomson Learning, 2003.

REFERENCE BOOKS:

1. Testing Computer Software, Cem Kaner, Jack Falk, Hung Quoc Nguyen, Wiley India, rp2012.
2. Software Testing – Principles, Techniques and Tools, M.G.Limaye, Tata McGraw-Hill, 2009.
3. Software Testing – A Craftsman's approach, Paul C. Jorgensen, Third edition, Auerbach Publications, 2010.
4. Foundations of Software Testing, Aditya P. Mathur, Pearson Education, 2008.
5. Software Testing and Quality Assurance – Theory and Practice, Kshirasagar Naik, Priyadashi Tripathy, Wiley India, 2010.

COURSE OUTCOMES

- Students learn to apply software testing knowledge and engineering methods
- Students analyze and understand the use of software testing methods and modern software testing tools for their testing projects
- Students identify defects and manage those defects for improvement in quality for given Software
- Students learn to design SQA activities, SQA strategy.
- Students learn to design formal technical review report for software quality control and assurance.

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CBCSPOOL

ProfessionalElective-VI

(R22A0532) ADHOC ANDSENSORNETWORKS

COURSE OBJECTIVES:

1. To understand the concepts of sensor networks
2. To understand the MAC and transport protocols for adhoc networks
3. To understandthe security of sensor networks
4. To understand the applications of adhoc and sensor networks
5. To understand location services.

UNIT-I

Introduction to AdHoc Networks-Characteristics of MANETs,Applications of MANETs and Challenges of MANETs.

Routing in MANETs - Criteria for classification, Taxonomy of MANET routing algorithms, Topology-based routing algorithms-Proactive: DSDV; Reactive: DSR, AODV; Hybrid: ZRP; Position-based routing algorithms – Location Services-DREAM, Quorum-based.

UNIT-II

Data Transmission- Broadcast Storm Problem, **Rebroadcasting Schemes**-Simple-flooding, Probability-based Methods, Area-based Methods, Neighbor Knowledge-based: SBA, Multipoint Relaying, AHBP.

Multicasting: Tree-based: AMRIS,MAODV;Mesh-based: ODMRP, CAMP; Hybrid:AMRoute, MCEDAR.

UNIT-III

Geo-casting: Data-transmission Oriented-LBM; Route Creation Oriented-GeoTORA.

TCP over AdHoc TCP protocol Overview: TCP Basics, TCP Header Format, Congestion Control; TCP and Manets: Effects of Partition on TCP, Impact Of Lower Layers On TCP.

UNIT-IV

Basics of Wireless, Sensors and Lower Layer Issues: Applications, Classification of sensor networks, Architecture of sensor network, Physical layer, MAC layer, Link layer, Routing Layer.

UNIT-V

Upper Layer Issuesof WSN: Transport layer,High-level application layersupport,Adapting to the inherent dynamic nature of WSNs, Sensor Networks and mobile robots.

TEXT BOOKS:

1. AdHocand Sensor Networks–Theory and Applications, Carlos Corderio Dharma P.Aggarwal, World Scientific Publications, March 2006,ISBN–981–256–681–3.
2. WirelessSensorNetworks:AnInformationProcessingApproach,FengZhao,Leonidas Guibas,ElsevierScience,ISBN –978-1-55860-914-3 (MorganKauffman).

COURSEOUTCOMES:

1. Ability tounderstand the state-of-the-artresearch inthe emerging subject of Ad Hoc and Wireless Sensor Networks
2. Ability tosolve the issues in real-time application development based on ASN.
3. Ability toconduct further research in the domain of ASN
4. Ability to conduct research on Sensor NEtworks
5. Students can to wireless connections in the network.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

IV Year B.Tech. CSE- II Sem **L/T/P/C 4/0/0/4**

(R22A0336) INNOVATION,START-UP & 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.

s**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:

- Students will be able to understand
  a) Startup opportunities
  b) Legal and other requirements for new ventures
  c) Financial Issues of startups
  d) Sustainability and growth of startups
  e) Exit strategies
- Students will be able to understand
  a) mindset of the entrepreneurs,
  b) identify ventures for launching,
  c) develop an idea on the legal framework and
  d) strategic perspectives in entrepreneurship.