R22

ACADEMIC REGULATIONS, COURSE STRUCTURE, AND DETAILED SYLLABUS

COMPUTER SCIENCE AND ENGINEERING

Applicable to

B.Tech Regular Four Year Degree Programme

(For the Batches admitted from the Academic Year 2022-23)

B.Tech (Lateral Entry Scheme)

(For the Batches admitted from the Academic Year 2023-2024)

Offered under Choice Based Credit System (CBCS)

TEEGALA KRISHNA REDDY ENGINEERING COLLEGE

(UGC- AUTONOMOUS)

Sponsored by TKR Educational Society, Approved by AICTE, Affiliated to JNTUH

Accredited by NAAC with 'A' Grade. Accredited by NBA

(Medbowli, Meerpet, Balapur(M), Hyderabad, Telangana- 500097)

College

Vision:

Imparting Knowledge and instilling skills to the aspiring students in the field of Engineering, Technology, Science and Management to face the emerging challenges of the society.

Mission:

- Encouraging scholarly activities that transfer knowledge in the areas of Engineering, Technology, Science and Management.
- Ensuring students of all levels, well trained to meet the needs of education and their future endeavors.
- Inculcating human values and ethics into the education system for the all-round development of the students.

Department

About Department:

Department of CSE Established in the year 2005, with an intake of 240, M.Tech in CSE with an intake of 24.It has Sophisticated infrastructural, state-of-art labs and experienced faculty. The department is keen in academic exposure of the students to the latest domain trends by conducting a series of Seminars and workshops are organized regularly to help the faculty and students to update their knowledge about the latest tools and technologies. We give additional inputs to the students to meet the corporate needs and expectations. The training that we give and the syllabus we have designed for training apart from university curriculum fills the gap between the University and the Industry. It is updated regularly to keep up with the growing demands and the changing trends of the software industry and research laboratories. It helps students enhance their skills and leave the campus with a sense of total fulfillment. Whether it is intelligent gaming, mobile applications, IOT, cloud computing, data security, social networks, or bio-informatics the heart of CSE with action rules. In view of all these academic activities, the department has been accredited by NBA.

Vision:

Enhance learning that promotes techno graduates aiming employability and entrepreneurship with human values to face the challenges in the global technological society.

Mission:

- Empowering students for professional career and higher studies by providing hands on experience and value education to become successful technocrats in the society.
- Nurturing students with interpersonal and entrepreneurial skills, so that they gain ability to work as a team.
- Imparting quality education, employability skills and techno ethical values among the students for the benefit of the society.

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1.0 Under Graduate Degree Programme in Engineering & Technology (UGP in E&T)

TEEGALA KRISHNA REDDY ENGINEERING COLLEGE (TKREC) offers a 4-year (8 semesters) **Bachelor of Technology** (B.Tech.) degree programme, under Choice BasedCredit System (CBCS) in all branches of Engineering with effect from the Academic Year 2022-23

2.0. Eligibility for Admission

2.1. Admission to the undergraduate (UG) programme shall be made either on the basis of the merit rank obtained by the qualified student in entrance test conducted by the Telangana State Government (EAMCET) or the University or on the basis of any other order of merit approved by the University, subject to reservations as prescribed by the government from time to time.

2.2. The medium of instructions for the entire undergraduate programme in Engineering & Technology will be **English** only.

3.0 B.TECH. PROGRAMME STRUCTURE

3.1. A student after securing admission shall complete the B.Tech. programme in a minimumperiod of **four** academic years (8 semesters), and a maximum period of **eight** academic years (16 semesters) starting from the date of commencement of first year first semester,failing which student shall forfeit seat in B.Tech course. Each student shall secure 160 credits (with CGPA $\geq$ 5) required for the completion of the undergraduate programme and award of the B.Tech. Degree.

3.2. UGC/ AICTE specified definitions/ descriptions are adopted appropriately for various terms and abbreviations used in these academic regulations/ norms, which are listed below.

3.2.1. Semester Scheme

Each undergraduate programme is of 4 academic years (8 semesters) with the academic year divided into two semesters of 22 weeks (≥ 90 instructional days) each and in each semester - 'Continuous Internal Evaluation (CIE)' and 'Semester End Examination (SEE)' under Choice Based Credit System (CBCS) and Credit Based Semester System (CBSS) indicated by UGC, and curriculum /course structure suggested by AICTE are followed.

3.2.2 Credit Courses

All subjects/ courses are to be registered by the student in a semester to earn credits which shall be assigned to each subject/ course in an L: T: P: C (Lecture periods: Tutorial periods: Practical periods: Credits) structure based on the following general pattern.

- One credit for one hour/ week/ semester for Theory/ Lecture (L) courses or Tutorials.
- One credit for two hours/ week/ semester for Laboratory/ Practical (P) courses.

Courses like Environmental Science, Constitution of India, Intellectual Property Rights, and Gender Sensitization Lab are mandatory courses. These courses will not carry any credits.

3.2.3 Subject Course Classification

All subjects/ courses offered for the undergraduate programme in E&T (B.Tech. degree programmes) are broadly classified as follows. The College

has followed almost all the guidelines issued by AICTE/UGC.

S. NO.	CATEGORY	Suggested breakup of credits (Total 160)
1	Humanities and Social sciences including Management	10*
2	Basic Sciences	22.5*
3	Engineering Sciences courses including Workshop, Drawing, basics of Electrical /Mechanical / Computer etc.	18.5*
4	Professional Core Courses	63*
5	Professional Elective Courses relevant to chosen specialization/branch	19*
6	Open Electives-Electives from other technical and/or emerging subjects	9*
7	Project work, Seminar and Internship in Industry or elsewhere	18*
8	Mandatory courses [Environmental Sciences, Induction Training, Indian Constitution, Essence of Indian Traditional Knowledge]	(non- credit)
	Total	**160***

* Variation is allowed as per the need of the respective disciplines.

3.2.4. Subject Code Classification

The subject codes of various branches in TKREC Regulations are formulated using the following Procedure

Regulation, Branch, Semester, Classification, S. No.

Regulation	20, 21, 22, …., and so on
UG Branch	Corresponding branch code like CE,EE …..etc
Semester	01, 02, 03, 04, 05, 06, 07, 08
Classification	HS-Humanities and Sciences, BS-Basic Sciences, ES-Engineering Sciences, PC- Professional Core, PE- Professional Elective, OE-Open Elective, PW-Project Work
S. No.	01 to 09

4.0. COURSE REGISTRATION

4.1. A 'faculty advisor or counselor' shall be assigned to a group of 20 students, who will advise the students about the undergraduate programme, its course structure and curriculum, choice/option for subjects/ courses, based on their competence, progress, pre-requisites and interest.

4.2. The academic section of the college invites 'registration forms' from students before the beginning of the semester through 'on-line registration', ensuring 'date and time stamping'. The on-line registration requests for any 'current semester' shall be **completed before the commencement of SEEs (Semester End Examinations) of the 'preceding semester'**.

4.3. A student can apply for **on-line** registration, **only after** obtaining the '**written approval**' from faculty advisor / counselor, which should be submitted to the college academic section through the Head of the Department. A copy of it shall be retained with the Head of the Department, Faculty Advisor / Counselor and the student.

4.4. A student may be permitted to register for all the subjects/ courses in a semester as specified in the course structure with maximum additional subject(s) / course(s) limited to 6 Credits (any 2 elective subjects), based on **progress** and SGPA/ CGPA, and completion of the '**pre-requisites'** as indicated for various subjects / courses, in the department course structure and syllabus contents.

4.5. Choice for '**additional subjects/ courses**', not more than any 2 elective subjects in any Semester, must be clearly indicated, which needs the specific approval and signature of the Faculty Advisor / Mentor / HOD.

4.6. If the student submits ambiguous choices or multiple options or erroneous entries during **on-line** registration for the subject(s) / course(s) under a given/ specified course group/ category as listed in the course structure, only the first mentioned subject/ course in that category will be taken into consideration.

4.7. Subject / course options exercised through **on-line** registration are final and **cannot** be changed or inter-changed; further, alternate choices also will not be considered. However, if the subject/ course that has already been listed for registration by the Head of the Department in a semester could not be offered due to any inevitable or unexpected reasons, then the student shall be allowed to have alternate choice either for a new subject(subject to offering of such a subject), or for another existing subject (subject to availability of seats). Such alternate arrangements will be made by the Head of the Department, with due notification and time-framed schedule, within **a week** after the commencement of class-work for that semester.

4.8. Dropping of subjects/ courses may be permitted, only after obtaining prior approval from the faculty advisor/ counselor 'within a period of 15 days' from the beginning of the current semester.

4.9**. Open Electives**: The students have to choose three Open Electives (OE-I, II & III) from the list of Open Electives given by other departments. However, the student can opt for an Open Elective subject offered by his own (parent) department, if the student has not registered and not studied that subject under any category (Professional Core, Professional Electives, Mandatory Courses etc.) offered by parent department in any semester. Open Elective subjects already studied should not repeat / should not match with any category (Professional Core, Professional Electives, and Mandatory Courses etc.) of subjects even in the forthcoming semesters.

4.10**. Professional Electives**: The students have to choose six Professional Electives (PE-I to VI) from the list of professional electives given.

5.0. SUBJECTS / COURSES TO BE OFFERED

5.1. A subject/ course may be offered to the students, **only if** a minimum of 15 students opt for it.

5.2. More than **one faculty member** may offer the **same subject** (lab/ practical may be included with the corresponding theory subject in the same semester) in any semester. However, selection of choice for students will be based on - '**first come first serve** basis and CGPA criterion' (i.e. the first focus shall be on early **on-line entry** from the student for registration in that semester, and the second focus, if needed, will be on CGPA of the student).

5.3. If more entries for registration of a subject come into picture, then the Head of the Department concerned shall decide, whether or not to offer such a subject / course for **two (or multiple) sections**.

5.4. In case of options coming from students of other departments/ branches/ disciplines (not considering **open electives**), first **priority** shall be given to the student of the '**parent department**'.

6.0. ATTENDANCE REQUIREMENTS

6.1. A student shall be eligible to appear for the semester end examinations, if the student acquires a minimum of 75% of attendance in aggregate of all the subjects/ courses (including attendance in mandatory courses like Environmental Science, Constitution of India, Intellectual Property Rights, and Gender Sensitization Lab) for that semester. **Two periods** of attendance for each theory subject shall be considered, if the student appears for the mid-term examination of that subject. **This attendance should alsobe included in the attendance submitted every fortnight to the College Examination Branch.**

6.2. Shortage of attendance in aggregate upto 10% (65% and above, and below 75%) in each semester may be condoned by the college academic committee on genuine and valid grounds, based on the student's representation with supporting evidence.

6.3. A stipulated fee shall be payable for condoning of shortage of attendance.

6.4. Shortage of attendance below 65% in aggregate shall in **NO** case be condoned.

6.5. Students whose shortage of attendance is not condoned in any semester are not eligible to take their end examinations of that semester. They get detained and their registration for that semester shall stand cancelled, including all academic credentials (internal marks etc.) of that semester**. They will not be promoted to the next semester.** They may seek re-registration for all those subjects registered in that semester in which the student is detained, by seeking re-admission into that semester as and when offered; if there are any professional electives and/ or open electives, the same may also be re- registered if offered. However, if those electives are not offered in later semesters, then alternate electives may be chosen from the **same** set of elective subjects offered under that category.

6.6. A student fulfilling the attendance requirement in the present semester shall not be eligible for readmission into the same class.

7.0. ACADEMIC REQUIREMENTS

The following academic requirements have to be satisfied, in addition to the attendancerequirements mentioned in Item No. **6**.

7.1. A student shall be deemed to have satisfied the academic requirements and earned the credits

allotted to each subject/ course, if student secures not less than 35% (14 marks out of 40 marks including minimum 35% of average Mid-Term examinations for 25 marks) in the internal examinations, not less than 35% (21 marks out of 60 marks) in the semester end examination, and a minimum of 40% (40 marks out of 100 marks) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together; in terms of letter grades, this implies securing **'C'** grade or above in that subject/ course.

7.2. A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to Real-time Research Project (or) Field Based Research Project (or) Industry Oriented Mini Project (or) Internship (or) Seminar, if the student secures not less than 40% marks (i.e. 40 out of 100 allotted marks) in each of them. The student is deemed to have failed, if he (i) does not submit a report on Industry Oriented Mini Project / Internship, or (ii) not make a presentation of the same before the evaluation committee as per schedule, or (iii) secures less than 40% marks in Real-time ResearchProject (or) Field Based Research Project (or) Industry Oriented Mini Project (or) Internship evaluations.

A student may reappear once for each of the above evaluations, when they are scheduled again; if the student fails in such 'one reappearance' evaluation also, the student has to reappear for the same in the next subsequent semester, as and when it is scheduled.

7.3. **Promotion Rules**

S. No.	Promotion	Conditions to be fulfilled
1	**First year first semester to firstyear second semester**	**Regular course of study of first year first semester.**
2	**First year second semester to Second year first semester**	**(i) Regular course of study of first yearsecond semester.** **(ii) Must have secured at least 20 credits out of 40 credits i.e., 50% credits up to first year second semester from all the relevant regular and supplementary examinations, whetherthe student takes those examinations or not.**
3.	**Second year first semester to Second year second semester**	**Regular course of study of second year first semester.**
4	**Second year second semester toThird year first semester**	**(i) Regular course of study of second year second semester.**

		(ii) Must have secured at least 48 credits out of 80 credits i.e., 60% credits up to second year second semester from all the relevant regular and supplementary examinations, whether the student takes those examinations or not.
5	**Third year first semester to Thirdyear second semester**	**Regular course of study of third year first semester.**
6	**Third year second semester to Fourth year first semester**	**(i) Regular course of study of third year second semester.** **(ii) Must have secured at least 72 credits out of 120 credits i.e., 60% credits up to third year second Semester from all the relevant regular and supplementary examinations,whether the student takes those examinations or not.**
7	**Fourth year first semester toFourth year second semester**	**Regular course of study of fourth year first semester.**

7.4. A student (i) shall register for all courses /subjects covering 160 credits as specified and listed in the course structure, (ii) fulfills all the attendance and academic requirements for 160 credits, (iii) earn all 160 credits by securing SGPA $\geq$ 5.0 (in each semester), and CGPA $\geq$ 5 (at the end of 8 semesters), (iv) **passes all the mandatory courses,** to successfully complete the undergraduate programme. The performance of the student in these 160 credits shall be considered for the calculation of the final CGPA **(at the end of undergraduate programme),** and shall be indicated in the grade card / marks memo of IV-year II semester.

7.5. If a student registers for **'extra subjects'** (in the parent department or other departments / branches of Engg.) other than those listed subjects totaling to 160 credits as specified in the course structure of his department, the performances in those '**extra subjects**' (although evaluated and graded using the same procedure as that of the required 160 credits) will not be considered while calculating the SGPA and CGPA. For such '**extra subjects'** registered, percentage of marks and letter grade alone will be indicated in the grade card / marks memo as a performance measure, subject to completion of the attendance and academic requirements as stated in regulations Items 6 and 7.1 – 7.4 above.

7.6. A student eligible to appear in the semester end examination for any subject/ course, but absent from it or failed (thereby failing to secure **'C'** grade or above) may reappear for that subject/ course in the supplementary examination as and when conducted. In such cases, internal marks (CIE) assessed earlier for that subject/ course will be carried over, and added to the marks to be obtained in the SEE supplementary examination for evaluating performance in that subject.

7.7. A student **detained in a semester due to shortage of attendance may be re-admitted in the same semester in the next academic year for fulfillment of academic requirements**. The academic regulations under which a student has been re-admitted shall be applicable. Further, no grade allotments or SGPA/ CGPA calculations will be done for the entire semester in which the student has been detained.

7.8. A student detained **due to lack of credits, shall be promoted to the next academic year only after acquiring the required number of academic credits.** The academic regulations under which the student has been readmitted shall be applicable to him.

8.0. EVALUATION - DISTRIBUTION AND WEIGHTAGE OF MARKS

8.1. The performance of a student in every subject / course (including practical and Project Stage – I & II) will be evaluated for 100 marks each, with 40 marks allotted for CIE (Continuous Internal Evaluation) and 60 marks for SEE (Semester End-Examination).

8.2. In CIE, for theory subjects, during a semester, there shall be two mid-term examinations. Each Mid-Term examination consists of one part for 30 marks with a total duration of 2 hours as follows:

1. Midterm Examination in descriptive mode for 30 marks:

The remaining 10 marks of Continuous Internal Assessment (out of 40) are distributed as:

2. Assignment for 5 marks. (Average of 2 Assignments each for 5marks)
3. Subject Viva-Voce / PPT / Poster Presentation / Case Study on a topic in the concerned subject for 5 marks.

The descriptive paper shall contain 5 full questions out of which, the student has to answer all the questions, each carrying 6 marks and internal choice may be given. Average of two mid-term examinations (I Mid-Term & II Mid-Term) will be taken as final marks for mid-term examinations (For 30 marks).

While the first mid-term examination shall be conducted on 50% of the syllabus, the second mid-term examination shall be conducted on the remaining 50% of the syllabus.

Five (5) 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-term examination, and the second assignment should be submitted before the conduct of the second mid-term examination. The average of the two assignments shall be taken as the final marks for assignment (for 5 marks).

Subject Viva-Voce / PPT / Poster Presentation / Case Study on a topic in the subject concerned for 5 marks before II Mid-Term Examination.

- The student, in each subject, shall have to earn 35% of marks(i.e.14 marks out of 40 marks) in CIE, 35% of marks (i.e.21 marks out of 60) in SEE and overall 40% of marks (i.e. 40 marks out of 100 marks) both CIE and SEE marks put together to get pass grade (i.e. **C**) or above.
- The student is eligible to write Semester End Examination of the concerned subject, if the student scores ≥ 35% (14 marks) of 40 continuous Internal Examination (CIE) marks.
- In case, the student appears for Semester End Examination of the concerned subject but not scored minimum 35% of CIE marks (14 marks out of 40 internal marks), his performance in that subject in SEE shall stand cancelled in spite of appearing the SEE.

There is NO Computer Based Test (CBT) for R22 regulations.

8.2.1 The semester end examinations (SEE), for theory subjects, will be conducted for 60marks consisting of two parts viz. i) **Part- A** for 10 marks, ii) **Part - B** for 50 marks.

- Part-A is a compulsory question which consists of ten sub-questions from all units carrying equal marks.
- Part-B consists of five questions (numbered from 2 to 6) carrying 10 marks each. Each of these questions is from each unit and may contain sub-questions. For each question there will be an "either" "or" choice, which means that there will be two questions from each unit and the student should answer either of the two questions.

The duration of Semester End Examination is 3 hours.

<u>The details of evaluation of end semester exam are as follows</u>

- Double evaluation of the answer scripts for the External Examinations is followed.
- The average of the two evaluations shall be considered as final marks.
- If the difference of two valuations is more than or equal to15 marks, third evaluation shall be recommended.
- If any difference appeared in the marks after the third valuation also, average of two evaluations will be considered whose difference is minimum, as final marks.

The details of challenging valuation of end semester exam are as follows

- There shall not be any recounting or re-evaluation for all subjects as the double valuation was adopted. But, the students will be given a chance to apply for challenging valuation for all the theory Subjects (no Practical/lab subjects) within one week from the date of declaration of results.
- Whenever the students apply for challenge valuation of answer scripts of semester end examinations, the students should submit their applications (through the HOD) within one week from the date of declaration of the results to the Examination Branch by paying Rs.10,000 (Rupees Ten Thousand only) per subject, in the form of Demand Draft, Drawn in Favor of "TKREC AUTONOMOUS". Any application received after the due date of submission for Challenge valuation, shall not be accepted under any circumstances.

On receipt of the DD

The answer script of the applied subject will be shown to the candidate to verify whether it belongs to him or not and the script will be evaluated by the senior faculty of the college appointed by the Controller of examinations. If there is any change in marks (Equal or above 15% of the maximum marks) the new marks will be awarded to the student. Otherwise, there will be no change in old marks. If the change in marks (Equal or above 15% of the maximum marks) occurs, an amount of Rs.9,000/- will be refunded to the student. Otherwise, the student will forfeit the total amount which he /she paid.

8.2.2. For the subject, Computer Aided Engineering Graphics, the Continuous Internal Evaluation(CIE) and Semester End Examinations (SEE) evaluation pattern is same as for other theory subjects.

8.3 For practical subjects there shall be a Continuous Internal Evaluation (CIE) during the semester for 40 marks and 60 marks for semester end examination. Out of the 40 marks for internal evaluation:

1. A write-up on day-to-day experiment in the laboratory (in terms of aim, components / procedure, expected outcome) which shall be evaluated for 10 marks.
2. **10 marks for viva-voce (**or) tutorial (or) case study (or) application (or) poster presentation of the course concerned.
3. Internal practical examination conducted by the laboratory teacher concerned shall be evaluated for 10 marks.
4. The remaining 10 marks are for Laboratory Project, which consists of the Design (or) Software / Hardware Model Presentation (or) App Development (or) Prototype Presentation submission which shall be evaluated after completion of laboratory course and before

semester end practical examination.

The Semester End Examination shall be conducted with an external examiner and the laboratory teacher. The external examiner shall be appointed from the cluster / other colleges which will be decided by the examination branch of the college.

In the Semester End Examination held for 3 hours, total 60 marks are divided and allocated as shown below:

10 marks for write-up

15 marks for experiment/program

15 marks for evaluation of results

10 marks for presentation on another experiment / program in the same laboratory course and

10 marks for viva-voce on concerned laboratory course

❖ The student, in each subject, shall have to earn 35% of marks(i.e.14 marks out of 40 marks) in CIE, 35% of marks (i.e.21 marks out of 60) in SEE and overall 40% of marks (i.e. 40 marks out of 100 marks) both CIE and SEE marks put together to secure Pass grade (i.e. "C") or above.

❖ The student is eligible to write Semester End Examination of the concerned subject, if the student scores ≥ 35% (14 marks) of 40 continuous Internal Examination (CIE) marks.

❖ In case, the student appears for Semester End Examination of the concerned subject but not scored minimum 35% of CIE marks (14 marks out of 40 internal marks), his performance in that subject in SEE shall stand cancelled in spite of appearing the SEE.

8.4 The evaluation of courses having ONLY internal marks in I-Year I Semester and II- Year II Semester is as follows:

1) I Year I Semester course (*ex., Elem ents of CE / ME / EEE / ECE / CSE*): The Continuous Internal Evaluation (CIE) is for 50 marks and it shall take place during I Mid-Term examination and II Mid-Term examination. The average marks of two Mid-Term examinations are the final for 50 marks. Student shall have to earn 40%, i.e. 20 marks out of 50 marks from average of the two examinations. There shall be NO external evaluation. The student is deemed to have failed, if he (i) is absent as per schedule,or (ii) secures less than 40% marks in this course.

   For CSE / IT and allied branches the Continuous Internal Evaluation (CIE) will be for 50 marks. Each Mid-Term examination consists of two parts i) Part – A for 20 marks, ii) Part – B for 20 marks with a total duration of 2 hours.

Part A: Objective/quiz paper is set with multiple choice, fill-in the blanks and match the following type of questions for a total of 20 marks.

Part B: Descriptive paper shall contain 6 full questions out of which, the student has to answer 4 questions, each carrying 5 marks.

The remaining 10 marks of Continuous Internal Evaluation are for Assignment (5 marks) and Subject Viva-Voce / PPT / Poster Presentation / Case Study (5 marks) and the evaluation pattern will remain same as for other theory subjects.

For all other branches, the Continuous Internal Evaluation (CIE) will be for 50 marks. Out of the 50 marks for internal evaluation:

a) A write-up on day-to-day experiment in the laboratory (in terms of aim, components/procedure, expected outcome) which shall be evaluated for 10 marks

b) 10 marks for viva-voce (or) tutorial (or) case study (or) application (or) poster presentation of the course concerned.

c) Internal practical examination conducted by the laboratory teacher concerned shall be evaluated for 15 marks.

d) The remaining 15 marks are for Laboratory Report/Project and Presentation, which consists of the Design (or) Software / Hardware Model Presentation (or) App Development (or) Prototype Presentation submission which shall be evaluated after completion of laboratory course and before semester end practical examination.

2) II Year II Semester *Real-Time (or) Field-based Research Project* course: The Continuous Internal Evaluation (CIE) is for 50 marks and it shall take place during I Mid-Term examination and II Mid-Term examination. The average marks of two Mid-Term examinations are the final for 50 marks. Student shall have to earn 40%, i.e. 20 marks out of 50 marks from average of the two examinations. There shall be NO externalevaluation. The student is deemed to have failed, if he (i) does not submit a report on the Project, or (ii) does not make a presentation of the same before the internal committee as per schedule, or (iii) secures less than 40% marks in this course..

8.5. There shall be Industry training (or) Internship (or) Industry oriented Mini-project (or) Skill Development Courses (or) Paper presentation in reputed journal (or) Industry Oriented Mini Project in collaboration with an industry of their specialization. Students shall register for this immediately after II-Year II Semester Examinations and pursue it during summer vacation /semester break & during III Year without effecting regular course work. Internship at reputed organization (or) Skill development courses (or) Paper presentation in reputed journal (or) Industry Oriented Mini Project

shall be submitted in a report form and presented before the committee in III-year II semester before end semester examination. It shall be evaluated for 100 external marks. The committee consists of an External Examiner, Head of the Department, Supervisor of the Industry Oriented Mini Project (or) Internship etc, Internal Supervisor and a Senior Faculty Member of the Department. There shall be **NO internal marks** for Industry Training (or) Internship (or) Mini-Project (or) Skill Development Courses (or) Paper Presentation in reputed journal (or) Industry Oriented Mini Project.

8.6. The UG project shall be initiated at the end of the IV Year I Semester and the duration of the project work is one semester. The student must present Project Stage – I during IV Year I Semester before II Mid examinations, in consultation with his Supervisor, the title, objective and plan of action of his Project work to the departmental committee for approval before commencement of IV Year II Semester. Only after obtaining the approval of the departmental committee, the student can start his project work.

8.7. UG project work shall be carried out in two stages: Project Stage – I for approval of project before Mid-II examinations in IV Year I Semester and Project Stage – II during IV Year II Semester. Student has to submit project work report at the end of IV Year II Semester. The project shall be evaluated for 100 marks before commencement of SEE Theory examinations.

8.8. For Project Stage – I, the departmental committee consisting of Head of the Department, project supervisor and a senior faculty member shall approve the project work to begin before II Mid-Term examination of IV Year I Semester. The student is deemed to be not eligible to register for the Project work, if he does not submit a report on Project Stage - I or does not make a presentation of the same before the evaluation committee as per schedule.

A student who has failed may reappear once for the above evaluation, when it is scheduled again; if he fails in such 'one re appearance' evaluation also, he has to reappear for the same in the next subsequent semester, as and when it is scheduled.

8.9. For Project Stage – II, the external examiner shall evaluate the project work for 60 marks and the internal project committee shall evaluate it for 40 marks. Out of 40 internal marks, the departmental committee consisting of Head of the Department, Project Supervisor and a Senior Faculty Member shall evaluate the project work for 20 marks and Project Supervisor shall evaluate for 20 marks. The topics for Industry Oriented Mini Project / Internship / SDC etc. and the main Project shall be different from the topic already taken. The student is deemed to have failed, if he / she (i) does not submit a report on the Project, or (ii) does not make a presentation of the same before the External Examiner as per schedule, or (iii) secures less than 40% marks in the sum total of the CIE and SEE taken together.

For conducting viva-voce of project, Controller and Principal selects an external examiner from the list of experts in the relevant branch submitted by the HOD concerned

A student, who has failed, may reappear once for the above evaluation, when it is scheduled again; if student fails in such 'one re appearance' evaluation also, he has to reappear for the same in the next subsequent semester, as and when it is scheduled.

8.10. A student shall be given one time chance to re-register for a maximum of two subjects in a semester

- If the internal marks secured by a candidate in the continuous Internal Evaluation marks for 40 (sum of average of two mid-term exams and two assignments & subject Viva-voce / PPT / Poster presentation / Case Study on the topic in concerned subject) are less than 35% and failed in those subjects.
- A student must re-register for the failed subject(s) for 40 marks within four weeks of commencement of the class work in next academic year.

In the event of the student taking this chance, his Continuous Internal Evaluation marks for 40 and Semester End Examination marks for 60 obtained in the previous attempt stand cancelled

9.0 GRADING PROCEDURE

9.1. Grades will be awarded to indicate the performance of students in each Theory Subject, Laboratory/ Practical's / Industry-Oriented Mini Project/Internship / SDC and Project Stage. Based on the percentage of marks obtained (Continuous Internal Evaluation plus Semester End Examination, both taken together) as specified in item 8 above, a corresponding letter grade shall be given.

9.2. As a measure of the performance of a 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:

% of Marks Secured in a Subject/Course (Class Intervals)	Letter Grade (UGC Guidelines)	Grade Points
Greater than or equal to 90%	O (Outstanding)	10
80 and less than 90%	A+ (Excellent)	9
70 and less than 80%	A (Very Good)	8
60 and less than 70%	B+ (Good)	7

50 and less than 60%	B (Average)	6
40 and less than 50%	C (Pass)	5
Below 40%	F (FAIL)	0
Absent	**Ab**	0

9.3. A student who has obtained an '**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.

9.4. To a student who has not appeared for an examination in any subject, '**Ab**' grade will be allocated in that subject, and he is deemed to have '**Failed**'. A student will be required to reappear as a 'supplementary student' in the semester end examination, as and when offered next. In this case also, the internal marks in those subjects will remainthe same as those obtained earlier.

9.5. 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.

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

Credit Points (CP) = Grade Point (GP) x Credits …. For a course

9.7. A student passes the subject/course only when GP $\geq$ **5 ('C' grade or above)**

9.8. The Semester Grade Point Average (SGPA) is calculated by dividing the sum of credit points ($\sum$CP) secured from all subjects / courses registered in a semester, by the total number of credits registered during that semester. SGPA is rounded off to **two** decimalplaces. SGPA is thus computed as

$$\mathbf{SGPA} = \{\sum_{i=1}^{n} \mathbf{Ci\ Gi}\} / \{\sum_{i=1}^{n} \mathbf{Ci}\} \ldots\ldots \mathbf{For\ each\ semester},$$

where 'i' is the subject indicator index (considering all subjects in a semester), 'N' is the no. of subjects '**registered**' for the semester (as specifically required and listed under the course structure of the parent department), C_i is the no. of credits allotted to the i^{th} subject, and G_i represents the grade points (GP) corresponding to the letter grade awarded for that i^{th} subject.

9.9. The Cumulative Grade Point Average (CGPA) is a measure of the overall cumulative performance of a student in all semesters considered for registration. The CGPA is the ratio of the total credit points secured by a student in **all** registered courses (of 160) in **all** semesters, and the total number of credits registered in **all** the semesters. CGPA is rounded off to **two** decimal places. CGPA is thus computed from the I year II semester onwards at the end of each semester as per the formula

$$\mathbf{CGPA} = \{\sum_{j=1}^{m} \mathbf{Cj\ Gj}\} / \{\sum_{j=1}^{m} \mathbf{Cj}\} \text{ for all S Semesters Registered}$$

(i.e., up to and inclusive of S semesters, S ≥ 2),

where '**M**' is the **total** no. of subjects (as specifically required and listed under the course structure of the parent department) the student has '**registered**' i.e., from the 1st semester onwards up to and inclusive of the 8th semester, 'j' is the subject indicator index (takes into account all subjects from 1 to 8 semesters), C_j is the no. of credits allotted to the j^{th} subject, and G_j represents the grade points (GP) corresponding to the letter grade awarded for that j^{th} subject. After registration and completion of I year I semester, the SGPA of that semester itself may be taken as the CGPA, as there are no cumulative effects.

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 up to 3rd Semester:

Semester	Course/ Subject Title	Credits Allotted	Letter Grade Secured	Corresponding Grade Point (GP)	Credit Points (CP)
I	Course 1	3	A	8	24
I	Course 2	3	O	10	30
I	Course 3	3	B	6	18
I	Course 4	4	A	8	32
I	Course 5	3	A+	9	27
I	Course 6	4	C	5	20
II	Course 7	4	B	6	24

II	Course 8	4	A	8	32
II	Course 9	3	C	5	15
II	Course 10	3	O	10	30
II	Course 11	3	B+	7	21
II	Course 12	4	B	6	24
II	Course 13	4	A	8	32
II	Course 14	3	O	10	30
III	Course 15	2	A	8	16
III	Course 16	1	C	5	5
III	Course 17	4	O	10	40
III	Course 18	3	B+	7	21
III	Course 19	4	B	6	24
III	Course 20	4	A	8	32
III	Course 21	3	B+	7	21
	Total Credits	69		Total Credit Points	518

CGPA = 518/69 = 7.51

The calculation process of CGPA illustrated above will be followed for each subsequent semester until 8th semester. The CGPA obtained at the end of 8th semester will become the final CGPA secured for entire B.Tech. programme.

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

9.11. SGPA and CGPA of a semester will be mentioned in the semester Memorandum of Grades if all subjects of that semester are passed in first attempt. Otherwise the SGPA and CGPA shall be mentioned only on the Memorandum of Grades in which sitting he passed his last exam in that semester. However, mandatory courses will not be taken into consideration.

10.0. PASSING STANDARDS

10.1. A student shall be declared successful or 'passed' in a semester, if he secures a GP ≥ 5 ('C' grade or above) in every subject/course in that semester (i.e. when the student gets an SGPA $\geq$ 5.0 at the end of that particular semester); and he shall be declared successful or 'passed' in the entire undergraduate programme, only when gets a CGPA ≥ 5.00 ('C' grade or above) for the award of the degree as required.

10.2. After the completion of each semester, a grade card or grade sheet 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, grade earned, etc.) and credits

earned. **There is NO exemption of credits in any case.**

11.0. Declaration of results

11.1. Computation of SGPA and CGPA are done using the procedure listed in 9.6 to 9.9.

11.2. For final percentage of marks equivalent to the computed final CGPA, the following formula may be used.

$$\% \text{ of Marks} = (\text{final CGPA} - 0.5) \times 10$$

12.0. Award of Degree

12.1. A student who registers for all the specified subjects/ courses as listed in the course structure and secures the required number of 160 credits (with 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 B.Tech. Degree in the branch of Engineering selected at the time of admission.

12.2. A student who qualifies for the award of the degree as listed in item 12.1 shall be placed in the following classes.

12.3. A student with final CGPA (at the end of the undergraduate programme) > 8.00, and fulfilling the following conditions - shall be placed in '**First Class with Distinction'**.
However, he

(i) Should have passed all the subjects/courses in '**First Appearance'** within the first 4 academic years (or 8 sequential semesters) from the date of commencement of first year first semester.

(ii) Should not have been detained or prevented from writing the semester end examinations in any semester due to shortage of attendance or any other reason.

A student not fulfilling any of the above conditions with final CGPA > 8 shall beplaced in **'First Class'.**

12.4. Students with final CGPA (at the end of the undergraduate programme) $\geq$ 7.0 but < 8.00 shall be placed in **'First Class'.**

12.5. Students with final CGPA (at the end of the undergraduate programme) $\geq$ 6.00 but < 7.00, shall be placed in '**Second Class'**.

12.6. All other students who qualify for the award of the degree (as per item 12.1), with finalCGPA (at the end of the undergraduate programme) $\geq$ 5.00 but < 6, shall be placed in '**pass class**'.

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

12.8. Students fulfilling the conditions listed under item 12.3 alone will be eligible for award of '**Gold Medal**'.

12.9. **Award of 2-Year B.Tech. Diploma Certificate**

1. A student is awarded 2-Year UG Diploma Certificate in the concerned engineering branch on completion of all the academic requirements and earned all the 80 credits (within 4 years from the date of admission) up to B. Tech. – II Year – II Semester, if the student want to exit the 4-Year B. Tech. program. The student **once opted and awarded for 2-Year UG Diploma Certificate, the student will not be permitted to join** in B. Tech. III Year – I Semester and continue for completion of remaining years of study for 4-Year B. Tech. Degree.

2. A student may be permitted to take one year break after completion of II Year – II Semester or B. Tech. – III Year – II Semester (with university permission through the principal of the college well in advance) and can re-enter the course in **next Academic Year in the same college** and complete the course on fulfilling all the academic credentials within a stipulated duration i.e. double the duration of the course (Ex. within 8 Years for 4-Year program).

13.0 WITHHOLDING OF RESULTS

13.1 If the student has not paid the fees to the 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 the 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.

14.0. TRANSITORY REGULATIONS

A. For students detained due to shortage of attendance:

(1) A Student who has been detained in I year of R20 Regulations due to lack of attendance, shall be permitted to join I year I Semester of R22 Regulations and he is required to complete the study of B.Tech./B. Pharmacy programme within the stipulated period of eight academic years from the date of first admission in I Year.

(2) A student who has been detained in any semester of II, III and IV years of R20 regulations for want of attendance, shall be permitted to join the corresponding semester of R22 Regulations and is required to complete the study of B.Tech./B. Pharmacy within the

stipulated period of eight academic years from the date of first admission in I Year. The R22 Academic Regulations under which a student has been readmitted shall be applicable to that student from that semester. See rule (C) for further Transitory Regulations.

B. For students detained due to shortage of credits:

(i) A student of **R20** Regulations who has been detained due to lack of credits, shall be promoted to the next semester of **R22** Regulations only after acquiring the required number of credits as per the corresponding regulations of his/her first admission. The total credits required are 160 including both **R20 & R22** regulations. The student is required to complete the study of B.Tech. within the stipulated period of eight academic years from the year of first admission. The **R22** Academic Regulations are applicable to a student from the year of readmission. See rule (C) for further Transitory Regulations.

C. For readmitted students in **R22** Regulations:

(i) A student who has failed in any subject under any regulation has to pass those subjects in the same regulations.

(ii) The maximum credits that a student acquires for the award of degree, shall be the sum of the total number of credits secured in all the regulations of his/her study including R22 Regulations. **There is NO exemption of credits in any case**.

(iii) If a student is readmitted to R22 Regulations and has any subject with 80% of syllabus common with his/her previous regulations, that particular subject in R22 Regulations will be substituted by another subject to be suggested by the University.

Note: If a student readmitted to R22 Regulations and has not studied any subjects/topics in his/her earlier regulations of study which is prerequisite for further subjects in R22 Regulations, the College Principals concerned shall conduct remedial classes to cover those subjects/topics for the benefit of the students.

15.0 STUDENT TRANSFERS

15.1. There shall be no branch transfers after the completion of admission process.

15.2. There shall be no transfers from one college/stream to another within the college.

15.3. The students seeking transfer to TKREC from various other Universities / institutions have to pass the failed subjects which are equivalent to the subjects of TKREC, and also pass the subjects of TKREC which the students have not studied at the earlier institution. Further, though the students

have passed some of the subjects at the earlier institutions, if the same subjects are prescribed in different semesters of TKREC, the students have to study those subjects in TKREC in spite of the fact that those subjects are repeated.

15.4 The transferred students from other Universities/Institutions to TKREC who are on rolls are to be provided one chance to write the CBT (for internal marks) in the **equivalent subject(s)** as per the clearance letter issued by the University.

15.5 The College will provide one chance to write the internal examinations in the equivalent subject(s) to the students transferred from other Universities/ institutions to TKREC who are on rolls, as per the clearance equivalence) letter issued by the University.

16.0 SCOPE

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

16.2. In case of any doubt or ambiguity in the interpretation of the above rules, the decision of the Vice-Chancellor is final.

16.3. The University 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 dates notified by the University authorities.

16.4. Where the words “he”, “him”, “his”, occur in the regulations, they include “she”, “her”, “hers”.

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TEEGALA KRISHNA REDDY ENGINEERING COLLEGE

ACADEMIC REGULATIONS FOR B.TECH (LATERAL ENTRY SCHEME) FROMTHE AY 2023-24

1. **Eligibility for the award of B.Tech Degree (LES)**

   The LES students after securing admission shall pursue a course of study for not less than three academic years and not more than six academic years.

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

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

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

5. **Promotion rule**

S. No	Promotion	Conditions to be fulfilled
1	Second year first semester to second year second semester	Regular course of study of second year first semester.
2	Second year second semester to third year first semester	(i) Regular course of study of second year second semester. (ii) Must have secured at least 24 credits out of 40 credits i.e., 60% credits up to second year second semester from all the relevant regular and supplementary examinations, whether the student takes those examinations or not.
3	Third year first semester to third year second semester	Regular course of study of third year first semester.
4	Third year second semester to fourth year first semester	(i) Regular course of study of third year second semester. (ii) Must have secured at least 48 credits out of 80 credits i.e., 60% credits up to third year second semester from all the relevant regular and supplementary examinations, whether the student takes those examinations or not.
5	Fourth year first semester to fourth year second semester	Regular course of study of fourth year first semester

6. All the other regulations as applicable to B. Tech. 4-year degree course (Regular) will hold good for B. Tech. (Lateral Entry Scheme).
7. LES students are not eligible for 2-Year B. Tech. Diploma Certificate.

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MALPRACTICES RULES

DISCIPLINARY ACTION FOR IMPROPER CONDUCT IN EXAMINATIONS

S.No	Nature of Malpractices /Improper conduct	Punishment
	If the candidate:	
1.(a)	Possesses or keeps accessible in examination hall, any paper, notebook, programmable calculators, Cell phones, pager, palm computers or any other form of material concerned with or related to the subject to 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 to 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 the relevant material will be kept in the Examinations Branch.

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 College 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 de barred for two consecutive semesters from class work and all **College** examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.
5.	Uses 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/	In case of students of the college, they shall be expelled from

	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 by visible representation, assaults the officer-in- charge, 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.	examination halls and cancellation of their performance in that subject and allot her subjects the candidate(s) has (have) already appeared and shall not be permitted to appear for the remaining examinations of the subjects of that 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 par there of 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 **College** 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 **Controller/Principal** for further action to award suitable punishment.	

I Year B.Tech. CSE - I Sem

S. No	Subject Code	Category	Subject Name	Hours per			Credits
				L	T	P	
1	22MA101BS	BS	Matrices and Calculus	3	1	0	4
2	22CH102BS	BS	Engineering Chemistry	3	1	0	4
3	22CS103ES	ES	Programming for Problem Solving	3	0	0	3
4	22EE104ES	ES	Basic Electrical Engineering	2	0	0	2
5	22ME105ES	ES	Computer Aided Engineering Graphics	1	0	4	3
6	22CS106ES	ES	Elements of Computer Science & Engineering	0	0	2	1
7	22CH107BS	BS	Engineering Chemistry Laboratory	0	0	2	1
8	22CS108ES	ES	Programming for Problem Solving Laboratory	0	0	2	1
9	22EE109ES	ES	Basic Electrical Engineering Laboratory	0	0	2	1
Total				**12**	**2**	**12**	**20**

I Year B.Tech. CSE - II Sem

S. No	Subject Code	Category	Subject Name	Hours per			Credits
				L	T	P	
1	22MA201BS	BS	Ordinary Differential Equations and Vector Calculus	3	1	0	4
2	22PH202BS	BS	Applied Physics	3	1	0	4
3	22ME203ES	ES	Engineering Workshop	0	1	3	2.5
4	22EN204HS	HS	English for Skill Enhancement	2	0	0	2
5	22EC205ES	ES	Electronic Devices and Circuits	2	0	0	2
6	22CS206ES	ES	Python Programming Laboratory	0	1	2	2
7	22PH207BS	BS	Applied Physics Laboratory	0	0	3	1.5
8	22EN208HS	HS	English Language and Communication Skills Laboratory	0	0	2	1
9	22CS209ES	ES	IT Workshop	0	0	2	1
Total				**10**	**4**	**12**	**20**

II Year B.Tech. CSE - I Sem

S. No	Subject Code	Category	Subject Name	Hours per			Credits
				L	T	P	
1	22EC308PC	PC	Digital Electronics	3	0	0	3
2	22CS301PC	PC	Data Structures	3	0	0	3
3	22MA302BS	BS	Computer Oriented Statistical Methods	3	1	0	4
4	22CS302PC	PC	Computer Organization and Architecture	3	0	0	3
5	22CS303PC	PC	Object Oriented Programming through Java Java	3	0	0	3
6	22CS304PC	PC	Data Structures Lab	0	0	3	1.5
7	22CS305PC	PC	Object Oriented Programming through Java Lab	0	0	3	1.5
8	22CS306PC	PC	Skill Development Course(Data visualization- R Programming / Power BI)	0	0	2	1
9	22MC309	MC	Gender Sensitization Lab	0	0	2	0
Total				**15**	**1**	**10**	**20**

II Year B.Tech. CSE - II Sem

S. No	Subject Code	Category	Subject Name	Hours per			Credits
				L	T	P	
1	22MA401BS	PC	Discrete Mathematics	3	0	0	3
2	22HS401MS	HS	Business Economics & Financial Analysis	3	0	0	3
3	22CS401PC	PC	Operating Systems	3	0	0	3
4	22CS402PC	PC	Database Management Systems	3	0	0	3
5	22CS403PC	PC	Software Engineering	3	0	0	3
6	22CS404PC	PC	Operating Systems Lab	0	0	2	1
7	22CS405PC	PC	Database Management Systems Lab	0	0	2	1
8	22CS401PW	PW	Real-time Research Project/ Societal Related Project	0	0	4	2
9	22CS406PC	EC	Skill Development Course (Node JS/ React JS/ Django)	0	0	2	1
10	22MC410	MC	Constitution of India	3	0	0	0
Total				**18**	**0**	**10**	**20**

III Year B.Tech. CSE - I Sem

S. No	Subject Code	Category	Subject Name	Hours per			Credits
				L	T	P	
1	22CS501PC	PC	Design and Analysis of Algorithms	3	1	0	4
2	22CS502PC	PC	Computer Networks	3	0	0	3
3	22CS503PC	PC	Dev Ops	3	0	0	3
4	22CS51XPE	PE	Professional Elective-I	3	0	0	3
5	22CS52XPE	PE	Professional Elective -II	3	0	0	3
6	22CS504PC	PC	Computer Networks Lab	0	0	2	1
7	22CS505PC	PC	DevOps Lab	0	0	2	1
8	22EN501HS	HS	Advanced English Communication Skills Lab	0	0	2	1
9	22CS506PC	PC	Skill Development Course (UI design-Flutter)	0	0	2	1
10	22MC510	MC	Intellectual Property Rights	3	0	0	0
Total				**18**	**1**	**8**	**20**

Professional Elective-I

S.NO	Subject Code	Category	Subject Name
1	22CS511PE	PE	Quantum Computing
2	22CS512PE	PE	Advanced Computer Architecture
3	22CS513PE	PE	Data Analytics
4	22CS514PE	PE	Image Processing
5	22CS515PE	PE	Principles of Programming Languages

Professional Elective-II

S.NO	Subject Code	Category	Subject Name
1	22CS521PE	PE	Computer Graphics
2	22CS522PE	PE	Embedded Systems
3	22CS523PE	PE	Information Retrieval Systems
4	22CS524PE	PE	Distributed Databases
5	22CS525PE	PE	Natural Language Processing

III Year B.Tech. CSE - II Sem

S. No	Subject Code	Category	Subject Name	Hours per			Credits
				L	T	P	
1	22CS601PC	PC	Machine Learning	3	0	0	3
2	22CS602PC	PC	Formal Languages and Automata Theory	3	0	0	3
3	22CS603PC	PC	Artificial Intelligence	3	0	0	3
4	22CS63XPE	PE	Professional Elective – III	3	0	0	3
5	22XX61XOE	OE	Open Elective-I	3	0	0	3
6	22CS604PC	PC	Machine Learning Lab	0	0	2	1
7	22CS605PC	PC	Artificial Intelligence Lab	0	0	2	1
8	22CS63XPE	PE	Professional Elective-III Lab	0	0	2	1
9	22CS601PW	PW	Industrial Oriented Mini Project/ Internship/ Skill Development Course (Big data-Spark)	0	0	4	2
10	22MC610	MC	Environmental Science	3	0	0	0
Total				**18**	**0**	**10**	**20**

Professional Elective-III

S.NO	Subject Code	Category	Subject Name
1	22CS631PE	PE	Full Stack Development
2	22CS632PE	PE	Internet of Things
3	22CS633PE	PE	Scripting Languages
4	22CS634PE	PE	Mobile Application Development
5	22CS635PE	PE	Software Testing Methodologies

Professional Elective -III LAB

S.NO	Subject Code	Category	Subject Name
1	22CS636PE	PE	Full Stack Development Lab
2	22CS637PE	PE	Internet of Things Lab
3	22CS638PE	PE	Scripting Languages Lab
4	22CS639PE	PE	Mobile Application Development Lab
5	22CS63APE	PE	Software Testing Methodologies Lab

Open Elective -I

S.NO	Subject Code	Category	Subject Name
1	22CS611OE	OE	Data Structures
2	22CS612OE	OE	Database Management Systems

- Open Elective subjects' syllabus is provided at the end of the document.
- Open Elective – Students should take Open Electives from the List of Open Electives Offered by Other Departments/Branches Only.

Ex: - A Student of Mechanical Engineering can take Open Electives from all other departments/branches except Open Electives offered by Mechanical Engineering Dept.

IV Year B.Tech. CSE - I Sem

S. No	Subject Code	Category	Subject Name	Hours per			Credits
				L	T	P	
1	22CS701PC	PC	Cryptography and Network Security	3	0	0	3
2	22CS702PC	PC	Compiler Design	3	0	0	3
3	22CS74XPE	PE	Professional Elective-IV	3	0	0	3
4	22CS75XPE	PE	Professional Elective -V	3	0	0	3
5	22XX72XOE	OE	Open Elective - II	3	0	0	3
6	22CS703PC	PC	Cryptography and Network Security Lab	0	0	2	1
7	22CS704PC	PC	Compiler Design Lab	0	0	2	1
8	22CS701PW	PW	Project Stage - I	0	0	6	3
Total				**15**	**0**	**10**	**20**

Professional Elective-IV

S.NO	Subject Code	Category	Subject Name
1	22CS741PE	PE	Graph Theory
2	22CS742PE	PE	Advanced Operating Systems
3	22CS743PE	PE	Soft Computing
4	22CS744PE	PE	Cloud Computing
5	22CS745PE	PE	Ad hoc & Sensor Networks

Professional Elective-V

S.NO	Subject Code	Category	Subject Name
1	22CS751PE	PE	Advanced Algorithms
2	22CS752PE	PE	Agile Methodology
3	22CS753PE	PE	Robotic Process Automation
4	22CS754PE	PE	Blockchain Technology
5	22CS755PE	PE	Software Process & Project Management

Open Elective -II

S.NO	Subject Code	Category	Subject Name
1	22CS721OE	OE	Operating Systems
2	22CS722OE	OE	Software Engineering

- Open Elective – Students should take Open Electives from the List of Open Electives Offered by Other Departments/Branches Only

EX:-A Student of Mechanical Engineering can take Open Electives from all other departments/branches except Open Electives offered by Mechanical Engineering Dept

IV Year B.Tech. CSE - II Sem

S. No	Subject Code	Category	Subject Name	Hours per			Credits
				L	T	P	
1	22HS801MS	HS	Organizational Behavior	3	0	0	3
2	22CS86XPE	PE	Professional Elective-VI	3	0	0	3
3	22XX83XOE	OE	Open Elective - III	3	0	0	3
4	22CS801PW	PW	Project Stage - II including Seminar	0	0	22	11
Total				**9**	**0**	**22**	**20**

Professional Elective-VI

S.NO	Subject Code	Category	Subject Name
1	22CS861PE	PE	Computational Complexity
2	22CS862PE	PE	Distributed Systems
3	22CS863PE	PE	Deep Learning
4	22CS864PE	PE	Human Computer Interaction
5	22CS865PE	PE	Cyber Forensics

Open Elective –III

S.NO	Subject Code	Category	Subject Name
1	22CS831OE	OE	Algorithms Design and Analysis
2	22CS832OE	OE	Introduction to Computer Networks

- Open Elective subjects' syllabus is provided at the end of the document.
- Open Elective – Students should take Open Electives from the List of Open Electives Offered by Other Departments/Branches Only.

Ex: - A Student of Mechanical Engineering can take Open Electives from all other departments/branches except Open Electives offered by Mechanical Engineering Dept.

TEEGALA KRISHNA REDDY ENGINEERING COLLEGE

I YEAR B.TECH. CSE- I SEM

L	T	P	C
3	1	0	4

(22MA101BS) MATRICES AND CALCULUS

Course Objectives: To learn.

- Types of matrices and their properties.
- Concept of a rank of the matrix and applying this concept to know the consistency and solving the system of linear equations.
- Concept of Eigen values and eigenvectors and to reduce the quadratic form to canonical form
- Geometrical approach to the mean value theorems and their application to the mathematical problems
- Evaluation of surface areas and volumes of revolutions of curves
- Evaluation of improper integrals using Beta and Gamma functions.
- Partial differentiation, concept of total derivative
- Finding maxima and minima of function of two and three variables.
- Evaluation of multiple integrals and their applications

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

CO1: Write the matrix representation of a set of linear equation s and to analyze the solution of the system of equations

CO2. Find the Eigen values and Eigen vectors and reduce the quadratic form to canonical form using orthogonal transformations.

CO3. Apply the mean value theorems and evaluate the improper integrals using Beta and Gamma functions

CO4. Find the extreme values of functions of two variables with / without constraints.

CO5. Evaluate the multiple integrals and apply the concept to find areas, volumes.

	PROGRAMME OUTCOMES													
Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3		1								1		
CO2	2	3												
CO3	2	2		1								1		
CO4	2	1		1	2							1		
CO5		1										1		

UNIT - I: Matrices

Rank of a matrix by Echelon form and Normal form, Inverse of Non-singular matrices by Gauss-Jordan method, System of linear equations: Solving system of Homogeneous and Non- Homogeneous equations by Gauss elimination method, Gauss Seidel Iteration Method.

UNIT - II: Eigen values and Eigen vectors

Linear Transformation and Orthogonal Transformation: Eigen values, Eigenvectors 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: Calculus

Mean value theorems: Rolle's theorem, Lagrange's Mean value theorem with their Geometrical Interpretation and applications, Cauchy's Mean value Theorem, Taylor's Series.
Applications of definite integrals to evaluate surface areas and volumes of revolutions of curves (Only in Cartesian coordinates), Definition of Improper Integral: Beta and Gamma functions and their applications.

UNIT - IV: Multivariable Calculus (Partial Differentiation and applications)
Definitions of Limit and continuity.

Partial Differentiation: Euler's Theorem, Total derivative, Jacobian, Functional dependence & independence. Applications: Maxima and minima of functions of two variables and three variables using method of Lagrange multipliers.

UNIT-V: Multivariable Calculus (Integration)

Evaluation of Double Integrals (Cartesian and polar coordinates), change of order of integration (only Cartesian form), Evaluation of Triple Integrals: Change of variables (Cartesian to polar) for double and (Cartesian to Spherical and Cylindrical polar coordinates) for triple integrals.
Applications: Areas (by double integrals) and volumes (by double integrals and triple integrals).

TEXT BOOKS:

1 B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010.

2 R.K. Jain and S.R.K. Iyengar, Advanced Engineering Mathematics, Narosa Publications, 5th Editon, 2016

REFERENCE BOOKS:

1 Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.

2 G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9thEdition, Pearson, Reprint, 2002.

3 N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008.

4 H. K. Dass and Er. Rajnish Verma, Higher Engineering Mathematics, S Chand and Company Limited, New Delhi.

TEEGALA KRISHNA REDDY ENGINEERING COLLEGE

I Year B.Tech. CSE- I Sem	**L**	**T**	**P**	**C**
	3	**1**	**0**	**4**

(22CH102BS) ENGINEERING CHEMISTRY

Course Objectives: To learn.

- To bring adaptability to new developments in Engineering Chemistry and to acquire the skills required to become a perfect engineer
- To include the importance of water in industrial usage, fundamental aspects of battery chemistry, significance of corrosion it's control to protect the structures.
- To imbibe the basic concepts of petroleum and its products
- To acquire required knowledge about engineering materials like cement, smart materials and Lubricants.

Course Outcomes:

1. Apply the principle of potable water for industrial and domestic purposes.
2. Identify the electrolytic and electrochemical cells with different types of batteries and make use of corrosion control methods in industry.
3. Explore the fundamental properties of polymers and other materials in engineering field
4. Distinguish various types of fuels and their applications in day-to-day life.
5. Develop understanding of engineering materials like cement, smart materials and Lubricants.

	PROGRAMME OUTCOMES													
Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2				2	2					2		
CO2	3	2				2	2					3		
CO3	3	2				2	2					2		
CO4	3	2	1				2					3		
CO5	3	2					2					2		

UNIT - I: Water and its treatment:

Introduction to hardness of water – Estimation of hardness of water by complex metric Method and related numerical problems. Potable water and its specifications - Steps involved in the treatment of potable water - Disinfection of potable water by chlorination and break - point chlorination. Defluoridation
Determination of F-ion by ion- selective electrode method.
Boiler troubles: Sludges, Scales and Caustic embrittlement. Internal treatment of Boiler feed water - Calgon conditioning - Phosphate conditioning - Colloidal conditioning, External treatment methods - Softening of water by ion- exchange processes. Desalination of water –Reverse osmosis.

UNIT - II: Battery Chemistry & Corrosion

Introduction - Classification of batteries- primary, secondary and reserve batteries with examples. Basic requirements for commercial batteries. Construction, working and applications of: Zn-air and Lithium ion battery, Applications of Li-ion battery to electrical vehicles. Fuel Cells- Differences between battery and a fuel cell, Construction and applications of Methanol Oxygen fuel cell and Solid oxide fuel cell. Solar cells - Introduction and applications of Solar cells.
Corrosion: Causes and effects of corrosion – theories of chemical and electrochemical corrosion – mechanism of electrochemical corrosion, Types of corrosion: Galvanic, waterline and pitting corrosion. Factors affecting rate of corrosion, Corrosion control methods Cathodic protection – Sacrificial anode and impressed current methods.

UNIT - III: Polymeric materials:

Definition – Classification of polymers with examples – Types of polymerization – addition (free radical addition) and condensation polymerization with examples – Nylon 6:6, Terylene **Plastics:** Definition and characteristics- thermoplastic and thermosetting plastics, Preparation, Properties and engineering applications of PVC and Bakelite, Teflon, Fiber reinforced plastics (FRP). **Rubbers:** Natural rubber and its vulcanization.
Elastomers: Characteristics –preparation – properties and applications of Buna-S, Butyl and Thiokol rubber.
Conducting polymers: Characteristics and Classification with examples-mechanism of Conduction in trans-polyacetylene and applications of conducting polymers.
Biodegradable polymers: Concept and advantages - Polylactic acid and poly vinyl alcohol and their applications.

UNIT - IV: Energy Sources:

Introduction, Calorific value of fuel – HCV, LCV- Dulongs formula. Classification solid fuels: coal – analysis of coal – proximate and ultimate analysis and their significance. Liquid fuels – petroleum and its refining, cracking types – moving bed catalytic cracking. Knocking – octane and cetane rating, synthetic petrol - Fischer-Tropsch's process; Gaseous fuels – composition and uses of natural gas, LPG and CNG, Biodiesel – Transesterification, advantages

UNIT-V: Engineering Materials

Cement: Portland cement, its composition, setting and hardening.
Smart materials and their engineering applications
Shape memory materials- Poly L- Lactic acid. Thermo response materials- Polydactyl amides, Poly vinyl amides
Lubricants: Classification of lubricants with examples-characteristics of a good lubricants - mechanism of lubrication (thick film, thin film and extreme pressure)- properties of lubricants: viscosity, cloud point, pour point, flash point and fire point.

TEXT BOOKS:

1 Engineering Chemistry by P.C. Jain and M. Jain, Dhanpatrai Publishing Company, 2010

2 Engineering Chemistry by Rama Devi, Venkata Ramana Reddy and Rath, Cengage learning, 2016

3 A text book of Engineering Chemistry by M. Thirumala Chary, E. Laxminarayana and K. Shashikala, Pearson Publications, 2021.

4 Textbook of Engineering Chemistry by Jaya Shree Anireddy, Wiley Publications.

REFERENCE BOOKS:

1 Engineering Chemistry by Shikha Agarwal, Cambridge University Press, Delhi (2015)

2 Engineering Chemistry by Shashi Chawla, Dhanpatrai and Company (P) Ltd. Delhi (2011)

TEEGALA KRISHNA REDDY ENGINEERING COLLEGE

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

(22CS103ES) PROGRAMMING FOR PROBLEM SOLVING

Course Objectives: To learn.

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

Course Outcomes : The student will learn

1. Build the algorithm for the given unsolved problems.
2. Apply the concepts of arrays, pointers, strings and structures to find the solution for given problem
3. Apply the various pre-processor commands in a given different real time situations
4. Dissect a problem into sub functions to develop modular reusable code
5. Demonstrate various searching and sorting techniques along with the complexity analysis

	PROGRAMME OUTCOMES													
Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	3	3		2				2	1			2	2
CO2	2	3	3		2				2	1			2	2
CO3	2	3	3		2				2				2	2
CO4	2	3	3		2				2				2	2
CO5	2	3	3		2				2				2	2

UNIT - I: Introduction to Programming

Compilers, compiling and executing a program. Representation of Algorithm - Algorithms for finding roots of a quadratic equations, finding minimum and maximum numbers of a given set, finding if a number is prime number Flowchart/Pseudo code with examples, Program design and structured programming

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

Conditional Branching and Loops: Writing and evaluation of conditionals and consequent branching with if, if-else, switch-case, ternary operator, goto, Iteration with for, while, do while loops I/O: Simple input and output with scanf and printf, formatted I/O, Introduction to stdin, stdout and stderr. Command line arguments

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

arrays Strings: Introduction to strings, handling strings as array of characters, basic string functions available in C (strlen, strcat, strcpy, strstr etc.), arrays of strings Structures: Defining structures, initializing structures, unions, Array of structures Pointers: Idea of pointers, Defining pointers, Pointers to Arrays and Structures, Use of Pointers in self- referential structures, usage of self referential structures in linked list (no implementation) Enumeration data type

UNIT - III: Preprocessor and File handling in C:

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

UNIT - IV: Function and Dynamic Memory Allocation:

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

Recursion: Simple programs, such as Finding Factorial, Fibonacci series etc., Limitations of Recursive functions Dynamic memory allocation: Allocating and freeing memory, Allocating memory for arrays of different data

UNIT-V: Searching and Sorting:

Basic searching in an array of elements (linear and binary search techniques), Basic algorithms to sort array of elements (Bubble, Insertion and Selection sort algorithms), Basic concept of order of complexity through the example programs

TEXT BOOKS:

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

2 B.A. Forouzan and R.F. Gilberg C Programming and Data Structures, Cengage Learning, (3rd Edition)

REFERENCE BOOKS:

1 Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice Hall of India

2 E. Balagurusamy, Computer fundamentals and C, 2nd Edition, McGraw-Hill

3 Yashavant Kanetkar, Let Us C, 18th Edition, BPB

4 R.G. Dromey, How to solve it by Computer, Pearson (16th Impression)

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

6 Herbert Schildt, C: The Complete Reference, Mc Graw Hill, 4th Edition

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

TEEGALA KRISHNA REDDY ENGINEERING COLLEGE

I Year B.Tech. CSE- I Sem

L	T	P	C
2	0	0	2

(22EE104ES) BASIC ELECTRICAL ENGINEERING

Prerequisites: Mathematics

Course Objectives:

- To understand common forms of number representation in logic circuits
- To learn basic techniques for the design of digital circuits and fundamental concepts Used in the design of digital systems.
- Tounderstandtheconceptsofcombinationallogiccircuitsandsequentialcircuits.
- To understand the Realization of Logic Gates Using Diodes &Transistors

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

1. Verify the basic Electrical circuits through different experiments.
2. Evaluate the performance calculations of Electrical Machines and Transformers through various testing methods
3. Analyze the transient responses of R, L and C circuits for different input conditions.
4. To determine the performance of different types of DC, AC machines and Transformers.
5. To import the knowledge of various electrical installations and the concept of power, power factor and its improvement

Course Outcomes	Program Outcomes											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3			2	2	1						1
CO2	2	3	2		2	2				1		1
CO3	1		3	1		3					2	
CO4	1	2	3		1					1		1
CO5	1	1	3	2	2	1						2

UNIT - I:

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

UNIT - II:

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

UNIT - III:

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

UNIT - IV:

Electrical Machines: Construction and working principle of dc machine, performance characteristics of dc shunt machine. Generation of rotating magnetic field, Construction and working of a three-phase induction motor, Significance of torque-slip characteristics. Single-phase induction motor, Construction and working. Construction and working of synchronous generator.

UNIT-V:

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

TEXT BOOKS:

1 D.P. Kothari and I. J. Nagrath, "Basic Electrical Engineering", Tata McGraw Hill, 4 th Edition, 2019.

2 MS Naidu and S Kamakshaiah, "Basic Electrical Engineering", Tata McGraw Hill, 2nd Edition, 2008.

REFERENCE BOOKS:

1 P. Ramana, M. Suryakalavathi, G.T. Chandrasheker, "Basic Electrical Engineering", S. Chand, 2nd Edition, 2019.

2 D. C. Kulshreshtha, "Basic Electrical Engineering", McGraw Hill, 2009

3 M. S. Sukhija, T. K. Nagsarkar, "Basic Electrical and Electronics Engineering", Oxford, 1st Edition, 2012.

4 Abhijit Chakrabarthi, Sudipta Debnath, Chandan Kumar Chanda, "Basic Electrical Engineering", 2nd Edition, McGraw Hill, 2021.

5 L. S. Bobrow, "Fundamentals of Electrical Engineering", Oxford University Press, 2011.

6 E. Hughes, "Electrical and Electronics Technology", Pearson, 2010.

7 V. D. Toro, "Electrical Engineering Fundamentals", Prentice Hall India, 1989

TEEGALA KRISHNA REDDY ENGINEERING COLLEGE

I Year B.Tech. CSE- I Sem

L	T	P	C
1	0	4	3

(22ME105ES) COMPUTER AIDED ENGINEERING GRAPHICS

Course Objectives:

- To develop the ability of visualization of different objects through technical drawings
- To acquire computer drafting skill for communication of concepts, ideas in the design of engineering products

Course Outcomes (COs): Using conventional and computer aided drafting tools, the student will be able to

1. Apply the principles of Engineering Graphics to create Engineering Drawings of various Geometric constructions, conic sections, curves and scales as per BIS standards.
2. Construct orthographic projections for points, lines and planes in different quadrants and Auxiliary views.
3. Draw the sectional views and true shape of sections of solids, by applying principles of projections.
4. Draw the development of surfaces in real time situations.
5. Develop isometric and orthographic views of the objects

Cos	Program Outcomes													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO 1	PSO 2
CO1	2	2			2				1	1		1		
CO2	2	2			2				1	1		1		
CO3	2	2			2				1	1		1		
CO4	2	2			2				1	1		1		
CO5	2	2			2				1	1		1		

UNIT - I:

Introduction to Engineering Graphics: Principles of Engineering Graphics and their Significance, Scales – Plain & Diagonal, Conic Sections including the Rectangular Hyperbola – General method only. Cycloid, Epicycloids and Hypocycloid, Introduction to Computer aided drafting – views, commands and conics

UNIT - II:

Orthographic Projections: Principles of Orthographic Projections – Conventions – Projections of Points and Lines, Projections of Plane regular geometric figures. Auxiliary Planes. Computer aided orthographic projections – points, lines and planes

UNIT - III:

Projections of Regular Solids – Auxiliary Views - Sections or Sectional views of Right Regular Solids – Prism, Cylinder, Pyramid, Cone – Auxiliary views, Computer aided projections of solids – sectional views

UNIT - IV:

Development of Surfaces of Right Regular Solids – Prism, Cylinder, Pyramid and Cone, Development of surfaces using computer aided drafting

UNIT-V:

Isometric Projections: Principles of Isometric Projection – Isometric Scale – Isometric Views – conventions – Isometric Views of Lines, Plane Figures, Simple and Compound Solids – Isometric Projection of objects having non- isometric lines. Isometric Projection of Spherical Parts. Conversion of Isometric Views to Orthographic Views and Vice-versa –Conventions. Conversion of orthographic projection into isometric view using computer aided drafting.

TEXT BOOKS:

1 Engineering Drawing N.D. Bhatt / Charotar

2 Engineering Drawing and graphics Using AutoCAD Third Edition, T. Jeyapoovan, Vikas: S. Chand and company Ltd.

REFERENCE BOOKS:

1 Engineering Drawing, Basant Agrawal and C M Agrawal, Third Edition McGraw Hill

2 Engineering Graphics and Design, WILEY, Edition 2020

3 Engineering Drawing, M. B. Shah, B.C. Rane / Pearson.

4 Engineering Drawing, N. S. Parthasarathy and Vela Murali, Oxford

5 Computer Aided Engineering Drawing – K Balaveera Reddy et al – CBS Publishers

TEEGALA KRISHNA REDDY ENGINEERING COLLEGE

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

0 0 2 1

(22CS106ES) ELEMENTS OF COMPUTER SCIENCE & ENGINEERING

Course Objective: To provide an overview of the subjects of computer science and engineering.

Course Outcomes (COs):

1. Know the working principles of functional units of a basic Computer
2. Understand program development, the use of data structures and algorithms in problem Solving.
3. Know the need and types of operating system, database systems
4. Understand the significance of networks, internet, and WWW and cyber security.
5. Understand Autonomous systems, the application of artificial intelligence.

CO's	Program Outcomes													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO 1	PSO 2
CO1	1												3	
CO2	3											2	1	
CO3	1	2												2
CO4	2	2	1									2	2	
CO5	2	2	1									2	2	

UNIT - I:

Basics of a Computer – Hardware, Software, Generations of computers. Hardware - functional units, Components of CPU, Memory – hierarchy, types of memory, Input and output devices. Software – systems software, application software, packages, frameworks, IDEs.

UNIT - II:

Software development – waterfall model, Agile, Types of computer languages – Programming, markup, scripting Program Development – steps in program development, flowcharts, algorithms, data structures – definition, types of data structures

UNIT - III:

Operating systems: Functions of operating systems, types of operating systems, Device & Resource management

Database Management Systems: Data models, RDBMS, SQL, Database Transactions, data centers, cloud services

UNIT - IV:

Computer Networks: Advantages of computer networks, LAN, WAN, MAN, internet, Wi-Fi, sensor networks, vehicular networks, 5G communications.

World Wide Web – Basics, role of HTML, CSS, XML, Tools for web designing, Social media, Online social networks. Security – information security, cyber security, cyber laws

UNIT-V:

Autonomous Systems: IoT, Robotics, Drones, Artificial Intelligence – Learning, Game Development, natural language processing, image and video processing.

TEXT BOOKS:

1 Invitation to Computer Science, G. Michael Schneider, Macalester College, Judith L.Gersting University of Hawaii, Hilo, Contributing author: Keith Miller University of Illinois, Springfield.

REFERENCE BOOKS:

1 Fundamentals of Computers, Reema Thareja, Oxford Higher Education, Oxford University Press.

2 Introduction to computers, Peter Norton, 8th Edition, Tata McGraw Hill.

3 Computer Fundamentals, Anita Goel, Pearson Education India, 2010.

4 Elements of computer science, Cengage.

TEEGALA KRISHNA REDDY ENGINEERING COLLEGE

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

0 0 2 1

(22CH107BS) ENGINEERING CHEMISTRY LABORATORY

Course Objectives: The course consists of experiments related to the principles of chemistry required for engineering student. The student will learn:

- Estimation of hardness of water to check its suitability for drinking purpose.
- Students are able to perform estimations of acids and bases using conductometry, potentiometry and pH metry methods
- Students will learn to prepare polymers such as Bakelite and nylon-6 in the laboratory
- Students will learn skills related to the lubricant properties such as saponification value surface tension and viscosity of oils.

Course Outcomes (COs): The experiments will make the student gain skills on:

1. Determination of parameters like hardness of water and rate of corrosion of mild steel in various conditions
2. Performing experimental methods such as conductometry, potentiometry and pH metry in order to find out the concentrations or equivalence points of acids and bases.
3. Preparation of polymers like Bakelite and nylon-6
4. Estimation of saponification value, surface tension and viscosity of lubricant oils.
5. Estimation of different types of qualitative and quantitative measurements of a given compound.

Course Outcomes	Program Outcomes													
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	3	2		1			2					2		
CO2	2	2					2					2		
CO3	2	2				1	2					2		
CO4	3	2				2	2					2		
CO5	3	2		2								2		

List of Experiments:

I. Volumetric Analysis: Estimation of Hardness of water by EDTA Complexometry method

II. Conductometry: Estimation of the concentration of an acid by Conductometry**.**

III. Potentiometry: Estimation of the amount of Fe^{+2} by Potentiomentry

IV. pH Metry: Determination of an acid concentration using pH meter.

V. Preparations:

1. Preparation of Bakelite
2. Preparation Nylon – 6.

VI. Lubricants:

1. Estimation of acid value of given lubricant oil.
2. Estimation of Viscosity of lubricant oil using Ostwald's Viscometer

VII. Corrosion: Determination of rate of corrosion of mild steel in the presence and absence of inhibitor**.**

VIII. Virtual lab experiments

1. Construction of Fuel cell and its working
2. Smart materials for Biomedical applications
3. Batteries for electrical vehicles.
4. Functioning of solar cell and its applications

REFERENCE BOOKS:

1	Lab manual for Engineering chemistry by B. Ramadevi and P. Aparna, S Chand Publications, New Delhi (2022)
2	Vogel's text book of practical organic chemistry 5th edition
3	Inorganic Quantitative analysis by A.I. Vogel, ELBS Publications.
4	College Practical Chemistry by V.K. Ahluwalia, Narosa Publications Ltd. New Delhi (2007)

TEEGALA KRISHNA REDDY ENGINEERING COLLEGE

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

0 0 2 1

(22CS108ES) PROGRAMMING FOR PROBLEM SOLVING LABORATORY

[Note: The programs may be executed using any available Open Source/ Freely

Available IDE some of the Tools available are:

Code Lite: https://codelite.org/

Code: Blocks:

http://www.codeblocks.org/

Dev Cpp :

http://www.bloodshed.net/devcpp.html

Eclipse: http://www.eclipse.org

This list is not exhaustive and is NOT in any order of preference]

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

Course Outcomes (COs):

CO1: Formulate the algorithms for simple problems

CO2: Translate the given algorithms to C Programs

CO3: Build the logic using arrays, strings for the given problem

CO4: Make use of pointers in different types to modularize the code with functions

CO5: Apply the appropriate sortig techniques for the given list of elements

Course Outcomes	Program Outcomes													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	3	2						2	3				1
CO2	2		2		2				2	3		2		
CO3			2		2				2	3				3
CO4	2	2			2				2	3		2		3
CO5	2	2		2					2	3		2		3

Practice sessions:

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

Simple numeric problems:

a. Write a program for finding the max and min from the three numbers.
b. Write the program for the simple, compound interest
c. 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.
d. Write a program that prints a multiplication table for a given number and the number of rows in the table. For example, for a number 5 and rows = 3, the output should be:
   5 x 1 = 5
   5 x 2 = 10
   5 x 3 = 15
e. Write a program that shows the binary equivalent of a given positive number between 0 to 255.

Expression Evaluation:

a. A building has 10 floors with a floor height of 3 meters each. A ball is dropped from the top of the building. Find the time taken by the ball to reach each floor. (Use the formula s = ut+(1/2)at^2 where u and a are the initial velocity in m/sec (= 0) and acceleration in m/sec^2 (= 9.8 m/s^2)).
b. Write a C program, which takes two integer operands and one operator from the user, erforms the operation and then prints the result. (Consider the operators +,-,*, /, % and use Switch Statement)
c. Write a program that finds if a given number is a prime number
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 0 and 1. Subsequent terms are found by adding the receding 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.
h. Write a C program to calculate the following, where x is a fractional value. i. 1-x/2 +x^2/4-x^3/6
i. Write a C program to read in two numbers, x and n, and then compute the sum of this geometric progression: 1+x+x^2+x^3+ +x^n. For example: if n is 3 and x is 5, then the program Computes 1+5+25+125.

Arrays, Pointers and Functions:

a. Write a C program to find the minimum, maximum and average in an array of integers.
b. Write a function to compute mean, variance, Standard Deviation, sorting of n elements in a
c. Write a C program that uses functions to perform the following:
d. Addition of Two Matrices
e. Multiplication of Two Matrices
f. Transpose of a matrix with memory dynamically allocated for the new matrix as row and
g. Write C programs that use both recursive and non-recursive functions
h. To find the factorial of a given integer.
i. To find the GCD (greatest common divisor) of two given integers.
j. To find x^n
k. Write a program for reading elements using a pointer into an array and display the values
l. Write a program for display values reverse order from an array using a pointer.
m. Write a program through a pointer variable to sum of n elements from an array.

Files:

a. Write a C program to display the contents of a file to standard output device.
b. Write a C program which copies one file to another, replacing all lowercase characters with their uppercase equivalents.
c. Write a C program to count the number of times a character occurs in a text file. The file name and the character are supplied as command line arguments.
d. Write a C program that does the following:
   It should first create a binary file and store 10 integers, where the file name and 10 values are given in the command line. (hint: convert the strings using atoi function)Now the program asks for an index and a value from the user and the value at that index should be changed to the new value in the file. (hint: use fseek function)The program should then read all 10 values and print them back.
e. Write a C program to merge two files into a third file (i.e., the contents of the first file followedby those of the second are put in the third file).

Strings:

a. Write a C program to convert a Roman numeral ranging from I to L to its decimal equivalent.
b. Write a C program that converts a number ranging from 1 to 50 to Roman equivalent
c. Write a C program that uses functions to perform the following operations
d. To insert a sub-string into a given main string from a given position.
e. To delete n Characters from a given position in a given string.
f. Write a C program to determine if the given string is a palindrome or not (Spelled same in both directions with or without a meaning like madam, civic, noon, abcba, etc.)
g. Write a C program that displays the position of a character ch in the string S or – 1 if S doesn‘t contain ch.
h. Write a C program to count the lines, words and characters in a given text

Miscellaneous:

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

message if an invalid choice is entered

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

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

Sorting and Searching:

a. Write a C program that uses non recursive function to search for a Key value in a given
b. list of integers using linear search method
c. Write a C program that uses non recursive function to search for a Key value in a given
d. Sorted list of integers using binary search method.
e. Write a C program that implements the Bubble sort method to sort a given list of Integers in ascending order.
f. Write a C program that sorts the given array of integers using selection sort in descending order
g. Write a C program that sorts the given array of integers using insertion sort in ascending order
h. Write a C program that sorts a given array of names

TEXT BOOKS:

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

2 B.A. Forouzan and R.F. Gilberg C Programming and Data Structures, Cengage Learning, (3rd Edition)

REFERENCE BOOKS:

1 Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, PHI

2 E. Balagurusamy, Computer fundamentals and C, 2nd Edition, McGraw-Hill

3 Yashavant Kanetkar, Let Us C, 18th Edition, BPB

4 R.G. Dromey, How to solve it by Computer, Pearson (16th Impression)

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

TEEGALA KRISHNA REDDY ENGINEERING COLLEGE

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

(22EE109ES) BASIC ELECTRICAL ENGINEERING LABORATORY

Prerequisites: Basic Electrical Engineering

Course Objectives:

- To measure the electrical parameters for different types of DC and AC circuits using conventional and theorems approach.
- To study the transient response of various R, L and C circuits using different excitations.
- To determine the performance of different types of DC, AC machines and Transformers.

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

1. Verify the basic Electrical DC and AC circuits through different experiments.
2. Evaluate the performance calculations of Transformers through various testing methods.
3. Evaluate the performance calculations of DC Electrical Machines through various testing methods.
4. Evaluate the performance calculations of AC Electrical Machines through various testing methods.
5. Analyze the simple circuit for lighting and power installations.

CO'S	**Program Outcomes**											
	PO 1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	1		1				2		2	2
CO2	3	2	1	1	3	2			1		2	2
CO3	2	1	1		1		1		2	1	2	1
CO4	3	2	2	1	3	1		1	2	2	1	2
CO5	2	3	1	1	1	2			1		2	1

List of experiments/demonstrations:

PART- A (compulsory)

1 Verification of KVL and KCL

2 Verification of Thevenin's and Norton's theorem

3 Transient Response of Series RL and RC circuits for DC excitation

4 Resonance in series RLC circuit

5 Calculations and Verification of Impedance and Current of RL, RC and RLC series circuits

6 Measurement of Voltage, Current and Real Power in primary and Secondary Circuits of a Single-Phase Transformer

7 Performance Characteristics of a DC Shunt Motor

8 Torque-Speed Characteristics of a Three-phase Induction Motor.

PART-B (any two experiments from the given list)

1 Verification of Superposition theorem

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

3 Load Test on Single Phase Transformer (Calculate Efficiency and Regulation)

4 Measurement of Active and Reactive Power in a balanced Three-phase circuit

5 No-Load Characteristics of a Three-phase Alternator

TEXT BOOKS:

1 D.P. Kothari and I. J. Nagrath, "Basic Electrical Engineering", Tata McGraw Hill, 4 th Edition, 2019.

2 MS Naidu and S Kamakshaiah, "Basic Electrical Engineering", Tata McGraw Hill, 2 nd Edition, 2008.

REFERENCE BOOKS:

1 P. Ramana, M. Suryakalavathi, G.T.Chandrasheker,"Basic Electrical Engineering", S. Chand, 2nd Edition, 2019.

2 D. C. Kulshreshtha, "Basic Electrical Engineering", McGraw Hill, 2009

TEEGALA KRISHNA REDDY ENGINEERING COLLEGE

I Year B.Tech. CSE- II Sem

L	T	P	C
3	1	0	4

(22MA201BS) ORDINARY DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS

Prerequisites: Mathematical Knowledge at pre-university level

Course Objectives: To learn

- Methods of solving the differential equations of first and higher order
- Concept, properties of Laplace transforms
- Solving ordinary differential equations using Laplace transforms techniques.
- The physical quantities involved in engineering field related to vector valued functions
- The basic properties of vector valued functions and their applications to line, surface and volume

Course Outcomes (COs): After learning the contents of this paper, the student must be able to

1. Identify whether the given differential equation of first order is exact or not.
2. Apply the concept of differential equation to real world problems.
3. Use the Laplace transforms techniques for solving ODE's.
4. Use gradient to evaluate directional derivatives and conservative vector field.
5. Calculate the line, surface and volume integrals and converting them from one to another.

CO's	Program Outcomes													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PS02
CO1	2	3		1	1						1			
CO2	1	2			2						2			
CO3	3	2		2										
CO4	2	1		2							1			
CO5	2	2									1			

UNIT - I: First Order ODE

Exact differential equations, Equations reducible to exact differential equations, linear and Bnoulli's equations, Orthogonal Trajectories (only in Cartesian Coordinates). Applications: Newton's law of cooling, Law of natural growth and decay

UNIT-II: Ordinary Differential Equations of Higher Order:

Second order linear differential equations with constant coefficients: Non- Homogeneous sterms of the typee ^{ax}, sinax, cosax , polynomial sinx,$e^{axV(x)}$ and xV (x), method of variation of parameters, Equations reducible to linear ODE with constant coefficients: Legendre' s equation, Cauchy Euler equation.

UNIT - III: Laplace transforms

Laplace Transforms: Laplace Transform of standard functions, First shifting theorem, Second shifting theorem, Unit step function, Dirac delta function, Laplace transforms of functions when they are multiplied and divided by't', Laplace transforms of derivatives and integrals of function, Evaluation of integrals by Laplace transforms, Laplace transform of periodic functions, Inverse Laplace transform by different methods, convolution theorem (without proof). Applications: solving Initial value problems by Laplace Transform method.

UNIT - IV: Vector Differentiation

Vector point functions and scalar point functions, Gradient, Divergence and Curl, Directional derivatives, Tangent plane and normal line, Vector Identities, Scalar potential functions, So lenoidal and Irrotational vectors.

UNIT-V: Vector Integration

Line, Surface and Volume Integrals, Theorems of Green, Gauss and Stokes (without proofs) and their applications.

TEXT BOOKS:

1 B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 44th Edition, 2016.

2 R.K.Jain and S.R.K. Iyengar, Advanced Engineering Mathematics, Narosa Publications, 10th Edition, 2020.

REFERENCE BOOKS:

1 Erwin Kreyszig, Advanced Engineering Mathematics, 10 th Edition, John Wiley & Sons, 2018.

2 G.B.Thomas and R.L.Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002.

3 H.K .Dassand Er. Rajnish Verma, Higher Engineering Mathematics, S Chand and Company Limited, New Delhi.

4 N.P.Baliand Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2018.

5 S.L. Ross, differential equations 3rd edition, Wiley India, 2007.

TEEGALA KRISHNA REDDY ENGINEERING COLLEGE

I Year B.Tech. CSE- II Sem

L	T	P	C
3	1	0	4

(22PH202BS) APPLIED PHYSICS

Course Objectives: The objectives of this course for the student are to:

- Understand the basic principles of quantum physics and band theory of solids.
- Understand the underlying mechanism involved in construction and working principles of various semiconductor devices.
- Study the fundamental concepts related to the dielectric, magnetic and energy materials
- Identify the importance of nano scale, quantum confinement and various fabrications echniques.
- Study the characteristics of lasers and optical fibres

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

1. Gain knowledge on fundamentals of modern physics and quantum mechanics, and utilize the knowledge in various applications.
2. Able to apply various electronic circuits by the fundamentals of semiconductor physics.
3. Study the fundamental concepts related to the dielectric, magnetic materials and superconductors
4. Identify the importance of nano scale, quantum confinement and various fabrications
5. Able to apply the learned knowledge of LASER and Fibre optics in communication systems.

CO's	Program Outcomes													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PS02
CO1	3	2	3			1						2		
CO2	2	1			1							2		
CO3	2	1			1							1		
CO4	3			2	2							2		
CO5	2	1			1				1			1		

UNIT - I: QUANTUM PHYSICS AND SOLIDS

Quantum Mechanics: Introduction to quantum physics, blackbody radiation –Energy distribution of black body, Planck's radiation law-photo electric effect-Davis son and Germer experiment–Heisenberg uncertainty principle - Born interpretation of the wave function – time independent Schrodinger wave equation –particle in one dimensional potential box. Solids: free electron theory (Drude & Lorentz, Sommerfeld) - Fermi-Dirac distribution - Bloch'stheorem-Kronig-Penneymodel–E-Kdiagram-effectivemassofelectron-origin of energy bands-classification of solids.

UNIT-II: SEMI CONDUCTORS AND DEVICES

Intrinsic and extrinsic semiconductors – Hall effect - direct and indirect band gap semiconductors -construction, principle of operation and characteristics of P-N Junction diode, Zener diode and bipolar junction transistor (BJT)–LED, PIN diode, avalanche photo diode (APD) and solar cell, their structure, materials, working principle and characteristics.

UNIT - III: DI ELECTRIC, MAGNETIC AND SUPER CONDUCTORS

Dielectric Materials: Basic definitions- types of polarizations (qualitative) - ferroelectric, piezoelectric, and pyroelectric materials – applications – liquid crystal displays (LCD) and crystal oscillators. Magnetic Materials: Hysteresis- soft and hard magnetic materials - magnetostriction, Magneto resistance-applications-bubble memory devices, magnetic field sensors and multi ferroics. Superconductivity: Introduction to super conductors (temperature dependence), Meissner

UNIT - IV: NANO TECHNOLOGY

Nano scale, quantum confinement, surface to volume ratio, bottom-up fabrication: sol-gel, precipitation, combustion methods–top-down fabrication: ball milling-physical vapor deposition (PVD) - chemical vapor deposition (CVD) - characterization techniques - XRD, SEM &TEM –applications of nano materials.

UNIT-V: LASER AND FIBER OPTICS

Lasers: Laser beam characteristics-three quantum processes-Einstein coefficients and their relations lasing action-pumpingmethods-rubylaser,CO2laser,Argonion Laser, Nd: YAGlaser semiconductor laser-applications of laser. Fiber Optics: Introduction to optical fiber- advantages of optical Fibers - total internal reflection construction of optical fiber-acceptance angle-numerical aperture-classification of optical fibers Losses in optical fiber-optical fiber for communication system-applications.

TEXT BOOKS:

1. M.N. Avadhanulu, P.G.Kshirsagar & TVS ArunMurthy ”A Textbook of Engineering Physics”- S. Chand Publications, 11thEdition2019.
2. Engineering Physics by Shatendra Sharma and Jyotsna Sharma, Pearson Publication, 2019
3. Semi conductor Physics and Devices- Basic Principle–Donald A,Neamen, McGrawHill, 4thEdition, 2021.
4. B.K.Pandey and S.Chaturvedi, Engineering Physics, Cengage Learning, 2ndEdition, 2022.
5. Essentials of Nano science & Nano technology by Narasimha Reddy Katta, Typical Creatives NANO DIGEST, 1stEdition, 2021

REFERENCE BOOKS:

1. Quantum Physics, H.C.Verma, TBS Publication, 2ndEdition 2012.
2. Fundamentals of Physics –Halliday, Resnick and Walker, JohnWiley & Sons, 11thEdition, 2018.
3. Introduction to Solid State Physics, Charles Kittel, Wiley Eastern, 2019
4. Elementary Solid State Physics, S.L.Gupta and V.Kumar, Pragathi Prakashan, 2019.
5. A.K. Bhandhopadhya -Nano Materials, New AgeInternational, 1stEdition, 2007.
6. Energy Materials a Short Introduction to Functional Materials for Energy Conversion and Storage Aliaksandr S.Bandarenka, CRC Press Taylor & Francis Group
7. Energy Materials, Taylor & FrancisGroup, 1stEdition, 2022.

TEEGALA KRISHNA REDDY ENGINEERING COLLEGE

I Year B.Tech. CSE- II Sem

L	T	P	C
0	1	3	2.5

(22ME203ES) ENGINEERING WORKSHOP

Pre- requisites: Practical skill

Course Objectives:

- To Study of different hand operated power tools, uses and their demonstration.
- To gain a good basic working knowledge required for the production of various Engineering products.
- To provide hands on experience about use of different engineering materials, tools, equipments and processes those are common in the engineering field.
- To develop a right attitude, team working, precision and safety at workplace.
- It explains the construction, function, use and application of different working tools, Equipment and machines.
- To study commonly used carpentry joints
- To have practical exposure to various welding and joining processes
- Identify and use marking out tools, hand tools, measuring equipment and to work to prescribed tolerances.

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

1. Demonstrate various machines, tools and their operations.
2. Apply different workshop trades like fitting, carpentry, foundry and welding.
3. Practice work shop trades like Tim smith, Black smithy
4. Apply suitable tools for different trades of engineering processes including drilling, material removing, measuring, chiseling.
5. Apply basic electrical engineering knowledge for house wiring practice.

CO's	Program Outcomes													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PS02
CO1	2	1	1						2	1		1		
CO2	2	2	1						2	1		1		
CO3	2	1	1						2	1		1		
CO4	2	1	1						2	1		1		
CO5	2	2	1						2	1		1		

1. TRADES FOR EXERCISES:

At least two exercises from each trade:

I. Carpentry–(T-Lap Joint, Dovetail Joint, Mortise &Tenon Joint)
II. Fitting–(V-Fit, Dovetail Fit & Semi-circular fit)
III. Tin-Smithy–(Square Tin, Rectangular Tray& Conical Funnel)
IV. Foundry–(Preparation of Green Sand Mould using Single Piece and Split Pattern)

V. V. Welding Practice–(Arc Welding & Gas Welding)

VI. House-wiring–(Parallel & Series, Two-way Switch and Tube Light)
VII. Black Smithy–(Round to Square, Fan Hook and S-Hook)

2. TRADES FOR DEMONSTRATION & EXPOSURE:

Plumbing, Machine Shop, Metal Cutting(WaterPlasma), Power tools in construction and Wood Working

TEXT BOOKS:

1 Workshop Practice B.L.Juneja Cengage

2 Workshop Manual K.Venugopal, Anuradha.

REFERENCE BOOKS:

1 Workshop Manual -P.Kannaiah, K.L.Narayana, Scitech

2 Workshop Manual, VenkatReddy, BSP

TEEGALA KRISHNA REDDY ENGINEERING COLLEGE

I Year B.Tech. CSE- II Sem

L	T	P	C
2	0	0	2

(22EN204HS) ENGLISH FOR SKILL ENHANCEMENT

Course Objectives:

- Improve the language proficiency of students in English with an emphasis on Vocabulary, Grammar, Reading and Writing skills.
- Develop study skills and communication skills in various professional situations
- Equip students to study engineering subjects more effectively and critically using the theoretical and practical components of the syllabus

Course Outcomes (COs): Students will be able to:

1. Choose appropriate vocabulary and sentence structures for their oral and written communication.
2. Demonstrate their understanding of the rules of functional grammar.
3. Develop comprehension skills from the known and unknown passages.
4. Take an active part in drafting paragraphs, letters, essays, abstracts, précis and reports in Various contexts.
5. Acquire basic proficiency in reading and writing modules of English

CO's	Program Outcomes													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PS02
CO1						3			3	3		3		
CO2						2			3	3		3		
CO3						3			2	3		3		
CO4						2			3	3		2		
CO5						3			2	3		3		

UNIT - I:

Chapter entitled 'Toasted English' by R.K. Narayan from "English: Language, Context and Culture" published by Orient Black Swan, Hyderabad.

Vocabulary: The Concept of Word Formation -The Use of Prefixes and Suffixes – Acquaintance with Prefixes and Suffixes from Foreign Languages to form Derivatives– Synonyms and Antonyms

Grammar: Identifying Common Errorsin Writing with Reference to Articles and Prepositions.

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

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

UNIT-II:

Chapter entitled **'ApproJRD'** by **Sudha Murthy** from "English: Language, Context and Culture" Published by Orient Black Swan, Hyderabad.

Vocabulary: Words Often Misspelt -Homophones, Homonyms and Homographs

Grammar: Identifying Common Errorsin Writing with Reference to Noun-pronoun Agreement and Subject-verb Agreement

Reading: Sub-Skills of Reading –Skimming and Scanning–Exercises for Practice

Writing: Nature and Style of Writing -Defining/ Describing People, Objects, Places and Events –Classifying- Providing Examples or Evidence.

UNIT - III:

Chapter entitled **'Lessons from Online Learning' by F.Haider Alvi, Deborah Hurst et al** from" **English:** Language, Context and Culture" published by Orient Black Swan, Hyderabad.

Vocabulary: Words Often Confused- Words from Foreign Languages and their Use in English.

Grammar: Identifying Common Errors in Writing with Reference to Misplaced Modifiers and Tenses.

Reading: Sub-Skills of Reading–Intensive Reading and Extensive Reading–Exercises for Practice.

Writing: Format of a Formal Letter-Writing Formal Letters E.g.., Letter of Complaint, Letter of Requisition, Email Etiquette, Job Application with CV/Resume.

UNIT - IV:

Chapter entitled **'Art and Literature** ' by **Abdul Kalam** from "English: Language, Context and Culture" published by Orient Black Swan, Hyderabad.

Vocabulary: Standard Abbreviations in English

Grammar: Redundancies and Clichés in Oral and Written Communication.

Reading: Survey, Question, Read, Recite and Review (SQ3RMethod)- Exercises for Practice

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

UNIT-V:

Chapter entitled 'Go, Kissthe World 'by **Subroto Bagchi** from "English: Language, Context and Culture" published by Orient Black Swan, Hyderabad.

Vocabulary: Technical Vocabulary and their Usage

Grammar: Common Errors in English (Covering all the other aspects of grammar which were not covered in the previous units)

Reading: Reading Comprehension-Exercises for Practice

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

TEXT BOOKS:

1 "English: Language, ContextandCulture"byOrientBlackSwanPvt.Ltd,Hyderabad.2022.Print

REFERENCE BOOKS:

1 Effective Academic Writing by Liss and Davis(OUP)

2 Richards,JackC.(2022)InterchangeSeries.Introduction,1,2,3.CambridgeUniversityPress

3 Wood, F.T.(2007).Remedial English Grammar. Macmillan.

4 Chaudhuri, SantanuSinha.(2018).Learn English: A Fun Book of Functional Language, Grammar and Vocabulary.(2nded.,).Sage Publications India Pvt. Ltd.

5 (2019).Technical Communication. Wiley India Pvt. Ltd.

6 Vishwamohan, Aysha.(2013). English for Technical Communication for Engineering Students. McGraw –Hill Education India Pvt. Ltd.

7 Swan, Michael. (2016). Practical English Usage. Oxford University Press. Fourth Edition.

TEEGALA KRISHNA REDDY ENGINEERING COLLEGE

I Year B.Tech. CSE- II Sem

L	T	P	C
2	0	0	2

(22EC205ES) ELECTRONIC DEVICES AND CIRCUITS

Course Objectives:

- To introduce components such as diodes, BJTs and FETs.
- To know the applications of devices.
- To know the switching characteristics of devices
- To know the clipping concepts of a signal

Course Outcomes (COs): Upon completion of the Course, the students will be able to:

1. Apply the concepts of Diode applications.
2. Apply concepts of Non-Linear application in solving various problems.
3. Analyse the switching concepts of BJT
4. Compare BJT with FET and MOSFET
5. Design circuits using Special Purpose Devices

CO's	Program Outcomes													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PS02
CO1	2	1	1			1	1					1		
CO2	3	2	1	1		2	1					1		
CO3	3	3	1	1		2	1					1		
CO4	3	2	2	1							1	1	1	
CO5	3	2	2	1							1	1	2	

UNIT - I:

Diodes: Diode - Static and Dynamic resistances, Equivalent circuit, Diffusion and Transition Capacitances, V-I Characteristics, Diode as a switch- switching times.

UNIT-II:

Diode Applications: Rectifier - Half Wave Rectifier, Full Wave Rectifier, Bridge Rectifier, Rectifiers with Capacitive and Inductive Filters, Clippers-Clipping at two independent levels, Clamper-Clamping Circuit Theorem, Clamping Operation, Types of Clampers.

UNIT - III:

Bipolar Junction Transistor (BJT): Principle of Operation, Common Emitter, Common Base and Common Collector Configurations, Transistor as a switch, switching times,

UNIT - IV:

Junction Field Effect Transistor (FET): Construction, Principle of Operation, Pinch-Off Voltage, Volt-Ampere Characteristic, Comparison of BJT and FET, FET as Voltage Variable Resistor, MOSFET, MOSTET as a capacitor.

UNIT-V:

Special Purpose Devices: Zener Diode - Characteristics, Zener diode as Voltage Regulator, Principle of Operation - SCR, Tunnel diode, UJT, Varactor Diode, Photo diode, Solar cell, LED, Schottky diode

TEXT BOOKS:

1 Jacob Millman - Electronic Devices and Circuits, McGraw Hill Education.

2 Robert L. Boylestead, Louis Nashelsky- Electronic Devices and Circuits theory,11th Edition, 2009, Pearson.

REFERENCE BOOKS:

1 Horowitz -Electronic Devices and Circuits, David A. Bell – 5thEdition, Oxford.

2 Chinmoy Saha, Arindam Halder, Debaati Ganguly - Basic Electronics Principles and Applications, Cambridge, 2018.

TEEGALA KRISHNA REDDY ENGINEERING COLLEGE

I Year B.Tech. CSE- II Sem

L	T	P	C
0	1	2	2

(22CS206ES) PYTHON PROGRAMMING LABORATORY

Course Objectives:

- To install and run the Python interpreter
- To learn control structures.
- To Understand Lists, Dictionaries in python
- To Handle Strings and Files in Python

Course Outcomes (COs): After completion of the course, the student should be able to

1. Develop the application specific codes using python
2. Understand Strings, Lists, Tuples and Dictionaries in Python
3. Verify programs using modular approach, file I/O, Python standard library
4. Implement Digital Systems using Python
5. Learn NUmpy, PlotPy, SCIpy packages

Note: The lab experiments will be like the following experiment examples.

CO's	Program Outcomes													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PS02
CO1	2	3	2						2	3			2	1
CO2	2		2		2				2	3		2	2	
CO3			2		2				2	3			2	3
CO4	2	2			2				2	3		2	2	3
CO5	2	2			2				2	3		2	2	3

Week-1:

1. i. Use a web browser to go to the Python website http://python.org. This page contains information about Python and links to Python-related pages, and it gives you the ability to search the Python documentation.
   ii. Start the Python interpreter and type help () to start the online help utility.
2. Start a Python interpreter and use it as a Calculator.
3. i. Write a program to calculate compound interest when principal, rate and number of periods are given
   ii. Given coordinates(x1,y1),(x2,y2)find the distance between two points
4. Read name, address, email and phone number of a person through keyboard and print the details.

Week-2:

1 Print the below triangle using for loop.

2 Write a program to check whether the given input is digit or lowercase character or uppercase character or a special character(use 'if-else-if' ladder)

3 Python Program to Print the Fibonacci sequence using while loop

4 Python program to print all prime numbers in a given interval(use break)

Week-3:

1 i. Write a program to convert a list and tuple into arrays
ii. Write a program to find common values between two arrays.

2 Write a function called gcd that takes parameters and b and returns their greatest command divisor.

3 Write a function called palindrome that takes a string argument and returns True if it is a Palindrome and False otherwise. Remember that you can use the built-in function len to Check the length of a string.

Week-4:

1 Write a function called is sorted that takes a list as a parameter and returns True if the list Is sorted in ascending order and False otherwise.

2 Write a function called has duplicates that takes a list and returns True if there is any Element that appears more than once. It should not modify the original list.
i. Write a function called remove duplicates that takes a list and returns a new list with only the unique elements from the original. Hint: they don't have to be in the same order.
ii. The wordlist I provided, words.txt, doesn't contain single letter words. So you might want to add "I", "a", and the empty string.
iii. Write a python code to read dictionary values from the user. Construct a function to invert its content. i.e., keys should be values and values should be keys.

3 i. Add a comma between the characters. If the given word is 'Apple', it should become 'A,p,p,l,e'
ii. Remove the given word in all the places in a string?
iii. Write a function that takes a sentence as an input parameter and replaces the first letter of every word with the corresponding upper-case letter and the rest of the letters in the word by corresponding letters in lowercase without using a built-in function?

4 Write a recursive function that generates all binary strings of n-bit length

Week-5:

1. i. Write a python program that defines a matrix and prints
ii. Write a python program to perform addition of two square matrices
iii. Write a python program to perform multiplication of two square matrices

2. How do you make a module? Give an example of construction of a module using different geometrical shapes and operations on the masits functions.

3 Use the structure of exception handling all general-purpose exceptions.

Week-6:

1. a) Write a function called draw rectangle that takes a Canvas and a Rectangle as Arguments and draws a representation of the Rectangle on the Canvas.
b) Add an attribute named color to your Rectangle objects and modify draw rectangles that it uses the color attribute as the fill color
c) Write a function called draw point that takes a Canvas and a Point as arguments and draws are presentation of the Point on the Canvas.
d) Define a new class called Circle with appropriate attributes and instantiate a few Circle objects write a function called draw circle that draws circles on the canvas.

2. Write a Python program to demonstrate the usage of Method Resolution Order(MRO) in multiple levels of Inheritances.

3. Write a python code to read a phone number and email id from the user and validate it for correctness.

Week-7

1. Write a Python code to merge two given file contents into a third file.
2. Write a Python code to open a given file and construct a function to check for given words present in it and display on found.
3. Write a Python code to Read text from a text file, find the word with most number of occurrences
4. Write a function that reads a file file1 and displays the number of words, number of vowels, blank spaces, lowercase letters and uppercase letters.

Week-8

1. Import numpy, Plotpy and Scipy and explore their functionalities.
2. a) Install Num Py package with pip and explore it.
3. Write a program to implement Digital Logic Gates–AND,OR,NOT,EX-OR
4. Write a program to implement Half Adder, Full Adder, and Parallel Adder
5. Write a GUI program to create a window wizard having two text labels, two text fields and two buttons as Submit and Reset.

TEXT BOOKS:

1 Super charged Python: Take your code to the next level, Overland

2 Learning Python, MarkLutz, O'reilly

REFERENCE BOOKS:

1 Python Programming: A Modern Approach, Vamsi Kurama, Pearson

2 Python Programming A Modular Approach with Graphics, Database, Mobile, and Web Applications, Sheetal Taneja, Naveen Kumar, Pearson

3 Programming with Python, A User's Book, Michael Dawson, Cengage Learning, India Edition

4 Think Python, Allen Downey, Green Tea Press

5 Core Python Programming, W.Chun, Pearson

6 Introduction to Python, Kenneth A.Lambert, Cengage

TEEGALA KRISHNA REDDY ENGINEERING COLLEGE

I Year B.Tech. CSE- II Sem

L	T	P	C
0	0	3	1.5

(22PH207BS) APPLIED PHYSICS LABORATORY

Course Objectives: The objectives of this course for the student to

- Capable of handling instruments related to the Hall effect and photoelectric effect experiments and their measurements.
- Understand the characteristics of various devices such as PN junction diode, Zener diode, BJT, LED, solar cell, lasers and optical fiber and measurement of energy gap and resistivity of semiconductor materials.
- Able to measure the characteristics of dielectric constant of a given material.
- Study the behavior of B-H curve of ferromagnetic materials
- Understanding the method of least squares fitting.

Course Outcomes (COs): The students will be able to:

1. Able to study the (V-I/P-I) characteristics of LED, LASER and Solar cell.
2. Able to understand the energy gap of semiconductor diode
3. Correlate the theory of Hall Effect with experiment by determining the Hall coefficient.
4. Examine the Bending losses for different Optical fiber cables.
5. Able to understand various concepts-Resonance, Time constant and Magnetic field using LCR, RC, Stewart and Gees circuits.

CO'S	Program Outcomes													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PS02
CO1	2		1		2				2			2		
CO2	2		1		1				2			2		
CO3	2			1	2				1			2		
CO4	2		2		1							2		
CO5	2	2	2									2		

LIST OF EXPERIMENTS:

1. Determination of work function and Planck's constant using photo electric effect.
2. Determination of Hall co-efficient and carrier concentration of a given semiconductor.
3. Characteristics of series and parallel LCR circuits.
4. V-I characteristics of a p-njunction diode and Zener diode.
5. Input and output characteristics of BJT(CE,CB &CC configurations).
6. a)V-I and L-I characteristics of light emitting diode(LED).
   b) V-I Characteristics of solar cell.
7. Determination of Energy gap of a semi conductor
8. R-C Circuit: To determine the time constant of R-Ccircuit.
9. Stewart–Gee's experiment: Determination of magnetic field along the axis of a current carrying coil.

10. Determination of bending losses of optical fiber.
11. a)Determination of wavelength of the given LASER beam using diffraction grating.
    b)Determination of Acceptance Angle and Numerical Aperture of an optical fiber.
12. Understanding the method of least squares–Torsional pendulum as an example

Note: Any 8 experiments are to be performed.

REFERENCEBOOK:

S.Balasubramanian, M.N. Srinivasan "A Text book of Practical Physics"- SChand Publishers

TEEGALA KRISHNA REDDY ENGINEERING COLLEGE

I Year B.Tech. CSE- II Sem

L	T	P	C
0	0	2	1

(22EN208HS) ENGLISH LANGUAGE AND COMMUNICATION SKILLS LABORATORY

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

Course Objectives:

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

Course Outcomes (COs): Students should be able to

1. Employ the nuances of English language through audio-visual experience and group activities.
2. Articulate a neutral accent of English for intelligibility by overcoming mother tongue influence.
3. Develop the skill of using appropriate language in various speaking contexts.
4. Understand how to use language to make formal presentations.
5. Interpret speaking skills with clarity and confidence which in turn enhances their interpersonal skills.

CO'S	Program Outcomes													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PS02
CO1					3	2			3	3		3		
CO2					3	3			3	3		3		
CO3						3			3	3		3		
CO4					3				3	3		3		
CO5									3	3		3		

Exercise – I

CALL Lab:

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

Practice: Introduction to Phonetics –Speech Sounds–Vowels and Consonants–MinimalPairs Consonant Clusters-Past Tense Marker and Plural Marker-Testing Exercises

ICS Lab:

Understand: Spoken vs. Written language- Formal and Informal English.

Practice: Ice-Breaking Activity and JAM Session-Situational Dialogues–Greetings–Taking Leave–

Introducing One self and Others.

Exercise II CALL Lab :

Understand: Structure of Syllables–Word Stress–Weak Forms and Strong Forms–Stress pattern in sentences–Intonation.

Practice: Basic Rules of Word Accent-Stress Shift-Weak Forms and Strong Forms-Stress pattern in sentences–In to nation-Testing Exercises

ICS Lab:

Understand: Features of Good Conversation – Strategies for Effective Communication.

Practice: Situational Dialogues–Role Play-Expressions in Various Situations– Making Requests and Seeking Permissions-Telephone Etiquett

Exercise-III

CALL Lab:

Understand: Errors in Pronunciation- Neutralising Mother Tongue Interference(MTI).

Practice: Common Indian Variants in Pronunciation–Differences between British and American Pronunciation-Testing Exercises

ICS Lab:

Understand: Descriptions- Narrations –Giving Directions and Guidelines–Blog Writing

Practice: Giving Instructions – Seeking Clarifications – Asking for and Giving Directions –Thanking and Responding – Agreeing and Disagreeing – Seeking and Giving Advice – Making Suggestions.

Exercise–IV

CALL Lab:

Understand: Listening for General Details

Practice: Listening Comprehension Tests –Testing Exercises

ICS Lab:

Understand: Public Speaking–Exposure to Structured Talks- Non-verbal Communication Presentation Skills.

Practice: Making a Short Speech–Extempore-Making a Presentation.

Exercise–V

CALL Lab:

Understand: Listening for Specific Details.

Practice: Listening Comprehension Tests-Testing Exercises

ICS Lab:

Understand: Group Discussion

Practice: Group Discussion

Minimum Requirement to infrastructural facilities for ELCS Lab:

1. Computer Assisted Language Learning(CALL) Lab:

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

System Requirement (Hardware component):

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

i. Computers with Suitable Configuration
ii. High Fidelity Headphones

2. Inter active Communication Skills(ICS)Lab:

The Interactive Communication Skills Lab: A Spacious room with movable chairs and audio visual aids with a Public Address System, a T. V. or LCD, a digital stereo –audio & video system and camcorder etc.

Source of Material(Master Copy):
Exercises in Spoken English. Part1,2, 3.CIEFL and Oxford University Press
Suggested Software:

- Cambridge Advanced Learners' English Dictionary with CD.
- Grammar Made Easy by Darling Kindersley.
- Punctuation Made Easy by Darling Kindersley.
- Oxford Advanced Learner's Compass, 10th Edition.
- English in Mind (Series1-4), Herbert Puchta and JeffStranks with Meredith Levy, Cambridge.
- English Pronunciation in Use (Elementary, Intermediate, Advanced) Cambridge University Press.
- English Vocabulary in Use (Elementary, Intermediate, Advanced) Cambridge University Press.
- TOEFL & GRE (KAPLAN, AARCO & BARRONS, USA, Cracking GRE by CLIFFS).
- Digital All Orell Digital Language Lab(Licensed Version)

REFERENCEBOOKS:

1 (2022). English Language Communication Skills–Lab Manual cum Workbook .C engage Learning India Pvt. Ltd.
2 Shobha, KN &Rayen ,J.Lourdes.(2019). Communicative English–A workbook. Cambridge University Press
3 Kumar, Sanjay & Lata, Pushp.(2019). Communication Skills: A Workbook. Oxford University Press
4 Board of Editors.(2016).ELCS Lab Manual: A Work book for CALL and ICS Lab Activities. Orient Black Swan Pvt.Ltd.
5 Mishra, Veerendraetal.(2020). English Language Skills: A Practical Approach. Cambridge University Press

TEEGALA KRISHNA REDDY ENGINEERING COLLEGE

I Year B.Tech. CSE- II Sem

L	T	P	C
0	0	2	1

(22CS209ES) IT WORKSHOP

Course Objectives: The IT Workshop for engineers is a training lab course spread over 60hours.

The modules include training on PC Hardware, Internet & World Wide Web and Productivity tools including Word, Excel, Power Point and Publisher.

Course Outcomes :

1. Perform Hardware trouble shooting
2. Understand Hardware components and interdependencies
3. Safeguard computer systems from viruses /worms
4. Document/ Presentation preparation
5. Perform calculations using spread sheets

CO'S	Program Outcomes													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PS02
CO1	3	3	1				2			3		2	2	2
CO2	3	2	2	3									3	3
CO3		2	2		3				3				3	2
CO4			2	2					3	3			3	
CO5						3				2	2			

PC Hardware

Task1: Identify the peripherals of a computer, componentsina CPU and it s functions .Draw the block

Diagram of the CPU along with the configuration of each peripheral and submit to you in struct or.

Task 2: Every student should disassemble and assemble the PC back to working condition .Lab instructors should verify the work and follow it up with a Viva. Also students need to go through the video which shows the process of assembling a PC. A video would be given as part of the course content.

Task 3: Every student should individually install MS windows on the personal computer Lab instructor should verify the installation and follow it up with a Viva.

Task 4: Every student should install Linux on the computer. This computer should have windows installed. The system should be configured as dual boot with both Windows and Linux. Lab instructors should verify the installation and follow it up with a Viva

Internet & World Wide Web

Task1: Orientation & Connectivity Boot Camp: Students should get connected to their Local Area Network and access the Internet. In the process they configure the TCP/IP setting. Finally students should demonstrate, to the instructor, how to access the websites and email. If there is no internet connectivity preparations need to be made

by the instructors to simulate the WWW on the LAN.

Task2: Web Browsers, Surfing the Web: Students customize their web browsers with the LAN proxy settings, bookmarks, search toolbars and pop up blockers. Also, plug-ins like Macromedia Flash and JRE for applets should be configured

Task 3: Search Engines & Netiquette: Students should know what search engines are and how to use the search engines. A few topics would be given to the students for which they need to search on Google. This should be demonstrated to the instructors by the student

Task 4: Cyber Hygiene: Students would be exposed to the various threats on the internet and would be asked to configure their computer to be safe on the internet. They need to customize their browsers to block pop ups, block active downloads to avoid viruses and/or worms.

LaTeX and WORD

Task1–Word Orientation: The mentor needs to give an overview of LaTeX and Microsoft(MS) office or equivalent(FOSS) tool word: Importance of LaTeX and MS office or equivalent(FOSS) tool Word as word Processors, Details of the four tasks and features that would be covered in each, Using LaTeX .and word – Accessing, overview of toolbars, saving files, Using help and resources, rulers, format painter in word.

Task 2: Using LaTeX and Word to create a project certificate. Features to be covered: - Formatting Fontsin word, Drop Capin word, Applying Text effects, Using Character Spacing, Borders and Colors, Inserting Header and Footer, Using Date and Time option in both LaTeX and Word.

Task 3: Creating project abstract Features to be covered: -Formatting Styles, inserting table, Bullets and Numbering, Changing Text Direction, Cell alignment, Footnote, Hyperlink, Symbols, Spell Check, Track Changes**.**

Task 4: Creating a Newsletter: Features to be covered: - Table of Content, Newspaper columns, Images from files and clipart, Drawing toolbar and Word Art, Formatting Images, Textboxes, Paragraphs and Mail Merge in word.

Excel

Excel Orientation: The mentor needs to tell the importance of MS office or equivalent (FOSS) tool Excel as a Spreadsheet tool, give the details of the four tasks and features that would be covered in each. Using Excel– Accessing, overview of toolbars, saving excel files, Using help and resources.

Task1: Creating a Scheduler-Features to be covered: Gridlines, Format Cells, Summation, auto fill, Formatting Text

Task 2 : Calculating GPA - .Features to be covered:- Cell Referencing, Formulae in excel – average, std. deviation, Charts, Renaming and Inserting work sheets, Hyper linking, Count function, LOOKUP/VLOOKUP

Task3: Split cells, freeze panes, group and outline, Sorting, Boolean and logical operators, Conditional formatting

Power point

Task 1: Students will be working on basic power point utilities and tools which help them create basic power point presentations. PPT Orientation, Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering Auto Shapes, Lines and Arrows in Power Point.

Task 2: Interactive presentations - Hyperlinks, Inserting –Images, Clip Art, Audio, Video, Objects, Tables and Charts.

Task 3: Master Layouts (slide, template, and notes), Types of views (basic, presentation, slide slotter, notes etc), and Inserting–Background, textures, Design Templates, Hidden slides.

REFERENCEBOOKS:

1 Comdex Information Technology course toolkit Vikas Gupta, WILEY Dreamtech
2 The Complete Computer upgrade and repair book, 3rdedition Cheryl ASchmidt, WILEY Dreamtech
3 Introduction to Information Technology, ITL Education Solutions limited, Pearson Education.
4 PC Hardware- A Handbook–Kate J.Chase PHI(Microsoft)
5 LaTeX Companion–Leslie Lamport,PHI/Pearson.
6 IT Essentials PC Hardware and Software Companion Guide Third Edition by David Anfinson and Ken Quamme.– CISCO Press, Pearson Education.
7 IT Essentials PC Hardware and Software Labs and Study Guide Third Edition by PatrickRegan – CISCO Press, Pearson Education.

TEEGALA KRISHNA REDDY ENGINEERING COLLEGE

II Year B.Tech. CSE- I Sem

L	T	P	C
3	0	0	3

(22EC308PC) DIGITAL ELECTRONICS

Course Objectives:

1. To understand common forms of number representation in logic circuits.
2. To learn basic techniques for the design of digital circuits and fundamental concepts used in the design of digital systems.
3. To understand the concepts of combinational logic circuits and sequential circuits.
4. To understand the concepts of memory design.

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

1 Apply concepts of numerical information in different forms and Boolean Algebra theorems.

2 Analyse Postulates of Boolean algebra and to minimize combinational functions, and design the combinational circuits

3 Analyse Combinational Circuits for various cyclic functions

4 Design sequential circuits

5 Design of Programmable Devices

CO'S	Program Outcomes													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PS02
CO1	3	2	3	1	2	1						2	2	
CO2	3	2	2	1	2	1						2	2	
CO3	2	3	3	2	2	1						1	2	
CO4	3	2	1	1	1								1	
CO5	2	2	2	1									1	

UNIT-I

BOOLEAN ALGEBRA AND LOGIC GATES: Digital Systems, Binary Numbers, Number base conversions, Octal and Hexadecimal Numbers, complements, Signed binary numbers, Binary codes, Binary Storage and Registers, Binary logic.

Basic Definitions, Axiomatic definition of Boolean Algebra, Basic theorems and properties of Boolean algebra, Boolean functions, canonical and standard forms, other logic operations, Digital logic gates.

UNIT-II

GATE – LEVEL MINIMIZATION: The map method, Four-variable map, Five-Variable map, product of sums simplification Don't-care conditions, NAND and NOR implementation other Twolevel implementations, Exclusive –Or function

UNIT-III

COMBINATIONAL LOGIC: Combinational Circuits, Analysis procedure Design procedure, Binary

Adder-Subtractor Decimal Adder, Binary multiplier, magnitude comparator, Decoders, Encoders, Multiplexers, HDL for combinational circuits.

UNIT-IV

SEQUENTIAL LOGIC: Sequential circuits, latches, Flip-Flops Analysis of clocked sequential circuits, state Reduction and Assignment, Design Procedure. Registers, shift Registers, Ripple counters, synchronous counters, other counters

UNIT-V

MEMORIES AND ASYNCHRONOUS SEQUENTIAL LOGIC: Introduction, RandomAccess Memory, Memory Decoding, Error Detection and correction Read-only memory, Programmable logic Array programmable Array logic, Sequential Programmable Devices.

Introduction, Analysis Procedure, Circuits with Latches, Design Procedure, Reduction of state and Flow Tables, Race-Free state Assignment Hazards, Design Example.

TEXT BOOKS:

1 Digital Design–Third Edition, M.Morris Mano, Pearson Education/PHI
2 Digital Principles and Applications Albert Paul Malvino Donald P.Leach TATA Mc Graw Hill Edition.
3 Fundamentals of Logic Design, Roth, 5thEdition, Thomson

REFERENCEBOOKS

1 Switching and Finite Automata Theory by Zvi. Kohavi, Tata Mc Graw Hill.
2 Switching and Logic Design, C.V.S.Rao, Pearson Education
3 Digital Principles and Design– Donald D.Givone, Tata Mc Graw Hill, Edition
4 Fundamentals of Digital Logic and Microcomputer Design, 5TH Edition, M. Rafiqu zzaman JohnWiley.

TEEGALA KRISHNA REDDY ENGINEERING COLLEGE

II Year B.Tech. CSE- I Sem

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3	0	0	3

(22CS301PC) DATA STRUCTURES

Pre requisites: Programming for Problem Solving

Course Objectives:

- Exploring basic data structures such as stacks and queues.
- Introduces a variety of data structures such as hash tables, search trees, tries, heaps, graphs
- Introduces sorting and pattern matching algorithms

Course Outcomes:

1. Construct appropriate data structures to represent data items in real-world problems with linear data structures.
2. Ability to apply the linear representations of skip lists and dictionaries and hash tables to overcome problems of sequential data structures.
3. Ability to design programs using a variety of non-linear data structures balanced trees
4. Able to implement the principal algorithms graph traversal methods. and searching, and sort in
5. Implement and know the applications of pattern matching

CO'S	Program Outcomes													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PS02
CO1	3												2	1
CO2	3	2	1	1									2	1
CO3	3	2	1	1	2				1				2	1
CO4	3	2	1	1	2				1				2	1
CO5	3				2				1				2	1

UNIT-I

Introduction to Data Structures, abstract data types, Linear list – singly linked list implementation, insertion, deletion and searching operations on linear list, Stacks-Operations, array and linked Representations of stacks stack applications, Queues-operations, array and linked representations.

UNIT-II

Dictionaries: linear list representation, skip list representation, operations - insertion, depletion and Searching. Hash Table Representation: hash functions, collision resolution-separate chaining, open Addressing-linear probing, quadratic probing, double hashing, and rehashing, extendible hashing.

UNIT-III

Search Trees: Binary Search Trees, Definition, Implementation, Operations- Searching, Insertion and Deletion, B- Trees, B+ Trees, AVL Trees, Definition, Height of an AVL Tree, Operations – Insertion, Deletion and Searching, Red –Black, Splay Trees.

UNIT-IV

Graphs: Graph Implementation Methods. Graph Traversal Methods. Sorting: Quick Sort, Heap Sort, External Sorting-Model for external sorting, Merge Sort.

UNIT-V

Pattern Matching and Tries: Pattern matching algorithms-Brute force, the Boyer –Moore algorithm, the Knuth-Morris-Pratt algorithm, Standard Tries, Compressed Tries, and Suffix tries.

TEXT BOOKS:

1 Fundamentals of Data Structures in C, 2nd Edition, E.Horowitz, S.Sahni and Susan Anderson Freed, Universities Press.
2 Data Structures using C–A.S.Tanenbaum, Y.Langsam, and M.J.Augenstein, PHI/Pearson Education.

REFERENCEBOOK:

1 Data Structures: A Pseudo code Approach with C, 2nd Edition, R.F.Gilberg and B.A.Forouzan, Cengage Learning

TEEGALA KRISHNA REDDY ENGINEERING COLLEGE

II Year B.Tech. CSE- I Sem

L	T	P	C
3	1	0	4

(22MA302BS) COMPUTER ORIENTED STATISTICAL METHODS

Pre- requisites Mathematics courses of first year of study.

Course Objectives: To learn

1. The theory of Probability, Probability distributions of single and multiple random variables
2. The sampling theory, testing of hypothesis and making statistical inferences
3. Stochastic process and Markov chains.

Course outcomes: After learning the content Soft this paper, the student must be able to

1 Apply the concept of probability and Random variables in solving given Real time problems

2 Formulate and solve problems involving random variables and apply statistical methods for analyzing experimental data.

3 Apply various concepts of distribution to find out continuous distribution values

4 Apply concept so estimation and testing of hypothesis to case studies.

5 Describe Stochastic Principles to simplify processes that satisfy Markov property.

CO'S	Program Outcomes													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PS02
CO1	2	1		2								2		
CO2	2	3			1							1		
CO3	2	2			2							1		
CO4	1	2			1									
CO5	2	2			1							1		

UNIT-I : Probability

Sample Space, Events, Counting Sample Points, and Probability of an Event, Additive Rules, Conditional Probability, Independence and the Product Rule, Baye's Rule.

Random Variables and Probability Distributions: Concept of a Random Variable, Discrete Probability Distributions, Continuous Probability Distributions.

UNIT-II : Expectation and discrete distributions

Mean of a Random Variable, Variance and Covariance of Random Variables, Means and Variances of Linear Combinations of Random Variables.

Discrete Probability Distributions: Binomial Distribution, Poisson distribution.

UNIT-III : Continuous and Sampling Distributions

Uniform Distribution, Normal Distribution, Areas under the Normal Curve, Applications of the Normal Distribution, Normal Approximation to the Binomial Distributions.

Fundamental Sampling Distributions: Random Sampling, Some Important Statistics, Sampling

Distributions, Sampling Distribution of Means and the Central Limit Theorem, t - Distribution, F Distribution.

UNIT-IV : Sample Estimation & Tests of Hypotheses

L Introduction, Statistical Inference, Classical Methods of Estimation, Single Sample: Estimation the Mean, standard error of appoint estimate, prediction interval. Two samples: Estimating the difference Between two means, Single sample: Estimating a proportion.
Statistical Hypotheses: General Concepts, Testing a Statistical Hypothesis, Single sample: Tests Concerning a single mean two samples: tests on two means.

UNIT-V : Stochastic Processes and Markov Chains

Introduction to Stochastic processes- Markov process. Transition Probability, Transition Probability Matrix, First order and Higher order Markov process, n-step transition probabilities, Markov chain, Steady state condition, Markov analysis.

TEXT BOOKS:

1 Ronald E. Walpole, Raymond H. Myers, Sharon L. Myers, Keying Ye, Probability & Statistics For Engineers & Scientists, 9thEd. Pearson Publishers.
2 SC Gupta and VKK apoor, Fundamentals of Mathematical statistics, Khanna publications.
3 S.D. Sharma, Operations Research, Keda rnath and Ramnath Publishers, Meerut, Delhi.

REFERENCEBOOKS:

1 T.T. Soong, Fundamentals of Probability and Statistics For Engineers, John Wiley & Sons, Ltd,2004
2 Sheld on MRoss, Probability and statistics for Engineers and scientists, academic press.
3 Miller and Freund's, Probability and Statistics for Engineers, 9th Edition, Pearson Educations

TEEGALA KRISHNA REDDY ENGINEERING COLLEGE

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

3 0 0 3

(22CS302PC) COMPUTER ORGANIZATION AND ARCHITECTURE

Co-requisite: A Course on "Digital Electronics"

Course Objectives: To learn

1. The purpose of the course is to introduce principles of computer organization and the basic architectural concepts
2. It begins with basic organization, design, and programming of a simple digital computer and introduces simple register transfer language to specify various computer operations.
3. Topics include computer arithmetic, instruction set design, micro programmed control unit, pipelining and vector processing, memory organization and I/O systems, and multiprocessors

Course outcomes:

1 Understand the basics of instruction sets and their impact on processor design.

2 Demonstrate an understanding of the design of the functional units of a digital computer system.

3 Evaluate cost performance and design trade-offs in designing and constructing a computer processor including memory.

4 Design a pipeline for consistent execution of instructions with minimum hazards.

5 Recognize and manipulate representations of numbers stored in digital computers

CO'S	Program Outcomes													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PS02
CO1	2	1	1	2	1				1		2	1	1	2
CO2	1	1	3	3	2				2		1	2	1	1
CO3	2	1	1	2	1				2		1	3	2	2
CO4	2	1	2	2	2				2		2	1	2	2
CO5	2	1	1	3	1				2		1	2	2	1

UNIT-I :

Digital Computers: Introduction, Block diagram of Digital Computer, Definition of Computer Organization, Computer Design and Computer Architecture. Register Transfer Language and Micro operations: Register Transfer language, Register Transfer, Bus and memory transfers, Arithmetic Micro operations, logic micro operations, shift micro operations, Arithmetic logic shift unit. Basic Computer Organization and Design: Instruction codes, Computer Registers Computer instructions, Timing and Control, Instruction cycle, Memory Reference Instructions, Input – Output and Interrupt.

UNIT-II

Micro programmed Control: Control memory, Address sequencing, micro program example, design of control unit. Central Processing Unit: General Register Organization, Instruction Formats, Addressing modes, Data Transfer and Manipulation, Program Control.

UNIT-III :

Data Representation: Data types, Complements, Fixed Point Representation, Floating Point Representation. Computer Arithmetic: Addition and subtraction, multiplication Algorithms, Division Algorithms, Floating – point Arithmetic operations. Decimal Arithmetic unit, Decimal Arithmetic operations.

UNIT-IV :

Input-Output Organization: Input-Output Interface, Asynchronous data transfer, Modes of Transfer, Priority Interrupt Direct memory Access. Memory Organization: Memory Hierarchy, Main Memory, Auxiliary memory, Associate Memory, Cache Memory.

UNIT-V :

Reduced Instruction Set Computer: CISC Characteristics, RISC Characteristics. Pipeline and Vector Processing: Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline, RISC Pipeline, Vector Processing, Array Processor. Multi Processors: Characteristics of Multiprocessors, Interconnection Structures, Inter processor arbitration, Inter processor communication and synchronization, Cache Coherence.

TEXT BOOKS:

1 Computer System Architecture – M.Morris Mano, Third Edition, Pearson/PHI

REFERENCEBOOKS:

1 Computer Organization –Carl Hamacher, Zvonks Vranesic, SafeaZaky, Vth Edition, Mc GrawHill.
2 Computer Organization and Architecture–William Stallings Sixth Edition, Pearson/PHI
3 Structured Computer Organization–AndrewS.Tanenbaum,4th Edition, PHI/Pearson.

TEEGALA KRISHNA REDDY ENGINEERING COLLEGE

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

3 0 0 3

(22CS303PC) OBJECT ORIENTED PROGRAMMING THROUGH JAVA

Co-requisite: A Course on "Digital Electronics"

Course Objectives:

1. To understand the basic object-oriented programming concepts and apply them in problem solving.
2. To illustrate inheritance concepts for reusing the program.
3. To Demonstrate multitasking by using multiple threads and event handling.
4. To develop data-centric applications using JDBC.
5. To Understand the basics of java console and GUI based programming

Course outcomes:

1 Demonstrate the behavior of programs involving the basic programming constructs like control structures, constructors, string handling and garbage collection. .
2 Demonstrate the implementation of inheritance (multilevel, hierarchical and multiple) by using extend and implement keywords
3 Use multithreading concepts to develop inter process communication.
4 Understand the process of graphical user interface design and implementation using AWT or swings.
5 Develop applets that interact abundantly with the client environment and deploy on the server.

CO'S	Program Outcomes													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PS02
CO1	3	3	2	1		1			2	3		2	3	2
CO2	3	3	3	2		1			3	3	2	3	3	3
CO3	3	3	3	2					3	3	2	3	3	3
CO4	3	3	3	3	2	2	2	1	3	3	3	2	3	3
CO5	3	3	3	3	3	2	2	1	3	3	3	2	3	3

UNIT-I :

Object oriented thinking and Java Basics- Need for oop paradigm, summary of oop concepts, coping with complexity, abstraction mechanisms. A way of viewing world – Agents, responsibility, messages, methods, History of Java, Java buzzwords, data types, variables, scope and lifetime of variables, arrays, operators, expressions, control statements, type conversion and casting, simple java program, concepts of classes, objects, constructors, methods, access control, this keyword, garbage collection, overloading methods and constructors, method binding, inheritance, overriding and exceptions, parameter passing, recursion, nested and inner classes, exploring string class.

UNIT-II

Inheritance, Packages and Interfaces – Hierarchical abstractions, Base class object, subclass, subtype, substitutability, forms of inheritance specialization, specification, construction, extension, limitation,

Combination, benefits of inheritance, costs of inheritance. Member access rules, super uses, using final with

Inheritance, polymorphism- method overriding, abstract classes, the Object class. Defining, Creating and Accessing a Package, Understanding CLASSPATH, importing packages, differences between classes and interfaces, defining an interface, implementing interface, applying interfaces, variables in interface and extending interfaces. Exploring java.io.

UNIT-III :

Exception handling and Multithreading-- Concepts of exception handling, benefits of exception handling, Termination or resumptive models, exception hierarchy, usage of try, catch, throw, throws and finally, built in exceptions, creating own exception subclasses. String handling, exploring java. util. Differences between multithreading and multitasking, thread life cycle, creating threads, thread priorities, synchronizing threads, inter thread communication, thread groups, daemon threads. Enumerations, auto boxing, annotations, generics.

UNIT-IV :

Event Handling: Events, Event sources, Event classes, Event Listeners, Delegation event model, handling mouse and keyboard events, Adapter classes. The AWT class hierarchy, user interface components- labels, button, canvas, scrollbars, text components, check box, checkbox groups, choices, Lists panels – scroll pane, dialogs, menu bar, graphics, and layout manager – layout manager types – border, grid, and flow, card and grid bag.

UNIT-V :

Applets – Concepts of Applets, differences between applets and applications, life cycle of an applet, types of applets, creating applets, passing parameters to applets. Swing – Introduction, limitations of AWT, MVC architecture, components, containers, exploring swing- J Applet, J Frame and J Component, Icons and Labels, text fields, buttons – The J Button class, Check boxes, Radio buttons, Combo boxes, Tabbed Panes, Scroll Panes, Trees, and Tables.

TEXT BOOKS:

1 Java the complete reference, 7th edition, Herbert schildt, TMH
2 Understanding OOP with Java, updated edition, T. Budd, Pearson education.

REFERENCEBOOKS:

1 An Introduction to programming and OO design using Java, J.Nino and F.A. Hosch, John wiley& sons.
2 An Introduction to OOP, third edition, T. Budd, Pearson education.
3 Introduction to Java programming, Y. Daniel Liang, Pearson education.
4 An introduction to Java programming and object-oriented application development, R.A. Johnson-Thomson.
5 Core Java 2, Vol 1, Fundamentals, Cay.S. Horstmann and Gary Cornell, eighth Edition, Pearson Education.
6 Core Java 2, Vol 2, Advanced Features, Cay.S. Horstmann and Gary Cornell, eighth Edition, Pearson Education
7 Object Oriented Programming with Java, R.Buyya, S.T.Selvi, X.Chu, TMH.
8 Java and Object Orientation, an introduction, John Hunt, second edition, Springer. 9. Maurach's Beginning Java2 JDK 5, SPD.

TEEGALA KRISHNA REDDY ENGINEERING COLLEGE

II Year B.Tech. CSE- I Sem

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(22CS304PC) DATA STRUCTURES LAB

Pre requisites: A Course on "Programming for problem solving".

Course Objectives:

1. It covers various concepts of C programming language
2. It introduces searching and sorting algorithms
3. It provides an understanding of data structures such as stacks and queues.

Course outcomes:

1 Identity the appropriate data structure to solve various problems

2 Implement various list operations by using pointers and dynamic memory allocation

3 Implementing linear data structures stack, queue operations by using arrays and pointers

4 Implement various sorting algorithms

5 Implement various non-linear data structures trees, graphs operations

CO'S	Program Outcomes													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PS02
CO1	3	3	3	2	2				1				3	3
CO2	3	3	3	3	2				1				3	3
CO3	3	3	3	3	2				1				3	3
CO4	3	3	3	3	2				1				3	3
CO5	3	3	3	3	2				1				3	3

List of Experiments:

1. Write a program that uses functions to perform the following operations on singly linked list
   i) Creation ii)Insertion iii)Deletion iv)Traversal
2. Write a program that uses functions to perform the following operations on doubly linked list
   i) Creation ii)Insertion iii)Deletion iv)Traversal
3. Write a program that uses functions to perform the following operations on circular linked list.:
   i) Creation ii)Insertion iii)Deletion iv)Traversal
4. Write a program that implement stack(its operations)using
   i)Arrays ii)Pointers
5. Write a program that implement Queue (its operations)using
   i)Arrays ii)Pointers
6. Write a program that implements the following sorting methods to sort a given list of integers in ascending order
   i) Quicksort ii) Heapsort iii)Merge sort

7. Write a program to implement the tree traversal methods (Recursive and Non-Recursive)

8. Write a program to implement
   i) Binary Search tree ii) B Trees iii)B+ Trees iv) AVL trees v)Red –Black trees

9. Write a program to implement the graph traversal methods.

10. Implement a Pattern matching algorithms using Boyer-Moore, Knuth-Morris-Pratt

TEXT BOOKS:

1 Fundamentals of Data Structures in C, 2nd Edition, E. Horowitz, S. Sahni and Susan Anderson Freed, Universities Press.
2 Data Structures using C–A.S.Tanenbaum, Y.Langsam, and M.J.Augenstein, PHI/ Pearson Education.

REFERENCEBOOKS:

1 Data Structures: APseudocode Approach with C, 2ndEdition,R.F .Gilberg and B.A.Forouzan,Cengag eLearning.

TEEGALA KRISHNA REDDY ENGINEERING COLLEGE

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

(22CS305PC) OBJECT ORIENTED PROGRAMMING THROUGH JAVA LAB

Course Objectives:

1. To write programs using abstract classes.
2. To write programs for solving real world problems using the java collection framework.
3. To write multithreaded programs.
4. To write GUI programs using swing controls in Java
5. To introduce java compiler and eclipse platform.
6. To impart hands-on experience with java programming.

Course outcomes:

1 Able to write programs for solving real world problems using the java collection Frame work.

2 Able to write programs using abstract classes.

3 Able to write multithreaded programs.

4 Able to write GUI programs using swing controls in Java.

5 Create web pages using Applets for example problem.

Cos	**Program Outcomes**													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PS02
CO1	3	3	2	1		3		1				3		3
CO2	3	3	3			3						3		2
CO3	3	3	2	1								3		3
CO4	3	3	2	3				1	3	3	3	3		3
CO5	3	3	3	3	3			1	3	3	3	3		3

Note:
Use LINUX and My SQL for the Lab Experiments. Though not mandatory, encourage the use of the Eclipse platform

The list suggests the minimum program set. Hence, the concerned staff is requested to add more problems to the list as needed.

List of Experiments:

1. Use Eclipse or Net bean platform and acquaint yourself with the various menus. Create a test project, add a test class, and run it. See how you can use auto suggestions, auto fill. Try code formatter and code refactoring like renaming variables, methods, and classes. Try debug step by step with a small program of about 10 to 15 lines which contains at least one if else condition and a for loop.
2. Write a Java program that works as a simple calculator. Use a grid layout to arrange buttons for the digits and for the +, -,*, % operations. Add a text field to display the result. Handle any possible exceptions like divided by zero.
3. A. Develop an applet in Java that displays a simple message
   B. Develop an applet in Java that receives an integer in one text field, and computes its factorial Value and returns it in another text field, when the button named "Compute" is clicked.
4. Write a Java program that creates a user interface to perform integer divisions. The user enters two numbers in the text fields, Num1 and Num2. The division of Num1 and Num 2 is displayed in the Result field when the Divide button is clicked. If Num1 or Num2 were not an integer, the program would throw a Number Format Exception. If Num2 were Zero, the program would throw an Arithmetic Exception. Display the exception in a message dialog box.
5. Write a Java program that implements a multi-thread application that has three threads. First thread generates a random integer every 1 second and if the value is even, the second thread computes the square of the number and prints. If the value is odd, the third thread will print the value of the cube of the number.
6. Write a Java program for the following: Create a doubly linked list of elements.
   Delete a given element from the
   Above list. Display the contents
   of the list after deletion.
7. Write a Java program that simulates a traffic light. The program lets the user select one of three lights: red, yellow, or green with radio buttons. On selecting a button, an appropriate message with "Stop" or "Ready" or "Go" should appear above the buttons in the selected color. Initially, there is no message shown.
8. Write a Java 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. Each one of the classes contains only the method print Area () that prints the area of the given shape.
9. Suppose that a table named Table.txt is stored in a text file. The first line in the file is the header, and the remaining lines correspond to rows in the table. The elements are separated by commas
   Write a java program to display the table using Labels in Grid Layout.
10. Write a Java program that handles all mouse events and shows the event name at the center of the window when a mouse event is fired (Use Adapter classes).
11. Write a Java program that loads names and phone numbers from a text file where the data is organized as one line per record and each field in a record are separated by a tab (\t). It takes a name or phone number as input and prints the corresponding other value from the hash table (hint: use hash tables).
12. Write a Java program that correctly implements the producer – consumer problem using the concept of inter thread communication.
13. Write a Java program to list all the files in a directory including the files present in all its subdirectories.

REFERENCEBOOKS:

1 Java for Programmers, P. J. Deitel and H. M. Deitel, 10th Edition Pearson education
2 Thinking in Java, Bruce Eckel, Pearson Education.
3 Java Programming, D. S. Malik and P. S. Nair, Cengage Learning
4 Core Java, Volume 1, 9th edition, Cay S. Horstmann and G Cornell, Pearson.

TEEGALA KRISHNA REDDY ENGINEERING COLLEGE

II Year B.Tech. CSE- I Sem

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(22CS306PC) SKILL DEVELOPMENT COURSE
(DATA VISUALIZATION- R PROGRAMMING / POWER B1

Course Objectives:

1. Effective use of Business Intelligence (BI) technology (Tableau) to apply data visualization
2. To discern patterns and relationships in the data
3. To build Dashboard applications.
4. To communicate the results clearly and concisely.
5. To be able to work with different formats of data sets.

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

1. Understand How to import data into Tableau.
2. Understand Tableau concepts of Dimensions and Measures.
3. Develop Programs and understand how to map Visual Layouts and Graphical Properties.
4. Create a Dashboard that links multiple visualizations.
5. Use graphical user interfaces to create Frames for providing solutions to real world problems.

Cos	Program Outcomes													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PS02
CO1	3	2			3				3	2	1	3	3	3
CO2	3	2	1		3				2	2	1	3	3	3
CO3	3	3	3		3				2	2	1	3	3	3
CO4	3	3	3		3				2	2	1	3	3	3
CO5	3	2	3		3				2	2	1	3	3	3

Lab Problems:

1. Understanding Data, What is data, where to find data, Foundations for building Data Visualizations, Creating Your First visualization?
2. Getting started with Tableau Software using Data file formats, connecting your Data to Tableau, creating basic charts(line, bar charts, Tree maps),Using the Show me panel.
3. Tableau Calculations, Overview of SUM, AVR, and Aggregate features, Creating custom calculations and fields.
4. Applying new data calculations to your visualizations, Formatting Visualizations, Formatting Tools and Menus, Formatting specific parts of the view.
5. Editing and Formatting Axes, Manipulating Data in Tableau data, Pivoting Tableau data
6. Structuring your data, Sorting and filtering Tableau data, Pivoting Tableau data.
7. Advanced Visualization Tools: Using Filters, Using the Detail panel, using the Size panels, customizing filters, Using and Customizing tooltips, Formatting your data with colors.
8. Creating Dashboards & Storytelling, creating your first dashboard and Story, Design for different displays, adding interactivity to your Dashboard, Distributing & Publishing your Visualization.
9. Tableau file types, publishing to Tableau Online, Sharing your visualizations, printing, and Exporting.
10. Creating custom charts, cyclical data and circular area charts, Dual Axis charts.

REFERENCEBOOKS:

1 Microsoft Power BI cookbook, Brett Powell, 2nd edition.
2 R Programming for Data Science by Roger D. Peng (References)
3 The Art of R Programming by Norman Matloff Cengage Learning India

TEEGALA KRISHNA REDDY ENGINEERING COLLEGE

II Year B.Tech. CSE- I Sem

L	T	P	C
0	0	2	0

(22MC309) GENDER SENSITIZATION LAB

COURSE DESCRIPTION

This course offers an introduction to Gender Studies, an interdisciplinary field that asks critical questions about the meanings of sex and gender in society. The primary goal of this course is to familiarize students with key issues, questions and debates in Gender Studies, both historical and contemporary. It draws on multiple disciplines – such as literature, history, economics, psychology, sociology, philosophy, political science, anthropology and media studies – to examine cultural assumptions about sex, gender, and sexuality.

This course integrates analysis of current events through student presentations, aiming to increase awareness of contemporary and historical experiences of women, and of the multiple ways that sex and gender interact with race, class, caste, nationality and other social identities. This course also seeks to build an understanding and initiate and strengthen programmes combating gender-based violence and discrimination. The course also features several exercises and reflective activities designed to examine the concepts of gender, gender-based violence, sexuality, and rights. It will further explore the impact of gender-based violence on education, health and development

Learning Outcomes

1. Students will have developed a better understanding of important issues related to gender in Contemporary India.
2. Students will be sensitized to basic dimensions of the biological, sociological, psychological and legal aspects of gender. This will be achieved through discussion of materials derived from research, facts, everyday life, literature and film.
3. Students will attain a finer grasp of how gender discrimination works in our society and how to counter it. Students will acquire insight into the gendered division of labor and its relation to politics and economics
4. Men and women students and professionals will be better equipped to work and live together as equals. Students will develop a sense of appreciation of women in all walks of life.
5. Through providing accounts of studies and movements as well as the new laws that provide protection and relief to women, the textbook will empower students to understand and respond to gender violence.

Cos	Program Outcomes													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PS02
CO1						2								
CO2	2													
CO3						2								
CO4				2										
CO5			3											

Unit-I: UNDERSTANDING GENDER

Introduction: Definition of Gender-Basic Gender Concepts and Terminology- exploring Attitudes towards Gender-Construction of Gender-Socialization: Making Women, Making Men Preparing for Womanhood. Growing up Male. First lessons in Caste.

Unit – II: GENDER ROLES AND RELATIONS

Two or Many? -Struggles with Discrimination-Gender Roles and Relations-Types of Gender Roles- Gender Roles and Relationships Matrix-Missing Women-Sex Selection and Its Consequences-

Declining Sex Ratio. Demographic Consequences-Gender Spectrum: Beyond the Binary

Unit – III: GENDER AND LABOUR

Division and Valuation of Labour-Housework: The Invisible Labor- "My Mother doesn't Work." "Share the Load."-Work: Its Politics and Economics -Fact and Fiction. Unrecognized and Unaccounted work. -Gender Development Issues-Gender, Governance and Sustainable Development-Gender and Human Rights-Gender and Mainstreaming

Unit – IV: GENDER - BASED VIOLENCE

The Concept of Violence- Types of Gender-based Violence-Gender-based Violence from a Human Rights Perspective-Sexual Harassment: Say No!-Sexual Harassment, not Eve-teasing Coping with Everyday Harassment- Further Reading: "Chupulu". Domestic Violence: Speaking Out Is Home a Safe Place? -When Women Unite [Film]. Rebuilding Lives. Thinking about Sexual Violence Blaming the Victim-"I Fought for my Life…."

Unit – V: GENDER AND CULTURE

Gender and Film-Gender and Electronic Media-Gender and Advertisement-Gender and Popular Literature-Gender Development Issues-Gender Issues- Gender Sensitive Language Gender and Popular Literature - Just Relationships: Being Together as Equals Mary Kom and Onler. Love and Acid just do not Mix. Love Letters. Mothers and Fathers.

Rosa Parks- The Brave Heart.

Note: Since it is Interdisciplinary Course, Resource Persons can be drawn from the fields of English Literature or Sociology or Political Science or any other qualified faculty who has expertise in this field from engineering departments.

- Classes will consist of a combination of activities: dialogue-based lectures, discussions, collaborative learning activities, group work and in-class assignments. Apart from the above prescribed book, Teachers can make use of any authentic materials related to the topics given in the syllabus on "Gender".

ESSENTIAL READING: The Textbook, "Towards a World of Equals: A Bilingual Textbook on Gender" written by A .Suneetha , Uma Bhrugubanda, DuggiralaVasanta, Rama Melkote, Vasudha Nagaraj, Asma Rasheed, Gogu Shyamala, Deepa Sreenivas and Susie Tharu published by Telugu Akademi, Telangana Government in 2015.

ASSESSMENT AND GRADING:

- Discussion & Classroom Participation: 20%
- Project/Assignment: 30%
- % • End Term Exam: 50%

TEEGALA KRISHNA REDDY ENGINEERING COLLEGE

II Year B.Tech. CSE- II Sem

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3	0	0	3

(22MA401BS) DISCRETE MATHEMATICS

Course Objectives:

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

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

1. Understand and construct precise mathematical proofs
2. Apply logic and set theory to formulate precise statements
3. Analyze and solve counting problems on finite and discrete structures
4. Describe and manipulate sequences
5. Apply graph theory in solving computing problems

Cos	Program Outcomes													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PS02
CO1	2	2			2							1		
CO2	3	1			1							2		
CO3	1	2										1		
CO4	1	2										1		
CO5	2	2			2							2		

UNIT-I

Mathematical logic: Introduction, Statements and Notation, Connectives, 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 and Ordering, Functions.

UNIT-III

Algebraic Structures: Introduction, Algebraic Systems, Semi groups and Monoids, Lattices as Partially Ordered Sets, Boolean Algebra.

UNIT-IV

Elementary Combinatory: Basics of Counting, Combinations and Permutations, Enumeration of Combinations and Permutations, Enumerating Combinations and Permutations with Repetitions, Enumerating Permutation with Constrained Repetitions, Binomial Coefficient, The Binomial and Multinomial Theorems, The Principle of Exclusion.

UNIT-V

Graph Theory: Basic Concepts, Isomorphism and Subgraphs, Trees and their Properties, Spanning Trees, Directed Trees, Binary Trees, Planar Graphs, Euler's Formula, Multi-graphs and Euler Circuits, Hamiltonian Graphs, Chromatic Numbers, The Four-Color Problem.

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: Joel .Mott, Abraham Kandel, Teodore P.Baker, Prentis Hall of India,2nd ed.

REFERENCEBOOKS:

1 Discrete and Combinatorial Mathematics - an applied introduction: Ralph.P. Grimald, Pearsoneducation, 5th edition.

2 Discrete Mathematical Structures: Thomas Kosy, Tata Mc Graw Hill publishing co

TEEGALA KRISHNA REDDY ENGINEERING COLLEGE

II Year B.Tech. CSE- II Sem

L	T	P	C
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(22HS401MS) BUSINESS ECONOMICS & FINANCIAL ANALYSIS

Course Objectives: To learn the basic business types, impact of the economy on Business and Firms specifically. To analyze the Business from the Financial Perspective.

Course Outcomes:

1. Understand and Learn the Business Economic Concepts in Micro and Macro Business firm
2. Understand microeconomic factors in related to demand and supply analysis and its forecasting
3. Apply the theory of production function and Cost concepts to determine the Break Even Analysis. Remember different market structures, pricing strategies and different forms business organization
4. Determine the financial statement by using Fundamental accounting concepts
5. Interpret the financial statement by using Fundamental accounting concepts and Ratio analysis

Cos	Program Outcomes													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PS02
CO1	2					2								
CO2	3					2								
CO3	2	1	1		2									
CO4		2			3									
CO5	1		1		3	2								

Unit – I: Introduction to Business and Economics

Business: Structure of Business Firm, Theory of Firm, Types of Business Entities, Limited Liability Companies, Sources of Capital for a Company, Non-Conventional Sources of Finance. Economics: Significance of Economics, Micro and Macro Economic Concepts, Concepts and Importance of National Income, Inflation, Money Supply and Inflation, Business Cycle, Features and Phases of Business Cycle. Nature and Scope of Business Economics, Role of Business Economist, Multidisciplinary nature of Business Economics.

UNIT - II: Demand and Supply Analysis

Elasticity of Demand: Elasticity, Types of Elasticity, Law of Demand, Measurement and Significance of Elasticity of Demand, Factors affecting Elasticity of Demand, Elasticity of Demand in decision making, Demand Forecasting: Characteristics of Good Demand Forecasting, Steps in Demand Forecasting, Methods of Demand Forecasting.

Supply Analysis: Determinants of Supply, Supply Function and Law of Supply

UNIT - III: Production, Cost, Market Structures & Pricing

Production Analysis: Factors of Production, Production Function, Production Function with one Variable input, two variable inputs, Returns to Scale, Different Types of Production Functions. Cost analysis: Types of Costs, Short run and Long run Cost Functions.

Market Structures: Nature of Competition, Features of Perfect competition, Monopoly, Oligopoly, and Monopolistic Competition. Pricing: Types of Pricing, Product Life Cycle based Pricing, Break Even Analysis, and Cost Volume Profit Analysis.

UNIT - IV: Financial Accounting: Accounting concepts and Conventions, Accounting Equation, Double-Entry system of Accounting, Rules for maintaining Books of Accounts, Journal, Posting to Ledger, Preparation of Trial Balance, Elements of Financial Statements, Preparation of Final Accounts (Simple Problems)

UNIT - V: Financial Ratios Analysis: Concept of Ratio Analysis, Importance and Types of Ratios, Liquidity Ratios, Turnover Ratios, Profitability Ratios, Proprietary Ratios, Solvency, Leverage Ratios – Analysis and Interpretation (simple problems)..

TEXT BOOKS:

1 D. D. Chaturvedi, S. L. Gupta, Business Economics - Theory and Applications, International Book House Pvt. Ltd. 2013
2 Dhanesh K Khatri, Financial Accounting, Tata Mc –Graw Hill, 2011.
3 Geethika Ghosh, Piyali Gosh, Purba Roy Choudhury, Managerial Economics, 2e, Tata Mc Graw Hill Education Pvt. Ltd. 2012.

REFERENCEBOOKS:

1 Paresh Shah, Financial Accounting for Management 2e, Oxford Press, 2015.
2 S. N. Maheshwari, Sunil K Maheshwari, Sharad K Maheshwari, Financial Accounting, 5e, Vikas Publications, 2013.

TEEGALA KRISHNA REDDY ENGINEERING COLLEGE

II Year B.Tech. CSE- II Sem

L	T	P	C
3	0	0	3

(22CS401PC) OPERATING SYSTEMS

Prerequisites:

1. A course on "Computer Programming and Data Structures".
2. A course on "Computer Organization and Architecture".

Course Objectives:

1. Introduce operating system concepts (i.e., processes, threads, scheduling, synchronization, deadlocks, memory management, file and I/O sub systems and protection)
2. Introduce the issues to be considered in the design and development of operating system
3. Introduce basic Unix commands, system call interface for process management, inter process communication and I/O in Unix

Course Outcomes:

1. Understanding of basic system calls and processes in Operating system
2. Getting Knowledge of process scheduling algorithms and mechanism for overcoming deadlocks
3. Understanding about process management, synchronization of process and how inter process communication is done among the processes.
4. Able to understand about the working mechanism of memory management and how virtual memory is used for handling multiple processes
5. Knowing the file system interfaces and operations on files.

CO'S	Program Outcomes													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PS02
CO1	2	2	1									2	2	2
CO2	2											2	2	1
CO3	2	2	2	2								3	2	1
CO4	3	2	2	2								3	3	1
CO5	3	2	2	2								2	2	2

Unit – I:

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

Process - Process concepts and scheduling, Operations on processes, Cooperating Processes, Threads

UNIT - II:

CPU Scheduling- Scheduling Criteria, Scheduling Algorithms, Multiple-Processor Scheduling. System call interface for process management- fork, exit, wait, wait pid, exec Deadlocks - System Model, Deadlocks Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, and Recovery from Deadlock

UNIT - III:

P**rocess Management and Synchronization**-The Critical Section Problem, Synchronization Hardware, Semaphores, and Classical Problems of Synchronization, Critical Regions, Monitors
Interprocess Communication Mechanisms: IPC between processes on a single computer system, IPC between processes on different systems, using pipes, FIFOs, message queues, shared memory.

UNIT - IV:

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, Free-space Management. Usage of open, create, read, write, close, lseek, stat, ioctl system calls.

TEXT BOOKS:

1 Operating System Principles-Abraham Silberchatz, PeterB.Galvin, GregGagne , 7th Edition, JohnWiley.
2 Advanced programming in the UNIX environment, W.R.Stevens, Pearson education.

REFERENCEBOOKS:

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

TEEGALA KRISHNA REDDY ENGINEERING COLLEGE

II Year B.Tech. CSE- II Sem

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(22CS402PC) DATABASE MANAGEMENT SYSTEMS

Pre requisites: A course on "Data Structures"

Course Objectives:

1. To understand the basic concepts and the applications of database systems.
2. To master the basics of SQL and construct queries using SQL.
3. Topics included at a models, database design, relational model, relational algebra, transaction control, concurrency control, storage structures and access techniques.

Course Outcomes:

1. Construct the E-R model to represent databases on real world problems.
2. Experiment with queries and nested queries on real world problems by using several operators like join, set, and aggregate.
3. Plan and Relate the concept of data planning and database design using normalization.
4. Utilize the ACID properties in transaction management and interpret concurrency control echanisms.
5. Categorize various file organizations and indexing for faster retrieval of data, persistent storage of data

CO'S	Program Outcomes													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PS02
CO1		2	3										3	
CO2		2	1	2									2	
CO3			3	2	1								2	
CO4				2	1				1				2	
CO5	1	2	2						3				3	

Unit – I:

Database System Applications: A Historical Perspective, File Systems versus a DBMS, the Data Model, Levels of Abstraction in a DBMS, Data Independence, Structure of a DBMS

Introduction to Database Design: Database Design and ER Diagrams, Entities, Attributes, and Entity Sets, Relationships and Relationship Sets, Additional Features of the ER Model, Conceptual Design with the ER Model

UNIT - II:

Introduction to the Relational Model: Integrity constraint over relations, enforcing integrity constraints, querying relational data, logical database design, introduction to views, destroying/altering tables and views. Relational Algebra, Tuple relational Calculus, Domain relational calculus.

UNIT - III:

SQL: QUERIES, CONSTRAINTS, TRIGGERS: form of basic SQL query, UNION, INTERSECT, and EXCEPT, Nested Queries, aggregation operators, NULL values, complex integrity constraints in SQL, triggers and active databases.

Schema Refinement: Problems caused by redundancy, decompositions, problems related to decomposition, reasoning about functional dependencies, First, Second, Third normal forms, BCNF, lossless join

Decomposition, multivalued dependencies, Fourth normal form, Fifth normal form.

UNIT - IV:

Transaction Concept, Transaction State, Implementation of Atomicity and Durability, Concurrent Executions, Serializability, Recoverability, Implementation of Isolation, Testing for serializability, Lock Based Protocols, Timestamp Based Protocols, Validation- Based Protocols, Multiple Granularity, Recovery and Atomicity, Log–Based Recovery, Recovery with Concurrent Transactions.

UNIT – V:

Data on External Storage, File Organization and Indexing, Cluster Indexes, Primary and Secondary Indexes, Index data Structures, Hash Based Indexing, Tree based Indexing, Comparison of File Organizations, Indexes- Intuitions for tree Indexes, Indexed Sequential Access Methods(ISAM), B+ Trees: A Dynamic Index Structure.

TEXT BOOKS:

1 Database System Concepts, Silberschatz, Korth, Mc Graw hill, 5th Edition.
2 Database Management Systems, Raghurama Krishnan, Johannes Gehrke, Tata Mc Graw Hill.

REFERENCEBOOKS:

1 Database Systems design, Implementation, and Management, Peter Rob & Carlos Coronel 7th Edition.
2 Fundamentals of Database Systems, Elmasri Navrate, Pearson Education
3 Introduction to Database Systems, C.J.Date, Pearson Education
4 Oracle for Professionals, The XTeam, 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

TEEGALA KRISHNA REDDY ENGINEERING COLLEGE

II Year B.Tech. CSE- II Sem

L	T	P	C
3	0	0	3

(22CS403PC) SOFTWARE ENGINEERING

Course Objectives:

- The aim of the course is to provide an understanding of the working knowledge of the techniques for estimation, design, testing and quality management of large software development projects.
- Topics include process models, software requirements, software design, software testing, software process/product metrics, risk management, quality management and UML diagrams

Course Outcomes:

1. Ability to translate end-user requirements into system and software requirements, using e.g. ML, and structure the requirements in a Software Requirements Document (SRD).
2. Identifyandapplyappropriatesoftwarearchitecturesandpatternstocarryouthighleveldesignofa system and be able to critically compare alternative choices.
3. Will have experience and/or a wariness of testing problems and will be able to develop a simple testing report
4. Recognize the importance of software maintenance and complexities involved in software evolution.
5. Able to learn various processes used in all the phases of the product.

CO'S	Program Outcomes													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PS02
CO1	2	2	3	3	3	1			3	2	3	3	2	3
CO2	2	1	2	2	1				2	1	2	2	2	2
CO3	1	3	3	3	2				2	2	3	2	1	2
CO4	2	2	3	3	1						1	1	1	
CO5	1	1	1	2	1					1	1	2	1	

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 a 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, use case 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 for software 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 ISO9000 quality Standards.

TEXT BOOKS:

1 Software Engineering, A practitioner's Approach-RogerS. Pressman, 6th edition, McGraw Hill International Edition
2 Software Engineering- Sommerville, 7th edition, Pearson Education.

REFERENCEBOOKS:

1 The unified modeling language user guide Grady Booch, JamesRambaugh, IvarJacobson, and Pearson Education.
2 Software Engineering, an Engineering approach-JamesF.Peters, WitoldPedrycz, JohnWiley
3 Software Engineering principles and practice-WamanSJawadekar, The McGraw-Hill Companies.
4 Fundamentals of object-oriented design using UML Meiler page-Jones: Pearson Education.

TEEGALA KRISHNA REDDY ENGINEERING COLLEGE

II Year B.Tech. CSE- II Sem

L	T	P	C
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(22CS404PC) OPERATING SYSTEMS LAB

Prerequisites: A course on "Programming for Problem Solving",
A course on "Computer Organization and Architecture".

Co-requisite: A course on "Operating Systems".

Course Objectives:

1. To provide an understanding of the design aspects of operating system concepts through simulation
2. Introduce basic Unix commands, system call interface for process management, inter process communication and I/O in Unix

Course Outcomes:

1. Simulate and implement operating system concepts such as scheduling and system calls
2. Illustrating the process of deadlock management, and semaphore
3. Understanding the working IPC mechanisms with an example
4. Implement operating system concepts file management and memory management
5. Able to implement Page replacement policies.

CO/PO	Program Outcomes													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PS02
CO1	3	2	2	2	1							2	2	1
CO2	3	2	2	2	1							2	2	1
CO3	2	2	2	2	1							3	2	1
CO4	3	2	2	2	1							3	3	1
CO5	3	2	2	2	1							2	2	2

List of Experiments:

1. Write C programs to simulate the following CPU Scheduling algorithms
   a) FCFS b) SJF c) Round Robin d) priority
2. Write programs using the I/O system calls of UNIX/LINUX operating system (open, read, write, close, fcntl, seek, stat, open dir, read dir)
3. Write a C program to simulate Bankers Algorithm for Deadlock Avoidance and Prevention.
4. Write a C program to implement the Producer–Consumer problem using semaphores using UNIX/LINUX system calls.
5. Write C programs to illustrate the following IPC mechanisms
   a) Pipes b) FIFOs c) Message Queues d) Shared Memory
6. Write C programs to simulate the following memory management techniques
   a) Paging b)Segmentation
7. Write C programs to simulate Page replacement policies
   a) FCFS b) LRU c) Optimal

TEXT BOOKS:

1 Operating System Principles-Abraham Silberchatz, PeterB.Galvin, GregGagne 7th Edition, JohnWiley
2 Advanced programming in the Unix environment, W.R.Stevens, Pearson education.

REFERENCEBOOKS:

1 OperatingSystems–InternalsandDesignPrinciples,WilliamStallings,FifthEdition 2005,PearsonEducation/PHI
2 Operating System-A Design Approach-Crowley, TMH
3 Modern Operating Systems, Andrew STanenbaum, 2nd edition,Pearson/PHI
4 UNIX Programming Environment, Kernighan and Pike, PHI/Pearson Education
5 UNIX Internals: Th eNew Frontiers, U.Vahalia, Pearson Education

TEEGALA KRISHNA REDDY ENGINEERING COLLEGE

II Year B.Tech. CSE- II Sem

L	T	P	C
0	0	2	1

(22CS405PC) DATABASE MANAGEMENT SYSTEMS LAB

Co-requisites: "Database Management Systems"

Course Objectives:

1. Introduce ER data model, database design and normalization
2. Learn SQL basics for data definition and data manipulation

Course Outcomes:

1. Design a database schema for given problem data.
2. Build a GUI application
3. Apply the normalization techniques for development of application software to realistic problems
4. Formulate queries using SQL DML/DDL/DCL commands.
5. Implement triggers to raise as per real time data and also Implement concurrency control mechanisms.

CO/PO	Program Outcomes													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PS02
CO1		2	2										2	
CO2		1	2										1	
CO3		3	2	2									1	
CO4		1	2	3									2	
CO5		1	2	2	1								2	

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 sub queries
7 Queries using Aggregate functions, GROUPBY, HAVING and Creation and dropping of Views.
8 Triggers (Creation of insert trigger, delete trigger, update trigger)
9 Procedures
10 Usage of Cursors

TEXT BOOKS:

1 Database Management Systems, Raghurama Krishnan, Johannes Gehrke, Tata Mc GrawHill, 3 rd Edition
2 Database System Concepts, Silberschatz, Korth, Mc Graw Hill, Vedition.

REFERENCEBOOKS:

1 Database Systems design, Implementation, and Management, PeterRob & Carlos Coronel 7 thEdition.
2 Fundamentals of Database Systems, Elmasri Navrate, Pearson Education

3 Introduction to 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

TEEGALA KRISHNA REDDY ENGINEERING COLLEGE

II Year B.Tech. CSE- II Sem

L	T	P	C
0	0	4	2

(22CS401PW) REAL-TIME RESEARCH PROJECT/ SOCIETAL RELATED PROJECT

Course Objectives:

Mini Project is a short project intended to train students to identify a problem of practical significance

Experiments:

1. Software design process
2. Various Tools used in the industry
3. Application/ software development

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

1. Enable the Students to undertake short research projects in a team under the direction of members of the faculty.
2. Enable the students to identify a topic of interest and complete the preliminary work of undertaking case studies, data collection and feasibility studies.
3. Produce, improve and/or refine technical aspects for engineering products or components.
4. Enable the students to undertake fabrication work of new experimental set up/devices or develop software packages
5. Communicate their components by making an oral presentation before an evaluation committee

CO/PO	Program Outcomes													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PS02
CO1	1	2	1											1
CO2	2		2	1									1	
CO3			2		2						1			3
CO4				1										
CO5		2	3						1				2	

Project Intended to train the students to identify a problem of practical significance related to

i. Software design process
ii. Research in specific domain
iii. Application/ software development

The student is encouraged to study of literature based on the guidance received by a project supervisor and identify a specific problem and works for a solution. At the end he is expected to submit a report based on his findings

The project can be done as a group consisting maximum of four persons

TEEGALA KRISHNA REDDY ENGINEERING COLLEGE

II Year B.Tech. CSE- II Sem

L	T	P	C
0	0	2	1

(22CS406PC) SKILL DEVELOPMENT COURSE (Node JS/ React JS/ Django)

Prerequisites: Object Oriented Programming through Java, HTML Basics

Course Objectives:

- To implement the static web pages using HTML and do client side validation using JavaScript.
- To design and work with databases using Java
- To develop an end to end application using java full stack
- To introduce Node JS implementation for server side programming
- To experiment with single page application development using React

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

1. Build a custom website with HTML, CSS, and Bootstrap and little JavaScript.
2. Demonstrate Advanced features of JavaScript and learn about JDBC
3. Develop Server – side implementation using Java technologies like
4. Develop the server – side implementation using Node JS
5. Design a Single Page Application using React.

CO/PO	Program Outcomes													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PS02
CO1	3	3	2	1		1			2			2	3	2
CO2	3	3	3	2		1			3		2	3	3	3
CO3	3	3	3	2					3		2	3	3	3
CO4	3	3	3	3	2	2		1	3		3	2	3	3
CO5	3	3	3	3	3	2		1	3		3	2	3	3

Exercises:

1 Build a responsive web application for shopping cart with registration, login, catalog and cart pages using CSS3 features, flex and grid

2 Make the above web application responsive web application using Bootstrap framework.

3 Use JavaScript for doing client – side validation of the pages implemented in Experiment 1 and experiment 2.

4 Explore the features of ES6 like arrow functions, callbacks, promises, async/await. Implement an application for reading the weather information from openweathermap.org and display the information in the form of a graph on the web page.

5 Develop a java stand alone application that connects with the database (Oracle / mySql) and perform the CRUD operation on the database tables

6 Create an xml for the bookstore. Validate the same using both DTD and XSD.

7 Design a controller with servlet that provides the interaction with application developed in experiment

1 and the database created in experiment 5.

8 Maintaining the transactional history of any user is very important. Explore the various session tracking mechanism (Cookies, HTTP Session)

9 Create a custom server using http module and explore the other modules of Node JS like OS, path, event.

10 Develop an express web application that can interact with REST API to perform CRUD operations on student data. (Use Postman)

11 For the above application create authorized end points using JWT (JSON Web Token).

12 Create a react application for the student management system having registration, login, contact, about pages and implement routing to navigate through these pages.

13 Create a service in react that fetches the weather information from openweathermap.org and the display the current and historical weather information using graphical representation using chart.js

14 Create a TODO application in react with necessary components and deploy it into github

REFERENCE BOOKS:

1 Jon Duckett, Beginning HTML, XHTML, CSS, and JavaScript, Wrox Publications, 2010

2 Bryan Basham, Kathy Sierra and Bert Bates, Head First Servlets and JSP, O'Reilly Media, 2nd Edition, 2008.

3 Vasan Subramanian, Pro MERN Stack, Full Stack Web App Development with Mongo, Express, React, and Node, 2nd Edition, A Press.

TEEGALA KRISHNA REDDY ENGINEERING COLLEGE

II Year B.Tech. CSE- II Sem

L	T	P	C
3	0	0	0

(22MC410) CONSTITUTION OF INDIA

Course Objectives: Students will be able to:

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

Course Outcomes: Students will be able to:

1. CO1: Discuss the growth of the demand for civil rights in India for the bulk of Indians before the arrival of Gandhi in Indian politics.
2. CO2: Discuss the intellectual origins of the framework of argument that informed the conceptualization of social reforms leading to revolution in India.
3. CO3: Discuss the circumstances surrounding the foundation of the Congress Socialist Party [CSP] under the leadership of Jawaharlal Nehru and the eventual failure of the proposal of direct elections through adult suffrage in the Indian Constitution
4. CO4: Discuss the passage of the Hindu Code Bill of 1956.

CO/PO	Program Outcomes													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PS02
CO1		3	3	2		2	3	2	1	3		2	1	1
CO2	1	2	1	2		2	2	2	2	2	1	2	2	1
CO3	1	3	3	3	1	2	3	1	2	3	1	2	3	2
CO4		2	2	2		2	3	2	3	3	1	2	1	3
CO5		2	2	2		2	3	2	3	3	1	2	1	3

Unit - 1 History of Making of the Indian Constitution- History of Drafting Committee

Unit - 2 Philosophy of the Indian Constitution- Preamble Salient Features

Unit - 3 Contours of Constitutional Rights & Duties - Fundamental Rights

- Right to Equality
- Right to Freedom
- Right against Exploitation
- Right to Freedom of Religion
- Cultural and Educational Rights

- Right to Constitutional Remedies
- Directive Principles of State Policy
- Fundamental Duties.

Unit -4 Organs of Governance: Parliament, Composition, ualifications and Disqualifications, Powers and Functions, Executive, President, Governor, Council of Ministers, Judiciary, Appointment and Transfer of Judges, Qualifications, Powers and Functions

Unit -5 Local Administration: District's Administration head: Role and Importance, Municipalities: Introduction, Mayor and role of Elected Representative, CEO of Municipal Corporation. Panchayat raj: Introduction, PRI: Zila Panchayat. Elected officials and their roles, CEO ZilaPanchayat: Position and role. Block level: Organizational Hierarchy (Different departments), Village level: Role of Elected and Appointed officials, Importance of grass root democracy

Unit -6 Election Commission: Election Commission: Role and Functioning. Chief Election Commissioner and Election Commissioners. State Election Commission: Role and Functioning. Institute and Bodies for the welfare of SC/ST/OBC and women.

Suggested Reading:

The Constitution of India, 1950 (Bare Act), Government Publication

Dr. S. N. Busi, Dr. B. R. Ambedkar framing of Indian Constitution, 1st Edition, 2015

M. P. Jain, Indian Constitution Law, 7th Edn., Lexis Nexis, 2014.

D.D. Basu, Introduction to the Constitution of India, Lexis Nexis, 2015.

TEEGALA KRISHNA REDDY ENGINEERING COLLEGE

III Year B.Tech. CSE - I Sem

L	T	P	C
3	1	0	4

(22CS501PC) DESIGN AND ANALYSIS OF ALGORITHMS

Prerequisites:

1 A course on "Computer Programming and Data Structures".
2 A course on "Advanced Data Structures".

Course Objectives:

- Introduces the notations for analysis of the performance of algorithms and the data structure of disjoint sets.
- Describes major algorithmic techniques (divide-and-conquer, backtracking, dynamic programming, greedy, branch and bound methods) and mention problems for which each technique is appropriate
- Describes how to evaluate and compare different algorithms using worst-, average-, and best case analysis
- Explains the difference between tractable and intractable problems, and introduces the problems that are P, NP and NP complete.

Course Outcomes: The student will learn

CO1 Able to evaluate the performance Analysis and Make use of divide and conquer methods for developing algorithms.
CO2 Apply the concept of backtracking to solve the optimization problems.
CO3 Solve the optimization problems using dynamic programming methodology.
CO4 Solve the optimization problem by using Greedy method.
CO5 Solve the optimization problem by using branch and bound method and NP-Hard and NP Complete for the given example problems

CO's	PROGRAM OUTCOMES													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	3	3	3		2			1		1		3	3
CO2	3	3	3	3		2			1		1		3	3
CO3	3	3	3	3		2			1		1		3	3
CO4	3	3	3	3		2			1		1		3	3
CO5	3	3	3	3		2			1		1		3	3

UNIT - I

Introduction: Algorithm, Performance Analysis-Space complexity, Time complexity, Asymptotic **Notations-** 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 Sets: Disjoint set operations, union and find algorithms, Priority Queue- Heaps, Heapsort

Backtracking: General method, applications, n-queen's problem, sum of subsets problem, graph coloring, Hamiltonian cycles.

UNIT - III

Dynamic Programming: General method, applications- Optimal binary search trees, 0/1 knapsack problem, all pairs shortest path problem, Traveling sales person problem, Reliability design

UNIT - IV

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

Basic Traversal and Search Techniques: Techniques for Binary Trees, Techniques for Graphs, Connected components, Bi connected components.

UNIT - V

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

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

TEXT BOOKS:

1 Fundamentals of Computer Algorithms, Ellis Horowitz, Satraj Sahni and Raja sekharan, University Press

REFERENCE BOOKS:

1 Design and Analysis of algorithms, Aho, Ullman and Hopcroft, Pearson education
2 Introduction to Algorithms, second edition, T. H. Cormen, C.E. Leiserson, R. L. Rivest, and Stein, PHI Pvt. Ltd. / Pearson Education.
3 Algorithm Design: Foundations, Analysis and Internet Examples, M.T. Goodrich and R. Tamassia, John Wiley and sons

TEEGALA KRISHNA REDDY ENGINEERING COLLEGE

III Year B.Tech. CSE - I Sem

L	T	P	C
3	0	0	3

(22CS502PC) COMPUTER NETWORKS

Prerequisites:

1 A course on "Programming for problem solving"
2 A course on "Data Structures"

Course Objectives:

- The objective of the course is to equip the students with a general overview of the concepts and fundamentals of computer networks.
- Familiarize the students with the standard models for the layered approach to communication between machines in a network and the protocols of the various layers

Course Outcomes: The student will learn

CO1 Demonstrate the concepts of Data communication procedures and various models of Networking.
CO2 Summarize the features of various protocols used in Data Link Layer.
CO3 Identify appropriate routing algorithm for broadcasting in Network Layer and understanding addressing.
CO4 Demonstrate the services and features of TCP/UDP protocols in Transport Layer
CO5 Summarize the services and features of Application Layer with respect to WWW

CO's	PROGRAM OUTCOMES													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2				2	1						1	3	2
CO2	3	3	2	2	1							2	1	2
CO3	2	3	2	3	1							2	2	3
CO4	1			1								1	1	3
CO5	3	3	3	3	2	2	2					3	3	2

UNIT - I

Network hardware, Network software, OSI, TCP/IP Reference models, Example Networks: ARPANET, Internet.
Physical Layer: Guided Transmission media: twisted pairs, Coaxial cable, fiber optics, Wireless transmission.
Data link layer: Design issues, framing, Error detection and correction.

UNIT - II

Elementary data link protocols: simplex protocol, A simplex stop and wait protocol for an Error-free channel, A simplex stop and wait protocol for noisy channel.
Sliding Window protocols: A one-bit sliding window protocol, A protocol using Go-Back- N, A Protocol using Selective Repeat, Example data link protocols.
Medium Access sub layer: The channel allocation problem, Multiple access protocols: ALOHA, Carrier senses multiple access protocols, collision free protocols. Wireless LANs, Data link layer switching.

UNIT - III

Network Layer: Design issues, Routing algorithms: shortest path routing, Flooding, Hierarchical routing, Broadcast, Multicast, distance vector routing, Congestion Control Algorithms, Quality of Service, Internetworking, IPV4 and IPV6 Addressing, The Network layer in the internet.

UNIT - IV

Transport Layer: Transport Services, Elements of Transport protocols, Connection Management, TCP and UDP protocols.

UNIT - V

Application Layer –Domain name system, SNMP, Electronic Mail; the World WEB, HTTP, Streaming audio and video.

TEXT BOOKS:

1 Computer Networks -- Andrew S Tanenbaum, David. J.Wetherall, 5th Edition. Pearson Education/PHI
2 Data Communications and Networking – Behrouz A. Forouzan. Third Edition TMH

REFERENCE BOOKS:

1 An Engineering Approach to Computer Networks-S. Keshav, 2nd Edition, Pearson Education
2 Understanding communications and network,3rd Edition, W.A.Shay, Thomson

TEEGALA KRISHNA REDDY ENGINEERING COLLEGE

III Year B.Tech. CSE - I Sem

L	T	P	C
3	0	0	3

(22CS503PC) DevOps

Pre-requisites:
Course on Web development / Programming language/ Script Languages and Software Engineering

Course Objectives:
- Describe the agile relationship between development and IT operations.
- Understand the skill sets and high-functioning teams involved in DevOps and related methodsto reach a continuous delivery capability.
- Implement automated system update and DevOps lifecycle.

Course Outcomes: The student will learn

CO1	Identify components of Devops environment
CO2	Describe Software development models and architectures of DevOps
CO3	Apply different project management, integration, testing and code deployment tool
CO4	Investigate different DevOps Software development models and best practices
CO5	Collaborate and adopt Devops in real-time projects.

CO's	PROGRAM OUTCOMES													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1		2			3				2	2		1	2	2
CO2	2	2	2		3				2	2	2	1	2	2
CO3			2		3				2	2	2	1	2	2
CO4			2		3				1	2	1	1	2	2
CO5	2		2		3				2	2	2	1	2	2

UNIT - I
Introduction to Devops: Introduction, Agile development model, DevOps, and ITIL. DevOps process and Continuous Delivery, Release management, Scrum, Kanban, delivery pipeline, Identifying bottlenecks

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, Overview of Deployment tools: Chef, Salt Stack and Docker

TEXT BOOKS:

1 Joakim Verona.” Practical Devops”, Second Edition.Packt publishing, Orielly, ISBN- 10: 1788392574
2 Deepak Gaikwad, Viral Thakkar. “DevOps Tools from Practitioner's Viewpoint”. Wiley publications. ISBN: 9788126579952

REFERENCE BOOKS:

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

TEEGALA KRISHNA REDDY ENGINEERING COLLEGE

III Year B.Tech. CSE - I Sem

L	T	P	C
3	0	0	3

(22CS511PE) QUANTUM COMPUTING
(Professional Elective–I)

Prerequisites:

Course Objectives:

- To introduce the fundamentals of quantum computing
- The problem-solving approach using finite dimensional mathematics

Course Outcomes: The student will learn

CO1: Understand basics of quantum computing
CO2: Understand physical implementation of Qubit
CO3: Understand Quantum algorithms and their implementation
CO4: Understand the Impact of Quantum Computing on Cryptography
CO5: Understand the Noise and error correction techniques

CO's	PROGRAM OUTCOMES													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	1	1							2		1	2	2
CO2	2	1	1	1								1	2	2
CO3	3	2	2	2								2	2	2
CO4	3	2	2	2	1							2	2	2
CO5	3	2	2	2	1							2	2	2

UNIT - I

History of Quantum Computing: Importance of Mathematics, Physics and Biology. Introduction to Quantum Computing: Bits Vs Qubits, Classical Vs Quantum logical operations

UNIT - II

Back ground Mathematics: Basics of Linear Algebra, Hilbert space, Probabilities and measurements. Background Physics: Paul's exclusion Principle, Superposition, Entanglement and super-symmetry, density operators and correlation, basics of quantum mechanics, Measurements in bases other than computational basis. Background Biology: Basic concepts of Genomics and Proteomics (Central Dogma)

UNIT - III

Qubit: Physical implementations of Qubit. Qubit as a quantum unit of information. The Bloch sphere Quantum Circuits: single qubit gates, multiple qubitgates, designing the quantum circuits. Bellstates.

UNIT - IV

Quantum Algorithms: Classical computation on quantum computers. Relationship between quantum and classical complexity classes. Deutsch's algorithm, Deutsch's-Jozsa algorithm, Shor's factorization algorithm, Grover's search algorithm.

UNIT - V

Noise and error correction: Graph states and codes, Quantum error correction, fault-tolerant computation. Quantum Information and Cryptography: Comparison between classical and quantum information theory. Quantum Cryptography, Quantum teleportation

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 Quantum Computing for Computer Scientists by Noson S.Yanof sky and Mirco A.Mannucci

2 BenentiG., CasatiG.and StriniG., Principles of Quantum Computation and Information,Vol. I: Basic Concepts, Vol II

3 Basic Tools and Special Topics, World Scientific. Pittenger A.O., An Introduction to Quantum Computing Algorithms

TEEGALA KRISHNA REDDY ENGINEERING COLLEGE

III Year B.Tech. CSE - I Sem

L	T	P	C
3	0	0	3

(22CS512PE) ADVANCED COMPUTER ARCHITECTURE
(Professional Elective–I)

Prerequisites:

1 A course on "Computer Organization"

Course Objectives:

- To impart the concepts and principles of parallel and advanced computer architectures.
- develop the design techniques of Scalable and multithreaded Architectures.
- To Apply the concepts and techniques of parallel and advanced computer architectures to design modern computer systems

Course Outcomes: The student will learn

CO1: Sketch the concept of Computational models and Computer Architectures.
CO2: Illustrate the concepts of parallel computer models.
CO3: Tell about Scalable Architectures, Pipelining, Super scalar processors, and multiprocessors.
CO4: Write about Multifactor & SIMD computers.
CO5: Demonstrate Multithreaded & Hybrid computers.

CO's	PROGRAM OUTCOMES													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	3	3	3				3	2	3	2	2	3
CO2	2	2	1	2	2				2	2	2	2	2	2
CO3	3	3	3	2	3					2	3	2	1	2
CO4	2	2	2	3	2				2	2	3	2	1	1
CO5	3	2	3	2	3				3	2	1	2	1	1

UNIT - I

Theory of Parallelism, Parallel computer models, The State of Computing, Multiprocessors and Multi computers, Multi vector and SIMD Computers, PRAM and VLSI models, Architectural development tracks, Program and network properties, Conditions of parallelism, Program partitioning and Scheduling, Program flow Mechanisms, System interconnect Architectures.

UNIT - II

Principles of Scalable performance, Performance metrics and measures, Parallel Processing applications, Speed up performance laws, Scalability Analysis and Approaches, Hardware Technologies, Processes and Memory Hierarchy, Advanced Processor Technology, Superscalar and Vector Processors

UNIT - III

Shared-Memory Organizations, Sequential and weak consistency models, Pipelining and superscalar techniques, Linear Pipeline Processors, Non-Linear Pipeline Processors, and Instruction Pipeline design, Arithmetic pipeline design, superscalar pipeline design.

UNIT - IV

Parallel and Scalable Architectures, Multiprocessors and Multicomputers, Multiprocessor system interconnects, cache coherence and synchronization mechanism, Three Generations of Multicomputer, Message-passing Mechanisms, Multivetor and SIMD computers.

UNIT - V

Vector Processing Principles, Multivector Multiprocessors, Compound Vector processing, SIMD computer Organizations, The connection machine CM-5.

TEXT BOOKS:

1 Advanced Computer Architecture Second Edition, Kai Hwang, Tata McGraw Hill Publishers.

REFERENCE BOOKS:

1 Computer Architecture, Fourth edition, J. L. Hennessy and D.A. Patterson. ELSEVIER.

2 Advanced Computer Architectures, S.G. Shiva, and Special Indian edition, CRC, Taylor &Francis.

3 Introduction to High Performance Computing for Scientists and Engineers, G. Hager and G.Wellein, CRC Press, Taylor & Francis Group

4 Advanced Computer Architecture, D. Sima, T. Fountain, P. Kacsuk, Pearson education.'

5 Computer Architecture, B. Parhami, Oxford Univ. Press

TEEGALA KRISHNA REDDY ENGINEERING COLLEGE

III Year B.Tech. CSE - I Sem

L	T	P	C
3	0	0	3

(22CS513PE) DATA ANALYTICS
(Professional Elective–I)

Prerequisites:

- A course on "Database Management Systems".
- Knowledge of probability and statistics

Course Objectives:

- To explore the fundamental concepts of data analytics.
- To learn the principles and methods of statistical analysis
- Discover interesting patterns, analyze supervised and unsupervised models and estimate the accuracy of the algorithms.
- To understand the various search methods and visualization techniques

Course Outcomes: The student will learn

CO1: Understand the impact of data analytics for business decisions and strategy

CO2: Carry out data analysis/statistical analysis

CO3: To carry out standard data visualization and formal inference procedures

CO4: Design Data Architecture

CO5: Understand various Data Sources

CO's	PROGRAM OUTCOMES													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2				1							2	3
CO2	1	1	1	1							1		2	3
CO3	1	2	1		2								2	
CO4	1	1	2								2		2	
CO5	2	1	1				2				1		2	

UNIT - I

Data Management: Design Data Architecture and manage the data for analysis, understand various sources of Data like Sensors/Signals/GPS etc. Data Management, Data Quality(noise, outliers, missing values, duplicate data) and Data Processing & Processing

UNIT - II

Data Analytics: Introduction to Analytics, Introduction to Tools and Environment, Application of ModelinginBusiness,Databases&TypesofDataandVariables,DataModelingTechniques,Missing Imputations etc. Need for Business Modeling

UNIT - III

Regression– Concepts, Blue property assumptions, Least Square Estimation, Variable Rationalization, and Model Building etc.
LogisticRegression:ModelTheory,ModelfitStatistics,ModelConstruction,Analyticsapplicationsto various Business Domains etc

UNIT - IV

Object Segmentation: Regression Vs Segmentation–Supervised and Unsupervised Learning, Tree Building–Regression, Classification, Overfitting, Pruning and Complexity, Multiple Decision Treesetc. Time Series Methods: Arima, Measures of Forecast Accuracy, STL approach, Extract features from generated model as Height, Average Energy etc and Analyze for prediction

UNIT - V

Data Visualization: Pixel-Oriented Visualization Techniques, Geometric Projection Visualization Techniques, Icon-Based Visualization Techniques, Hierarchical Visualization Techniques, Visualizing Complex Data and Relations.

TEXT BOOKS:

1 Student's Hand book for Associate Analytics–II,III.

2 Data Mining Concepts and Techniques , Han ,Kamber, 3rdEdition, Morgan Kaufmann Publishers.

REFERENCE BOOKS:

1 IntroductiontoDataMining,Tan,SteinbachandKumar,AddisionWisley,2006

2 Data Mining Analysis and Concepts, M.Zaki and W.Meira

3 Mining of Massive Datasets, Jure Leskovec Stanford Univ. Anand Rajaraman Mill way Labs Jeffrey D Ullman Stanford Univ.

TEEGALA KRISHNA REDDY ENGINEERING COLLEGE

III Year B.Tech. CSE - I Sem

L	T	P	C
3	0	0	3

(CS514PE) IMAGE PROCESSING
(Professional Elective–I)

Prerequisites:

- Students are expected to have knowledge in linear signals and systems, Fourier Transform, basic linear algebra, basic probability theory and basic programming techniques; knowledge of digital signal processing is desirable.
- A course on " Computational Mathematics"
- A course on" Computer Oriented Statistical Methods"

Course Objectives:

- Provide a theoretical and mathematical foundation of fundamental Digital Image Processing concepts.
- The topics include image acquisition; sampling and quantization; preprocessing; enhancement; restoration; segmentation; and compression

Course Outcomes: The student will learn

CO1: Review the fundamental concepts of a digital image processing system.

CO2: Analyze images in the frequency domain using various transforms.

CO3: Evaluate the techniques for image enhancement and image restoration.

CO4: Categorize various compression techniques

CO5: Interpret Image compression standards.

CO's	PROGRAM OUTCOMES													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	-	2	3	-	-	-	3	-	-	3	-	-
CO2	3	1	-	-	3	-	2	-	3	-	-	-	2	-
CO3	3	1	-	2	3	3	2	-	-	-	-	3	-	3
CO4	3	2	-	2	3	3	2	-	-	-	--	3	2	3
CO5	3	2	-	2	3	3	-	-	3	-	-	3	2	3

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 Dis continuities, 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, 2nd Ed, 2004.

REFERENCE BOOKS:

1 Fundamentals of Digital Image Processing: A.K.Jain, PHI.

2 Digital Image Processing using MAT LAB: RafaelC. Gonzalez, Richard E. Woods, Steven L. Eddins: Pearson Education India, 2004

3 Digital Image Processing: WilliamK.Pratt, JohnWiley, 3rdEdition,2004.

TEEGALA KRISHNA REDDY ENGINEERING COLLEGE

III Year B.Tech. CSE - I Sem

L	T	P	C
3	0	0	3

(22CS515PE) PRINCIPLES OF PROGRAMMING LANGUAGES
(Professional Elective–I)

Prerequisites:

- A course on "Mathematical Foundations of Computer Science"
- A course on "Computer Programming and Data Structures".

Course Objectives:

- Introduce important paradigms of programming languages
- To provide conceptual understanding of high-level language design and implementation
- Topics include programming paradigms; syntax and semantics; data types, expressions and statements; sub programs and blocks; abstract data types; concurrency ;functional and logic programming languages; and scripting languages

Course Outcomes: The student will learn

CO1: Acquire the skills for expressing syntax and semantics informal notation

CO2: Identify and apply a suitable programming paradigm for a given computing application.

CO3: Gain knowledge of and able to compare the features of various programming languages

CO4: Demonstrating the use of scripting languages

CO5: Finding various data types of different programming languages

CO's	PROGRAM OUTCOMES													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1		1	1		2							1	2	2
CO2	1	1	1	1	2				1			1	2	2
CO3	1	1	1	1	2				1			1	2	2
CO4	1	1	1	1	2		1		1			1	2	2
CO5	1	1	1	1	2		1		1			1	2	2

UNIT - I

Preliminary Concepts: Reasons for Studying Concepts of Programming Languages, Programming Domains, Language Evaluation Criteria, Influences on Language Design, Language Categories, Language Design Trade-Offs, Implementation Methods, Programming Environments Syntax and Semantics: General Problem of Describing Syntax and Semantics, Formal Methods of Describing Syntax, Attribute Grammars, Describing the Meanings of Programs

UNIT - II

Names, Bindings, and Scopes: Introduction, Names, Variables, Concept of Binding, Scope, Scope and Lifetime, Referencing Environments, Named Constants

Data Types: Introduction, Primitive Data Types, Character String Types, User Defined

Ordinal Types, Array Associative Arrays, Record, Union, Tuple Types, List T ypes, Pointer and Reference Types, Type Checking, Strong Typing, Type Equivalence Expressions and Statements, Arithmetic Expressions, Overloaded Operators, Type Conversions, Relational and Boolean Expressions, Short Circuit Evaluation, Assignment Statements, Mixed-Mode Assignment Control Structures – Introduction, Selection Statements, Iterative Statements, Unconditional Branching, Guarded Commands

UNIT - III

Subprograms and Blocks: Fundamentals of Sub-Programs, Design Issues for Subprograms, Local Referencing Environments, Parameter Passing Methods, Parameters that Are Subprograms, Calling Subprograms Indirectly, Overloaded Subprograms, Generic Subprograms, Design Issues for Functions, User Defined Overloaded Operators, Closures,

Co routines Implementing Subprograms: General Semantics of Calls and Returns, Implementing Simple Subprograms, Implementing Subprograms with Stack-Dynamic Local Variables, Nested Subprograms, Blocks, Implementing Dynamic Scoping

Abstract Data Types: The Concept of Abstraction, Introductions to Data Abstraction, Design Issues, Language Examples, Parameterized ADT, Encapsulation Constructs, Naming Encapsulations

UNIT - IV

Concurrency: Introduction, Introduction to Subprogram Level Concurrency, Semaphores, Monitors, Message Passing, Java Threads, Concurrency in Function Languages, Statement Level Concurrency.

Exception Handling and Event Handling: Introduction, Exception Handling in Ada, C++,Java, Introduction to Event Handling, Event Handling with Java and C#.

UNIT - V

Functional Programming Languages: Introduction, Mathematical Functions, Fundamentals of Functional Programming Language, LISP, Support for Functional Programming in Primarily Imperative Languages, Comparison of Functional and Imperative Languages

Logic Programming Language: Introduction, an Overview of Logic Programming, Basic Elements of Prolog, Applications of Logic Programming.

Scripting Language: Pragmatics, Key Concepts, Case Study: Python–Values and Types, Variables, Storage and Control, Bindings and Scope, Procedural Abstraction, Data Abstraction, Separate Compilation, Module Library. (Text Book 2)

TEXT BOOKS:

1 Concepts of Programming Languages Robert.W.Sebesta10/E, Pearson Education.

2 Programming Language Design Concepts, D.A.Watt, Wiley Dreamtech, 2007

REFERENCE BOOKS:

1 Programming Languages, 2ndEdition, A.B.Tucker ,R.E.Noonan, TMH.

2 Programming Languages, K.C.Louden,2nd Edition,Thomson,2003.

TEEGALA KRISHNA REDDY ENGINEERING COLLEGE

III Year B.Tech. CSE - I Sem

L	T	P	C
3	0	0	3

(22CS521PE) COMPUTER GRAPHICS
(Professional Elective–II)

Prerequisites:
- Programming for problem solving and Data Structures

Course Objectives:
- Provide the basics of graphics systems including Points and lines, line drawing algorithms, 2D, 3D objective transformations

Course Outcomes: The student will learn

CO1: Understand the fundamental algorithms used in computer graphics and to some extent be able to compare and evaluate them

CO2: Able to design, develop, and modify electronically generated imaginary using a wide range of sophisticated graphical tools and techniques.

CO3: Able to summarize different hidden surface elimination algorithms and shading techniques used in computer graphics and digital media production.

CO4: Able to explain about the technology necessary for creating multimedia content for the web, video, DVD, 2D and 3D graphics, Sound and programming.

CO5: Apply the knowledge, techniques, skills and modern tools to become successful professionals in communication and media industries.

CO's	PROGRAM OUTCOMES													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	1	2									1	1	
CO2	2	2	1		1							1	1	2
CO3	2	1	1		3							1	2	
CO4	2	2		2		1						1		
CO5	1	2	1									1	1	

UNIT - I

Introduction: Application areas of Computer Graphics, overview of graphics systems, video-display devices, raster-scan systems, random-scan systems, graphics monitors and work stations and input devices

Output primitives: Points and lines, line drawing algorithms (DDA and Bresenham's Algorithm) circle- generating algorithms and ellipse - generating algorithms

PolygonFilling: Scan-linealgorithm,boundary-fillandflood-fillalgorithms

UNIT - II

2-D geometric transformations: Translation, scaling, rotation, reflection and shear transformations, matrix representations and homogeneous coordinates, composite transforms, transformations between coordinate systems

2-D viewing: The viewing pipeline, viewing coordinate reference frame, window to view-port coordinate transformation, viewing functions, clipping operations, point clipping, Line clipping-Cohen Sutherland algorithms, Polygon clipping-Sutherland Hodgeman polygon

clipping algorithm..

UNIT – III

3- D objectrepresentation:Polygonsurfaces,quadricsurfaces,splinerepresentation,Hermitecurve, Bezier curve and B-Spline curves, Bezier and B-Spline surfaces, Polygon rendering methods, color models and color applications

UNIT - IV

3-DGeometric transformations: Translation, rotation, scaling, reflection and shear transformations, composite transformations.

3-D viewing: Viewing pipeline, viewing coordinates, projections, view volume and general projection transforms and clipping

UNIT - V

Computer animation: Design of animation sequence, general computer animation functions, raster animations, computer animation languages, key frame systems, motion specifications.

Visible surface detection methods: Classification, back-face detection, depth-buffer method, BSP- tree method, area sub-division method and octree method.

TEXT BOOKS:

1 Computer Graphics Cversion, Donald Hearn and M.Pauline Baker, Pearson Education

REFERENCE BOOKS:

1 Procedural elements for Computer Graphics, David FRogers, Tata Mc Graw hill, 2nd edition.
2 Principles of Interactive Computer Graphics",Neuman and Sproul,TMH
3 Principles of Computer Graphics, Shalini Govil, Pai,2005, Springer.
4 "Computer Graphics Principles & practice", second edition in C, Foley, Van Dam, Feiner and Hughes, Pearson Education.
5 Computer Graphics, Steven Harrington, TMH.

TEEGALA KRISHNA REDDY ENGINEERING COLLEGE

III Year B.Tech. CSE - I Sem

L	T	P	C
3	0	0	3

22CS522PE: EMBEDDED SYSTEMS

(Professional Elective–II)

Prerequisites:

- A course on "Digital Logic Design and Microprocessors"
- A course on "Computer Organization and Architecture

Course Objectives:

- To provide an overview of principles of Embedded System
- To provide a clear understanding of role of firmware, operating systems in correlation with hardware systems

Course Outcomes: The student will learn

CO1: Expectedtounderstandtheselectionprocedureofprocessorsintheembeddeddomain.

CO2: Design procedure of embedded firmware.

CO3: Expected to visualize the role of real time operating systems in embedded systems.

CO4: Expected to evaluate the correlation between task synchronization and latency issues

CO5: Understand how the OS based embedded System works

CO's	PROGRAM OUTCOMES													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1	2	2	1								1	2	1
CO2	1	2	2	1								1	2	1
CO3	1	2	2	1	1							1	2	1
CO4	1	2	2	1	1							1	2	1
CO5	1	2	2	1								1	2	1

UNIT - I

Introduction to Embedded Systems: Process or embedded into a system, Embedded Hardware units and devices in a system, Embedded software in a system, Design process of an embedded system, classification of embedded systems, characteristics and quality attributes of an embedded systems

UNIT - II

Introduction to processor/microcontroller architecture, Real world interfacing, processor and memory organization, memory types, memory maps and addresses, interrupt sources and interrupt service mechanism

UNIT – III

On board Communication Basics: serial; communication devices, Parallel devices, Wireless devices, Real time clock, Serial bus communication Protocols - I2C, SPI; Parallel buss communication - ISA, PCI.

UNIT - IV

Embedded Firmware Development: Overview of programming concepts- in assembly language and in high level language 'C', C Program elements- Heads, Source files, Processor Directives, Macros, Functions, Data types and Data Structures

UNIT - V

OS Based Embedded Systems: OS services - Process/Task Management, Memory Management, I/O subsystem manager, Inter Process/Task communications - Tasks, Task states, Shared data, Signals, Message Queues, Mailbox, Pipes and concepts of Semaphores

TEXT BOOKS:

1 Embedded Systems, RajKamal, 2nd edition,Tata Mc GrawHill

2 ShibuKV, "Introduction to Embedded Systems", Second Edition, Mc GrawHill

REFERENCE BOOKS:

1 Rajkamal, Embedded Systems Architecture, Programming and Design, TataMc Graw-Hill

2 Frank Vahid and Tony Givargis, "Embedded Systems Design"-A Unified Hardware/Software Introduction, John Wiley

3 Lyla,"Embedded Systems"–Pearson

4 David E.Simon, An Embedded Software Primer, Pearson Education Asia, First Indian Reprint 2000.

TEEGALA KRISHNA REDDY ENGINEERING COLLEGE

III Year B.Tech. CSE - I Sem

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22CS523PE: INFORMATION RETRIEVAL SYSTEMS

(Professional Elective–II)

Prerequisites:

- A course on "Data Structures

Course Objectives:

- To learn the concepts and algorithms in Information Retrieval Systems
- To understand the data/file structures that are necessary to design, and implement information retrieval (IR) systems

Course Outcomes: The student will learn

CO1: Ability to apply IR principles to locate relevant information large collections of data

CO2: Ability to design different document clustering algorithms.

CO3: Implement retrieval systems for web search tasks.

CO4: Design an Information Retrieval System for web search tasks.

CO5: Ability to imply text search techniques.

CO's	PROGRAM OUTCOMES													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3			3				2	2	2		3	2	
CO2		3						1		2				3
CO3		3	3			2			2	2		1	3	2
CO4	2	2	2				1	2	1					
CO5	3	3		3	1			2				1	2	3

UNIT - I

Introduction to Information Retrieval Systems: Definition of Information Retrieval System, Objectives of Information Retrieval Systems, Functional Overview, Relationship to Database Management Systems, Digital Libraries and Data Warehouses Information Retrieval System Capabilities: Search Capabilities, Browse Capabilities

UNIT - II

Cataloging and Indexing: History and Objectives of Indexing, Indexing Process, Automatic Indexing, Information Extraction Data Structure: Introduction to Data Structure, Stemming Algorithms, Inverted File Structure, N-Gram Data Structures, PAT Data Structure, Signature File Structure, Hypertext and XML Data Structures, Hidden Markov Models

UNIT – III

Automatic Indexing: Classes of Automatic Indexing, Statistical Indexing, Natural Language, Concept Indexing, Hypertext Linkages Document and Term Clustering: Introduction to Clustering, Thesaurus Generation, Item Clustering, Hierarchy of Clusters

UNIT - IV

User Search Techniques: Search Statements and Binding, Similarity Measures and Ranking, Relevance Feedback, Selective Dissemination of Information Search, Weighted Searches of Boolean Systems, Searching the INTERNET and Hypertext Information.

UNIT - V

Text Search Algorithms: Introduction to Text Search Techniques, Software Text Search Algorithms, and Hardware Text Search Systems Multimedia Information Retrieval: Spoken Language Audio Retrieval, Non-Speech Audio Retrieval, Graph Retrieval, Imagery Retrieval, And Video Retrieval.

TEXT BOOKS:

1 Information Storage and Retrieval Systems – Theory and Implementation, Second Edition, Gerald J. Kowalski, Mark T. Maybury, Springer.

REFERENCE BOOKS:

1 Frakes, W.B., Ricardo Baeza-Yates: Information Retrieval Data Structures and Algorithms, PrenticeHall,1992.

2 Information Storage & Retrieval by Robert Korfhage – John Wiley & Sons.

3 Modern Information Retrieval by Yates and Neto Pearson Education.

TEEGALA KRISHNA REDDY ENGINEERING COLLEGE

III Year B.Tech. CSE - I Sem

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22CS524PE: DISTRIBUTED DATABASES

(Professional Elective–II)

Prerequisites:

- A course on "Database Management Systems"

Course Objectives:

- 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.
- Introduce basic principles and implementation techniques of distributed database systems.
- Equip students with principles and knowledge of parallel and object-oriented databases.
- Topics include distributed DBMS architecture and design; query processing and optimization; distributed transaction management and reliability; parallel and object database management systems

Course Outcomes: The student will learn

CO1: Understand theoretical and practical aspects of distributed database systems.

CO2: Study and identify various issues related to the development of distributed database system.

CO3: Understand the design aspects of object-oriented database system and related development.

CO4: Interpret the concepts of Distributed DBMS and Parallel Database Systems

CO5: Determine the various design aspects of an object-oriented database system

CO's	PROGRAM OUTCOMES													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	1				2					2	2	2
CO2	3	2	2	3									3	3
CO3		2	2						3				3	2
CO4			2	2					3				3	
CO5						3					2			

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 and Giuseppe Pelagatti: Distributed Databases McGrawHill.

REFERENCE BOOKS:

1 Hector Garcia- Molina ,JeffreyD. Ullman, Jennifer Widom:“Database Systems: The Complete Book”, Second Edition, Pearson International Edition.

TEEGALA KRISHNA REDDY ENGINEERING COLLEGE

III Year B.Tech. CSE - I Sem

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3	0	0	3

22CS525PE: NATURAL LANGUAGE PROCESSING

(Professional Elective–II)

Prerequisites:

- A course on " Data structures and compiler design"

Course Objectives:

- Introduce to some of the problems and solutions of NLP and their relation to linguistics and statistics.

Course Outcomes: The student will learn

CO1: Show sensitivity to linguistic phenomena and an ability to model them with formal grammars.

CO2: Understand and carry out proper experimental methodology for training and evaluating empirical NLP systems

CO3: Able to manipulate probabilities, construct statistical models over strings and trees, and estimate parameters using supervised and unsupervised training methods.

CO4: Able to design, implement, and analyze NLP algorithms

CO5: Able to design different language modeling Techniques.

CO's	PROGRAM OUTCOMES													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	2	3	2	1	1	2	1	2	2	2	3	1
CO2	3	3	2	3	3	1	1	2	1	3	3	2	3	1
CO3	3	3	2	3	3	1	1	2	1	3	3	2	3	1
CO4	3	3	3	3	3	1	1	2	1	3	3	2	3	1
CO5	3	3	3	2	2	1	1	2	1	2	2	2	3	1

UNIT - I

Finding the Structure of Words: Words and Their Components, Issues and Challenges, Morphological Models

Finding the Structure of Documents: Introduction, Methods, Complexity of the Approaches, Performances of the Approaches, Features

UNIT - II

Syntax I: Parsing Natural Language, Tree banks: A Data-Driven Approach to Syntax, Representation of Syntactic Structure, Parsing Algorithms

UNIT – III

Syntax II: Models for Ambiguity Resolution in Parsing, Multi lingual Issues

Semantic Parsing I: Introduction, Semantic Interpretation, System Paradigms, Word Sense

UNIT - IV

Semantic Parsing II: Predicate-Argument Structure ,Meaning Representation Systems

UNIT - V

Language Modeling : Introduction, N-Gram Models ,Language Model Evaluation, Bayesian parameter estimation, Language Model Adaptation, Language Models- class based, variable length, Bayesian topic based, Multilingual and Cross Lingual Language Modeling

TEXT BOOKS:

1 Multilingual natural Language Processing Applications: From Theory to Practice – Daniel M. Bikel and Imed Zitouni, Pearson Publication

REFERENCE BOOKS:

1 Speech and Natural Language Processing- DanielJurafsky & James HMartin, Pearson Publications.

2 Natural Language Processing and Information Retrieval: Tanvier Siddiqui, U.S.Tiwary.

TEEGALA KRISHNA REDDY ENGINEERING COLLEGE

III Year B.Tech. CSE - I Sem

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22CS504PC: COMPUTER NETWORKS LAB

Prerequisites:

- A course on "Programming for Problem Solving".

Course Objectives:

- To understand the working principle of various communication protocols.
- To understand the network simulator environment and visualize a network topology and observe its performance
- To analyze the traffic flow and the contents of protocol frames

Course Outcomes: The student will learn

CO1: Implement data link layer farming methods

CO2: Analyze error detection and error correction codes.

CO3: Implement and analyze routing and congestion issues in network design.

CO4: Implement Encoding and Decoding techniques used in presentation layer

CO5: To be able to work with different network tools

CO's	PROGRAM OUTCOMES													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1	1	2										1	
CO2	2	2	2	2								1	1	2
CO3	2	1	3	3					2	1	2	2	2	2
CO4	1	2	2										1	
CO5	2	2	1	2	3	2	1	1				2	2	2

List of Experiments:

1. Implement the data link layer framing methods such as character, character-stuffing and bitstuffing.
2. Write a program to compute CRC code for the polynomials CRC-12, CRC-16 and CRC CCIP
3. Develop a simple data link layer that performs the flow control using the sliding window protocol, and loss recovery using the Go-Back-N mechanism.
4. Implement Dijsktra's algorithm to compute the shortest path through a network
5. Take an example subnet of hosts and obtain a broadcast tree for the subnet.
6. Implement distance vector routing algorithm for obtaining routing tables at each node.
7. Implement data encryption and data decryption
8. Write a program for congestion control using Leaky bucket algorithm.
9. Write a program for frame sorting technique used in buffers.
10. Wire shark
    i. Packet Capture Using Wire shark

ii. Starting Wire shark
iii. Viewing Captured Traffic
iv. Analysis and Statistics & Filters.

11 Do the following using NS2 Simulator
i. NS2 Simulator-Introduction
ii. Simulate to Find the Number of Packets Dropped
iii. Simulate to Find the Number of Packets Dropped by TCP/UDP
iv. Simulate to Find the Number of Packets Dropped due to Congestion
v. Simulate to Compare Data Rate& Throughput.
vi. Simulate to Plot Congestion for Different Source/Destination
vii. Simulate to Determine the Performance with respect to Transmission of Packets

TEXT BOOKS:

1 Computer Networks -- Andrew S Tanenbaum, David. J.Wetherall, 5th Edition. Pearson Education/PHI
2 Data Communications and Networking – Behrouz A. Forouzan. Third Edition TMH

REFERENCE BOOKS:

1 An Engineering Approach to Computer Networks-S. Keshav, 2nd Edition, Pearson Education
2 Understanding communications and network,3rd Edition, W.A.Shay, Thomson

TEEGALA KRISHNA REDDY ENGINEERING COLLEGE

III Year B.Tech. CSE - I Sem

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22CS505PC:DEVOPS Lab

Prerequisites:

- Course on Web development / Programming language/ Script Languages

Course Objectives:

- Describe the agile relationship between development and IT operations.
- Understand the skill sets and high-functioning teams involved in
- DevOps and related methods to reach a continuous delivery capability
- Implement automated system update and DevOps lifecycle

Course Outcomes: The student will learn

CO1: Identify components of Devops environment

CO2: Apply different project management, integration, testing and code deployment tool

CO3: Investigate different DevOps Software development, models

CO4: Demonstrate continuous integration and development using Jenkins.

CO5: Apply Automated Testing (selenium) for testing a web application

CO's	PROGRAM OUTCOMES													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1		2			3				2	2		1	2	2
CO2	2	2	2		3				2	2	2	1	2	2
CO3			2		3				2	2	2	1	2	2
CO4			2		3				1	2	1	1	2	2
CO5	2		2		3				2	2	2	1	2	2

List of Experiments:

1. Write code for a simple user registration form for an event.
2. Explore Git and GitHub commands.
3. Practice Source code management on GitHub. Experiment with the source code written in exercise 1.
4. Jenkins installation and setup, explore the environment.
5. Demonstrate continuous integration and development using Jenkins.
6. Explore Docker commands for content management.
7. Develop a simple containerized application using Docker.
8. Integrate Kubernetes and Docker
9. Automate the process of running containerized application developed in exercise 7using Kubernetes.
10. Install and Explore Selenium for automated testing.

11 Write a simple program in JavaScript and perform testing using Selenium.

12 Develop test cases for the above containerized application using selenium.

TEXT BOOKS:

1 Joakim Verona." Practical Devops", Second Edition. Packt publishing, Orielly, ISBN-10: 1788392574

2 Deepak Gaikwad, Viral Thakkar. "DevOps Tools from Practitioner's Viewpoint". Wiley publications. ISBN: 9788126579952

REFERENCE BOOKS:

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

2 Edureka DevOps Full Course - https://youtu.be/S_0q75eD8Yc

TEEGALA KRISHNA REDDY ENGINEERING COLLEGE

III Year B.Tech. CSE - I Sem **L T P C**
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22EN501HS: ADVANCED ENGLISH COMMUNICATION SKILLS LAB

Prerequisites:

Course Objectives:

The introduction of the Advanced Communication Skills Lab is considered essential at 3rd year level. At this stage, the students need to prepare themselves for their careers which may require them to listen to, read, speak and write in English both for their professional and inter personal communication in the globalized context

The proposed course should be a laboratory course to enable students to use 'good' English and perform the following:

- Gathering ideas and information to organize ideas relevantly and coherently.
- Engaging in debates.
- Participating in group discussions.
- Facing interviews
- Writing project / research reports / technical reports.
- Making oral presentations.
- Writing formal letters.
- Transferring information from non-verbal to verbal texts and vice-versa.
- Taking part in social and professional communication.

Course Outcomes: The student will learn

CO1: To improve the students' fluency in English, with a focus on vocabulary

CO2: To enable them to listen to English spoken at normal conversational speed by educated English speakers

CO3: To respond appropriately in different socio-cultural and professional contexts

CO4: To communicate their ideas relevantly and coherently in writing

CO5: To prepare the students for placements.

CO's	PROGRAM OUTCOMES													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1					2	2			2	3		2		
CO2					2	2			2	3		2		
CO3						2			2	3		2		
CO4									2	3		2		
CO5						2			2	3		2		

UNIT - I

Activities on Listening and Reading Comprehension: Active Listening – Development of Listening Skills Through Audio clips - Benefits of Reading – Methods and Techniques of Reading – Basic Steps to Effective Reading – Common Obstacles – Discourse Markers or Linkers - Sub-skills of reading - Reading for facts, negative factsand Specific Details- Guessing Meanings from Context, Inferring Meaning - Critical Reading — Reading Comprehension – Exercises for Practice

UNIT - II

Activities on Writing Skills:Vocabulary for Competitive Examinations - Planning for Writing – Improving Writing Skills -Structure and presentation of different types of writing– Free Writing and Structured Writing -Letter Writing –Writing a Letter of Application –Resume vs. Curriculum Vitae – Writing a Résumé **–** Styles of Résumé - e-Correspondence – Emails – Blog Writing - (N)etiquette –Report Writing – Importance of Reports – Types and Formats of Reports–Technical Report Writing– Exercises for Practice

UNIT – III

Activities on Presentation Skills - Starting a conversation – responding appropriately and relevantly – using the right language and body language – Role Play in different situations including Seeking Clarification, Making a Request, Asking for and Refusing Permission, Participating in a Small Talk – Oral presentations (individual and group) through JAM sessions-PPTs – Importance of Presentation Skills – Planning, Preparing, Rehearsing and Making a Presentation – Dealing with Glossophobia or Stage Fear – Understanding Nuances of Delivery - Presentations through Posters/Projects/Reports – Checklist for Making a Presentationand Rubrics of Evaluation

UNIT - IV

Activities on Group Discussion (GD): Types of GD and GD as a part of a Selection Procedure - Dynamics of Group Discussion- Myths of GD - Intervention, Summarizing - Modulation of Voice, Body Language, Relevance, Fluency and Organization of Ideas **–** Do's and Don'ts - GD Strategies – Exercises for Practice.

UNIT - V

Interview Skills: Concept and Process -Interview Preparation Techniques - Types of Interview Questions – Pre-interview Planning, Opening Strategies, Answering Strategies - Interview Through Tele-conference &Video-conference - Mock Interviews

MINIMUM REQUIREMENT:

The Advanced English Communication Skills(AECS) Laboratory shall have the following infrastructural facilities to accommodate at least 35 students in the lab:

- Spacious room with appropriate acoustics
- Round Tables with movable chairs
- Audio-visual aids
- LCD Projector
- Public Address system
- P–IV Processor, HardDisk–80GB,RAM–512MBMinimum,Speed–2.8GHZ
- T.V,a digital stereo & Camcorder
- Head phonesof High quality

SUGGESTEDSOFTWARE:

- The software consisting of the prescribed topics elaborated above should be procured and used.
- Oxford Advanced Learner's Compass,7thEdition
- DELTA's key to the Next Generation TOEFL Test: Advanced Skill Practice
- Lingua TOEFL CBT Insider, by Dreamtech
- TOEFL&GRE(KAPLAN,AARCO&BARRONS,USA,CrackingGREbyCLIFFS)

REFERENCE BOOKS:

1. Rizvi, M. Ashraf (2018). Effective Technical Communication. (2nd ed.). McGraw Hill Education (India) Pvt. Ltd.
2. Suresh Kumar, E. (2015). Engineering English. Orient BlackSwan Pvt. Ltd.
3. Bailey, Stephen. (2018). Academic Writing: A Handbook for International Students. (5th Edition). Routledge
4. Koneru, Aruna. (2016). Professional Communication. McGraw Hill Education (India) Pvt. Ltd.
5. Raman, Meenakshi & Sharma, Sangeeta. (2015). Technical Communication, 3E: Principles and Practice. Oxford University Press.
6. Anderson,Paul V. (2007). Technical Communication. Cengage Learning Pvt. Ltd. New Delhi.
7. McCarthy, Michael; O'Dell, Felicity & Redman, Stuart. (2017). English Vocabulary in Use Series. Cambridge University Press
8. Sen, Leela. (2009). Communication Skills. PHI Learning Pvt Ltd., New Delhi
9. Elbow, Peter. (1998). Writing with Power. Oxford University Press.
10. Goleman, Daniel. (2013).Emotional Intelligence: Why it can matter more than IQ. Bloomsbury Publishing.

TEEGALA KRISHNA REDDY ENGINEERING COLLEGE

III Year B.Tech. CSE - I Sem **L T P C**
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22CS506PC:UI DESIGN-FLUTTER

Prerequisites: A course on "Programming for Problem Solving

Course Objectives:

- To learn installation of SDK of Flutter, Xcode and Android Emulator
- Understanding Stateless and Stateful Widgets and Widget Tree
- Learning of Dart basics
- Application of Animation to app.

Course Outcomes: The student will learn

CO1: Implements Flutter Widgets and Layouts

CO2: Responsive UI Design and with Navigation in Flutter

CO3: Create custom widgets for specific UI elements and also Apply styling using themes and custom styles.

CO4: Design a form with various input fields, along with validation and error handling

CO5: Fetches data and write code for unit Test for UI components and also animation

CO's	PROGRAM OUTCOMES													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	2	1	-	1	-	-	2	-	-	2	3	2
CO2	3	3	3	2	-	1	-	-	3	-	2	3	3	3
CO3	3	3	3	2	-	-	-	-	3	-	2	3	3	3
CO4	3	3	3	3	2	2	-	1	3	-	3	2	3	3
CO5	3	3	3	3	3	2	-	1	3	-	3	2	3	3

List of Experiments: Students need to implement the following experiments

1 a) Install Flutter and Dart SDK.
b) Write a simple Dart program to understand the language basics.
2 a) Explore various Flutter widgets (Text, Image, Container, etc.).
b) Implement different layout structures using Row, Column, and Stack widgets
3 a) Design a responsive UI that adapts to different screen sizes.
b) Implement media queries and breakpoints for responsiveness
4 a) Set up navigation between different screens using Navigator.
b) Implement navigation with named routes.
5 a) Learn about stateful and stateless widgets.
b) Implement state management using set State and Provider.
6 a) Create custom widgets for specific UI elements.

	b) Apply styling using themes and custom styles
7	a) Design a form with various input fields.
	b) Implement form validation and error handling
8	a) Add animations to UI elements using Flutter's animation framework.
	b) Experiment with different types of animations (fade, slide, etc.).
9	a) Fetch data from a REST API.
	b) Display the fetched data in a meaningful way in the UI.
10	a) Write unit tests for UI components.
	b) Use Flutter's debugging tools to identify and fix issues.

TEXT BOOKS:

1 Marco L. Napoli, Beginning Flutter: A Hands-on Guide to App Development, 1stedition,Wrox publisher

REFERENCE BOOKS:

1 Flutter for Beginners: An introductory guide to building cross

2 Rap Payne, Beginning App Development with Flutter: Create Cross

3 FrankZammetti, Practical Flutter: Improve your Mobile Development with Google's Latest Open

TEEGALA KRISHNA REDDY ENGINEERING COLLEGE

III Year B.Tech. CSE - I Sem

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3	0	0	0

22MC510: INTELLECTUAL PROPERTY RIGHTS

Prerequisites:

Course Objectives:

- Significance of intellectual property and its protection
- Introduce various forms of intellectual property

Course Outcomes: The student will learn

CO1: Distinguish and Explain various forms of IPRs.

CO2: Identify criteria to fit one's own intellectual work in particular form of IPRs.

CO3: Apply statutory provisions to protect particular form of IPRs.

CO4: Appraise of Trade secret law

CO5: Appraise new developments in IPR laws at national and international level

CO's	PROGRAM OUTCOMES													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3					2			1					
CO2	3					2							1	
CO3	2	1	1		2				1				2	1
CO4		2				2		2	1			3	2	2
CO5	3	1	1						2				2	2

UNIT - I

Introduction to Intellectual property: Introduction, types of intellectual property, international organizations, agencies and treaties, importance of intellectual property rights

UNIT - II

Trade Marks: Purpose and function of trade marks, acquisition of trade mark rights, protectable matter, selecting, and evaluating trade mark, trade mark registration processes

UNIT – III

Law of copyrights: Fundamental of copyright law, originality of material, rights of reproduction, rights to perform the work publicly, copyright ownership issues, copyright registration, notice of copyright, International copyright law.

Law of patents: Foundation of patent law, patent searching process, ownership rights and transfer

UNIT - IV

Trade Secrets: Trade secret law, determination of trade secret status, liability for misappropriations of trade secrets, protection for submission, trade secret litigation.

Unfair competition: Misappropriation right of publicity, false advertising.

UNIT - V

New development of intellectual property: new developments intrade mark law; copyright law, patent law, intellectual property audits.

International overview on intellectual property, international – trade mark law, copyright law, international patent law, and international development in trade secrets law.

TEXT BOOKS:

1 Intellectual property right, Deborah. E. Bouchoux, Cengag e learning.

REFERENCE BOOKS:

1 Intellectual property right–Unleashing the knowledge economy ,prabuddhaganguli, Tata McGraw Hill Publishing company ltd.

TEEGALA KRISHNA REDDY ENGINEERING COLLEGE

III Year B.Tech. CSE - II Sem

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3	0	0	3

22CS601PC: MACHINE LEARNING

Prerequisites: A course on " Data Structures"

Course Objectives:

- To introduce students to the basic concepts and techniques of Machine Learning.
- To have a thorough understanding of the Supervised and Unsupervised learning techniques
- To study the various probability- based learning techniques

Course Outcomes: The student will learn

CO1: Tell the concepts of computational intelligence in machine learning

CO2: To apply machine learning techniques to address the real time problems in different areas.

CO3: Infer the Neural Networks and its usage in machine learning application.

CO4: Application & implementation of Decision trees

CO5: Gain knowledge on Bayesian Networks, Reinforcement Algorithms & analytical learning

CO's	PROGRAM OUTCOMES													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	2	2	1				1	1		1	2	1
CO2	3	2	3	2					2	2	1	2	2	2
CO3	2	2	3	2					1	1		1	2	1
CO4	2	2	2	2					1	1	1	2	2	1
CO5	2	2	3	2					2	1		2	2	1

UNIT - I

Learning–Types of Machine Learning–Supervised Learning–The Brain and the Neuron–Design a Learning System– Perspectives and Issues in Machine Learning– Concept Learning Task–Concept Learning as Search – Finding a Maximally Specific Hypothesis – Version Spaces and the Candidate Elimination Algorithm–Linear Discriminants:–Perceptron–Linear Separability –Linear Regression

UNIT - II

Multi-layer Perceptron– Going Forwards – Going Backwards: Back Propagation Error – Multi-layer Perceptron in Practice– Examples of using the MLP–Overview–Deriving Back-Propagation–Radial Basis Functions and Splines– Concepts– RBF Network–Curse of Dimensionality– Interpolations and Basis Functions – Support Vector Machines

UNIT – III

Learning with Trees – Decision Trees – Constructing Decision Trees – Classification and Regression Trees – Ensemble Learning – Boosting – Bagging – Different ways to Combine

Classifiers – Basic Statistics – Gaussian Mixture Models – Nearest Neighbor Methods – Unsupervised Learning – K means Algorithms

UNIT - IV

Dimensionality Reduction – Linear Discriminant Analysis – Principal Component Analysis – Factor Analysis – Independent Component Analysis – Locally Linear Embedding – Isomap – Least Squares Optimization, Evolutionary Learning– Genetic algorithms– Genetic Offspring:- Genetic Operators– Using Genetic Algorithms

UNIT - V

Reinforcement Learning–Overview –Getting Lost Example

Markov Chain Monte Carlo Methods – Sampling– Proposal Distribution –Markov Chain Monte Carlo – Graphical Models – Bayesian Networks – Markov Random Fields – Hidden Markov Models – Tracking Methods

TEXT BOOKS:

1 Stephen Marsland, Machine Learning–An Algorithmic Perspective, Second Edition, Chapman and Hall/CRC Machine Learning and Pattern Recognition Series, 2014..

REFERENCE BOOKS:

1 Tom MMitchell , Machine Learning, First Edition, Mc Graw Hill Education, 2013.

2 Peter Flach, ―Machine Learning: The Art and Science of Algorithms that Make Sense of Data‖, First Edition, Cambridge University Press, 2012.

3 JasonBell,―Machine learning– Hands on for Developers and Technical Professionals‖, First Edition, Wiley, 2014

4 Ethem Alpaydin, ―Introduction to Machine Learning 3e (Adaptive Computation and Machine Learning Series), Third Edition, MIT Press, 2014

TEEGALA KRISHNA REDDY ENGINEERING COLLEGE

III Year B.Tech. CSE - II Sem

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22CS602PC: FORMAL LANGUAGES AND AUTOMATA THEORY

Prerequisites A course on "Discrete Mathematics

Course Objectives:

- To Provide Introduction To Some Of The Central Ideas Of Theoretical Computer Science From The Perspective Of Formal Languages.
- To introduce the Fundamental concepts of formal languages, Grammars and automata theory.
- Classify machines by their power to recognize languages.
- Employ finite state machines to solve problems In computing.
- To understand deterministic and non-Deterministic machines.
- To understand the differences between decidability and undesirability

Course Outcomes: The student will learn

CO1: Make use of the concept to automata and to recognize the appropriate languages.

CO2: Model finite state machine for the given regular expression and languages.

CO3: Construct context free grammars for any given formal languages.

CO4: Construct Turing machine for the given grammar.

CO5: Distinguish between decidability and undecidability.

CO's	PROGRAM OUTCOMES													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	2			2							3	2
CO2	3	3	3			2							3	2
CO3	3	3	3			2							3	2
CO4	3	3	2	3		2							3	2
CO5	3	3			3								3	1

UNIT - I

Introduction to Finite Automata: Structural Representations, Automata and Complexity, the Central Concepts of Automata Theory – Alphabets, Strings, Languages, Problems.

Nondeterministic Finite Automata: Formal Definition, an application, Text Search, Finite Automata with Epsilon-Transitions.

Deterministic Finite Automata: Definition of DFA, How ADFA Process Strings, The language of DFA, Conversion of NFA with ϵ-transitions to NFA without ϵ-transitions. Conversion of NFA to DFA, Moore and Melay machines

UNIT - II

Regular Expressions: Finite Automata and Regular Expressions, Applications of Regular

Expressions, Algebraic Laws for Regular Expressions, Conversion of Finite Automata to Regular Expressions.

Pumping Lemma for Regular Languages, Statement of the pumping lemma, Applications of the Pumping Lemma.

Closure Properties of Regular Languages: Closure properties of Regular languages, Decision Properties of Regular Languages, Equivalence and Minimization of Automata

UNIT – III

Context-Free Grammars: Definition of Context-Free Grammars, Derivations Using a Grammar, Leftmost and Rightmost Derivations, the Language of a Grammar, Sentential Forms, Parse Trees, Applications of Context-Free Grammars, Ambiguity in Grammars and Languages

PushDown Automata: Definition of the Push down Automaton, the Languages of a PDA, Equivalence of PDA's and CFG's ,Acceptance by final state, Acceptance by empty stack, Deterministic Pushdown Automata. From CFG to PDA, From PDA to CFG.

UNIT - IV

Normal Forms for Context- Free Grammars: Eliminating useless symbols, Eliminating €-Productions. Chomsky Normal form Greibach Normal form.

Pumping Lemma for Context-Free Languages: Statement of pumping lemma, Applications Closure Properties of Context-

FreeLanguages:ClosurepropertiesofCFL's,DecisionPropertiesof CFL'sTuringMachines:IntroductiontoTuringMachine,FormalDescription,Instantaneousdescription, The language of a Turing machine

UNIT - V

Types of Turing machine: Turing machines and halting

Undecidability: Undecidability, A Language that is Not Recursively Enumerable, An Undecidable Problem That is RE, Undecidable Problems about Turing Machines, Recursive languages, Properties of recursive languages, Post's Correspondence Problem, Modified Post Correspondence problem, Other Undecidable Problems, Counter machines.

TEXT BOOKS:

1. IntroductiontoAutomataTheory,Languages,andComputation,3ndEdition, JohnE.Hopcroft, Rajeev Motwani, Jeffrey D. Ullman, Pearson Education.
2. TheoryofComputerScience–Automatalanguagesandcomputation,Mishraand Chandra shekaran, 2nd edition, PHI.

REFERENCE BOOKS:

1. Introduction to Languages and The Theory of Computation, JohnCMartin,TMH.
2. Introduction to Computer Theory, DanielI .A.Cohen, John Wiley
3. A Text book on Automata Theory, P.K.Srimani, NasirS.F.B, Cambridge University Press.
4. Introduction to the Theory of Computation, Michael Sipser, 3rd edition, Cengage Learning
5. Introduction to Formal languages Automata Theory and Computation Kamala Krithivasan, Rama R, Pearson.

TEEGALA KRISHNA REDDY ENGINEERING COLLEGE

III Year B.Tech. CSE - II Sem

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22CS603PC: ARTIFICIAL INTELLIGENCE

Prerequisites A course on "Discrete Mathematics
A course on "Programming for problem solving",
A course on "Data Structures".

Course Objectives:

- To learn the distinction between optimal reasoning Vs. human like reasoning
- To understand the concepts of state space representation, exhaustive search, heuristic search together with the time and space complexities.
- To learn different knowledge representation techniques.
- To understand the applications of AI, namely game playing, theorem proving, and machine learning

Course Outcomes: The student will learn

CO1: Ability to formulate an efficient problem space for a problem expressed in natural language.
CO2: Select a search algorithm for a problem and estimate its time and space complexities.
CO3: Possess the skill for representing knowledge using the appropriate technique for a given problem.
CO4: Possess the ability to apply AI techniques to solve problems of game playing, and machine learning.
CO5: Ability to design Expert system

CO's	PROGRAM OUTCOMES													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	3		3		2			3	3		3	1	2
CO2	2			2		2						2	2	2
CO3		2	2						2			2	2	2
CO4	3	3		3		2			3				2	1
CO5	2	2	2			2				2		2	2	2

UNIT - I

Introduction to AI, Intelligent Agents, problem-Solving Agents, Searching for Solutions, Uninformed Search Strategies: Breadth-first search, Uniform cost search, Depth-first search, Iterative deepening Depth-first search, Bidirectional search, Informed (Heuristic) Search Strategies: Greedy best-first search, A* search, Heuristic Functions, Beyond Classical Search: Hill-climbing search, Simulated annealing search, Local Search in Continuous Spaces

UNIT - II

Problem Solving by Search-II and Propositional Logic

Adversarial Search: Games, Optimal Decisions in Games, Alpha–Beta Pruning, Imperfect Real-Time Decisions. Constraint Satisfaction Problems: Defining Constraint Satisfaction Problems,

Constraint Propagation, Backtracking Search for CSPs, Local Search for CSPs, The Structure of Problems. Propositional Logic: Knowledge-Based Agents, The Wumpus World, Logic, Propositional Logic, Propositional Theorem Proving: Inference and proofs, Proof by resolution, Horn clauses and definite clauses, Forward and backward chaining, Effective Propositional Model Checking, Agents Based on Propositional Logic.

UNIT – III

Logic and Knowledge Representation

First-Order Logic: Representation, Syntax and Semantics of First-Order Logic, Using First-Order Logic, Knowledge Engineering in First-Order Logic.

Inference in First-Order Logic: Propositional vs. First-Order Inference, Unification and Lifting, Forward Chaining, Backward Chaining, Resolution

UNIT - IV

Knowledge Representation: Ontological Engineering, Categories and Objects, Events. Mental Events and Mental Objects, Reasoning Systems for Categories, Reasoning with Default Information.

Classical Planning: Definition of Classical Planning, Algorithms for Planning with State-Space Search, Planning Graphs, other Classical Planning Approaches, Analysis of Planning approaches.

UNIT - V

Uncertain knowledge and Learning Uncertainty: Acting under Uncertainty, Basic Probability Notation, Inference Using Full Joint Distributions, Independence, Bayes' Rule and Its Use

Probabilistic Reasoning: Representing Knowledge in an Uncertain Domain, The Semantics of Bayesian Networks, Efficient Representation of Conditional Distributions, Approximate Inference in Bayesian Networks, Relational and First-Order Probability, Other Approaches to Uncertain Reasoning; Dempster-Shafer theory.

TEXT BOOKS:

1 Artificial Intelligence A Modern Approach, Third Edition, Stuart Russell and Peter Norvig,Pearson Education.

REFERENCE BOOKS:

1 Artificial Intelligence, 3rd Edn, E. Rich and K.Knight (TMH)
2 Artificial Intelligence, 3rd Edn., Patrick Henny Winston, Pearson Education.
3 Artificial Intelligence, Shivani Goel, Pearson Education.

TEEGALA KRISHNA REDDY ENGINEERING COLLEGE

III Year B.Tech. CSE - II Sem

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22CS631PE: FULL STACK DEVELOPMENT
(Professional Elective – III)

Prerequisites

- A course on Object Oriented Programming
- A course on Web Technologies

Course Objectives:

- Students will become familiar to implement fast, efficient, interactive and scalable web applications using run time environment provided by the full stack components.

Course Outcomes: The student will learn

CO1: Understand Full stack components for developing web application.

CO2: Apply packages of NodeJS to work with Data, Files, HttpRequests and Responses.

CO3: Use MongoDB data base for storing and processing huge data and connects with NodeJS application.

CO4: Design faster and effective single page applications using Express and Angular.

CO5: Create interactive user interfaces with react components.

CO's	PROGRAM OUTCOMES													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	2	2	1				1	1		2	2	1
CO2	3	3	2	2	2				1			2	2	1
CO3	2	2	2	1	1				1	1		3	2	1
CO4	3	3	2	1	1				1			3	2	1
CO5	3	3	2	1	1				1			3	2	1

UNIT - I

Introduction to Full Stack Development:

Understanding the Basic Web Development Framework- User, Browser, Webserver, Backend Services, Full Stack Components - Node.js, MongoDB, Express, React, Angular. Java Script Fundamentals, NodeJS- Understanding Node.js, Installing Node.js, Working with Node Packages, creating a Node.js Application, Understanding the Node.js Event Model, Adding Work to the Event Queue, Implementing Callbacks

UNIT - II

Node.js:

Working with JSON ,Using the Buffer Module to Buffer Data, Using the Stream Module to Stream Data, Accessing the File System from Node. js- Opening, Closing, Writing, Reading Files and other File System Tasks. Implementing HTTP Services in Node. js-Processing URLs ,Processing Query Strings and Form Parameters, Understanding Request, Response, and Server Objects, Implementing HTTP Clients and Servers in Node.js, Implementing HTTPS Servers and Clients. Using Additional Node.js Modules-Using the os Module, Using the util Module, Using the dns Module, Using the crypto Module..

UNIT – III

Mongo DB:

Need of No SQL, Understanding MongoDB, MongoDB DataTypes ,Planning Your Data Model ,Building the MongoDB Environment, Administering UserAccounts, Configuring Access Control, Administering Databases, Managing Collections, Adding the MongoDB Driver to Node.js, Connecting to MongoDB from Node.js, Understanding the Objects Used in the MongoDB Node.js Driver, Accessing and Manipulating Databases, Accessing and Manipulating Collections

UNIT - IV

Express and Angular:

Getting Started with Express, Configuring Routes, Using Requests Objects, Using Response Objects. Angular: importance of Angular, Understanding Angular, creating a Basic Angular Application, Angular Components, Expressions, Data Binding ,Built-inDirectives, Custom Directives ,Implementing Angular Services in Web Applications.

UNIT - V

React:

Need of React, Simple React Structure, The Virtual DOM, React Components, Introducing React Components, Creating Components inReact, Data and Data Flowin React, Rendering and LifeCycle Methods in React, Working with forms in React integrating third party libraries, Routing in React

TEXT BOOKS:

1 BradDayley, Brendan Dayley, Caleb Dayley., Node.js, MongoDB and Angular Web Development, 2nd Edition, Addison-Wesley, 2019

2 Mark Tielens Thomas, "React in action", 1st Edition, Manning Publications

REFERENCE BOOKS:

1 Vasan Subramanian ,Pro MERN Stack, Full Stack WebAppDevelopment 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.

TEEGALA KRISHNA REDDY ENGINEERING COLLEGE

III Year B.Tech. CSE - II Sem

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22CS632PE: INTERNET OF THINGS
(Professional Elective – III)

Prerequisites

Computer organization, Computer Networks

Course Objectives:

- To introduce the terminology, technology and its applications
- To introduce the concept of M2M (machine to machine) with necessary protocols
- To introduce the Python Scripting Language which is used in many IoT devices
- To introduce the RaspberryPI platform, that is widely used in IoT applications
- To introduce the implementation of web-based services on IoT devices

Course Outcomes: The student will learn

CO1: Interpret the impact and challenges posed by IoT networks leading to new architectural models.

CO2: Compare and contrast the deployment of smart objects and the technologies to connect them to network.

CO3: Appraise the role of IoT protocols for efficient network communication.

CO4: Identify the applications of IoT in Industry.

CO5: Interpret the impact and challenges posed by IoT networks leading to new architectural models.

CO's	PROGRAM OUTCOMES													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2					3			3	3		2	2	1
CO2		2	1	3								2	2	1
CO3	2	2		3								2	2	1
CO4	2	3	3	2	3		3		3		3	2	3	1
CO5		2	3	3					3	1	3	2	2	3

UNIT - I

Introduction to Internet of Things –Definition and Characteristics of IoT, Physical Design of IoT, Logical Design of IoT, IoT Enabling Technologies, IoT Levels and Deployment Templates

Domain Specific IoTs–Home automation, Environment, Agriculture, Health and Lifestyle

UNIT - II

IoT and M2M–M2M,Difference between IoT and M2M, SDN and NFV for IoT,

IoT System Management with NETCOZF, YANG- Need for IoT system Management, Simple Network management protocol, Network operator requirements, NETCONF ,YANG, IoT Systems Management with NETCONF-YANG

UNIT – III

IoT Systems – Logical design using Python-Introduction to Python – Python Data types & Data structures, Control flow, Functions, Modules ,Packaging ,File handling, Data/Time

operations, Classes, Exception, Python packages of Interest for IoT

UNIT - IV

IoT Physical Devices and Endpoints-Raspberry Pi, Linux on Raspberry Pi, Raspberry Pi Interfaces, Programming Raspberry PI with Python, Other IoT devices.

IoT Physical Servers and Cloud Offerings – Introduction to Cloud Storage models and communication APIs, WAMP-AutoBahn for IoT, Xively Cloud for IoT, Python web application framework –Django, Designing a RESTful web API

UNIT - V

Case studies- Home Automation, Environment-weather monitoring-weather reporting- air pollution monitoring, Agriculture

TEXT BOOKS:

1 Internet of Things - A Hands-on Approach, Arshdeep Bahga and Vijay Madisetti, Universities Press, 2015, ISBN: 9788173719547.

REFERENCE BOOKS:

1 Getting Started with Raspberry Pi, Matt Richardson & Shawn Wallace, O'Reilly (SPD), 2014, ISBN: 9789350239759

TEEGALA KRISHNA REDDY ENGINEERING COLLEGE

III Year B.Tech. CSE - II Sem

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22CS633PE: SCRIPTING LANGUAGES
(Professional Elective – III)

Prerequisites

- A course on "Computer Programming and Data Structures".
- A course on "Computer Programming and Data Structures".

Course Objectives:

- This course introduces the script programming paradigm
- Introduces scripting languages such as Perl, Ruby and TCL.
- Learning TCL

Course Outcomes: The student will learn

CO1: Acquire the skills for expressing syntax and semantics informal notation.

CO2: Identify and apply a suitable programming paradigm for a given computing application.

CO3: Gain knowledge of and able to compare the features of various programming languages.

CO4: Demonstrate the use of scripting languages

CO5: Demonstrate various data types of different programming languages.

CO's	PROGRAM OUTCOMES													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	2	3	3				2	1		2	2	2
CO2	2	2	2	2	2				2	1		3	2	2
CO3	2	2	2	2	2				2	1		2	2	2
CO4	3	2	2	2	2				2	1		3	2	2
CO5	3	2	2	2	2				2	1		2	2	2

UNIT - I

Introduction: Ruby,Rails,ThestructureandExecutionofRubyPrograms,PackageManagementwith RUBYGEMS, Ruby and web: Writing CGI scripts, cookies, Choice of Web servers, SOAP and web services RubyTk–SimpleTkApplication,widgets,Bindingevents,Canvas,scrolling

UNIT - II

Extending Ruby: Ruby Objects inC,the Juke box extension, Memory allocation, RubyType System, Embedding Ruby to Other Languages, Embedding a Ruby Interpreter

UNIT – III

Introduction to PERL and Scripting

Scripts and Programs, Origin of Scripting, Scripting Today, Characteristics of Scripting Languages,
UsesforScriptingLanguages,WebScripting,andtheuniverseofScriptingLanguages.PERL -Names and Values, Variables, Scalar Expressions, Control Structures, arrays, list, hashes, strings, pattern and regular expressions, subroutines

UNIT - IV

Advanced perl

Finer points of looping, pack and unpack, filesystem, eval, datastructures, packages, modules ,objects, interfacing to the operating system, Creating Internet ware applications, Dirty Hands Internet Programming, security Issues.

UNIT - V

TCL

TCL Structure, syntax, Variables and Data in TCL, Control Flow, Data Structures, input/output, procedures, strings, patterns, files, Advance TCL- eval, source, exec and uplevel commands, Name spaces, trapping errors, event driven programs, making applications internet aware, Nuts and Bolts Internet Programming, Security Issues, C Interface.

Tk

Tk-Visual ToolKits, Fundamental Concepts of Tk,Tk by example ,Events and Binding, Perl-Tk

TEXT BOOKS:

1 The World of Scripting Languages, David Barron, Wiley Publications.
2 Ruby Programming language by David Flanagan and Yukihiro Matsumoto O'Reilly
3 "Programming Ruby" The Pramatic Progammers guide by Dabve Thomas Second edition

REFERENCE BOOKS:

1 Open Source Web Development with LAMP using Linux Apache, MySQL, Perl and PHP,J. Lee and B. Ware (Addison Wesley) Pearson Education.
2 Perl by Example, E.Quigley, Pearson Education.
3 Programming Perl, LarryWall, T.Christiansen and J.Orwant, O'Reilly,SPD.
4 Tcl and the Tk Toolkit, Ousterhout, PearsonEducation.
5 Perl Power, J .P.Flynt, CengageLearning.

TEEGALA KRISHNA REDDY ENGINEERING COLLEGE

III Year B.Tech. CSE - II Sem

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22CS634PE: MOBILE APPLICATION DEVELOPMENT
(Professional Elective – III)

Prerequisites

1. Acquaintance with JAVA programming
2. A Course on DBMS

Course Objectives:

- To demonstrate their understanding of the fundamentals of Android operating systems
- To improves their skills of using Android software development tools
- To demonstrate their ability to develop software with reasonable complexity on mobile platform
- To demonstrate their ability to deploy software to mobile devices

To demonstrate their ability to debug programs running on mobile devices

Course Outcomes: The student will learn

CO1: Build an application using Android development environment.

CO2: Experiment with the method of storing, sharing and retrieving the datain Android applications.

CO3: Examine responsive user interface across wide range of devices.

CO4: Create a mobile Application by using various components like activity, views, services, content providers and receivers.

CO5: Develop and design apps for mobile devices using SQLite Database.

CO's	PROGRAM OUTCOMES													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3		3		2							1	2	1
CO2	1	3			2							1	2	1
CO3	1	3	1		2							1	2	1
CO4	1		3		2							1	2	1
CO5	3	1			2							1	2	1

UNIT - I

Introduction to Android Operating System: Android OS design and Features – Android development framework, SDK features, Installing and running applications on Android Studio, Creating AVDs, Types of Android applications, Best practices in Android programming, Android tools Android application components – Android Manifest file, Externalizing resources like values, themes, layouts, Menus etc, Resources for different devices and languages, Runtime Configuration Changes

Android Application Life cycle–Activities, Activity life cycle, activity states, monitoring state changes

UNIT - II

Android User Interface: Measurements – Device and pixel density independent measuring unit - s Layouts – Linear, Relative, Grid and Table Layouts
User Interface (UI) Components –Editable and non-editable TextViews, Buttons, Radio and Toggle Buttons, Checkboxes, Spinners, Dialog and pickers
Event Handling–Handling clicks or changes of various UI components
Fragments – Creating fragments, Lifecycle of fragments, Fragment states, Adding fragments to Activity, adding, removing and replacing fragments with fragment transactions, interfacing between fragments and Activities, Multi-screen Activities

UNIT – III

Intents and Broadcasts: Intent – Using intents to launch Activities, Explicitly starting new Activity, Implicit Intents, Passing data to Intents, Getting results from Activities, Native Actions, using Intent to dial a number or to send SMS
Broadcast Receivers–Using Intent filters to service implicit Intents, Resolving Intent filters, finding and using Intents received within an Activity
Notifications–CreatingandDisplayingnotifications,DisplayingToasts

UNIT - IV

Persistent Storage: Files–Using application specific folders and files, creating files, reading data from files, listing contents of a directory Shared Preferences – Creating shared preferences, saving and retrieving data using Shared Preference

UNIT - V

Database – Introduction to SQLite database, creating and opening a database, creating tables, inserting retrieving and etindelg data, Registering Content Providers, Using content Providers (insert, delete, retrieve and update)

TEXT BOOKS:

1 Professional Android4 Application Development, RetoMeier, WileyIndia,(Wrox),2012

REFERENCE BOOKS:

1 Android Application Development for Java Programmers, JamesCSheusi, Cengage Learning, 2013
2 Beginning Android4 Application Development, Wei-MengLee, WileyIndia(Wrox),2013 .

TEEGALA KRISHNA REDDY ENGINEERING COLLEGE

III Year B.Tech. CSE - II Sem

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22CS635PE: SOFTWARE TESTING METHODOLOGIES
(Professional Elective – III)

Prerequisites
A course on Software Engineering

Course Objectives:
- To provide knowledge of the concepts in software testing such as testing process, criteria, strategies, and methodologies.
- To develop skills in software test automation and management using the latest tools

Course Outcomes: : The student will learn

CO1: Understand purpose of testing and path testing

CO2: Understand strategies in dataflow testing and domain testing

CO3: Develop logic-based test strategies

CO4: Understand graph matrices and its applications

CO5: Implement test cases using any testing automation tool

CO's	PROGRAM OUTCOMES													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1	2	1	1	3				2	2	2	2	2	1
CO2	2	2	2	2	3				2	2	3	2	2	2
CO3	3	1	2	2	3				1	2	2	2	2	2
CO4	2	1	3	1	2				2	2	3	2	2	1
CO5	2	2	1	1	3				1	2	2	2	2	1

UNIT - I
Introduction: Purpose of testing, Dichotomies, model for testing, consequences of bugs, taxonomy of bugs Flow graphs and Path testing: Basics concepts of path testing, predicates, path predicates and achievable paths, path sensitizing, path instrumentation, application of path testing.

UNIT - II
Transaction Flow Testing: transaction flows, transaction flow testing techniques.
Data Flow testing: Basics of data flow testing, strategies in data flow testing, application of data flow testing.
Domain Testing: domains and paths, Nice & ugly domains, domain testing, domains and interfaces testing, domain and interface testing, domains and testability

UNIT – III
Paths, Path products and Regular expressions: path products & path expression, reduction procedure, applications, regular expressions & flow anomaly detection.
Logic Based Testing :overview, decision tables, path expressions, kvcharts, specifications.

UNIT - IV

State, State Graphs and Transition testing: stategraphs, good & bad state graphs, state testing, Testability tips

UNIT - V

Graph Matrices and Application: Motivational overview, matrix of graph, relations, power of a matrix, node reduction algorithm, building tools. (Student should be given an exposure to a tool like Jmeter/selenium/soapUI/Catalon).

TEXT BOOKS:

1 Software Testing techniques- BarisBeizer, Dreamtech, second edition.
2 Software Testing Tools–Dr.K.V.K.K.Prasad, Dreamtech.

REFERENCE BOOKS:

1 The craft of software testing- BrianMarick, Pearson Education
2 Software Testing Techniques–SPD(Oreille)
3 Software Testing in the RealWorld– EdwardKit ,Pearson.
4 Effective methods of Software Testing, Perry, JohnWiley.
5 Art of Software Testing–Meyers, JohnWiley.

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III Year B.Tech. CSE - II Sem

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22CS611OE:DATASTRUCTURES
(Open Elective–I)

Prerequisites

A course on Software Engineering

Course Objectives:

- Exploring basic data structures such as stacks and queues.
- Introduces a variety of data structures such as hash tables, search trees, tries, heaps, graphs.
- Introduces sorting and pattern matching algorithms

Course Outcomes: : The student will learn

CO1: Ability to select the data structures that efficiently model the information in a problem.

CO2: Ability to assess efficiency trade-offs among different data structure implementations or combinations.

CO3: Design programs using a variety of data structures, including hash tables, binary and general tree structures, search trees, tries, heaps, graphs, and AVL-trees.

CO4: Implement and know the application of algorithms for sorting

CO5: Implement and know the application of algorithms for pattern matching.

CO's	PROGRAM OUTCOMES													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3												2	1
CO2	3	2	1	1									2	1
CO3	3	2	1	1	2				1				2	1
CO4	3	2	1	1	2				1				2	1
CO5	3				2				1				2	1

UNIT - I

Introduction to Data Structures, abstract data types, Linear list – singly linked list implementation, insertion, deletion and searching operations on linear list, Stacks- Operations, array and linked representations of stacks, stack applications, Queues- operations, array and linked representations

UNIT - II

Dictionaries: linear list representation, skip list representation, operations - insertion, deletion and searching.

Hash Table Representation: hash functions, collision resolution-separate chaining, open addressing- linear probing, quadratic probing, double hashing, rehashing, extendible hashing

UNIT – III

SearchTrees:BinarySearchTrees,Definition,Implementation,Operations-Searching,Insertionand

Deletion, B- Trees, B+ Trees, AVL Trees, Definition, Height of an AVL Tree, Operations – Insertion, Deletion and Searching, Red –Black, Splay Trees

UNIT - IV

Graphs: Graph Implementation Methods. Graph Traversal Methods.
Sorting: Quick Sort, Heap Sort ,External Sorting-Model for external sorting, Merge Sort.

UNIT - V

Pattern Matching and Tries: Pattern matching algorithms-Brute force, the Boyer–Moore algorithm, the Knuth-Morris-Pratt algorithm, Standard Tries, Compressed Tries, Suffix tries

TEXT BOOKS:

1 Fundamentals of Data Structures in C, 2ndEdition, E.Horowitz, S.Sahni and Susan Anderson Freed, Press.
2 Data Structures using C – A. S.Tanenbaum, Y.Langsam, and M.J. Augenstein, PHI/Pearson Education.

REFERENCE BOOKS:

1 Data Structures: A Pseudocode Approach with C, 2 nd Edition, R. F. Gilberg and B.A.Forouzan, Cengage Learning.

TEEGALA KRISHNA REDDY ENGINEERING COLLEGE

III Year B.Tech. CSE - II Sem

L	T	P	C
3	0	0	3

22CS612OE: DATABASE MANAGEMENT SYSTEMS
(Open Elective–I)

Prerequisites
A course on "Data Structures

Course Objectives:

- To understand the basic concepts and the applications of database systems.
- To master the basics of SQL and construct queries using SQL.
- Topics include data models, database design, relational

Course Outcomes: : The student will learn

CO1: Gain knowledge of fundamentals of DBMS, database design and normal forms

CO2: Master the basics of SQL for retrieval and management of data.

CO3: Be acquainted with the basics of transaction processing and concurrency control.

CO4: Familiarity with database storage structures and access techniques

CO5: Categorize various file organizations and indexing for faster retrieval of data, persistent storage of data.

CO's	PROGRAM OUTCOMES													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1		2	3										3	
CO2		2	1	2									2	
CO3			3	2	1								2	
CO4				2	1				1				2	
CO5	1	2	2						3				3	

UNIT - I
Database System Applications: A Historical Perspective, File Systems versus a DBMS, the Data Model, Levels of Abstraction in a DBMS, Data Independence, Structure of a DBMS
Introduction to Database Design: Database Design and ER Diagrams, Entities, Attributes, and Entity Sets, Relationships and Relationship Sets, Additional Features of the ER Model, Conceptual Design With the ER Model

UNIT - II
Introduction to the Relational Model: Integrity constraint over relations, enforcing integrity constraints, querying relational data, logical database design, introduction to views, destroying / altering tables and views.
Relational Algebra, Tuple relational Calculus, Domain relational calculus

UNIT – III
SQL: QUERIES, CONSTRAINTS, TRIGGERS: form of basic SQLquery, UNION,

INTERSECT, and
EXCEPT, Nested Queries, aggregation operators, NULL values, complex integrity constraints in SQL, triggers and active databases.
Schema Refinement: Problems caused by redundancy, decompositions, problems related to decomposition, reasoning about functional dependencies, FIRST, SECOND, THIRD normal forms, BCNF, lossless join decomposition, multi valued dependencies, FOURTH normal form, FIFTH normal form.

UNIT - IV
Transaction Concept, Transaction State, Implementation of Atomicity and Durability, Concurrent Executions, Serializability, Recoverability, Implementation of Isolation, Testing for serializability, Lock Based Protocols, Timestamp Based Protocols, Validation- Based Protocols, Multiple Granularity, Recovery and Atomicity, Log–Based Recovery, Recovery with Concurrent Transactions.

UNIT - V
Data on External Storage, File Organization and Indexing, Cluster Indexes, Primary and Secondary Indexes, Index data Structures, Hash Based Indexing, Tree based Indexing, Comparison of File Organizations, Indexes- Intuitions for tree Indexes, Indexed Sequential Access Methods (ISAM),
B+Trees: A Dynamic Index Structure.

TEXT BOOKS:

1 Database System Concepts, Silberschatz, Korth, McGrawhill,V edition.
2 Database Management Systems, Raghurama Krishnan, Johannes Gehrke,Tata Mc GrawHill

REFERENCE BOOKS:

1 Database Systems design, Implementation, and Management, PeterRob & CarlosCoronel 7th Edition.
2 Fundamentals of Database Systems, Elmasri Navrate, Pearson Education
3 Introduction to Database Systems, C.J.Date, Pearson Education
4 Oracle for Professionals, TheXTeam 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, WileyStudent Edition

TEEGALA KRISHNA REDDY ENGINEERING COLLEGE

III Year B.Tech. CSE - II Sem

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0	0	2	1

22CS604PC: MACHINE LEARNING LAB

Prerequisites

A course on "Data Structures

Course Objectives:

- The objective of this lab is to get an overview of the various machine learning techniques and can demonstrate them using python.

Course Outcomes: : The student will learn

CO1: Memorize the basics of Python programming.

CO2: Implement modern notions in data analysis-oriented computing;

CO3: Analyzing data sets using python programming.

CO4: Be capable of confidently applying common Machine Learning algorithms in practice and implementing their own;

CO5: Be capable of performing experiments in Machine Learning using real-world data.

CO's	PROGRAM OUTCOMES													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2			2							3	3	1
CO2	2	3	1	3								3	2	1
CO3	2	3	2	3								3	2	1
CO4	2											3	2	1
CO5	2	3	2	3								2	2	1

List of Experiments:

1. Write a python program to compute Central Tendency Measures: Mean, Median, Mode Measure of Dispersion: Variance, Standard Deviation
2. Study of Python Basic Libraries such as Statistics, Math, Numpy and Scipy
3. Study of Python Libraries for ML application such as Pandas and Matplotlib
4. Write a Python program to implement Simple Linear Regression
5. Implementation of Multiple Linear Regression for House Price Prediction using sklearn
6. Implementation of Decision tree using sklearn and its parameter tuning
7. Implementation of KNN using sklearn
8. Implementation of Logistic Regression using sklearn
9. Implementation of K-Means Clustering
10. Performance analysis of Classification Algorithms on a specific dataset (Mini Project)

TEXT BOOKS:

1 Machine Learning–Tom M.Mitchell,-MGH.

REFERENCE BOOKS:

1 Machine Learning: An Algorithmic Perspective, Stephen Marshland, Taylor & Francis

TEEGALA KRISHNA REDDY ENGINEERING COLLEGE

III Year B.Tech. CSE - II Sem

L	T	P	C
0	0	2	1

22CS605PC: ARTIFICIAL INTELLIGENCE LAB

Prerequisites

A course on "Programming for problem solving",
A course on "Data Structures".

Course Objectives:

- .Become familiar with basic principles of AI toward problem solving, knowledge representation, and learning

Course Outcomes: : The student will learn

CO1: Apply basic principles of AI in solutions that require problem solving, knowledge representation, and learning.

CO2: Understand search strategies and intelligent agents

CO3: Understand different adversarial search techniques

CO4: Apply propositional logic ,predicate logic for knowledge representation

CO5: Apply AI techniques to solve problems of game playing,and machine learning.

CO's	PROGRAM OUTCOMES													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	3		3		2			3	3		3	1	2
CO2	2			2		2						2	2	2
CO3		2	2						2			2	2	2
CO4	3	3		3		2			3				2	1
CO5	2	2	2			2				2		2	2	2

List of Experiments:

Write a Program to Implement the following using Python.

1. Breadth First Search
2. Depth First Search
3. Tic-Tac-Toe game
4. 8-Puzzle problem
5. Water-Jug problem
6. Travelling Salesman Problem
7. Tower of Hanoi
8. Monkey Banana Problem
9. Alpha-Beta Pruning
10. 8-QueensProblem

TEXT BOOKS:

1 Artificial Intelligence a Modern Approach, Third Edition, Stuart Russell and Peter Norvig, Pearson Education

REFERENCE BOOKS:

1 Artificial Intelligence, 3rd Edn, E.Richand K.Knight(TMH)
2 Artificial Intelligence, 3rdEdn., Patrick Henny Winston,Pearson Education
3 Artificial Intelligence, Shivani Goel, Pearson Education.

TEEGALA KRISHNA REDDY ENGINEERING COLLEGE

III Year B.Tech. CSE - II Sem

L	T	P	C
0	0	2	1

22CS636PE: FULL STACK DEVELOPMENT LAB
(Professional Elective–III)

Prerequisites
A course on Object Oriented Programming
A course on Web Technologies

Course Objectives:
Introduce fast, efficient, interactive and scalable web applications using run time environment provided by the full stack components

Course Outcomes: : The student will learn

CO1: Design flexible and responsive Web applications using NodeJS, React, Express and Angular.

CO2: Perform CRUD operations with MongoDB on huge amount of data.

CO3: Develop real time applications using react components.

CO4: Use various fullstack modules to handle http requests and responses.

CO5: Create web pages that function using external data.

CO's	PROGRAM OUTCOMES													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	2	2	1				1	1		2	2	1
CO2	3	3	2	2	2				1			2	2	1
CO3	2	2	2	1	1				1	1		3	2	1
CO4	3	3	2	1	1				1			3	2	1
CO5	3	2	2	2	1				1			2	2	1

List of Experiments:

1. Create an application to setup nodeJS environment and display “HelloWorld”
2. Create a NodeJS application for user login system.
3. Write a NodeJS program to perform read, write and other operations on a file.
4. Write a Node JS program to read form data from query string and generate response using NodeJS
5. Create a food delivery website where users can order food from a particular restaurant listed the website for handling http requests and responses using NodeJS.
6. Implement a program with basic commands on databases and collections using MongoDB
7. Implement CRUD operations on the given dataset using MongoDB.
8. Perform Count, Limit, Sort ,and Skip operations on the given collections using MongoDB

9	Develop an angular JS form to apply CSS and Events.
10	Develop a Job Registration form and validate it using angularJS.
11	Write an angularJS application to access JSONfile data of an employee from a server using $httpservice
12	Develop a web application to manage student information using Express and AngularJS.
13	Write a program to create a simple calculator Application using ReactJS.
14	Write a program to create a voting application using ReactJS
15	Develop a leave management system for an organization where users can apply different types of leaves such as casual leave and medical leave. They also can view the available number of days using react application
16	Build a music store application using react components and provide routing among the web pages.
17	Create a react application for an online store which consist of registration, login, product information pages and implement routing to navigate through these pages.

TEXT BOOKS:

1. Brad Dayley, Brendan Dayley, Caleb Dayley., Node.js, MongoDB and Angular Web Development, 2nd Edition, Addison-Wesley,2019.
2. MarkTielensThomas., ReactinAction,1stEdition,ManningPublications.

REFERENCE BOOKS:

1. Vasan Subramanian, Pro MERN Stack, Full Stack WebApp 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', 1stedition, Apress, 2018.
3. Brad Green & Seshadri. AngularJS.1st Edition. O'ReillyMedia,2013.
4. Kirupa Chinnathambi, Learning React: A Hands-On Guide to Building Web Applications Using React and Redux, 2ndedition, Addison-Wesley Professional, 2018.

TEEGALA KRISHNA REDDY ENGINEERING COLLEGE

III Year B.Tech. CSE - II Sem

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0	0	2	1

22CS637PE:INTERNET OF THINGS LAB
(Professional Elective–III)

Prerequisites
Any Programming Language/ Scripting Language Knowledge

Course Objectives:

1. To introduce the raspberry PI platform, that is widely used in IoT applications
2. To introduce the implementation of distance sensor on IoT devices

Course Outcomes: : The student will learn

CO1: Ability to introduce the concept of M2M(machine to machine) with necessary protocols and get awareness in implementation of distance sensor
CO2: Get the skill to program using python scripting language which is used in many IoT devices
CO3: Creating programs using Node MCU and sensors
CO4: Configuring and creating programs on RaspberryPi
CO5: Create A DJANGO project and app for collecting the IOT data

CO's	PROGRAM OUTCOMES													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2					3			3	3		2	2	1
CO2		2	1	3								2	2	1
CO3	2	2		3								2	2	1
CO4	2	3	3	2	3		3		3		3	2	3	1
CO5		2	3	3					3	1	3	2	2	3

List of Experiments

1. Using Raspberry pi
   a. Calculate the distance using a distance sensor.
   b. Interface an LED and switch with Raspberrypi.
   c. Interface an LDR with RaspberrryPi.
2. Using Arduino Calculate
   a. Calculate the distance using a distance sensor.
   b. Interface an LED and switch with Aurdino.
   c. Interface an LDR with Aurdino
   d. Calculate temperature using a temperature sensor
3. Using Node MCU
   a. Calculate the distance using a distance sensor.
   b. Interface an LED and switch with Raspberrypi.
   c. Interface an LDR with Node MCU

d. Calculate temperature using a temperature sensor

4. Installing OS on Raspberry Pi
   a. Installation using PiImager
   b. Installation using image file
      - Downloading an Image
      - Writing the image to an SD card
        - Using Linux
        - Using Windows
      - Booting up Follow the instructions given in the URL

   https://www.raspberrypi.com/documentation/computers/getting-started.html
5. Accessing GPIO pins using Python
   a. Installing GPIO Zero library

   Update your repositories' list

   Install the package for Python3:
   b. Blinking an LED connected to one of the GPIOpin
   c. Adjusting the brightness of an LED Adjust the brightness of an LED(0to100,where100 means maximum brightness) using the in-built PWM wavelength.
6. Create a DJANGO project and an app.
7. Create a DJANGO view for weather station REST API
8. Create DJANGO template
9. Configure MYSQL with DJANGO framework

TEXT BOOKS:

1 Internet of Things- A Hands-on Approach, Arshdeep Bahga and Vijay Madisetti, Universities Press, 2015, ISBN: 9788173719547.

2 Getting Started with Raspberry Pi, Matt Richardson& Shawn Wallace, O'Reilly(SPD),2014, ISBN: 9789350239759.

REFERENCE BOOKS:

1 Bernd Scholz-Reiter, Florian Michahelles ,"Architecting the Internet of Things", ISBN978-3- 642-19156-5 e-ISBN 978-3-642-19157-2, Springer, 2016

2 N.Ida, Sensors, Actuators and Their Interfaces, Scitech Publishers, 2014.

TEEGALA KRISHNA REDDY ENGINEERING COLLEGE

III Year B.Tech. CSE - II Sem

L	T	P	C
0	0	2	1

22CS638PE: SCRIPTING LANGUAGES LAB
(Professional Elective–III)

Prerequisites
Any High level programming language(C,C++)

Course Objectives:

- To Understand the concepts of scripting languages for developing web based projects
- To understand the applications the of Ruby, TCL, Perl scripting languages

Course Outcomes: : The student will learn

CO1: Infer the differences between Scripting languages and programming languages

CO2: Acquire the knowledge of ruby programming.

CO3: Make use of perl programming for given problems.

CO4: Design applications by using TCL programming.

CO5: Develop application using scripting languages.

CO's	PROGRAM OUTCOMES													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	2	2	2							2	2	1
CO2	3	2	2	2	2							2	2	1
CO3	2	3	2	2	3							3	2	1
CO4	2	2	2	1	2							3	3	1
CO5	2	1	3	2	1							2	2	2

List of Experiments

1. Write a Ruby script to create a new string which is n copies of a given string where n is a non-negative integer
2. Write a Ruby script which accept the radius of a circle from the user and compute the parameter and area.
3. Write a Ruby script which accept the users first and last name and print the min reverse order with a space between them
4. Write a Ruby script to accept a file name from the user print the extension of that
5. Write a Ruby script to find the greatest of three numbers
6. Write a Ruby script to print odd numbers from 10 to 1
7. Write a Ruby script to check two integers and return true if one of them is 20 otherwise return their sum

8. Write a Ruby script to check two temperatures and return true if one is less than 0 and the other is greater than 100
9. Write a Ruby script to print the elements of a given array
10. Write a Ruby program to retrieve the total marks where subject name and marks of a student stored in a hash
11. Write a TCL script to find the factorial of a number
12. Write a TCL script that multiplies the numbers from 1 to 10
13. Write a TCL script for sorting a list using a comparison function
14. Write a TCL script to (i) create a list (ii) append elements to the list (iii) Traverse the list (iv) Concatenate the list
15. Write a TCL script to comparing the file modified times.
16. Write a TCL script to Copy a file and translate to n ative format.
17. a)Write a Perl script to find the largest number among three numbers.
    b)Write a Perl script to print the multiplication tables from 1-10 using subroutines**.**
18. Write a Perl program to implement the following list of manipulating functions
    a) Shift
    b) Unshift
    c) Push
19. a) Write a Perl script to substitute a word, with another word in a string.
    b) Write a Perl script to validateIP address and email address
20. Write a Perl script to print the file in reverse order using command line arguments

TEXT BOOKS:

1 The World of Scripting Languages, David Barron, Wiley Publications.
2 Ruby Programming language by David Flanagan and Yukihiro Matsumoto O'Reilly
3 "Programming Ruby "The Pramatic Progammers guide by Dabve Thomas Second edition

REFERENCE BOOKS:

1 Open Source Web Development with LAMP using Linux Apache, MySQL, Perl and PHP,J.Lee and B. Ware (Addison Wesley) Pearson Education.
2 Perl by Example, E.Quigley, Pearson Education.
3 Programming Perl ,LarryWall, T.Christiansen and J.Orwant, O'Reilly,SPD.
4 Tcl and the TkToolkit ,Ousterhout, Pearson Education.
5 Perl Power, J.P.Flynt ,Cengage Learning.

TEEGALA KRISHNA REDDY ENGINEERING COLLEGE

III Year B.Tech. CSE - II Sem

L	T	P	C
0	0	2	1

22CS639PE: MOBILE APPLICATION DEVELOPMENT LAB
(Professional Elective–III)

Prerequisites

Course Objectives:

- To learn how to develop Applications in an android environment.
- To learn how to develop user interface applications.
- To learn how to develop URL related applications.

Course Outcomes: : The student will learn

CO1: Understand the working of Android OS Practically.

CO2: Develop user interfaces.

CO3: Create application and linking with database.

CO4: Develop application with CRUD operations.

CO5: Develop, deploy and maintain the Android Applications.

CO's	PROGRAM OUTCOMES													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3		3		2							1	2	
CO2	1	3			2							1	2	
CO3	1	3	1		2							1	2	
CO4	1		3		2							1	2	
CO5	3	1			2							1	2	

List of Experiments

1. a. Create an Android application that shows Hello+name of the user and run it on an emulator.
   b. Create an application that takes the name from a textbox and shows hello message along with the name entered in the text box, when the user clicks the OK button.
2. Create a screen that has input boxes for User Name, Password, Address, Gender (radio buttons for male and female), Age (numeric), Date of Birth (Datepicker), State (Spinner) and a Submit button. On clicking the submit button, print all the data below the Submit Button. Use (a) Linear Layout (b) Relative Layout and (c) Grid Layout or Table Layout
3. Develop an application that shows names as a list and on selecting a name it should show the details of the candidate on the next screen with a "Back" button. If the screen is rotated to landscape mode (width greater than height), then the screen should show list on left fragment and details on the right fragment instead of the second screen with the back button. Use Fragment transactions and Rotation event listeners.
4. Develop an application that uses a menu with 3 options for dialing a number, opening a website and to send an SMS. On selecting anoption, the appropriate action should be

invoked using intents

5. Develop an application that inserts some notifications into Notification area and whenever a notification is inserted, it should show a toast with details of the notification
6. Create an application that uses a text file to store user names and passwords (tab separated fields and one record perline). When the user submits alog in name and password through a screen, the details should be verified with the textfile data and if they match, show a dialog saying that login is successful. Otherwise, show the dialog with a Login Failed message.
7. Create a user registration application that stores the user details in a database table
8. Create a database and a user table where the details of login names and passwords are stored. Insert some names and passwords initially. Now the login details entered by the user should be verified with the database and an appropriate dialog should be shown to the user.
9. Create an admin application for the user table, which shows all records as a list and the admin can select any record for edit or modify. The results should be reflected in the table.
10. Develop an application that shows all contacts of the phone along with details like name, phone number, mobile number etc
11. Create an application that's a ves user information like name, age, gender etc. in shared preference and retrieves them when the program restarts
12. Create an alarm that rings every Sunday at 8:00AM. Modify it to use a time picker to set alarm time.

TEXT BOOKS:

1 Professional Android4 Application Development, Reto Meier, Wiley India,(Wrox),2012.

2 Android Application Development for Java Programmers, JamesC Sheusi, Cengage,2013.

REFERENCE BOOKS:

1 Beginning Android4 Application Development, Wei-MengLee, Wiley India(Wrox),2013.

TEEGALA KRISHNA REDDY ENGINEERING COLLEGE

III Year B.Tech. CSE - II Sem

L	T	P	C
0	0	2	1

22CS63APE: SOFTWARE TESTING METHODOLOGIES LAB
(Professional Elective–III)

Prerequisites

A basic knowledge of programming.

Course Objectives:

- To provide knowledge of software testing methods.
- To develop skills in automation of software testing and software test automation management using the latest tools.

Course Outcomes: : The student will learn

CO1: Design and develop the best test strategies in accordance with the development model

CO2: Design and develop GUI, Bitmap and data base check points

CO3: Develop database check points for different checks

CO4: Perform batch testing with and without parameter passi

CO5: Implementation of interrupt execution

CO's	PROGRAM OUTCOMES													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	2	2	3				2	2	3	2	2	2
CO2	2	2	2	3	3				1	3	2	2	2	2
CO3	2	1	1	3	3				1	2	3	2	2	2
CO4	2	2	2	2	3				2	3	2	2	2	2
CO5	2	1	3	2	3				2	2	2	2	3	3

List of Experiments

1. Recording in context sensitive mode and analog mode
2. GUI check point for single property
3. GUI check point for single object/window
4. GUI check point for multiple objects
5. a. Bitmap check point for object/window
   b. Bitmap check point for screen area
6. Database check point for Default check
7. Database checkpoint for custom check
8. Database check point for runtime record check
9. a. Data driven test for dynamic test data submission
   b. Data driven test through flat files
   c. Data driven test through front grids

d. Data driven test through excel test

10. a. Batch testing without parameter passing
    b. Batch testing with parameter passing
11. Data driven batch
12. Silent mode test execution without any interruption
13. Test case for calculator in windows application

TEXT BOOKS:

1 Software Testing techniques, Baris Beizer, 2nd Edition, Dreamtech.
2 Software Testing Tools, Dr.K.V.K.K.Prasad, Dreamtech.

REFERENCE BOOKS:

1 The craft of softwa retesting, BrianMarick, Pearson Education.
2 Software Testing Techniques– SPD(Oreille)
3 Software Testing in the Real World, EdwardKit, Pearson.
4 Effective methods of Software Testing, Perry, JohnWiley.
5 Art of Software Testing, Meyers, JohnWiley.

TEEGALA KRISHNA REDDY ENGINEERING COLLEGE

III Year B.Tech. CSE - II Sem

L	T	P	C
0	0	4	2

22CS601PW: BIGDATA-SPARK

Prerequisites

A course on "Programming for problem solving",.

Course Objectives:

- The main objective of the course is to process Big Data with advance architecture like spark and streaming data in Spark

Course Outcomes: : The student will learn

CO1: Develop Map Reduce Programs to analyze large data set Using Hadoop and Spark

CO2: Write Hive queries to analyze large dataset Outline the Spark Eco system and its components

CO3: Perform the filter, count, distinct, map ,flat Map RDD Operations in Spark.

CO4: Build Queries using Spark SQL

CO5: Apply Spark joins on Sample Data Sets

CO's	PROGRAM OUTCOMES													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	2	1		1			2			2	3	2
CO2	3	3	3	2		1			3		2	3	3	3
CO3	3	3	3	2					3		2	3	3	3
CO4	3	3	3	3	2	2		1	3		3	2	3	3
CO5	3	3	3	3	3	2		1	3		3	2	3	3

List of Experiments

1. To Study of Big Data Analytics and Hadoop Architecture
   i. Know the concept of bigdata architecture
   ii. Know the concept of Hadoop architecture
2. Loading Data Set into HDFS for Spark Analysis Installation of Hadoop and cluster management
   i. Installing Hadoop single node cluster in ubuntu environment
   ii. Knowing the differencing between single node clusters and multi-node clusters
   iii. Accessing WEB-UI and the port number
   iv. Installing and accessing the environments such as hive and sqoop
3. File management tasks & Basic linux commands
   (i) Creating a directory in HDFS
   (ii) Moving forth and back to directories

(iii) Listing directory contents
(iv) Uploading and downloading a file in HDFS
(v) Checking the contents of the file
(vi) Copying and moving files
(vii) Copying and moving files between local to HDFS environment
(viii) Removing files and paths
(ix) Displaying few lines of a file
(x) Display the aggregate length of a file
(xi) Checking the permissions of a file
(xii) Zipping and unzipping the files with & without permission pasting it to allocation
(xiii) Copy, Paste commands

4. Map-reducing
   (i) Definition of Map-reduce
   (ii) Its stages and terminologies
   (iii) Word-count program to understand map-reduce(Mapperphase,Reducerphase,Driver code)
5. Implementing Matrix-Multiplication with Hadoop Map-reduce
6. Compute Average Salary and Total Salary by Gender for an Enterprise
7. I. Creating hive tables(External and internal)
   II. Loading data to external hive tables from sql tables(or) Structure dc.s.v using scoop
   III. Performing operations like filterations and up dations
   IV. Performing Join (inner ,outeretc)
   V. Writing User defined function on hive tables
8. Create a sqltableof employees Employee table with id, designation Salary table(salary ,dept id) Create external table in hive with similar schema of above tables ,Move data to hive using scoop and load the contents into tables ,filter a new table and write a UDF to encrypt the table with AES-algorithm, Decrypt it with key to show contents
9. i. Pyspark Definition (ApachePyspark) and difference between Pyspark, Scala, pandas
   ii. Pyspark files and class methods
   iii. get(filename)
   iv. getrootdirectory()
10. Py spark-RDD'S
    i. What is RDD's?
    ii. Ways to Create RDD
    iii. Parallelized collections
    iv. External dataset
    v. Existing RDD's
    vi. Spark RDD's operations(Count, foreach() ,Collect, join, Cache()
11. Perform pyspark transformations
    i. Map and flat Map
    ii. to remove the words, which are not necessary to analyze this text.
    iii. groupBy
    iv. What if we want to calculate how many times each word is coming in corpus?
    v. How do I perform a task (say count the words 'spark' and 'apache' in rdd3) separatly on each partition and get the output othe task

performed in these partition?

vi. Unions of RDD

vii. Join two pairs of RDD Based up on their key

12. Py spark spark conf – Attributes and applications

i. What is Pyspark spark conf()

ii. Using spark conf create aspark session to write a dataframe to readdetails in a c.s.v and later move that c.s.v to another location

TEXT BOOKS:

1 Spark in Action, Marko Bonaic and Petar Zecevic, Manning.

2 PySpark SQL Recipes: With HiveQL, Dataframe and Graphframes, Raju Kumar Mishra and Sundar Rajan Raman, Apress Media

REFERENCE BOOKS:

1 https://infyspringboard.onwingspan.com/web/en/app/toc/lex_auth_013301505844518912251

2 https://infyspringboard.onwingspan.com/web/en/app/toc/lex_auth_01258388119638835242

3 https://infyspringboard.onwingspan.com/web/en/app/toc/lex_auth_012605268423008256169

TEEGALA KRISHNA REDDY ENGINEERING COLLEGE

III Year B.Tech. CSE - II Sem

L	T	P	C
3	0	0	0

22MC610: ENVIRONMENTAL SCIENCE

Prerequisites

Course Objectives:

- Based on this course, the Engineering graduate will understand /evaluate / develop technologies on the basis of ecological principles and environmental regulations which in turn help in sustainable development.

Course Outcomes: : The student will learn

CO1: Know basic concept of ecological perspective and the value of the environment.

CO2: Understand the significance of various natural resources and its management.

CO3: Demonstrate a comprehensive understanding of the world's biodiversity and the importance of its conservation.

CO4: Identify different types of pollution and their control measures, Discovereffective methods of waste management and come out with best possible solutions.

CO5: Raise awareness about environmental laws and sustainable development.

CO's	PROGRAM OUTCOMES													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1		1	2			3	3	2			1	1		
CO2						1	3	2				1		
CO3		2	3			2	2	2				1		
CO4		1	1			3	3	2			1	2		
CO5						2	2	3				2		

UNIT - I

Ecosystems: Definition, Scope, and Importance of ecosystem. Classification, structure, and function of an ecosystem, Food chains, food webs, and ecological pyramids. Flow of energy, Biogeochemical cycles, Bioaccumulation, Biomagnification, ecosystem value, services and carrying capacity, Field visits.

UNIT - II

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

UNIT – III

Biodiversity and Biotic Resources: Introduction, Definition, genetic, species and ecosystem diversity. Value of biodiversity; consumptive use, productive use, social, ethical, aesthetic and optional values. India as a mega diversity nation, Hot spots of biodiversity. Field visit. Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts; conservation of biodiversity: In-Situ and Ex-situ conservation. National Biodiversity act.

UNIT - IV

Environmental Pollution and Control Technologies: Environmental Pollution: Classification of pollution, **Air Pollution:** Primary and secondary pollutants, Automobile and Industrial pollution, Ambient air quality standards. **Water pollution:** Sources and types of pollution ,drinking water quality standards. **Soil Pollution:** Sources and types, Impacts of modern agriculture, degradation of soil. **Noise Pollution:** Sources and Health hazards, standards, **Solid waste:** Municipal Solid Waste management, composition and characteristics of e-Waste and its management. **Pollution control technologies:** Wastewater Treatment methods: Primary Secondary and Tertiary.

Overview of air pollution control technologies, Concepts of bio remediation. **Global Environmental Issues and Global Efforts: C**limate change and impacts on human environment. Ozone depletion and Ozone depleting substances (ODS). Deforestation and desertification .International conventions / Protocols: Earth summit, Kyoto protocol, and Montréal Protocol. NAPCC-GoI Initiatives.

UNIT - V

Environmental Policy, Legislation & EIA: Environmental Protection act, Legal aspects AirAct-1981, Water Act, Forest Act, Wildlife Act, Municipal solid waste management and handling rules, biomedical waste management and handling rules, hazardous waste management and handling rules. EIA: EIA structure, methods of base line data acquisition .Overviewon Impact so fair, water, biological and Socio- economical aspects. Strategies for risk assessment, Concepts of Environmental Management Plan (EMP).

Towards Sustainable Future: Concept of Sustainable Development Goals, Population an dits explosion, Crazy Consumerism, Environmental Education, Urban Sprawl, Human health, Environmental Ethics, Concept of Green Building, Ecological Foot Print ,Life Cycle assessment (LCA), Low carbon life style.

TEXT BOOKS:

1 Textbook of Environmental Studies for Undergraduate Courses by Erach Bharucha for UniversityGrants Commission.

REFERENCE BOOKS:

1 Environmental Science: towards a sustainable future by Richard T. Wright. 2008 PHL Learning Private Ltd. New Delhi.

2 Environmental Engineering and science by Gilbert M. Masters and Wendell P. Ela. 2008 PHI Learning Pvt. Ltd.

3 Environmental Science by Daniel B. Botkin & Edward A. Keller, Wiley INDIA edition.

4 Environmental Studies by Anubha Kaushik, 4th Edition, New age international publishers.

5 Text book of Environmental Science and Technology - Dr. M. Anji Reddy 2007, BS Publications

6 Introduction to Environmental Science by Y. Anjaneyulu, BS. Publications

TEEGALA KRISHNA REDDY ENGINEERING COLLEGE

IV Year B.Tech. CSE – I Sem

L	T	P	C
3	0	0	3

22CS701PC: CRYPTOGRAPHY& NETWORK SECURITY

Prerequisites

1. knowledge of Mathematics
2. Basic knowledge of Computer Hardware and Software and Operating System

Course Objectives:

- Explain the objectives of information security
- Understand various cryptographic algorithms
- Describe public-key cryptosystem..
- Understand Intrusions and intrusion detection
- Discuss the fundamental ideas of public-key cryptography

Course Outcomes: : The student will learn

CO1: Able to understand the basics of security concepts, cryptography Techniques and Implement these in a real time environment.

CO2: Able to analyze the mechanisms of different cryptographic algorithms and find out the Efficiency of these in a given real time environment.

CO3: Able to understand & Implement Authentication techniques on Information.

CO4: Ability to identify wireless network security approaches in real time.

CO5: Able to understand current legal issues towards information security.

CO's	PROGRAM OUTCOMES													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	3	2	2	1	1				2	3	3
CO2	3	3	3	3	2	3				1		2	3	3
CO3	2	3	3	2	3	3	1	1		1		1	3	3
CO4	3	3	3	2	1	2	2					2	3	3
CO5	2	3	1	3	1	3	2	1		3	1	3	3	3

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, substitution techniques, transposition techniques ,encryption and decryption, symmetric and asymmetric key cryptography, steganography, key range and key size, possible types of attacks.

UNIT - II

Symmetric key Ciphers: Block Cipherprinciples,DES,AES,Blowfish,RC5,IDEA,Blockcipher operation, 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, Digitalsignatures, 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: Virtual Elections, Secure Inter-branch Payment Transactions

TEXT BOOKS:

1 Cryptography and Network Security - Principles and Practice: William Stallings, Pearson Education, 6th Edition

2 Cryptography and Network Security: AtulKahate, McGraw Hill, 3rd Edition

REFERENCE BOOKS:

1 Cryptography and Network Security: C K Shyamala

2 Cryptography and Network Security : Forouzan Mukhopadhyay

3 Information Security ,Principles, and Practice: Mark Stamp ,WileyIndia.

4 Principles of Computer Security: WM.Arthur Conklin, Greg White,TMH

5 Network Security and Cryptography BernardMenezes,CENGAGE Learning

6 Introduction to Network Security: Neal Krawetz, CENGAGE Learning

TEEGALA KRISHNA REDDY ENGINEERING COLLEGE

IV Year B.Tech. CSE – I Sem

L	T	P	C
3	0	0	3

22CS702PC: COMPILER DESIGN

Prerequisites

- A course on "Formal Languages and Automata Theory".
- A course on "Computer Organization and architecture".
- A course on "Data Structures".

Course Objectives:

- Introduce the major concepts of language translation and compiler design and impart the Knowledge of practical skills necessary for constructing a compiler
- .Topics include phases of compiler, parsing, syntax directed translation, type checking use of symbol tables, code optimization techniques, intermediate code generation, code generation and data flow analysis.

Course Outcomes: : The student will learn

CO1: Use Lex and Yacc tools for developing a scanner and a parser.

CO2: Make use of LL and LR parsers to develop the Parse tree.

CO3: Generate intermediate code for procedures.

CO4: Identify appropriate method for code generation.

CO5: Apply proper techniques for code optimization.

CO's	PROGRAM OUTCOMES													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	2	3	2			1	1		1	2	2	1
CO2	2	1	3	2	3		1	1	1	3	2	1	1	3
CO3	3	1	1	1	3			1		1	1	1	1	1
CO4	2	3		3					1	1		2	1	2
CO5	2	3		3								1	1	2

UNIT - I

Introduction: The structure of a compiler, Pass and phases of translation, Bootstrapping ,the science of building a compiler, programming language basics,

Lexical Analysis: The Role of the Lexical Analyzer, Input Buffering, Recognition of Tokens, The Lexical-Analyzer Generator Lex, Finite Automata, From Regular Expressionsto Automata, Design of a Lexical-Analyzer Generator, Optimization of DFA-Based Pattern Matchers.

UNIT - II

Syntax Analysis: Introduction, Context-Free Grammars, Writing a Grammar, Top-Down Parsing, Bottom-Up Parsing, Introduction to LR Parsing: Simple LR, More Powerful LR Parsers, Using Ambiguous Grammars , Error recovery in parsing and Parser Generators.

UNIT – III

Syntax-Directed Translation: Syntax-Directed Definitions, Evaluation Orders for SDD's, Applications of Syntax-Directed Translation, Syntax-Directed Translation Schemes, and Implementing L-Attributed SDD's.

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

UNIT - IV

Run-Time Environments: Stack Allocation of Space, Access to Nonlocal Data on the Stack, Heap Management, Introduction to Garbage Collection, Introduction to Trace-Based Collection.

Code Generation: Issues in the Design of a Code Generator, The Target Language, Addresses in the Target Code, Basic Blocks and Flow Graphs, Optimization of Basic Blocks, A Simple Code Generator, Peephole Optimization, Register Allocation and Assignment, Dynamic Programming Code-Generation

UNIT - V

Machine-Independent Optimization: The Principal Sources of Optimization, Introduction to Data-Flow Analysis, Foundations of Data-Flow Analysis, Constant Propagation, Partial-Redundancy Elimination, Loops in Flow Graphs.

TEXT BOOKS:

1 Compilers: Principles, Techniques and Tools, Second Edition, Alfred V. Aho, Monica S. Lam, Ravi Sethi, Jeffry D. Ullman.

REFERENCE BOOKS:

1 Lex & Yacc – John R. Levine, Tony Mason, Doug Brown, O'reilly CompilerConstruction, Louden, Thomson

TEEGALA KRISHNA REDDY ENGINEERING COLLEGE

IV Year B.Tech. CSE – I Sem

L	T	P	C
3	0	0	3

22CS741PE: GRAPH THEORY
(Professional Elective–IV)

Prerequisites
An understanding of Mathematics in general is sufficient.

Course Objectives:
- To introduce basics of group theory and its applications
- To impart knowledge on basic concepts of paths and circuits
- To impart knowledge on Trees, spanning trees, shortest spanning trees
- To familiarize in the matrix representation of graphs
- To transform scientific problems into generic computational models

Course Outcomes: : The student will learn

CO1: Know some important classes of graph theoretic problems and algorithms

CO2: apply graph theory concepts in core subjects such as data structures and network theory effectively

CO3: Construct minimum spanning tree using some algorithms and identify tree traversals

CO4: Be able to formulate and prove central theorems about trees, matching, connectivity.

CO5: Be able to use graph theory as a modeling tool and formulate and prove theorems on colouring and planar graphs

CO's	PROGRAM OUTCOMES													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	1	1	1	1	1	1				1	2	1	1
CO2	2	1	1	1	1	1	1				1	2	1	1
CO3	2	1	1	1	1	1	1				1	2	1	1
CO4	2	1	1	1	1	1	1				1	2	1	1
CO5	2	1	1	1	1	1	1				1	2	1	1

UNIT - I

Introduction-Discovery of graphs, Definitions, Subgraphs, Isomorphic graphs, Matrix representations of graphs, Degree of avertex, Directed walks, paths and cycles, Connectivity in digraphs, Eulerian and Hamilton digraphs, Eulerian digraphs, Hamilton digraphs, Special graphs, Complements, Larger graphs from smaller graphs, Union, Sum, Cartesian Product, Composition, Graphic sequences, Graph theoretic model of the LAN problem, Havel-Hakimi criterion, Realization of a graphic sequence

UNIT - II

Connected graphs and shortest paths - Walks, trails, paths, cycles, Connected graphs, Distance, Cut-vertices and cut-edges, Blocks, Connectivity, Weighted graphs and shortest paths, Weighted graphs, Dijkstra‟s shortest path algorithm, Floyd-Warshall shortest path algorithm.

UNIT – III

Trees- Definitions and characterizations, Number of trees, Cayley"s formula, Kirchoff-matrix-tree theorem, Minimum spanning trees, Kruskal"s algorithm, Prim"s algorithm, Special classes of graphs, Bipartite Graphs, Line Graphs, Chordal Graphs, Eulerian Graphs, Fleury"s algorithm, Chinese Postman problem, Hamilton Graphs, Introduction, Necessary conditions and sufficient conditions

UNIT - IV

Independent sets coverings and matchings– Introduction, Independent sets and coverings: basic equations, Matchings in bipartite graphs, Hall"s Theorem, K¨onig"s Theorem, Perfect matchings in graphs, Greedy and approximation algorithms

UNIT - V

Vertex Colorings-Basic definitions, Cliques and chromatic number, Mycielski"s theorem, Greedy coloring algorithm, Coloring of chordal graphs, Brooks theorem, Edge Colorings, Introduction and Basics, Gupta-Vizing theorem, Class-1 and Class-2 graphs, Edge-coloring of bipartite graphs, Class-2 graphs, Hajos union and Class-2 graphs, A scheduling problem and equitable edge-coloring.

TEXT BOOKS:

1 J.A.Bondy and U.S.R.Murty. Graph Theory volume 244 of Graduate Texts in Mathematics. Springer, 1st edition, 2008

2 J.A.Bondy and U.S.R.Murty. Graph Theory with Applications.

REFERENCE BOOKS:

1 Lecture Videos: http://nptel.ac.in/courses/111106050/13

2 Introduction to Graph Theory, Douglas B.West,Pearson.

TEEGALA KRISHNA REDDY ENGINEERING COLLEGE

IV Year B.Tech. CSE – I Sem

L	T	P	C
3	0	0	3

22CS742PE: ADVANCED OPERATING SYSTEMS

(Professional Elective–IV)

Prerequisites

Course on "Operating Systems"

Course Objectives:

- To study, learn, and understand the main concepts of advanced operating systems (parallel processing systems, distributed systems, real time systems, network operating systems, and open source operating systems)
- Hardware and software features that support these systems.

Course Outcomes: : The student will learn

CO1: Understand the design approaches of advanced operating systems

CO2: Analyze the design issues of distributed operating systems.

CO3: Evaluate design issues of multi processor operating systems.

CO4: Identify the requirements Distributed File System and Distributed Shared Memory.

CO5: Formulate the solutions to schedule the real time applications.

CO's	PROGRAM OUTCOMES													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	1	3									2	3	1
CO2	2	2	3									2	2	1
CO3	2	2	3									2	2	
CO4	2	3	3	1								2	2	1
CO5	2	3	2									2	2	1

UNIT - I

Architectures of Distributed Systems: System Architecture Types, Distributed Operating Systems, Issues in Distributed Operating Systems, Communication Primitives.

Theoretical Foundations: Inherent Limitations of a Distributed System, Lamport's Logical Clocks, Vector Clocks, Causal Ordering of Messages, Termination Detection

UNIT - II

Distributed Mutual Exclusion: The Classification of Mutual Exclusion Algorithms, Non-Token – Based Algorithms: Lamport's Algorithm, The Ricart- Agrawala Algorithm, Maekawa's Algorithm, Token-Based Algorithms: Suzuki-Kasami's Broadcast Algorithm, Singhal's Heurisric Algorithm, Raymond's Heuristic Algorithm.

UNIT – III

Distributed Deadlock Detection: Preliminaries, Deadlock Handling Strategies in Distributed Systems, Issues in Deadlock Detection and Resolution, Control Organizations for Distributed Deadlock Detection, Centralized- Deadlock – Detection Algorithms, Distributed Deadlock

Detection Algorithms, Hierarchical Deadlock Detection Algorithms

UNIT - IV

Multiprocessor System Architectures: Introduction, Motivation for multiprocessor Systems, Basic Multiprocessor System Architectures Multi Processor Operating Systems: Introduction, Structures of Multiprocessor Operating Systems, Operating Design Issues, Threads, Process Synchronization, Processor Scheduling.

Distributed File Systems: Architecture, Mechanisms for Building Distributed File Systems, Design Issues

UNIT - V

Distributed Scheduling: Issues in Load Distributing, Components of a Load Distributed Algorithm, Stability, Load Distributing Algorithms, Requirements for Load Distributing, Task Migration, Issues in task Migration

Distributed Shared Memory: Architecture and Motivation, Algorithms for Implementing DSM, Memory Coherence, Coherence Protocols, Design Issues

TEXT BOOKS:

1 Advanced Concepts in Operating Systems, Mukesh Singhal, Niranjan G. Shivaratri, Tata McGraw-Hill Edition 2001

REFERENCE BOOKS:

1 Distributed Systems: Andrew S. Tanenbaum, Maarten Van Steen, Pearson Prentice Hall, Edition – 2, 2007

TEEGALA KRISHNA REDDY ENGINEERING COLLEGE

IV Year B.Tech. CSE – I Sem

L	T	P	C
3	0	0	3

22CS743PE: SOFT COMPUTING

(Professional Elective–IV)

Prerequisites

Course Objectives:

- Familiarize with soft computing concepts
- Introduce and use the idea of fuzzy logic and use of heuristics based on human experience
- Familiarize the Neuro-Fuzzy modeling using Classification and Clustering techniques
- Learn the concepts of Genetic algorithm and its applications
- Acquire the knowledge of Rough Sets

Course Outcomes: : The student will learn

CO1: Identify the difference between Conventional Artificial Intelligence to Computational Intelligence.

CO2: Understand fuzzy logic and reasoning to handle and solve engineering problems

CO3: Apply the Classification and clustering techniques on various applications.

CO4: Understand the advanced neural networks and its applications

CO5: Perform various operations of genetic algorithms, Rough Sets.

CO's	PROGRAM OUTCOMES													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	1						1		1	1	2	2
CO2	3	2	2	2		2	1			1		3	2	2
CO3	3	2	2	2		2	2					2	2	2
CO4	3	2	2	2			1			1		3	2	2
CO5	3	2	2	1		1	2					2	2	2

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 BOOKS:

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-In Search, 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

TEEGALA KRISHNA REDDY ENGINEERING COLLEGE

IV Year B.Tech. CSE – I Sem

L	T	P	C
3	0	0	3

22CS744PE: CLOUD COMPUTING

(Professional Elective–IV)

Prerequisites

A course on "Computer Networks".
A course on " Operating System

Course Objectives:

- This course provides an in sight in to cloud computing
- Topics covered include- Cloud Computing Architecture, Deployment Models, Service Models, Technological Drivers for Cloud Computing, Networking for Cloud Computing and Security in Cloud Computing

Course Outcomes: : The student will learn

CO1: Understand different computing paradigms and potential of the paradigms and specifically cloud computing

CO2: Understand cloud service types, cloud deployment models and technologies supporting and driving the cloud

CO3: Acquire the knowledge of programming models for cloud and development of software application that runs the cloud and various services available from major cloud providers

CO4: Understand the security concerns and issues in cloud computing

CO5: Acquire the knowledge of advances in cloud computing.

CO's	PROGRAM OUTCOMES													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1	1	1		1							1	1	1
CO2	1	1	1		2							1	2	1
CO3	1	1	1		2							1	2	1
CO4	1	1	1		2							1	2	1
CO5	1	1	1		2							1	2	1

UNIT - I

Computing Paradigms, Cloud Computing Fundamentals, Cloud Computing Architecture and Management

UNIT - II

Cloud Deployment Models, Cloud Service Models, Technological Drivers for Cloud Computing: SOA and Cloud, Multicore Technology, Web 2.0 and Web 3.0, Pervasive Computing, Operating System, Application Environment

UNIT – III

Virtualization, Programming Models for Cloud Computing: Map Reduce, Cloud Haskell, Software Development in Cloud

UNIT - IV

Networking for Cloud Computing: Introduction, Overview of Data Center Environment, Networking Issues in Data Centers, Transport Layer Issues in DCNs, Cloud Service Providers

UNIT - V

Security in Cloud Computing, and Advanced Concepts in Cloud Computing

TEXT BOOKS:

1 Chandrasekaran K. *Essentials of cloud computing*. CRC Press, 2014

REFERENCE BOOKS:

1 Cloud Computing: Principles and Paradigms, Editors: Rajkumar Buyya ,James Broberg, Andrzej M. Goscinski, Wiley, 2011
2 Enterprise Cloud Computing- Technology ,Architecture ,Applications, Gautam Shroff, Cambridge University Press, 2010
3 Cloud Computing Bible, Barrie Sosinsky, Wiley-India,2010

TEEGALA KRISHNA REDDY ENGINEERING COLLEGE

IV Year B.Tech. CSE – I Sem

L	T	P	C
3	0	0	3

22CS745PE: AD HOC & SENSOR NETWORKS
(Professional Elective–IV)

Prerequisites

A course on "Computer Networks"
A course on "Mobile Computing

Course Objectives:

1. To understand the concepts of sensor networks
2. To understand the MAC and transport protocols for ad hoc networks
3. To understand the security of sensor networks
4. To understand the applications of adhoc and sensor networks

Course Outcomes: : The student will learn

CO1: Ability to understand the state-of-the-art research in the emerging subject of Ad Hoc and Wireless Sensor Networks

CO2: Ability to solve the issues in real-time application development based on ASN.

CO3: Ability to conduct further research in the domain of ASN

CO4: Discuss the sensor characteristics and WSN layer protocols

CO5: Illustrate the issues of routing in WSN and Security of WSN

CO's	PROGRAM OUTCOMES													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	2						1		3	3	3
CO2	3	3	3	3								3	2	1
CO3	3	2	3	1						1		3	2	2
CO4	3	2										2	2	2
CO5	3	3	2	1	1	3	1					2	3	2

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, WRP; Reactive: DSR, AODV, TORA; Hybrid: ZRP; *Position-based* routing algorithms- Location Services-DREAM, Quorum-based, GLS; Forwarding Strategies, Greedy Packet, Restricted Directional Flooding-DREAM, LAR; Other routing algorithms-QoS Routing, CEDAR

UNIT - II

Data Transmission

Broadcast Storm Problem, Rebroadcasting Schemes-Simple-flooding, Probability-based

Methods, Area- based Methods, Neighbour 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-Geo TORA,MGR**.**

TCPoverAdHocTCPprotocoloverview,TCPandMANETs,SolutionsforTCPoverAdhoc

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 Issues of WSN : Transport layer, High-level application layer support, Adapting to the inherent dynamic nature of WSNs.

Security**: Introduction, Security in Ad Hoc Networks, Distributed Systems Security, Security of Wireless Sensor Networks.**

TEXT BOOKS:

1 Ad Hoc and Sensor Networks – Theory and Applications, *Carlos Corderio Dharma P.Aggarwal,* World Scientific Publications, March 2006, ISBN – 981-256-681-3

2 Wireless Sensor Networks: An Information Processing Approach, FengZhao, LeonidasGuibas, Elsevier Science, ISBN – 978-1-55860-914-3 (Morgan Kauffman)

REFERENCE BOOKS:

1 C.Siva Ram Murthy,B.S.Manoj AdHoc Wireless Networks: Architectures and Protocols.

2 Taieb Znati Kazem Sohraby, Daniel Minoli, Wireless Sensor Networks: Technology, Protocols and Applications, Wiley

3 **Wireless Ad Hoc** Mobile wireless Networks- principle, protocols and applications, 2nd Edition, Auerbach publications

TEEGALA KRISHNA REDDY ENGINEERING COLLEGE

IV Year B.Tech. CSE – I Sem

L	T	P	C
3	0	0	3

22CS752PE :AGILE METHODOLOGY
(Professional Elective–V)

Prerequisites

- A course on "Software Engineering"

Course Objectives:

- Knowledge on concepts of agile development, releasing, planning and developing

Course Outcomes: : The student will learn

CO1: Identify basic concepts of agile methodology and Extreme programming

CO2: Analyze real customer involvement in collaboration

CO3: Discuss risk management and release of application

CO4: Understanding iteration planning incremental requirements

CO5: Understanding refactoring, incremental design and architecture

CO's	PROGRAM OUTCOMES													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	2		2							2	3	2
CO2	2	2	2		2							2	3	2
CO3	2	2	2		2							2	2	2
CO4	2	2	2		2							2	2	2
CO5	2	2	2		2							2	2	2

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-Upmeetings, coding standards, Iteration demo, Reporting.

UNIT – III

Releasing

Bug free 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 BOOKS:

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 Lowprice Edition 2004

TEEGALA KRISHNA REDDY ENGINEERING COLLEGE

IV Year B.Tech. CSE – I Sem

L	T	P	C
3	0	0	3

22CS753PE: ROBOTIC PROCESS AUTOMATION
(Professional Elective–V)

Prerequisites

- A course on "Software Engineering"

Course Objectives:

- Introduce robotic process automation, techniques of automation using UI Path RPA tool.

Course Outcomes: : The student will learn

CO1: Understand the concepts of Robotic Process Automation.

CO2: Apply the flow chart mechanism in various calculations.

CO3: Applying UIPath tool for debugging process

CO4: Design system managing techniques.

CO5: Create application for process automation using UIPath tool.

CO's	PROGRAM OUTCOMES													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1	2	2		2	1			1			1	2	1
CO2	1	2	2	2	2	1			1		1	1	2	1
CO3	1	2	2	2	2	1			1		1	1	2	1
CO4	1	2	2		2	1			1		1	2	2	1
CO5	1	2	2		2	1			1			2	2	1

UNIT - I

Robotic Process Automation: Introduction**,** Scope and techniques of automation, Robotic process automation, Components of RPA, RPA platforms, About UiPath
UIPath Stack Uipath Studio, Uipath Robot, Types of Robots, UiPath Orchestrator
UIPath Studio Projects, User interface
TheUser Interface: Task recorder, Advanced UI interactions: Input methods, Output methods

UNIT - II

Sequence, Flowchart, and Control Flow: Sequencing the work flow, Activities, Control Flow, various types of loops and decision making
Data Manipulation: Variables and scope, Collections, Arguments – Purpose and use, Data table usage with examples, File operation with step-by-step example, CSV/Excel to data table and vice versa

UNIT – III

Taking Control of the Controls: Finding and attaching windows, Finding the control, Techniques for waiting for a control, Acton controls –mouse and keyboard activities, Handling events, revisit recorder, When to use OCR, Types of OCR available, How to use OCR
Plugins and Extensions: Terminal Plugin, SAP Automation, Citrix automation and Credential

management.

UNIT - IV

Handling User Events and Assistant Bots: Assistant bots, Monitoring system event triggers, Monitoring image and element triggers, Launching an assistant bot on a keyboard event

Exception Handling, Debugging, and Logging: Exception handling, Common exceptions and ways to handle them, Logging and taking screen shots, Debugging techniques, Collecting crash dumps, Error reporting

UNIT - V

Managing and Maintaining the Code: Project organization, nesting workflows, Reusability of workflows, Commenting techniques, State Machine, When to use Flowcharts, State Machines, or Sequences, Using config files

Deploying and Maintaining the Bot: Publishing using publish utility, using Orchestration Server to control bots, deploy bots, License Management, Publishing and Managing updates

TEXT BOOKS:

1 Learning Robotic Process Automation: Create Software robots and automate business processes with the leading RPA tool - UiPath: Create Software robots. with the leading RPA tool – UiPath Kindle Edition

REFERENCE BOOKS:

1 Robotic Process Automation A Complete Guide- 2020 Edition Kindle Edition.

TEEGALA KRISHNA REDDY ENGINEERING COLLEGE

IV Year B.Tech. CSE – I Sem

L	T	P	C
3	0	0	3

22CS754PE: BLOCKCHAIN TECHNOLOGY
(Professional Elective–V)

Prerequisites

- Knowledge in information security and applied cryptography
- Knowledge in Computer Networks

Course Objectives:

- To learn the fundamentals of Blockchain and various types of block chain and consensus mechanisms
- To understand the public block chain system, Private block chain system and consortium block chain.
- Able to know the security issues of block chain technology

Course Outcomes: : The student will learn

CO1: Understanding concepts behind crypto currency

CO2: Applications of smart contracts in decentralized application development

CO3: Understand frameworks related to public, private and hybrid blockchain

CO4: Create block chain for different application case studies

CO5: Deploying and maintaining the block chain code and creating the BOTs

CO's	PROGRAM OUTCOMES													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	1	2	2	2	1						3	2	2
CO2	2	1		2	2					2			2	2
CO3	2		2	2			2		1	2	2	3		2
CO4	2	1	3	2	2		2	1		2	3	2	2	
CO5	1	1			2	2	2		1	2	2	3	2	2

UNIT - I

Fundamentals of Blockchain: Introduction, Origin of Block chain, Block chain Solution, Components of Blockchain, Block in a Block chain, The Technology and the Future.
Blockchain Types and Consensus Mechanism: Introduction, Decentralization and Distribution, Types of Blockchain, Consensus Protocol.
Cryptocurrency–Bitcoin, Altcoin and Token:Introduction, Bitcoin and the Cryptocurrency, Cryptocurrency Basics, Types of Cryptocurrencies, Cryptocurrency Usage

UNIT - II

Public Blockchain System: Introduction, Public Block chain, Popular Public Block chains,The Bitcoin Blockchain, Ethereum Blockchain.
Smart Contracts: Introduction, Smart Contract, Characteristics of a Smart Contract, Types of Smart Contracts, Types of Oracles, Smart Contracts in Ethereum, Smart Contracts in Industry.

UNIT – III

Private Blockchain System: Introduction ,Key Characteristics of Private Blockchain, Need of Private Blockchain, Private Blockchain Examples, Private Blockchain and Open Source, E-commerce Site Example, Various Commands (Instructions) in E-commerce Blockchain, Smart Contract in Private Environment, State Machine, Different Algorithms of Permissioned Blockchain, ByzantineFault, Multichain.

Consortium Blockchain: Introduction, Key Characteristics of Consortium Blockchain, Need of Consortium Blockchain, Hyperledger Platform, Overview of Ripple, Overview of Corda. Initial Coin Offering: Introduction, Blockchain Fund raising Methods, Launchingan ICO ,Investing in an ICO, Pros and Cons of Initial Coin Offering, Successful Initial Coin Offerings, Evolution of ICO, ICO Platforms.

UNIT - IV

Security in Blockchain: Introduction ,Security Aspects in Bitcoin, Security and Privacy Challenges of Blockchain in General, Performance and Scalability, Identity Management and Authentication, Regulatory Compliance and Assurance, Safeguarding Blockchain Smart Contract (DApp), Security Aspects in Hyperledger Fabric.

Applications of Blockchain: Introduction, Blockchain in Banking and Finance, Blockchain in Education, Blockchain in Energy, Blockchain in Healthcare, Blockchain in Real-estate, Blockchain In Supply Chain, The Blockchain and IoT. Limitations and Challenges of Blockchain.

UNIT - V

Managing and Maintaining the Code: Project organization, nesting workflows, Reusability of workflows, Commenting techniques, State Machine, When to use Flowcharts, State Machines, or Sequences, Using config files

Deploying and Maintaining the Bot: Publishing using publish utility, using Orchestration Server to control bots, deploy bots, License Management, Publishing and Managing updates

TEXT BOOKS:

1 "Blockchain Technology", Chandramouli Subramanian, AshaA.George, AbhilasjKA and Meena Karthikeyan, Universities Press.

REFERENCE BOOKS:

1 Michael JuntaoYuan, Building Block chain Apps Pearson,India.

2 Blockchain Blueprint for Economy, MelanieSwan, SPDO'reilly.

3 Blockchain for Business, JaiSinghArun ,JerryCuomo, NitinGaur, Pearson.

TEEGALA KRISHNA REDDY ENGINEERING COLLEGE

IV Year B.Tech. CSE – I Sem

L	T	P	C
3	0	0	3

22CS755PE: SOFTWARE PROCESS & PROJECT MANAGEMENT
(Professional Elective–V)

Prerequisites

- Knowledge on project development.

Course Objectives:

- To acquire knowledge on software process management.
- To acquire managerial skills for software project development.
- To understand software economics

Course Outcomes: : The student will learn

CO1: Infer the concept of software process assessment and reference models.

CO2: To get knowledge of software economics, phases in the life cycle of software development, project organization, project control and process instrumentation.

CO3: To analyze the major and minor milestones, artifacts and metrics from management and technical perspective

CO4: To design and develop software product using conventional and modern principles of software project management

CO5: To analyze the case study and future project management.

CO's	PROGRAM OUTCOMES													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	3	3	3				2		2		1	1
CO2	3	2	2	2	3				1	1	2		2	1
CO3	3	1	3	2	3				1	2	2		2	1
CO4	3	2	3	2	3				2	2	2		3	1
CO5	3	1	3	2	3				2	1	2		2	1

UNIT - I

Software Process Maturity

Software Maturity Framework, Principles of Software Process Change, Software Process Assessment, The Initial Process, The Repeatable Process, The Defined Process, The Managed Process, The Optimizing Process. Process Reference Models Capability Maturity Model (CMM), CMMI, PCMM, PSP, TSP).

UNIT - II

Software Project Management Renaissance

Conventional Software Management, Evolution of Software Economics, Improving Software Economics, Life-Cycle Phases and Process artifacts Engineering and Production stages, inception phase, elaboration phase, construction phase, transition phase, artifact sets, management artifacts, engineering artifacts and pragmatic artifacts, model-based software architecture

UNIT – III

Workflows and Checkpoints of process

Software process workflows, Iteration workflows, Major milestones, minor milestones, periodic status assessments. Process Planning Work breakdown structures, planning guidelines, cost and schedule estimating process, iteration planning process, Pragmatic planning

UNIT - IV

Project Organizations

Line-of- business organizations, project organizations, evolution of organizations, process automation. Project Control and process instrumentation, the seven-core metrics, management indicators, quality indicators, life-cycle expectations, Pragmatic software metrics, metrics automation.

UNIT - V

CCPDS-R Case Study and Future Software Project Management Practices Modern Project Profiles, Next-Generation software Economics, Modern Process Transitions.

TEXT BOOKS:

1 Managing the Software Process, Watts S. Humphrey, Pearson Education

2 Software Project Management, Walker Royce, Pearson Education

REFERENCE BOOKS:

1 Software Project Management, Walker Royce, Pearson Education

2 Process Improvement essentials, James R. Persse, O'Reilly, 2006

3 Software Project Management, Bob Hughes & Mike Cotterell, fourth edition, TMH, 2006

4 Applied Software Project Management, Andrew Stellman & Jennifer Greene, O'Reilly, 2006.

5 Head First PMP, Jennifer Greene & Andrew Stellman, O'Reilly, 2007

6 Software Engineering Project Management, Richard H. Thayer & Edward Yourdon, 2nd edition, Wiley India, 2004.

7 Agile Project Management, Jim Highsmith, Pearson education, 2004

TEEGALA KRISHNA REDDY ENGINEERING COLLEGE

IV Year B.Tech. CSE – I Sem

L	T	P	C
3	0	0	3

22CS721OE: OPERATING SYSTEMS
(Open Elective–II)

Prerequisites
1. A course on "Computer Programming and Data Structures".
2. A course on " Computer Organization and Architecture".

Course Objectives:
- Introduce operating system concepts (i.e., processes, threads, scheduling, synchronization, deadlocks, memory management, file and I/O sub systems and protection)
- Introduce the issues to be considered in the design and development of operating system
- Introduce basic Unix commands, system call interface for process management, inter process communication and I/O in Unix

Course Outcomes: : The student will learn

CO1: Understanding of basic system calls and processes in Operating system

CO2: Getting Knowledge of process scheduling algorithms and mechanism for overcoming deadlocks

CO3: Understanding about process management, synchronization of process and how inter process communication is done among the processes.

CO4: Able to understand about the working mechanism of memory management and how virtual memory is used for handling multiple processes.

CO5: Knowing the file system interfaces and operations on files.

CO's	PROGRAM OUTCOMES													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	1									2	2	2
CO2	2											2	2	1
CO3	2	2	2	2								3	2	1
CO4	3	2	2	2								3	3	1
CO5	3	2	2	2								2	2	2

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, System Calls

Process - Process concepts and scheduling, Operations on processes, Cooperating Processes, Threads

UNIT - II

CPU Scheduling- Scheduling Criteria, Scheduling Algorithms, Multiple-Processor Scheduling. System call interface for process management- fork, exit, wait, wait pid, exec

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

UNIT – III

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

Interprocess Communication Mechanisms: IPC between processes on a single computer system, IPC between processes on different systems, using pipes, FIFOs, message queues, shared memory

UNIT - IV

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, Free-space Management. Usage of open, create, read, write, close, lseek, stat, ioctl system calls.

TEXT BOOKS:

1 Operating System Principles-Abraham Silberchatz, PeterB.Galvin, GregGagne , 7th Edition, JohnWiley.

2 Advanced programming in the UNIX environment, W.R.Stevens, Pearson education.

REFERENCE BOOKS:

1 Operating Systems- Internals and Design Principles, William Stallings,Fifth Edition–2005, Pearson Education/PHI

2 Operating System A Design Approach- Crowley, TMH

3 Modern Operating Systems, Andrew S.Tanenbaum 2nd edition, Pearson/PHI

4 UNIX programming environment, Kernighan and Pike, PHI/Pearson Education

5 UNIX Internals-The New Frontiers, U.Vahalia, Pearson Education.

6 Operating Systems- Internals and Design Principles, William Stallings,Fifth Edition–2005, Pearson Education/PHI

7 Operating System A Design Approach- Crowley, TMH

TEEGALA KRISHNA REDDY ENGINEERING COLLEGE

IV Year B.Tech. CSE – I Sem

L	T	P	C
3	0	0	3

22CS722OE: SOFTWARE ENGINEERING
(Open Elective–II)

Prerequisites

Course Objectives:

- The aim of the course is to provide an understanding of the working knowledge of the techniques for estimation, design, testing and quality management of large software development projects
- Topics include process models, software requirements, software design, software testing, software process/product metrics, risk management, quality management and UML diagrams

Course Outcomes: : The student will learn

CO1: Ability to translate end-user requirements into system and software requirements, using e.g. UML, and structure the requirements in a Software Requirements Document (SRD).

CO2: Identifyandapplyappropriatesoftwarearchitecturesandpatternstocarryouthighleveldesignof a system and be able to critically compare alternative choices.

CO3: Willhaveexperienceand/orawarenessoftestingproblemsandwillbeabletodevelopasimpletest ingreport.

CO4: Recognize the importance of software maintenance and complexities involved in software evolution.

CO5: Able to learn various processes used in all the phases of the product.

CO's	PROGRAM OUTCOMES													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	3	3	3	1			3	2	3	3	2	3
CO2	2	1	2	2	1				2	1	2	2	2	2
CO3	1	3	3	3	2				2	2	3	2	1	2
CO4	2	2	3	3	1						1	1	1	
CO5	1	1	1	2	1					1	1	2	1	

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, use case diagrams, and 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 for software 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 ISO9000 quality standards

TEXT BOOKS:

1 Software Engineering, A practitioner's Approach-RogerS. Pressman, 6th edition, McGraw Hill International Edition.

2 Software Engineering- Sommerville, 7th edition, Pearson Education.

REFERENCE BOOKS:

1 The unified modeling language user guide Grady Booch, JamesRambaugh, IvarJacobson, Pearson Education.

2 Software Engineering, an Engineering approach-JamesF.Peters, WitoldPedrycz, JohnWiley.

3 Software Engineering principles and practice-WamanSJawadekar, The McGraw-Hill Companies

4 Fundamentals of object-oriented design using UML Meiler page-Jones: Pearson Education.

TEEGALA KRISHNA REDDY ENGINEERING COLLEGE

IV Year B.Tech. CSE – I Sem

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22CS703PC: CRYPTOGRAPHY AND NETWORK SECURITY LAB

Prerequisites

Course Objectives:

- Explain the objectives of information security
- Explain the importance and application of each of confidentiality, integrity, authentication and availability
- Understand various cryptographic algorithms

Course Outcomes: : The student will learn

CO1: Able to understand the conversion of plain text to cipher text and cipher text to plain text

CO2: Able to analyze the mechanisms of different cryptographic algorithms and find out the Efficiency of these in a given real time environment.(ex: DES

CO3: Able to understand & Implement rijndael algorithm

CO4: Ability to identify RSA algorithm

CO5: Able to understand an implement message digest with mD5

CO's	PROGRAM OUTCOMES													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2			2					3		1	2	
CO2	2		2		2				2	3			2	2
CO3	2		3	2	2					3	2		1	1
CO4	2				2	3	2	2		3			2	
CO5	2				2				2	3		2	1	

List of Experiments

1 Write a C/Java program that contains a string (char pointer) with a value 'Hello world'. The program should XOR each character in this string with 0 and displays the result.

2 Write a C/Java program that contains a string (char pointer) with a value 'Hello world'. The program should AND or and XOR each character in this string with 127 and display the result.

3 Write a C/Java program to perform encryption and decryption using the following algorithms a.Ceaser cipher b. Substitution cipher c. HillCipher

4 Write a C/Java program to implement the DES algorithm logic

5 Write a C/Java program to implement the Blowfish algorithm logic.

6 Write a C/Java program to implement the Rijndael algorithm logic

7 Write the RC4 logic in Java Using Java cryptography; encrypt the text "Hello world" using Blowfish. Create your own key using Java keytool

8 Write a C/ Java program to implement RSA algorithm.

9 Implement the Diffie-Hellman Key Exchange mechanism using HTML and JavaScript

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

11 Calculate the message digest of a text using the MD5 algorithm in JAVA

TEXT BOOKS:

1 Cryptography and Network Security - Principles and Practice: William Stallings, Pearson Education, 6th Edition

2 Cryptography and Network Security: AtulKahate, McGraw Hill, 3rd Edition

REFERENCE BOOKS:

1 Cryptography and Network Security: C K Shyamala, N Harini, Dr T R Padmanabhan, Wiley India, 1st Edition.

2 Cryptography and Network Security : ForouzanMukhopadhyay, McGraw Hill,3rd Edition

3 Information Security, Principles, and Practice: Mark Stamp, WileyIndia.

4 Principles of Computer Security: WM. Arthur Conklin, Greg White,TMH

TEEGALA KRISHNA REDDY ENGINEERING COLLEGE

IV Year B.Tech. CSE – I Sem

L	T	P	C
0	0	2	1

22CS704PC: COMPILER DESIGN LAB

Prerequisites

A Course on "Object Oriented Programming through Java".

Course Objectives:

- To understand the various phases in the design of a compiler.
- To understand the design of top-down and bottom-up parsers.
- To understand syntax directed translation schemes.
- To introduce lex and yacc tools.

Course Outcomes: : The student will learn

CO1: Design and develop interactive and dynamic web applications using HTML, CSS, JavaScriptand XML

CO2: Apply client-server principles to develop scalable and enterprise web applications.

CO3: Ability to design, develop, and implement a compiler for any language.

CO4: Able to use lex and yacc tools for developing a scanner and a parser.

CO5: Able to design and implement LL and LR parsers.

CO's	PROGRAM OUTCOMES													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	2	3	2			1	1		1	2	2	1
CO2	2	1	3	2	3		1	1	1	3	2	1	1	3
CO3	3	1	1	1	3			1		1	1	1	1	1
CO4	2	3		3					1	1		2	1	2
CO5	2	3		3								1	1	2

List of Experiments

1 Implementation of symbol table.

2 Develop a lexical analyzer to recognize a few patterns inc (ex. Identifiers, constants, comments, operators etc.)

3 Implementation of lexical analyzer usingle xtool.

4 Generate yacc specification for a few syntactic categories

a) Program to recognize a valid arithmetic expression that uses operator +,-,*and/.

b) Program to recognize a valid variable which starts with a letter followed by any number of letter or digits.

c) Implementation of calculator using lex and yacc.

5 Convert the bnf rules into yacc form and write code to generate abstract syntax tree.

6 Implement type checking

7 Implement any one storage allocation strategies (heap, stack, static)

8	Write a lex program to count the number of words and number of lines in a given file or program.
9	Write a'C' program to implement lexical analyzer using c program
10	Write recursive descent parser for the grammar E->E+TE->TT->T*FT->F F->(E)/id.
11	write recursive descent parser for the grammar S->(L) S->a L->L,SL->S
12	Write a C program to calculate first function for the grammar E->E+TE->TT->T*FT->F
13	Write a YACC program to implement a topdown parser for the given grammar
14	Write a YACC program to evaluate algebraic expression.

TEXT BOOKS:

1 Compilers: Principles,Techniques and Tools,Second Edition, Alfred V. Aho, Monica S. Lam, Ravi Sethi, Jeffry D. Ullman.

REFERENCE BOOKS:

1 Lex & Yacc– John R.Levine Tony Mason, DougBrown,O'reilly

2 Compiler Construction, Louden, Thomson

TEEGALA KRISHNA REDDY ENGINEERING COLLEGE

IV Year B.Tech. CSE – II Sem

L	T	P	C
3	0	0	3

22HS801MS: ORGANIZATIONAL BEHAVIOR

Prerequisites

Nil

Course Objectives:

- This course demonstrates individual, group behavior aspects: The dynamics of organizational climate, structure and its impact on Organizations.

Course Outcomes: : The student will learn

CO1: Upon the completion of the subject, the student will be able to analyse the behaviour of individuals and groups in organizations in terms of the key factors that influence organizational behaviour.

CO2: Assess the potential effects of organizational level factors (such as structure, culture and change) on organizational behaviour.

CO3: Critically evaluate the potential effects of important developments in the external environment (such as globalization and advances in technology) on organizational behaviour.

CO4: Analyse organizational behavioural issues in the context of organizational behaviour theories, models and concepts.

CO5: Describe the different theories related to Individual behavior in the Organization

CO's	PROGRAM OUTCOMES													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2												
CO2	3	2												
CO3	3	2	1											
CO4	3	3	2	1										
CO5	3	3	3	1	1							1		

UNIT - I

Organizational Behaviour

Definition, need and importance of organizational behaviour – Nature and scope – Frame work – Organizational behaviour models

UNIT - II

Individua lBehaviour

Personality–types –Factors influencing personality–Theories–Learning–Types of learners–The learning process–Learning theories–Organizational behavior modification, Misbehaviour–Types– Management Intervention. Emotions-Emotional Labour–Emotional Intelligence–Theories. Attitudes– Characteristics – Components – Formation – Measurement- Values. Perceptions – Importance – Factors influencing perception – Interpersonal perception-Impression Management. Motivation – importance – Types – Effects on work behavior

UNIT – III

Group Behaviour

Organization structure – Formation – Groups in organizations – Influence – Group dynamics – Emergence of informal leaders and working norms – Group decision making techniques – Team building - Interpersonal relations – Communication – Control.

UNIT - IV

Leadership and Power

Meaning–Importance–Leadership styles–Theories of leadership–Leaders Vs Managers– Sources of power – Power centers – Power and Politic

UNIT - V

Dynamics of Organizational Behaviour

Organizational culture and climate – Factors affecting organizational climate – Importance. Job satisfaction – Determinants – Measurements – Influence on behavior. Organizational change – Importance–StabilityVsChange–ProactiveVsReactionchange–thechangeprocess– Resistance to change – Managing change. Stress – Work Stressors – Prevention and Management of stress – Balancing work and Life. Organizational development – Characteristics–objectives–.Organizational effectiveness

TEXT BOOKS:

1 Stephen P. Robins, Organisational Behavior, PHI Learning / Pearson Education,11th edition, 2008.

2 Fred Luthans, Organisational Behavior, McGrawHill,11th Edition,2001.

REFERENCE BOOKS:

1 Schermerhorn, Hunt and Osborn, Organisational behavior, John Wiley, 9th Edition,2008

2 Udai Pareek, Understanding Organisational Behaviour, 2nd Edition, Oxford Higher Education, 2004

TEEGALA KRISHNA REDDY ENGINEERING COLLEGE

IV Year B.Tech. CSE – II Sem

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22CS861PE: COMPUTATIONAL COMPLEXITY
(Professional Elective–VI)

Prerequisites

1. A course on "Computer Programming and Data Structures"
2. A course on "Discrete Structures and Graph Theory"

Course Objectives:

- Introduces to theory of computational complexity classes
- Discuss about algorithmic techniques and application of these techniques to problems.
- Introduce to randomized algorithms and discuss how effective they are in reducing time and space complexity.
- Discuss about Graph based algorithms and approximation algorithms
- Discuss about search trees

Course Outcomes: : The student will learn

CO1: Ability to classify decision problems into appropriate complexity classes

CO2: Ability to specify what it means to reduce one problem to another, and construct reductions for simple examples.

CO3: Ability to classify optimization problems into appropriate approximation complexity classes

CO4: Ability to choose appropriate data structure for the given problem

CO5: Ability to choose and apply appropriate design method for the given problem

CO's	PROGRAM OUTCOMES													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	2	1	1							1	2	1
CO2	2	2	2	1	1							1	2	1
CO3	2	2	2	1	1							1	2	1
CO4	2	2	2	1	1							1	2	1
CO5	2	2	2	1	1							1	2	1

UNIT - I

Introduction: Algorithms and complexity, Basic Complexity Classes- Deterministic time and the class P. Computational Tasks and models: Computational tasks – Search problems, Decision problems, Uniform models- Overview, General Principles, Concrete Model, Halting problem, restricted models.

UNIT - II

P vs. NP: Efficient Computation, The Search Version (Finding vs. Checking), The Decision Version (Proving Vs Verifying), Equivalence of the two formulations, Optimal Search Algorithms for NP Polynomial time reduction: The general notation of a Reduction, Reducing Optimization Problems to search problems, Self-Reducibility of search problems

UNIT – III

NP–Completeness: Definition, Cook's theorem, Existence of NP Complete Problems bounded halting and non-halting, Natural NP Complete Problems – The NP completeness of CSAT, The NP Completeness of SAT, Combinatorics and Graph Theory, additional properties of the standard reductions,NegativeapplicationsofNPCompleteness,PositiveapplicationsofNPCompleteness,NP Sets, Reflections on Complete problems, NP –complete optimization problems

UNIT - IV

Diagonalization: Time Hierarchy theorem, Space Hierarchy theorem, Non-deterministic Time Hierarchy theorem, Ladner's theorem.

Space Complexity: Definition of space bounded computation, PSPACE completeness, NL Completeness, some space complexity classes– Savitch's theorem, Savitch's theorem, The essence of PSPACE

The polynomial time hierarchy and alternations: polynomial hierarchy, time versus alternations, properties of polynomial hierarchy, Complete problems in PH.

UNIT - V

Randomized computation: Probabilistic Turing machine, one sided and zero-sided error, Randomized reduction, Randomized space bounded computation.

Decision trees: Graphs and Decision Trees, Monotonic Graph properties, Topological criterion, Randomized decision trees.

TEXT BOOKS:

1 The Basics of Computational Complexity, Oded Gold reich, Cambridge University Press

2 Computational Complexity: A Modern Approach, Sanjeev Arora andBoaz Barak, Princeton University

REFERENCE BOOKS:

1 Computational Complexity, by Christos Papadimitriou

2 Theory of Computational Complexity, Ding-ZhuDu, Ker-IKo, WILEY

TEEGALA KRISHNA REDDY ENGINEERING COLLEGE

IV Year B.Tech. CSE – II Sem

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22CS862PE: DISTRIBUTED SYSTEMS
(Professional Elective–VI)

Prerequisites

A course on " Operating Systems".

A course on "Computer Organization & Architecture".

Course Objectives:

- To provide an insight into Distributed systems.
- To introduce concepts related to Peer to Peer Systems, Transactions and Concurrency control, Security and Distributed shared memory

Course Outcomes: : The student will learn

CO1: Understanding of Distributed Systems Concepts**.**

CO2: Design and Implementation of Distributed Applications.

CO3: Fault Tolerance and Resilience.

CO4: Distributed System Models**.**

CO5: Concurrency Control and Distributed Transactions.

CO's	PROGRAM OUTCOMES													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1	1	1	1	1	1						2	2	2
CO2	1	1	1	1	1	1						2	2	2
CO3	1	1	1	1	1	1						2	2	2
CO4	1	1	1	1	1	1						2	2	2
CO5	1	1	1	1	1	1						2	2	2

UNIT - I

Characterization of Distributed Systems: Examples of Distributed systems, Resource sharing and web, challenges

System models: Architectural and Fundamental models, Networking and Internetworking, Inter process Communication

Distributed objects and Remote Invocation: Communication between distributed objects, RPC, Events and notifications, Case study-Java RMI.

UNIT - II

Operating System Support- OS layer, Protection ,Processes and Threads, Communication and Invocation, Operating system architecture.

Distributed File Systems- Introduction, File Service architecture.

UNIT – III

Peer to Peer Systems–Napster and its legacy, Peer to Peer middleware

Time and Global States-Introduction ,Clocks, events and Process states, Synchronizing physical clocks, logical time and logical clocks, global states, distributed debugging.

Coordination and Agreement- Distributed mutual exclusion, Elections, Multicast

communication, consensus and related problems.

UNIT - IV

Transactions and Concurrency Control-Introduction, Transactions, Nested Transactions, Locks, Optimistic concurrency control, Timestamp ordering.

Distributed Transactions- Introduction, Flat and Nested Distributed Transactions, Atomic commit protocols, Concurrency control in distributed transactions

Distributed deadlocks: Transaction recovery.

UNIT - V

Replication: Introduction, System model and group communication, Fault tolerant services, Transactions with replicated data.

Distributed shared memory: Design and Implementation issues, Consistency models

TEXT BOOKS:

1 Distributed Systems Concepts and Design, G Coulouris, J Dollimore and T Kindberg, Fourth Edition, Pearson Education

2 Distributed Systems,S.Ghosh,Chapman & Hall/CRC, Taylor & Francis Group,2010

REFERENCE BOOKS:

1 Distributed Systems – Principles and Paradigms, A.S. Tanenbaum and M.V. Steen, Pearson Education

2 Distributed Computing ,Principles Algorithms and Systems ,Ajay D.K shemakalyani and Mukesh Singhal, Cambridge, rp 2010

TEEGALA KRISHNA REDDY ENGINEERING COLLEGE

IV Year B.Tech. CSE – II Sem

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22CS863PE: DEEP LEARNING
(Professional Elective–VI)

Prerequisites

A course on Engineering Mathematics

Course Objectives:

- TounderstanddeepLearningalgorithmsandtheirapplicationsinreal-worlddata
- To introduce the foundations of Artificial Neural Networks
- To acquire the knowledge on Deep Learning Concepts
- To learn various types of Artificial Neural Networks
- To gain knowledge to apply optimization strategies

Course Outcomes: : The student will learn

CO1: Understand machine learning basics and neural networks

CO2: Understand optimal usage of data for training deep models

CO3: Apply CNN and RNN models for real-world data

CO4: Evaluate deep models

CO5: Develop deep models for real-world problems

CO's	PROGRAM OUTCOMES													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	2	2	1		1					2	3	2
CO2	2	2	2	2	2		1					2	3	2
CO3	2	2	2	2	2		1					2	3	2
CO4	2	2	2	2	2		1					2	3	2
CO5	2	2	2	2	2		1					2	3	2

UNIT - I

Machine Learning Basics

Learning Algorithms, Capacity, Overfitting and Underfitting, Hyper parameters and Validation Sets, Estimators, Bias and Variance, Maximum Likelihood Estimation, Bayesian Statistics, Supervised Learning Algorithms, Unsupervised Learning Algorithms, Stochastic Gradient Descent, Building a Machine Learning Algorithm, Challenges Motivating Deep Learning

Deep Feed forward Networks Learning XOR, Gradient-Based Learning, Hidden Units, Architecture Design, Back-Propagation and Other Differentiation Algorithms

UNIT - II

Regularization for Deep Learning

Parameter Norm Penalties, Norm Penalties as Constrained Optimization, Regularization and Under- Constrained Problems, Dataset Augmentation, Noise Robustness, Semi-Supervised Learning, Multi- Task Learning, Early Stopping, Parameter Tying and Parameter Sharing, Sparse Representations, Bagging and Other Ensemble Methods, Dropout, Adversarial Training, Tangent Distance, Tangent Prop, and Manifold Tangent Classifier, Optimization for Training Deep Models, Learning vs Pure Optimization, Challenges in Neural Network

Optimization, Basic Algorithms, Parameter Initialization Strategies, Algorithms with Adaptive Learning Rates.

UNIT – III

Convolutional Networks

The Convolution Operation ,Motivation, Pooling, Convolution and Pooling as an Infinitely Strong Prior, Variants of the Basic Convolution Function, Structured Outputs, Data Types, Efficient Convolution Algorithms, Random or Unsupervised Features

UNIT - IV

Recurrent and Recursive Nets

Unfolding Computational Graphs, Recurrent Neural Networks, Bidirectional RNNs, Encoder-Decoder Sequence-to-Sequence Architectures, Deep Recurrent Networks, Recursive Neural Networks, The Challenge of Long-Term Dependencies, Echo State Networks, Leaky Units and Other Strategies for Multiple Time Scales, The Long Short-Term Memory and Other Gated RNNs, Optimization for Long- Term Dependencies, Explicit Memory

UNIT - V

Practical Methodology: Performance Metrics, Default Baseline Models, Determining Whether to Gather More Data**,** Selecting Hyper parameters, Debugging Strategies, Example: Multi-Digit Number Recognition

Applications: Large-ScaleDeepLearning,ComputerVision,SpeechRecognition,NaturalLanguage Processing, Other Applications

TEXT BOOKS:

1 Deep Learning by Ian Goodfellow , YoshuaBengio and AaronCourville,MITPress.

REFERENCE BOOKS:

1 The Elements of Statistical Learning. Hastie,R.Tibshirani,and J.Friedman, Springer.

2 Probabilistic Graphical Models. Koller,and N.Friedman,MITPress.

3 Bishop,C.,M.,Pattern Recognition and Machine Learning,Springer,2006.

4 Yegnanarayana,B., Artificial Neural Networks PHILearningPvt.Ltd,2009.

5 Golub,G.,H.,andVanLoan,C.,F.,Matrix Computations,JHUPress,2013.

6 SatishKumar ,Neural Networks: A Classroom Approach,TataMcGraw-HillEducation,2004.

TEEGALA KRISHNA REDDY ENGINEERING COLLEGE

IV Year B.Tech. CSE – II Sem

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22CS864PE: HUMAN COMPUTER INTERACTION
(Professional Elective–VI)

Prerequisites

A course on "Software Engineering"

Course Objectives:

- To gain an overview of Human-Computer Interaction(HCI)
- Understanding the alternatives to traditional "keyboard and mouse" computing.
- Getting familiarity with the vocabulary associated with sensory and cognitive systems
- Be able to apply models from cognitive psychology to predicting user performance
- Working in small groups on a product design with in valuable team-work experience

Course Outcomes: : The student will learn

CO1: Build the fundamentals of Human Computer Interaction.

CO2: Apply the concepts of user interface.

CO3: Build the various interaction tasks

CO4: Apply various interaction tasks

CO5: Demonstrate various invaluable team-work experience

CO's	PROGRAM OUTCOMES													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	2	2		2	2					2	2	2
CO2	3	2	2	2		2	2					3	2	2
CO3	2	2	2	2		2	2					2	2	3
CO4	3	2	2	2			2					3	2	2
CO5	3	2	2	2			2					2	3	2

UNIT - I

Introduction: Importance of user Interface – definition, importance of good design. Benefits of good design, A brief history of Screen design.

The graphical user interface – popularity of graphics, the concept of direct manipulation, graphical system, Characteristics, Web user – Interface popularity, characteristics- Principles of user interface

UNIT - II

Design process– Human interaction with computers, importance of human characteristics, human consideration, Human interaction speeds, and understanding business junctions.

ScreenDesigning:Designgoals–Screenplanningandpurpose,organizingscreenelements,ordering of screen data and content –screen navigation andflow – Visually pleasing composition – amount of information – focus and emphasis – presentation information simply and meaningfully – information retrieval on web – statistical graphics – Technological

consideration in interface design.

UNIT – III

Windows–New and Navigation schemes selection of window, selection of devices based and screen- based controls. Components – text and messages, Icons and increases – Multimedia, colors, uses problems, choosing colors.

UNIT - IV

HCI in the software process-The software life cycle, Usability engineering, Iterative design and prototyping,DesignFocus:Prototypinginpractice,Designrationale,Designrules,Principlestosupport usability Standards, Golden rules and heuristics, HCI patterns, Evaluation techniques, Goals of evaluation, Evaluation through expert analysis, Evaluation through user participation, Choosing an evaluation method, Universal design, Universal design principles Multimodal interaction

UNIT - V

Cognitive models Goal and task hierarchies Design Focus: GOMS saves money, Linguistic models, The challenge of display-based systems, Physical and device models, Cognitive architectures, Ubiquitous computing and augmented realities, Ubiquitous computing applications research, Design Focus: Ambient Wood – augmenting the physical, Virtual and augmented reality, Design Focus: Shared experience Design Focus: Applications of augmented reality Information and data visualization

TEXT BOOKS:

1 The essential guide to user interface design, Wilbert OGalitz, Wiley DreamTech.

2 Human Computer Interaction. Alan Dix,Janet Fincay, Gregory's, Abowd, Russell Bealg, Pearson Education.

REFERENCE BOOKS:

1 Designing the user interface. 3rd Edition Ben Shneidermann, Pearson Education Asia..

2 Interaction Design Prece, Rogers, Sharps. Wiley Dreamtech.

3 User Interface Design, Soren Lauesen, Pearson Education.

4 Human– Computer Interaction, D.R.Olsen, Cengage Learning

5 Human–Computer Interaction, Smith-Atakan, Cengage Learning.

TEEGALA KRISHNA REDDY ENGINEERING COLLEGE

IV Year B.Tech. CSE – II Sem

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22CS865PE: CYBER FORENSICS
(Professional Elective–VI)

Prerequisites

A course on "Network Security"

Course Objectives:

- A brief explanation of the objective is to provide digital evidence which is obtained from digital media.
- In order to understand the objectives of computer forensics, first of all, people have to recognize the different roles computers play in a certain crime.
- According to a snippet from the United States Security Service, the computer functions in different kinds of crimes.

Course Outcomes: : The student will learn

CO1: Students will understand the usage of computers in forensic, and how to use various forensic tools for a wide variety of investigations.

CO2: It gives an opportunity to students to continue their zeal in research in computer forensics.

CO3: Formulate about the different types of crimes, to dramatize the usage of computers in forensic.

CO4: Implementation of various forensic tools for a wide variety of investigations.

CO5: Ability to use of virtual machines in cyber forensics.

CO's	PROGRAM OUTCOMES													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	3	3	3				3	2	3	2	2	3
CO2	2	2	1	2	2				2	2	2	2	2	2
CO3	3	3	3	2	3				-	2	3	2	1	2
CO4	2	2	2	3	2				2	2	3	2	1	1
CO5	3	2	3	2	3				3	2	1	2	1	1

UNIT - I

Introduction of Cybercrime: Types, The Internet spawns crime, Worms versus viruses, Computers' roles in crimes, Introduction to digital forensics, Introduction to Incident - Incident Response Methodology – Steps - Activities in Initial Response, Phase after detection of an incident

UNIT - II

Initial Response and forensic duplication, Initial Response & Volatile Data Collection from Windows system-Initial Response & Volatile Data Collection from Unix system– Forensic Duplication: Forensic duplication: Forensic Duplicates as Admissible Evidence, Forensic Duplication Tool Requirements, Creating a Forensic. Duplicate/Qualified Forensic Duplicate of a Hard Drive

UNIT – III

Forensics analysis and validation: Determining what data to collect and analyze, validating forensic data, addressing data-hiding techniques, performing remote acquisitions

Network Forensics: Network forensics overview, performing live acquisitions, developing standard procedures for network forensics, using network tools, examining the honeynet project

UNIT - IV

Current Forensic tools: evaluating computer forensic tool needs, computer forensics software tools, computer forensics hardware tools, validating and testing forensics software E-Mail Investigations: Exploring the role of e-mail in investigation, exploring the roles of the client and server in e-mail, investigating e-mail crimes and violations, understanding e-mail servers, using specialized e-mail forensic tools.

Cell phone and mobile device forensics: Understanding mobile device forensics, understanding acquisition procedures for cell phones and mobile devices.

UNIT - V

Working with Windows and DOS Systems: understanding file systems, exploring Microsoft File Structures, Examining NTFS disks, Understanding whole disk encryption, windows registry, Microsoft startup tasks, MS-DOS startup tasks, virtual machines.

TEXT BOOKS:

1 Kevin Mandia, Chris Prosise, “Incident Response and computer forensics”, Tata Mc GrawHill, 2006.

2 Computer Forensics, Computer Crime Investigation by John R. Vacca, Firewall Media, New Delhi.

3 Computer Forensics and Investigations by Nelson, Phillips Enfinger, Steuart, CENGAGE Learning

REFERENCE BOOKS:

1 Real Digital Forensics by Keith J. Jones, Richard Bejtiich, Curtis W. Rose, Addison-Wesley Pearson Education

2 Forensic Compiling, A Practitioner is Guide by Tony Sammes and Brian Jenkinson, Springer International edition.

TEEGALA KRISHNA REDDY ENGINEERING COLLEGE

IV Year B.Tech. CSE – II Sem

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22CS831OE: ALGORITHMS DESIGN AND ANALYSIS
(Open Elective–III)

Prerequisites

A course on "Computer Programming and Data Structures".

Course Objectives:

- Introduces the notations for analysis of the performance of algorithms and the data structure of disjoint sets.
- Describes major algorithmic techniques (divide-and-conquer, backtracking, dynamic programming, greedy, branch and bound methods) and mention problems for which each technique is appropriate
- Describes how to evaluate and compare different algorithms using worst-, average-, and best case analysis.
- Explains the difference between tractable and intractable problems, and introduces the problems that are P, NP and NP complete.

Course Outcomes: : The student will learn

CO1: Able to evaluate the performance Analysis and Make use of divide and conquer methods for developing algorithms.

CO2: Apply the concept of backtracking to solve the optimization problems.

CO3: Solve the optimization problems using dynamic programming methodology.

CO4: Solve the optimization problem by using Greedy method.

CO5: Solve the optimization problem by using branch and bound method and NP-Hard and NP Complete for the given example problems.

CO's	PROGRAM OUTCOMES													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	3	3	3		2			1		1		3	3
CO2	3	3	3	3		2			1		1		3	3
CO3	3	3	3	3		2			1		1		3	3
CO4	3	3	3	3		2			1		1		3	3
CO5	3	3	3	3		2			1		1		3	3

UNIT - I

Introduction: Algorithm, Performance Analysis-Space complexity, Time complexity, Asymptotic Notations- 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 Sets: Disjoint set operations, union and find algorithms, Priority Queue- Heaps, Heapsort Backtracking: General method, applications, n-queen's problem, sum of subsets problem, graph coloring, Hamiltonian cycles.

UNIT – III

Dynamic Programming: General method, applications- Optimal binary search trees, 0/1 knapsack problem, all pairs shortest path problem, Traveling sales person problem, Reliability design

UNIT - IV

Greedy method: General method, applications-Job sequencing with deadlines, knapsack problem, Minimum cost spanning trees, Single source shortest path problem.
Basic Traversal and Search Techniques: Techniques for Binary Trees, Techniques for Graphs, Connected components, Biconnected components

UNIT - V

Branch and Bound: General method, applications - Travelling sales person problem, 0/1 knapsack problem - LC Branch and Bound solution, FIFO Branch and Bound solution.
NP-Hard and NP-Complete problems: Basic concepts, non-deterministic algorithms, NP - Hard and NP- Complete classes, Cook's theorem

TEXT BOOKS:

1 Kevin Mandia, Chris Prosise, "Incident Response and computer forensics", Tata Mc GrawHill, 2006.

REFERENCE BOOKS:

1 Design and Analysis of algorithms, Aho, Ullman and Hopcroft, Pearson education.

2 Introduction to Algorithms, second edition, T. H. Cormen, C.E. Leiserson, R. L. Rivest, and Stein, PHI Pvt. Ltd. / Pearson Education.

3 Algorithm Design: Foundations, Analysis and Internet Examples, M.T. Goodrich and R. Tamassia, John Wiley and sons.

TEEGALA KRISHNA REDDY ENGINEERING COLLEGE

IV Year B.Tech. CSE – II Sem

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22CS832OE :INTRODUCTION TO COMPUTER NETWORKS
(Open Elective–III)

Prerequisites

1. A course on "Programming for problem solving"
2. A course on "Data Structures"

Course Objectives:

- The objective of the course is to equip the students with a general overview of the concepts and fundamentals of computer networks.
- Familiarize the students with the standard models for the layered approach to communication between machines in a network and the protocols of the various layers.

Course Outcomes: : The student will learn

CO1: Demonstrate the concepts of Data communication procedures and various models of Networking.

CO2: Summarize the features of various protocols used in Data Link Layer.

CO3: Identify appropriate routing algorithm for broadcasting in Network Layer and understanding addressing.

CO4: Demonstrate the services and features of TCP/UDP protocols in Transport Layer.

CO5: Summarize the services and features of Application Layer with respect to WWW.

CO's	PROGRAM OUTCOMES													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2				2	1						1	3	2
CO2	3	3	2	2	1							2	1	2
CO3	2	3	2	3	1							2	2	3
CO4	1			1								1	1	3
CO5	3	3	3	3	2	2	2					3	3	2

UNIT - I

Network hardware, Network software, OSI, TCP/IP Reference models, Example Networks: ARPANET, Internet.
Physical Layer: Guided Transmission media: twisted pairs, Coaxial cable, fiber optics, Wireless transmission.
Data link layer: Design issues, framing, Error detection and correction.

UNIT - II

Elementary data link protocols: simplex protocol, A simplex stop and wait protocol for an Error-free channel, A simplex stop and wait protocol for noisy channel.
Sliding Window protocols: A one-bit sliding window protocol, A protocol using Go-Back- N, A Protocol using Selective Repeat, Example data link protocols.
Medium Access sub layer: The channel allocation problem, Multiple access protocols: ALOHA, Carrier senses multiple access protocols, collision free protocols. Data link layer switching

UNIT – III

Network Layer: Design issues, Routing algorithms: shortest path routing, Flooding, Hierarchical routing, Broadcast, Multicast, distance vector routing, Congestion Control Algorithms, Quality of Service, Internetworking, IPV4 and IPV6 Addressing, The Network layer in the internet.

UNIT - IV

Transport Layer: Transport Services, Elements of Transport protocols, Connection Management, TCP and UDP protocol

UNIT - V

Application Layer –Domain name system, SNMP, Electronic Mail; the World WEB, HTTP, Streaming audio and video

TEXT BOOKS:

1 Computer Networks -- Andrew S Tanenbaum, David. J.Wetherall, 5th Edition. Pearson Education/PHI

2 Data Communications and Networking – Behrouz A. Forouzan. Third Edition TMH

REFERENCE BOOKS:

1 An Engineering Approach to Computer Networks-S. Keshav, 2nd Edition, Pearson Education

2 Understanding communications and network,3rd Edition, W.A.Shay, Thomson

Program Educational Objectives (PEO's):

PEO1: The students of the program will have strong foundation in the fundamental principles and gain advanced knowledge in the Basic Sciences, Mathematics and other application of Advanced Computer Engineering.

PEO2: The students of the program will be prepared for their successful careers in the software industry / seek higher studies and continue to develop.

PEO3: The students of the program will prepare to engage in professional development through self-study, graduate and professional studies in engineering & business.

PEO4: Graduates shall have good communication skills, leadership skills, professional, ethical and social responsibilities.

Programme Outcomes (PO's) :

PO1.Engineering knowledge: Ability to obtain and apply the knowledge of science and engineering essentials in problem solving.

PO2.Problem Analysis: Ability to undertake problem recognition ,formulation and providing ideal solution.

PO3.Design/ development of solutions: An ability to design, implement a computer based system, with desire program to meet the needs of social and environmental considerations.

PO4.Conduct investigations of complex problems: An ability to apply mathematical formulas, algorithmic principles and computational theory to develop a model and design of computer based system.

PO5. Modern tool usage: An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

PO6.Engineer and society: An ability to analyze the impact of computing in different organizations, society including the varying policy issues that are taken care off.

PO7.Environment and sustainability: understanding of impact of engineering solutions on the environment and this attains sustainability with responsibility.

PO8.Ethics: An ability to lead a strong professionalism and the ethical values.

PO9.Individual and team work: An ability to function effectively on multidisciplinary environments leads to leadership and member of team work.

PO10. Communication: An ability to communicate effectively in both verbal and written form which enables to prepare well documentation for report writing and a project.

PO11.Project management and finance: Apply project management practices to the launch of new programs, initiatives, products, services, and events relative to the stakeholder needs including – finance.

PO12.Life-long learning: RRecognition of the need for higher studies and inspires to update the latest technologies by the way of life long learning process from time to time.

Program Specific Outcomes: (PSO's):

PSO1: Acquired knowledge will be used to design and modify principles in the development of software and hardware systems to get a better quality product.

PSO2: An ability to identify the state of professional development in preparing for competitive examinations that offer successful career and career building.

Institutes Under

TKR EDUCATIONAL SOCIETY

Teegala Krishna Reddy Engineering College(TKEM)

TKR College of Engineering and Technology(TKRC)

TKR Institute of Management and Science(TKRB)

TKR College of Pharmacy(TKRP)