ACADEMIC REGULATIONS, COURSE STRUCTURE, AND DETAILED SYLLABUS

COMPUTER SCIENCE AND DESIGN

For

B.Tech.FOUR YEAR DEGREE COURSE

(Applicable for the batches admitted from 2020-2021)

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:

Human Creativity received no barriers when it is combined with Digital Technology. Current World's Scenario has increased the need of Digital connectivity, Digital tools and Digital Applications. Computer Science and Design Course is confederate to Computer Science and Engineering, which not only focuses on Computing Technologies, Software's, Programming and Tools but also incorporates the various Design Methods and Interaction Approaches. The course aims at achieving the interdisciplinary skill-set that enables the graduates to endow themselves in various fields such as IT industry, Animation, Virtual Reality, Augmented Reality, Multimedia, Robotics, Game Development, Entertainment, Digital Analytics many more.

Vision:

Develop and apply computational and design engineering to deal with real-world problems and design creative solutions. Navigate the active digital background to become strong, productive, global-minded persons.
Participate in a wide-ranging and various computing society that appreciates and incorporates perspectives from different people. Engage as collaborators, researchers, and entrepreneurs on a clear path to success through education and profession.

Mission:

Computer science and design course prepares students to be successful in knowledge-based global market by providing fair and extended access to high-quality, standards-based, creative computing degree like this future-proof computer science and technological design engineering.

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

Teegala Krishna Reddy Engineering College (TKREC) offers a VIII- Semesters (4-years) Bachelor of Technology (B.Tech.) degree Program, under the Choice Based Credit System (CBCS) with effect from the academic year 2020- 21 in the various branches of Engineering.

2.0 Eligibility for Admission

2.1 Seats for each Program in the college are classified into CATEGORY-A (70% of intake), CATEGORY-B (30% of intake) and CATEGORY-C (10% of intake through Lateral Entry in III semester).

2.2 Admission to the CATEGORY-A (70% of Intake) is made either on the basis of the merit rank obtained by the qualified candidate in the entrance test conducted by the Telangana State Government (EAMCET) or on the basis of any other order of merit approved by the Talangana State council for Higher Education, subject to reservations prescribed by the government from time to time.

2.3 The college fills CATEGORY-B (30% of Intake) as per the guidelines of the competent authority.

2.4 CATEGORY-C (10% of intake) are Lateral Entry students who are admitted into the third semester directly based on the rank secured by the candidate in the Engineering Common Entrance Test (ECET) in accordance with the instructions received from the convener, ECET and the competent authority.

2.5 The medium of instruction for the entire under graduate Program in E & T will only be in English.

2.6 It is mandatory that every student follows the undertaking and abides by the rules of Teegala Krishna Reddy Engineering College.

3.0 B. Tech. Program structure

3.1 A student after securing admission is required to pursue the under graduate Program in B.Tech for a minimum period of eight semesters, (four academic years) and a maximum period of eight academic years starting from the date of commencement of the first semester, failing which the student shall forfeit the seat in the B.Tech course.

Each student should secure 160 credits (with CGPA ≥ 5.0) for the completion of Undergraduate Program and award of B.Tech. Degree.

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. The student shall register for 123 credits and secure 123 credits with CGPA ≥ 5 from II year to IV year B.Tech program (LES) for the award of B.Tech. degree. The students, who fail to fulfil the requirement for the award of the degree in six academic years from the year of admission, shall forfeit their seat in B.Tech. The attendance requirements of B. Tech. (Regular) shall be applicable to B.Tech (LES).

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

3.2.1 **Semester scheme**

Each under graduate program constitutes eight semesters (four academic years). Each academic year is divided into two semesters, maximum of 22 weeks and minimum of 18 weeks (≥ 90 instructional days) each. In each semester, students are subjected to "Continuous Internal Evaluation (CIE) and a Semester End Examination (SEE)". The Choice Based Semester System (CBSS) is implemented as prescribed by the UGC and the curriculum/course structure is followed as suggested by AICTE on time to time.

Credit Courses

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

- One credit for one Period/hour per week per semester for theory/lecture (L) courses.
- Half credit for one Period/hour per week per semester for laboratory/practical (P).

Courses like Environmental Science, Professional Ethics, Gender Sensitization lab, other social context courses, CRT and student activities like NCC/NSO, NSS are identified as mandatory courses. These courses do not carry any credits.

The structure of the Under Graduate Engineering Program:

S.NO.	CATEGORY	Suggested breakup of credits (Total 160)
01	Humanities and Social sciences including Management	9*
02	Basic Sciences	25*
03	Engineering Sciences courses including Workshop, Drawing,basics of Electrical/Mechanical/Computer etc.	18*
04	Professional Core Courses	66*
05	Professional Elective Courses relevant to chosenspecialization/branch	18*
06	Open Electives-Electives from other technical and/oremerging subjects	9*
07	Project work, Seminar and Internship in Industry orelsewhere	15*
08	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.**

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	**I,II,III,IV,V,VI,VII,VIII**
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.	**1 to 9**

4.0 Course registration

4.1 An adviser /counselor or mentor from the faculty shall be assigned to a group of 20 students, who instructs the students regarding the Under Graduate Program, its course structure and curriculum, choice/option for subjects/courses, which is based on their competence, progress, pre-requisites and interest.

4.2 The academic section of the college invites 'registration forms' from students before the commencement 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 the SEEs (Semester End Examinations) of the 'preceding semester', and for 1st semester students the online registration requests shall be completed four weeks from the date of admission.

4.3 A student can apply for on-line registration, only after obtaining the written approval from the faculty adviser/counselor or mentor, 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 or mentor and the student.

4.4 A student should register for all the courses offered to him in that particular semester not exceeding nine subjects/courses, excluding the Mandatory Courses.

4.5 If the student submits ambiguous choices or multiple options during on-line registration for the subject /course under a given/specified course group/category as listed in the course structure, then the Head of the Department will allot a subject/course without considering the submission.

4.6 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 cannot be offered due to any unforeseen or unexpected reasons, then the student shall be allowed to select an alternate choice either for a new subject (subject to offering of such subject), or another existing subject (subject to availability of seats). Such alternate arrangements will be made by the Head of the Department, with due notification and within a time-framed schedule, in the first week after commencement of the class-work for that semester.

4.7 Open electives: The students have to choose three/four open electives (OE-I), (OE-II) (OE- III), (OE-IV) depending upon the curriculum. The student cannot opt for open elective subjects offered by their own (parent) department. The student can choose an open elective subject from the list of subjects offered by any other department of the same college. Once, a subject is chosen under the open elective category it cannot be opted again.

4.8 Professional electives: Students have to choose six professional electives (PE-I, PE-II, PE-III, PE-IV, PE-V, PE-VI). However, the students may opt for professional elective subjects offered in the related area.

5.0 Subjects/courses to be offered

5.1 The class strength for each semester shall be 60.

5.2 A subject/ course may be offered to the students, only if a minimum of 20 students (1/3 of the section strength) opt for it. The maximum strength of a section is limited to 80 (60+ 1/3 of the

strength of the section).

5.3 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 by the students will be based on – 'first come first serve basis and the CGPA criterion' (i.e. the primary shall be on on-line entry from the student for registration in that semester, and the focus that follows, if needed, will be on the CGPA of the student)

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

5.5 An Elective Course is offered to the students if and only if there is a minimum of 1/3 strength of the sanctioned intake registers for that course.

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 in all the subjects/courses including days of internal examinations (excluding attendance in mandatory courses like Environmental Science, Professional Ethics, Gender Sensitization Lab, NCC and NSS, subjects related to social context and CRT) for that semester.

6.2 For Mandatory Courses a 'Satisfactory Participation' report shall be issued to those students from the authorities concerned only after securing ≥ 65% attendance in such a course.

6.3 Shortage of attendance in aggregate up to 10% (65% and above, and below 75%) in each semester may be condoned by the college academic committee on valid grounds, like natural calamity, medical emergency, any sudden demise of close family members based on the students representation with supporting evidence/certificates.

6.4 A stipulated fee shall be paid to condone the shortage of attendance.

6.5 Shortage of attendance below 65% in aggregate shall, in no case be condoned.

6.6 Students whose shortage of attendance, is not condoned in a semester, are not eligible to take their end examinations of that semester. They get detained and their registration for that semester shall be cancelled. They will not be promoted to the next semester.

6.7 The students who are detained due to lack of attendance should seek re-admission into tha t semester as and when offered, and re-register all the courses offered in that semester.

6.8 A student fulfilling the attendance requirement in the present semester shall not be eligible for readmission into the same class, until completion of the VIII semester, even on payment of the requisite fees.

7.0 Academic requirements

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

7.1 A student shall be deemed to have satisfied the minimum academic requirements if he/she has earned the credits allotted to each subject/course, and has secured not less than 35% marks (26 out of 75) in the semester end examination, and a minimum of 40% of 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 **Promotion Rules:**

S.No.	Promotion	Conditions to be fulfilled
1.	**I Semester to II Semester**	**Regular course of study of I semester bysatisfying attendance requirements.**

2.	**II Semester to III Semester**	**Regular course of study of II Semester, by satisfying attendance requirements. Must have secured at least 50% credits up to from the offered credits from all the relevant regular and supplementaryexaminations, whether the student takes those examinations or not.**
3.	**III Semester to IV Semester**	**Regular course of study of III semester, bysatisfying attendance requirements.**
4.	**IV Semester to V Semester**	**Regular course of study of IV semester, bysatisfying attendance requirements, andmust have secured at least credits i.e., 60%credits up to IV semester from the offeredcredits (rounding to near low value) from all the relevant regular and supplementary examinations, whether the students takes those examinations or not**
5.	**V Semester to VI Semester**	**Regular course of study of V Semester, bySatisfying attendance requirements.**
6	**VI Semester to VII Semester**	**Regular course study of VI semester, by satisfying attendance requirements. Must have secured at least 60% credits (rounding to near lower value) up to VI Semester from the offeredcredits from all the relevant regular andsupplementary examinations, whether the student takes those examinations or not.**
7	**VII Semester to VIII Semester**	**Regular course of study of VII Semester, bysatisfying attendance requirements.**

Promotion Rules for Lateral Entry Students

S.No.	Promotion	Conditions to be fulfilled
01	**III Semester to IV Semester**	**Regular course of study of Second Year first semester, by satisfying attendance requirements.**
02	**IV Semester to V Semester**	**Regular course of study of IV Semester by satisfying attendance requirements and a minimum of 50 % of credits (rounding to thenear lower value) from the offered credits, from one regular and one supplementary examinations of III semester, irrespective of the candidate takes the examination or not.**
03	**V Semester to VI Semester**	**Regular course of study of V Semester bysatisfying attendance requirements.**
04	**VI semester to VII Semester**	**Regular course of study of VI Semester bysatisfying academic requirements and aminimum of 60% of credits (rounding to thenear low value) from the offered credits,from two regular and two supplementaryexaminations of III Semester; two regularand one supplementary examinations of IV Semester; one regular and one Supplementary examination of V Semester.**
05	**VII Semester to VIII Semester**	**Regular course of study of VII semester bysatisfying the academic requirements.**

A student shall register for subjects covering 160 credits as specified and listed in the course

structure, fulfill all the attendance and academic requirements for 160 credits, 'earn all 160 credits' by securing SGPA ≥ 5.0 (in each semester) and CGPA (at the end of each successive semester ≥ 5.0) to successfully complete the Under Graduate Program.

7.4 A student eligible to appear in the end semester examination for any subject/course, but absent from it or failed (there by failing to secure 'c' grade or above) may reappear for that subject/course in the supplementary examination as and when conducted. In such cases, the 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 the performance in that subject.

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

7.6 A student detained **due to lack of credits, shall be promoted to the next academic year only after acquiring the required academic credits.** The academic regulations under which the student has been re-admitted 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) will be evaluated for 100 marks each, with 25 marks allotted for CIE (Continuous Internal Evaluation) and 75 marks for SEE (Semester End Examination).

8.2 For theory subjects, during a semester there shall be two mid-term examinations and average of two internal examinations will be taken as the final marks for CIE. Each mid-term examination consists of only descriptive paper carrying 20 marks with the time duration of 1hour 20 minutes. The remaining 5 marks will be evaluated by the assignment given by the concerned faculty. The syllabus for the first mid examination shall be first 2.5 units. The second mid examination covers remaining 2.5 units of syllabus. **The total marks secured by the student for the whole CIE (Continuous Internal Evaluation) will be the average of two mid-terms.** If any student is absent from / would like to seek improvement in any subject of a mid- term examination, a computer based test will be conducted for him/her by the examination branch of the college, which will be scheduled after completion of both mid-term examinations.

The details of CIE exam question paper are as follows

- ❖ The pattern of Mid-term exam for CIE consists of 4 questions and no choice will be given.
- ❖ Each question carries 5 marks.
- ❖ There will be a CBT (Computer Based Test) for the students who are absent and secured less than 14 marks in the continuous internal evaluation. The CBT will be conducted before the announcement of the results of semester-end exams.
- ❖ The question bank for the CBT should cover entire syllabus of the corresponding course.

The details of the pattern of the end semester question paper are as follows

- ➢ The end semester examinations will be conducted for 75 marks.
- ➢ The question paper consists of two parts namely Part- A and Part-B.
- ➢ Part-A consists of 10 questions. Each question carries 2.5 marks each and no choice will be given. Two questions are from one unit and all the five units should be covered.
- ➢ Part-B consists of five questions (number from 2 to 6) carrying 10 marks each. Each of these questions is from one 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 details of evaluation of end semester exam are as follows

- Double evaluation of the answer scripts 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.

8.3 For practical subjects there shall be a continuous internal evaluation during the semester for 25 marks and 75 marks for end semester practical examinations. The duration for both Internal and External Practical Examination is 3 hours. For 25 marks of Internal Evaluation of practical subjects, day-to-day evaluation in laboratory is done for 15 marks and internal practical examination will be assessed for 10 marks. The concerned laboratory subject teacher (Internal Examiner) will conduct the internal practical examination only. The external practical examination will have 2 examiners, one is the external examiner and the other is the internal examiner. The controller of examinations of the college will appoint the external examiner with the consultation of the chief superintendent of examinations from the three names given by the concerned department.

8.4 For the subjects that include design and/or drawing, (such as engineering graphics, engineering drawing, machine drawing and estimation), the distribution shall be 25 marks for continuous internal evaluation (15 marks for day-to-day evaluation and 10 marks for internal examination) and 75 marks for semester end examination. **There shall be two internal examinations in a semester and the average of the two shall be considered for the award of marks for internal examinations**.

8.5 (i) For subjects like **Engineering Graphics/ Engineering Drawing**, the SEE shall consist of five 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.

(ii) For the Subject **Estimation, Costing and Project Management**, the SEE paper should consist of Part- A, Part-B and Part C. (i) Part – A, 1 out of 2 questions from Unit – I for 30 Marks, (ii) Part – B, 1 out of 2 questions from Unit – II for 15 Marks,(iii) Part – C, 3 out of 5 questions from Units – III, IV, V for 30 Marks.

(iii) For subjects **Structural Engineering – I & II (RCC & STEEL),** the SEE will be conducted for 75 marks consisting of 2 parts viz. (i) Part – A for 15 marks and, (i) Part – B for 60 marks. Part

– A is a compulsory question consisting of ten sub- questions. The first five sub-questions are from each unit relating to design theory and codal provisions and carry 2 marks each. The next five sub-questions are from each unit and carry 1 mark each. Part – B consists of 5 questions (numbered 2 to 6).

8.6 The student has to undergo a comprehensive MCQ TEST/ Seminar/Internship/industry oriented mini project/Project Work offered to him by their respective departments and subsequently should satisfy the requirements for completion to acquire the required credits.

8.7 There shall be an Internship in collaboration with an industry of their specialization. Students will register for this immediately after II year II semester examinations and pursue it during summer vacation for 15 days. The Internship shall be submitted in a report form and presented before the committee in III year I semester. It shall be evaluated for 100 internal marks. The committee consists of Head of the Department, supervisor of the Internship and a senior faculty member of the department.

8.8 There shall be an Industrial Oriented Mini Project in collaboration with an industry of their specialization. Students will register for this immediately after III year II semester examinations and pursue it during summer vacation for one month. Industrial Oriented Mini Project shall be submitted in a report form and presented before the committee in IV year I semester. It shall be evaluated for 100 external marks. The committee consists of an external examiner, Head of the Department, supervisor of the Industrial Oriented mini project and a senior faculty member of the department. There shall be no internal marks for Industrial Oriented Mini Project.

8.9 There shall be a seminar presentation in IV year I semester. For the seminar, the student shall collect the information on a specialized topic, prepare a technical report, and submit it to the department. It shall be evaluated by the departmental committee consisting of Head of the Department, seminar supervisor and a senior faculty member. The seminar report shall be evaluated for 100 internal marks. There shall be no semester end examination for the seminar.

8.10 There shall be a comprehensive MCQ exam in IV year I semester. For the comprehensive MCQ exam covers the core subjects which are related to Graduate Aptitude Test in Engineering. It shall be evaluated by the departmental coordinator nominated by Head of the Department. The comprehensive MCQ exam shall be evaluated for 100 internal marks and consists of 50 MCQs. The student has to secure 40% of 100 marks i.e.40 marks. If any student is absent or failed in the comprehensive MCQ exam then he/she can appear for next supplementary exam like other end semester examinations.

8.11 UG project work shall be carried out in two stages: Project Stage – I during IV Year I Semester, Project Stage – II during IV Year II Semester. Each stage will be evaluated for 100 marks. Student has to submit project work report at the end of each semester. First report includes project work carried out in IV Year I semester and second report includes project work carried out in IV Year I & II Semesters. SEE for both project stages shall be completed before the commencement of SEE Theory examinations.

(i) For Project Stage – I, the departmental committee consisting of Head of the Department, project supervisor and a senior faculty member shall evaluate the project work for 75 marks and project supervisor shall evaluate for 25 marks. The student is deemed to have failed, if he (i) 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, or (ii) secures less than 40% marks in the sum total of the CIE and SEE taken together. 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.

(ii) For Project Stage – II, the external examiner shall evaluate the project work for 75 marks and the project supervisor shall evaluate it for 25 marks. The topics for industrial oriented mini project, seminar and Project Stage – I shall be different from one another. The student is deemed to have failed, if he (i) does not submit a report on Project Stage - II, or does not make a presentation of the same before the external examiner as per schedule, or (ii) secures less than 40% marks in the sum '

total of the CIE and SEE taken together. For conducting viva-voce of project stage – II, the controller of examination will nominate an external examiner with the consultation of the chief superintendent from the list of experts in the relevant branch submitted by the concerned department. A student who has failed may re-appear once for the above evaluation in the current semester, when it is scheduled again; if student fails in such 'one re-appearance' evaluation also, he/she has to reappear for the same in the next subsequent semester, as and when it is scheduled.

(iii) Procedure for opting the MOOCs

- If any student got an opportunity to do the final year project as an internship in any reputed company (Approved by the departmental committee), the student can opt for MOOCs which are equivalent to the elective courses offered in VIII semester.
- The MOOCs should be approved by the concerned BOS.
- The selected MOOCs duration should be minimum of 12 weeks.
- A student is eligible to secure up to 12 credits only through MOOCs.

The laboratory marks, sessional marks, and the end examination marks awarded by the college are subject to scrutiny and scaling, if necessary, by a committee, constituted in this regard, with a university representative/under the guidance of the Director of Evaluation of the affiliating university. The recommendations of the committee are final and binding. The laboratory records, internal examination scripts and external examination scripts, shall be preserved as per the rules for two consecutive academic years if the respective subjects are cleared, and shall be produced before the committee as and when required, till preserved.

For mandatory courses related to Environmental Science, Constitution of India, Intellectual Property Rights, Gender Sensitization lab and Campus recruitment training a student has to secure 40 marks out of 100 marks (i.e. 40% of the marks allotted) in the continuous internal evaluation for passing the subject/course. **These marks should also be uploaded along with the internal marksof other subjects**

For all non-credit courses and mandatory courses, no marks or letter grade is allotted.

Grading Procedure

Marks will be awarded to the student to indicate the performance in each theory subject, laboratory/ practical's, seminar, project stage I and project stage II. Based on the percentage of marks obtained (Continuous Internal Evaluation plus Semester End Examination, both taken together) as specified in item no. 8 above, a corresponding letter grade shall be given.

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

% of marks secured in a subject/course	Letter Grade	GradePoints
90% to 100%	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

**** Awarding of Letter Grade will be done for the benefit of the student.**

A student obtaining '**F**' grade in any subject shall be deemed to have **'failed'** and is required to reappear as a 'supplementary student' in the semester end examination, as and when offered. In

such cases, internal marks in those subjects will remain same as those obtained earlier.

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

A letter grade will not indicate any specific percentage of marks, but states only the range of markshe/she has obtained.

A student earns Grade Point (GP) in each subject/course, based on the Grade Point the letter grade is awarded for 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 points (GP) x Credits for a course

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

The semester grade point average (SGPA) is calculated by dividing the sum of credit points (∑CP) secured from all subjects/course registered in a semester, by the total number of credits registered during the semester. SGPA is rounded off to two decimal places. SGPA is thus calculated as

SGPA = {∑□i=1□□□□}/ {∑□ □□} ….. For each semester,

where 'i' is the subject indicator index (takes into account 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), Ci is the no. of credits allotted to the ith subject, and Gi represents the grade points (GP) corresponding to the letter grade awarded for the ith subject.

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 in all semesters, and the total number of credits registered in all the semesters. CGPA is rounded 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

CGPA = {∑Mj=1□j□j}/ {∑Mj=1 C j for all semester 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 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), cj is the no. of credits allotted to the jth subject, and Gj represents the grade point (GP) corresponding to the letter grade awarded for that jth subject. After registration and completion of first year first semester, the SGPA of that semester itself can be taken as the CGPA, as there are no cumulative effects.

Illustration of calculation of SGPA

Course/subject	Credits	Grade points	Letter Grade	Credit Points
Course1	3	8	A	3 x 8 = 24
Course2	3	10	O	3 x 10 = 30
Course3	3	5	C	3 x 5 = 15
Course4	3	6	B	3 x 6 = 18
Course5	3	9	A+	3 x 9 = 27
Course6	1.5	7	B+	1.5x 7 = 10.5
	16.5			**124.5**

SGPA = 124.5/16.5 = 7.55

Illustration of calculation of CGPA up to 2nd Semester

Course/subject	Credits	LetterGrade	Gradepoints	Credit Points
I year I semester				
Course1	4	A	8	4 x 8 = 32
Course2	4	O	10	4 x 10 = 40
Course3	4	C	5	4 x 5 = 20
Course4	3	B	6	3 x 6 = 18
Course5	3	A+	9	3 x 9 = 27
Course6	3	B+	7	3 x 7 = 21
I year II semester				
Course7	4	B	6	4 x 7 = 28
Course8	4	O	10	4 x 10 = 40
Course9	4	C	5	4 x 5 = 20
Course10	3	B	6	3 x 6 = 18
Course11	3	A+	9	3 x 9 = 27
Course12	1.5	B+	7	1.5 x 7 = 10.5
Total Credits =	**40.5**		**Total Credit=**	**301.5**

CGPA = 301.5/40.5 = 7.44

The above illustrated calculation process of CGPA 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.

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

For calculations listed in regulations 9.6 to 9.9, performance in failed subjects/courses (securing **F grade**) will also be taken into account, and the credits of such subjects/courses will be included in the multiplications and summations. After passing the failed subjects (s), newly secured grade points will be taken into account for calculation of SGPA and CGPA. However, mandatory courses will not be taken into consideration for calculation of CGPA and SGPA.

Passing standards

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

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

Declaration of results

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

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

% of marks = (CGPA-0.5) x 10

12 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 ≥ 5.0), within 8 academic years from the date of commencement of the first academic year, shall be declared to have '**qualified'** for the award of the B.Tech degree in the chosen branch of Engineering as selected at the time of admission.

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 Students with the final CGPA (at the end of the under graduate Program) ≥ 8.00, and fulfilling the following condition will be awarded **'first class with distinction'; should have secured a final (at the end of the undergraduate Program) CGPA ≥ 8.00,** for each year of course study.
Students with final CGPA (at the end of the under graduate Program) ≥ **6.50 but <8.00**, shall be placed in '**first class'**.
Students with final CGPA (at the end of the under graduate Program) ≥ **5.50 but<6.50**, shall be placed in '**second class'**.
Students with final CGPA (at the end of the under graduate Program) ≥ **5.00 but <5.50,** and all other students who qualify for the award of degree (as per 12.1) with final CGPA ≥ **5.00 but <5.50**, shall be placed in **'pass class'**.
A student with final CGPA (at the end of the under graduate Program) **<5.00, will not be eligible** for the award of the degree**.**

12.4 Student who secures SGPA ≥ 8.00 consistently in all semesters will be eligible to compete for the awards of 'rank' and 'gold medal'.

13 Withholding of results

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

14.0 Transitory Regulations

14.1 A student, who has discontinued for any reason, is liable to completely pay his balance annual fees, up to discontinued year.

14.2 A student who is detained due to lack of credits or lack of attendance has to follow the existing regulations of the year in which he/she is re-admitted, with additional/substitute subjects if necessary.

15.0 Students Transfers

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

15.2 There shall be no transfers from one branch to another branch within the constituent colleges and units of the affiliating university (JNTUH).

15.3 The students seeking transfer under the ceiling admission category to this college from any of the JNTUH affiliated Autonomous colleges or from various other Universities/institutions (National Importance, Autonomous) have to pass the failed subjects which are equivalent to the subjects of Teegala Krishna Reddy Engineering College and also pass the subjects of Teegala Krishna Reddy Engineering College which the students have not studied at the earlier institution/university. Further, though the students have passed some of the subjects at the earlier institution/university, if the same subjects are being offered in different semesters of Teegala Krishna Reddy Engineering College, the students have to study those subjects in Teegala Krishna Reddy Engineering College

in spite of the fact that those subjects are repeated.

15.4 The students transferred from other Universities/institutions to Teegala Krishna Reddy Engineering College, shall be provided a chance of writing online internal examination **for the failed subjects/and or subjects not studied** as per the equivalences recommended in the clearance letter issued by the university/institution, at the end of the semester as per the prescribed schedule by the college examination cell.

16.0 Scope

16.1 The academic regulations should be read as 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 Chairman, Governing Body of Teegala Krishna Reddy Engineering College is final.

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

MALPRACTICES RULES
DISCIPLINARY ACTION FOR / IMPROPER CONDUCT IN EXAMINATIONS

	Nature of Malpractices/ Improper conduct	**Punishment**
	If the Student	
1. (a)	Possesses or carries accessible in the examination hall, any paper, note book, programmable calculators, cell phones, pager, palm computers or any other form of material concerned with or related to the subject of theexamination (theory or practical) in which he is appearing but has not made use of (materialshall include any marks on the body of the candidate which can be used as an aid in thesubject of the examination)	Expulsion fromthe examination hall and cancellationof the performance in that subject only.
(b)	Gives assistance or guidance or receives it fromany other candidate orally or byany other bodylanguage methods or communicates through cell phones with any candidate or persons in oroutside the exam hall in respect of any matter.	Expulsion from the examination hall and cancellationof the performance in that subject only of all the candidates involved. In case of an outsider, he will behanded over to the police and a case is registered against him.
2.	Has copied in the examination hall from any paper, book, programmable calculators, palm computers or any other form of material relevant to the subject of the examination (theory or practical) in which the candidate is appearing.	Expulsion from the examination hall and cancellationof the performance in that subject and all other subjects the candidate has already appeared includingpractical examinations and project work and shall notbe permitted to appear for the remaining examinationsof the subjects of that Semester. The hall ticket of the candidate should be cancelled.
3.	Impersonates any other student in connection with the examination.	The student who has impersonated shall be expelled from the 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 practical and project work) already appeared and shall not be allowed to appear for

		examinations of the remaining subjects of that semester. The student is also debarred for two consecutive semesters from class work and all end examinations. The continuation of the course by the student is subject to the academic regulations in connection with forfeiture of the seat. If the imposteris an outsider, he will be handed over to the police and a case will be 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 cancellationof performance in that subject and all the other subjects the candidate has already appeared includingpractical examinations and project work and shall notbe permitted for the remaining examinations of the subjects of that semester. The student is also debarred for two consecutive semesters from class work and all end examinations. The continuation of the course by the student is subject to the academicregulations in connection with forfeiture of seat.
5.	Uses objectionable, abusive or offensive language in the answer paper or in letters tothe examiners or writes to the examiner requesting him to award pass marks.	Cancellation of the performance in that subject.
6.	Refuses to obey the orders of the Chief Superintendent/Assistant Superintendent / any officer on duty or misbehaves or creates disturbance of any kind in and around the examination hall or organizes a walk-out or instigates others to walk out, or threatens the officer-in charge or any person on duty in or outside the examination hall of any injury tohis person or to any of his relations whether	In case of students of the college, they shall be expelled from examination halls and cancellation of their performance in that subject and all other subjects the candidate(s) has (have) already appeared and shallnot be permitted to appear for the remaining examinations of the subjects of that semester. 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 will be registered against them.
	by words, either spoken or written or by signsor 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 thetendency to disrupt the orderly conduct of the examination	
7.	Leaves the exam hall taking away answerscript or intentionally tears of the script or any part thereof inside or outside the examination hall.	Expulsion from the examination hall and cancellation ofperformance inthat subject and all the other subjectsthe candidate has already appeared including practicalexaminations and project work and shall not be permitted for the remaining examinations of the subjects of that semester. The candidate is also debarred for two consecutive semesters from class work and all end examinations. The continuation of thecourse by the candidate is subject to the academic regulations in connection with forfeiture of seat.
8.	Possesses any lethal weapon or firearm in the examination hall.	Expulsion from the examination hall and cancellation ofthe performance inthat subject and allother subjectsthe 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. The candidate is also debarred and forfeits the seat.

9.	Indulges in any malpractice or improperconduct mentioned in clause 6 to 8 and is not a student for the particular examination or not a person connected with the college.	Student of the college expulsion from the examinationhall and cancellation ofthe 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. The candidate is also debarred and forfeits the seat. Person(s) who do not belong to the college will be handed over to the 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 ofthe performance inthat subject and allother subjectsthe 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.
11.	Is detected copying on the basis of internal evidence, such as, during valuation or during special scrutiny.	Cancellation of the performance in that subject and allother subjects the candidate has appeared including practical examinations and project work of that semester examinations.
12.	If any malpractice is detected which is not covered in the above clauses 1 to 11 shall bereported to the PRINCIPAL / DIRECTOR forfurther action to award suitable punishment.	

I Year B.Tech. CSG - I Sem

S. No	Subject Code	Category	Subject Name	Hours per			Credits
				L	T	P	
01	20MA1BS01	BS	Mathematics-I	3	1	0	4
02	20CH1BS02	BS	Chemistry	3	1	0	4
03	20EE1ES01	ES	Basic Electrical Engineering	3	0	0	3
04	20ME1ES05	ES	Engineering Workshop	1	0	3	2.5
05	20EN1HS01	HS	English	2	0	0	2
06	20CH1BS03	BS	Engineering Chemistry Lab	0	0	3	1.5
07	20EN1HS02	HS	English Language and Communication Skills Lab	0	0	2	1
08	20EE1ES03	ES	Basic Electrical Engineering Lab	0	0	2	1
09		MC	Induction Programme				
	Total			**12**	**2**	**10**	**19**

I Year B.Tech. CSG - II Sem

S. No	Subject Code	Category	Subject Name	Hours per			Credits
				L	T	P	
01	20MA2BS04	BS	Mathematics-II	3	1	0	4
02	20AP2BS05	BS	Applied Physics	3	1	0	4
03	20CS2ES04	ES	Programming for Problem Solving	3	1	0	4
04	20ME2ES05	ES	Engineering Graphics	1	0	4	3
05	20AP2BS06	BS	Applied Physics Lab	0	0	3	1.5
06	20CS2ES06	ES	Programming for Problem Solving Lab	0	0	3	1.5
07	20MC2ES07	MC	Environmental Science	3	0	0	0
	Total			**13**	**3**	**10**	**18**

II Year B.Tech. CSG - I Sem

S. No	Subject Code	Category	Subject Name	Hours per			Credits
				L	T	P	
01	20MA3BS08	BS	Computer Oriented Statistical Methods	3	0	0	3
02	20CS3PC01	PC	Computer Organization	3	1	0	4
03	20CD3PC01	PC	Object Oriented Programming using Java	2	0	0	2
04	20CS3PC03	PC	Data Structures	3	1	0	4
05	20CS3ES08	ES	Analog & Digital Electronics	3	0	0	3
06	20CS3PC04	PC	IT Workshop Lab	0	0	2	1
07	20CS3PC05	PC-LAB	Data Structures Lab	0	0	3	1.5
08	20CD3PC02	PC-LAB	Object Oriented Programming using Java Lab	0	0	3	1.5
09	20MC3HS01	MC	Professional & Engineering Ethics	3	0	0	0
10	20MC3BS02	MC	Quantitative Analysis-1	3	0	0	0
	Total			**20**	**2**	**8**	**20**

II Year B.Tech. CSG - II Sem

S. No	Subject Code	Category	Subject Name	Hours per			Credits
				L	T	P	
01	20MA4PC07	BS	Discrete Mathematics	3	0	0	3
02	20MS4HS03	HSMC	Business Economics & Financial Analysis	3	0	0	3
03	20CS4PC09	PC	Operating Systems	3	0	0	3
04	20CD4PC03	PC	Software Engineering	3	1	0	4
05	20CS4PC10	PC	Database Management Systems	3	1	0	4
06	20CS4PC11	PC-LAB	Operating System Lab	0	0	3	1.5
07	20CD4PC04	PC-LAB	Software Engineering Lab	0	0	2	1
08	20CS4PC13	PC-LAB	Database Management Systems Lab	0	0	3	1.5
09	20MC4HS03	MC	Gender Sensitization Lab	0	0	2	0
10	20MC4BS03	MC	Quantitative Logical and Reasoning	3	0	0	0
	Total			**18**	**2**	**10**	**21**

III Year B.Tech. CSG - I Sem

S. No	Subject Code	Category	Subject Name	Hours per			Credits
				L	T	P	
01	20CS5PC14	PC	Formal Languages & Automata Theory	3	0	0	3
02	20CD5PC05	PC	Software Design & Architecture	3	0	0	3
04	20CS5PC16	PC	Design and Analysis of Algorithms	3	1	0	4
03	20CD5PE11	PE- I	Professional Elective- I	3	0	0	3
05	20CD5PE20	PE-II	Professional Elective- II	3	0	0	3
06	20CD5PE20	PE-II-LAB	Professional Elective -II Lab	0	0	3	1.5
07	20CS5PC17	PC-LAB	Design and Analysis of Algorithms Lab	0	0	3	1.5
08	20EN5HS04	HSMC	Advanced Communication Skills Lab	0	0	3	1
09	20CD5PW01	PW	Summer Internship	0	0	0	1
10	20MC5HS05	MC	Intellectual Property Rights	3	0	0	0
11	20MC5HS06	MC	Personality Development & Soft Skills	3	0	0	0
	Total			**21**	**1**	**9**	**21**

Professional Elective – I

S. No	Subject Code	Subject Name
01	20CD5PE11	Artificial Intelligence
02	20CD5PE12	Advanced Computer Architecture
03	20CD5PE13	Service Oriented Architecture
04	20CD5PE14	Requirement Engineering

Professional Elective – II

S. No	Subject Code	Subject Name
01	20CD5PE21	Component Based Technologies
02	20CD5PE22	Web Technologies
03	20CD5PE23	OOAD Through UML
04	20CD5PE24	Middleware Technologies

Professional Elective – II Lab

S. No	Subject Code	Subject Name
01	20CD5PE25	COMPONENT BASED TECHNOLOGIES LAB
02	20CD5PE26	WEB TECHNOLOGIES LAB
03	20CD5PE27	OOAD Through UML LAB
04	20CD5PE28	MIDDLEWARE TECHNOLOGIES LAB

III Year B.Tech. CSG - II Sem

S. No	Subject Code	Category	Subject Name	Hours per			Credits
				L	T	P	
01	20CD6PC06	PC	Design pattern	3	0	0	3
02	20CD6PC07	PC	Software Project Management	3	0	0	3
03	20CS6PC18	PC	Computer Networks	3	1	0	4
04	20CD6PC08	PC	Software Testing	2	0	0	2
05	20CD6PE30	PE –III	Professional Elective- III	3	0	0	3
06	20CD6OE10	OE- I	Open Elective- I	3	0	0	3
07	20CD6PE30	PE-III Lab	Professional Elective- III Lab	0	0	2	1
08	20CD6PC09	PC-LAB	Computer Networks Lab	0	0	3	1.5
09	20CD6PC10	PC-LAB	Software Testing Lab	0	0	3	1.5
10	20MC6HS07	MC	Constitution of India	3	0	0	0
11	20MC6CS01	MC	Basic Technical Training	3	0	0	0
	Total			**23**	**1**	**8**	**22**

Professional Elective – III

S. No	Subject Code	Subject Name
01	20CD6PE31	Introduction to Statistical Software
02	20CD6PE32	Android Application Development
03	20CD6PE33	Internet of Things
04	20CD6PE34	Python Programming

Professional Elective – III LAB

S. No	Subject Code	Subject Name
01	20CD6PE35	Introduction to Statistical Software Lab
02	20CD6PE36	Android Application Development Labb
03	20CD6PE37	Internet of Things Lab
04	20CD6PE38	Python Programming Lab

Open Elective – I

S. No	Subject Code	Subject Name
01	20CS6OE11	Java
02	20CS6OE12	Computer Organization & Architecture

- 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. CSG- I Sem

S. No	Subject Code	Category	Subject Name	Hours per			Credits
				L	T	P	
01	20CD7PC11	PC	Extreme Programming	2	1	0	3
02	20CD7PC12	PC	Devops	3	0	0	3
03	20CD8PE40	PE-IV	Professional Elective- IV	3	0	0	3
04	20CD8PE50	PE-V	Professional Elective- V	3	0	0	3
05	20CD8OE20	OE-II	Open Elective- II	3	0	0	3
06	20CD7PC13	PC LAB	Devops - Lab	0	0	3	1
07	20CD5PW02	PW	Seminar	0	0	2	1
08	20CD5PW03	PW	Comprehensive Exam	0	0	0	1
09	20CD5PW04	PW	Industry oriented Mini Project	0	0	0	2
10	20CD5PW05	PW	Project Stage -1	0	0	6	3
11	20MC7CS02	MC	Advance Technical Training	3	0	0	0
	Total			**17**	**1**	**11**	**23**

Professional Elective – IV

S. No	Subject Code	Subject Name
01	20CD7PE41	Distributed Database
02	20CD7PE42	Agile Programming
03	20CD7PE43	Software Metrics
04	20CD7PE44	Cloud Computing

Professional Elective – V

S. No	Subject Code	Subject Name
01	20CD7PE51	Advanced Algorithms
02	20CD7PE52	Data Science
03	20CD7PE53	Software Quality Management
04	20CD7PE54	Computer vision

Open Elective – II

S. No	Subject Code	Subject Name
01	20CS7OE21	OPERATINGSYSTEMS
02	20CS7OE22	Artificial Intelligence

- 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. CSG- II Sem

S. No	Subject Code	Category	Subject Name	Hours per			Credits
				L	T	P	
01	20SM8MS02	HSMC	Organizational Behavior	3	0	0	3
02	20CD8PE60	PE-VI	Professional Elective- VI	3	0	0	3
03	20CD8OE30	OE-III	Open Elective- III	3	0	0	3
04	20CD8PW06	PW	Project Stage-II	0	0	15	7
	TOTAL			9	0	15	16

Professional Elective – VI

S. No	Subject Code	Subject Name
01	20CD8PE61	Software Security Engineering
02	20CD8PE62	Data Warehousing & Data Mining
03	20CD8PE63	Software Verification & Validation
04	20CD8PE64	Data Analytics

Open Elective – III

S. No	Subject Code	Subject Name
01	20CS8OE31	Cyber Security
02	20CS8OE32	Scripting Languages

- 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. CSG- I Sem

L	T	P	C
3	1	0	4

(20MA1BS01) MATHEMATICS – I

Course Objectives: To learn.

1. Types of matrices and their properties.
2. Concept of a rank of the matrix and applying this Concept to know the consistency and solving the System of linear equations.
3. Concept of Eigen values and eigenvectors and to reduce the quadratic form to canonical form.
4. Concept of Sequence.
5. Concept of nature of the series.
6. Geometrical approach to the mean value theorems and their application to the mathematical Problems.
7. Evaluation of surface areas and volumes of revolutions of curves.
8. Evaluation of improper integrals using Beta and Gamma functions.
9. Partial differentiation, concept of total derivative.
10. Finding maxima and minima of function of two and three variables.

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

1. Represent the matrix form of a set of linear equations and to analyze the solution of the System of equations.
2. Reduce the quadratic form to canonical form.
3. Analyze the nature of sequence and series.
4. Apply the mean value theorems.
5. Find the extreme values of functions of two variables with / without constraints.

UNIT-I

Matrices: Types of Matrices, Symmetric, Hermitian, Skew-symmetric, Skew-Hermitian, orthogonal matrices, Unitary 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. Gauss elimination method, Gauss Seidel Iteration Method.

UNIT-II

Eigen values and Eigen vectors: Linear Transformation and Orthogonal Transformation. Eigen values and 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

Sequences &Series: Sequence: Definition of a Sequence, limit, and Convergent, **Divergent and Oscillatory sequences. Series:** Convergent, Divergent and Oscillatory Series, Series of positive terms. Comparison test, p-test, D-Alembert's ratio test, Raabe's test, Cauchy's Integral test, Cauchy's root test, logarithmic test. **Alternating series**: Leibnitz test; **Alternating Convergent series**: Absolute and Conditional Convergence.

UNIT-IV

Single Variable 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). Improper Integral: Definitions of Beta and Gamma functions and their applications.

UNIT-V

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

TEXTBOOKS:

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010.
2. Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
3. G.B.Thomas and R.L.Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002.

REFERENCE BOOKS:

1. N.P. Bali and Manish Goyal, A textbook of Engineering Mathematics, Laxmi Publications, Reprint, 2008.
2. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11thReprint, 2010.

TEEGALA KRISHNA REDDY ENGINEERING COLLEGE

I Year B.Tech. CSG - I Sem

L	T	P	C
3	1	0	4

(20CH1BS02) CHEMISTRY

Course Objectives: To learn.

1. To bring adaptability to the concepts of chemistry and to acquire the required skills to become a perfect engineer.
2. To impart the basic knowledge of atomic, molecular and electronic modifications which makes the student to understand the technology based on them.
3. To acquire the knowledge of electrochemistry, corrosion and water treatment which are essential for the Engineers and in industry?
4. To acquire the skills pertaining to spectroscopy and to apply them for medical field etc.
5. To impart then knowledge of stereochemistry and synthetic aspects useful for understanding reaction path ways

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

1. Analyze microscopic chemistry in terms of atomic and molecular orbital's and inter molecular forces
2. Measure various parameter of water and its significance in industrial and domestic purposes.
3. Make use of essential aspects of Electro chemistry and Corrosion in industry.
4. Explain stereochemistry and synthetic aspects useful for understanding reaction pathways.
5. Apply the basic principle of various spectroscopic techniques in chemical industry and medical field.

UNIT-I

Molecular structure and Theories of Bonding: Atomic and Molecular orbitals. Linear Combination of Atomic Orbitals (LCAO), molecular orbitals of diatomic molecules, molecular orbital energy level diagrams of N2, O2 and NO molecules. Bond order. **Crystal Field Theory (CFT):** Salient Features of CFT – Crystal Field Splitting of transition metal ion d- orbitals in Tetrahedral, Octahedral and square planar geometries. Factors affecting in magnitude of splitting. Magnetic and colour properties. Band structure of solids and effect of doping on conductance. N-doping, P-doping.

UNIT-II

Water and its treatment: Introduction – hardness of water – Causes of hardness. Types of hardness: temporary and permanent. Expression and units of hardness. Estimation of hardness of water by complex metric method. Potable water and its specifications. Steps involved in treatment of water – Disinfection of water by chlorination and ozonization. Boiler feed water –Boiler troubles Scale, Sludge, Priming, Foaming and Caustic embrittlement. Treatment. Calgon conditioning, Phosphate conditioning and Colloidal conditioning. External treatment of water.Ion exchange process. Desalination of water – Reverse osmosis. Numerical problems..

UNIT-III

Electrochemistry and corrosion: Electrochemical cells – electrode potential, standard electrode potential, types of electrodes – Calomel, Quinhydrone and glass electrode. Nernst equation Determination of pH of a solution by using quinhydrone and glass electrode. Electro chemical series and its applications. Numerical problems. Potentiometric titrations. Batteries – Primary (Lithium cell) and secondary batteries (Lead – acid storage battery and Lithium-ion battery). Causes and effects of corrosion – Theories of chemical and electrochemical corrosion – mechanism of electrochemical corrosion. Types of corrosion: Galvanic, water-line and pitting corrosion. Factors affecting rate of electro chemical corrosion, Corrosion control methods- Cathodic protection – Sacrificial anode and impressed current cathodic methods. Surface coatings – metallic coatings – Methods of coating- Hot dipping, cementation – Hot Dipping-Galvanization and Tinning. Electroless plating of copper.

UNIT-IV

Stereochemistry, Reaction Mechanism and synthesis of drug molecules: Representation of 3-dimensional structures, Isomers-Structural and stereoisomers, Enantiomers, diastereomers, symmetry and chirality. Optical activity Absolute configuration. Conformational analysis of n- butane. Substitution reactions: Nucleophilic substitution reactions: Mechanism of SN1, SN2 reactions. Electrophilic and nucleophilic addition reactions: Addition of HBr to propene. Markownikoff and anti Markownikoff's additions. Grignard additions on carbonyl compounds. Elimination reactions: Dehydro halogenation of alkyl halides. Saytzeff rule. Oxidation reactions: Oxidation of alcohols using KMnO4 and CrO3. Reduction reactions: Reduction of carbonyl compounds using LiAlH4& NaBH4.Structure, synthesis and pharmaceutical applications of Paracetamol and Aspirin.

UNIT-V

Spectroscopic techniques and applications: Principles of electronic spectroscopy: Beer's Lamberts law, numerical problems. Types of electronic excitations. Applications of uv-visible spectroscopy. IR **Spectroscopy:** Principle, modes of vibrations, selection rules, Force constant, some common organic C) Applications of IR≡N, C=C and C≡Functional groups wave no. regions (C- H, NH, OH, -COOH, C=0, C Spectroscopy, H NMR (NMR Spectroscopy) Principle of NMR spectroscopy Chemical shift, chemical shifts of some common organic protons. Introduction to MRI.

TEXTBOOKS:

1. Text book of Engineering Chemistry by Jain & Jain, Dhanpat Rai Publishing company (P) Ltd. New Delhi.

REFERENCE BOOKS:

1. Physical Chemistry, by P.W.Atkins
2. Engineering Chemistry (NPTEL Web-book), by B.L. Tembe, Kamaluddin and. S.Krishnan
3. University Chemistry, by B.H.Mahan
4. Fundamentals of Molecular Spectroscopy, by C.N.Banwell
5. Organic Chemistry: Structure and Function by K.P.C. VolhardtandN.E.Schore, 5thEdition.

TEEGALA KRISHNA REDDY ENGINEERING COLLEGE

I Year B.Tech. CSG - I Sem

L	T	P	C
3	0	0	3

(20EE1ES01) BASIC ELECTRICAL ENGINEERING

Course Objectives: To learn.

1. To introduce the basics of electrical circuits and its components
2. To understand DC circuits and AC single phase & three phase circuits.
3. To introduce the concept of power, power factor.
4. To study and understand the different types of magnetic circuits i.e., DC/AC machines and Transformers.
5. To import the knowledge of various electrical installations and power factor improvement methods.

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

1. Solve electrical circuits using basic network laws and theorems.
2. Understand basic AC Circuits and effect of resonance.
3. Extract the working and operation of Transformers and its applications.
4. Articulate working principles of Electrical Machines of both AC and DC.
5. Describe about components of Components of LT Switchgear and installations.

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

UNIT-V

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

TEXTBOOKS:

1. Basic Electrical Engineering - D.P. Kothari and I.J. Nagrath, 3rd edition 2010, Tata Mc Graw Hill.
2. D.C. Kulshreshtha, “Basic Electrical Engineering”, Mc Graw Hill, 2009.

REFERENCE BOOKS:

1. L.S. Bobrow, Fundamentals of Electrical Engineering”, Oxford University Press, 2011
2. Electrical and Electronics Technology, E. Hughes, 10th Edition, Pearson, 2010.

3. Electrical Engineering Fundamentals, Vincent Deltoro, Second Edition, Prentice Hall, India, 1989.
4. Circuit Theory Analysis and Synthesis, Abhijit Chakrabarti, Dhanpat Rai& Co, 2016.

TEEGALA KRISHNA REDDY ENGINEERING COLLEGE

I Year B.Tech. CSG - I Sem	**L**	**T**	**P**	**C**
	1	**0**	**3**	**2.5**

(20ME1ES05) ENGINEERING WORKSHOP

Course Objectives: To learn.

1. To study of different hand operated power tools, uses and their demonstration.
2. To gain a good basic working knowledge required for the production of various engineering products.
3. To provide hands on experience about use of different engineering materials, tools, equipment's and processes those are common in the engineering field.
4. To develop a right attitude, team working, precision and safety at workplace.
5. To explain the construction, function, use and application of different working tools, equipment and machines.
6. To study commonly used carpentry joints.
7. To have practical exposure to various welding and joining processes.
8. To identify and use marking out tools, hand tools, measuring equipment and to work to prescribed to clearances.

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

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

1**. TRADES FOREXERCISES:**

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. 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 (Water Plasma), Power tools in construction and Wood Working.

TEXTBOOKS:

1. Workshop Practice /B. L. Juneja /Cengage.
2. Workshop Manual / K. Venugopal / Anuradha.

REFERENCE BOOKS:

1. Work shop Manual- P. Kannaiah/ K. L. Narayana/SciTech.
2. Workshop Manual / Venkat Reddy/BSP.

TEEGALA KRISHNA REDDY ENGINEERING COLLEGE

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

(20EN1HS01) ENGLISH

Course Objectives: To learn.

1. Improve the language proficiency of students in English with an emphasis on Vocabulary, Grammar, Reading and Writing skills.
2. Equip students to study academic subjects more effectively and critically using the theoretical and practical components of English syllabus.
3. Develop study skills and communication skills in formal and informal situations.

Course outcomes: Students should be able to

1. Use English Language effectively in spoken and written communication.
2. Understand the given texts and respond appropriately.
3. Articulate confidently in various contexts and different cultures.
4. Demonstrate basic proficiency in English including reading and listening comprehension, writing and speaking skills.
5. Improve language proficiency to meet their academic and professional needs.

UNIT-I

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

Vocabulary Building: The Concept of Word Formation --The Use of Prefixes and Suffixes. Grammar: Identifying Common Errors in Writing with Reference to Articles and Prepositions. Reading: Reading and Its Importance- Techniques for Effective Reading. Basic Writing Skills: Sentence Structures -Use of Phrases and Clauses in Sentences- Importance of Proper Punctuation- Techniques for writing precisely – Paragraph writing – Types, Structures and Features of a Paragraph - Creating Coherence- Organizing Principles of Paragraphs in Documents.

UNIT-II

'Ancient Architecture in India' from the prescribed textbook 'English for Engineers' published by Cambridge University Press. Vocabulary: Synonyms and Antonyms. Grammar: Identifying Common Errors in Writing with Reference to Noun-pronoun Agreement and Subject-verb Agreement. Reading: Improving Comprehension Skills – Techniques for Good Comprehension Writing: Format of a Formal Letter-Writing Formal Letters E.g.., Letter of Complaint, Letter of Requisition, Job Application with Resume.

UNIT-III

'Blue Jeans' from the prescribed textbook 'English for Engineers' published by Cambridge University Press. Vocabulary: Acquaintance with Prefixes and Suffixes from Foreign Languages in English to form Derivatives-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- Skimming and Scanning Writing: Nature and Style of Sensible Writing- Defining- Describing Objects, Places and Events – Classifying- Providing Examples or Evidence.

UNIT-IV

'What Should You Be Eating' from the prescribed textbook 'English for Engineers' published by

Cambridge University Press. Vocabulary: Standard Abbreviations in English Grammar: Redundancies and Clichés in Oral and Written Communication. Reading: Comprehension- Intensive Reading and Extensive Reading Writing: Writing Practices--Writing Introduction and Conclusion - Essay Writing-Précis Writing.

UNIT-V

How a Chinese Billionaire Built Her Fortune' from the prescribed textbook 'English for Engineers' published by Cambridge University Press. Vocabulary: Technical Vocabulary and their usage Grammar: Common Errors in English Reading: Reading Comprehension-Exercises for Practice Writing: Technical Reports- Introduction – Characteristics of a Report – Categories of Reports Formats- Structure of Reports (Manuscript Format) -Types of Reports - Writing a Report.

TEXTBOOKS:

1. Sudarshana, N.P. and Savitha, C. (2018). English for Engineers. Cambridge University Press.

REFERENCE BOOKS:

1. Swan, M. (2016). Practical English Usage. Oxford University Press.
2. Kumar, S and Lata, P. (2018). Communication Skills. Oxford University Press.
3. Wood, F.T. (2007). Remedial English Grammar. Macmillan.
4. Zinsser, William. (2001). On Writing Well. Harper Resource Book.
5. Hamp-Lyons, L. (2006). Study Writing. Cambridge University Press.
6. Exercises in Spoken English. Parts I –III. CIEFL, Hyderabad. Oxford University Press.
7. Raju, Yadava B, B T Sujatha & C, Murali Krishna. English for Better Performance, Orient Black swan, Pvt., Ltd, 2014.

TEEGALA KRISHNA REDDY ENGINEERING COLLEGE

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

(20CH1BS03) ENGINEERING CHEMISTRY LAB

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

1. Estimation of hardness and chloride content in water to check its suitability for drinking purpose.
2. To determine the rate constant of reactions from concentrations as a function of time.
3. The measurement of physical properties like adsorption and viscosity.
4. To synthesize the drug molecules and check the purity of organic molecules by thin layer chromatographic (TLC) technique.

Course outcomes: The experiments will make the student gain skills on

1. An ability to analyze the quality of water by determining its chemical parameters.
2. The synthesis of common drugs like Paracetamol and Aspirin.
3. Determination of rate constant of a reaction from concentration – time relationships.
4. Determination of physical properties like adsorption and viscosity of lubricants.
5. Estimation of different types of qualitative and quantitative measurements of given compound.

List of Experiments:

1. Determination of total hardness of water by complexometric method using EDTA.
2. Estimation of Fe^{+2} by Dichrometry.
3. Estimation of an HCl by Conductometric titrations.
4. Estimation of Acetic acid by Conductometric titrations.
5. Estimation of HCl by Potentiometric titrations.
6. Estimation of Fe^{2+} by Potentiometry using KMnO4.
7. Determination of rate constant of acid catalysed hydrolysis of methylacetate
8. Synthesis of Aspirin and Paracetamol.
9. Thin layer chromatography calculation of Rfvalues. Eg- ortho and para nitrophenols
10. Determination of acid value of coconut oil.
11. Verification of Freundlich adsorption isotherm-adsorption of acetic acid on charcoal
12. Determination of viscosity of Coconut oil and ground nut oil by using Ostwald' sviscometer.
13. Determination of surface tension of a give liquid using stalagmometer.
14. Determination of partition coefficient of acetic acid between n-butanol and water.

REFERENCE BOOKS:

1. Senior practical physical chemistry, B.D. Khosla, A. Gulati and V. Garg (R. Chand &Co., Delhi).
2. An introduction to practical chemistry, K.K. Sharma and D. S. Sharma (Vikas publishing, N. Delhi).
3. Vogel's text book of practical organic chemistry 5thedition.

TEEGALA KRISHNA REDDY ENGINEERING COLLEGE

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

(20EN1HS02) ENGLISH LANGUAGE COMMUNICATION SKILLS LAB

Course Objectives: To learn.

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

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

1. Better understanding of nuances of English language through audio- visual experience and group activities.
2. Neutralization of accent 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. Speaking skills with clarity and confidence which in turn enhances their inter personal skills

EXERCISE – I
CALL Lab:
CALL Lab:
Understand: Listening Skill- Its importance – Purpose- Process- Types- Barriers of Listening. Practice: Introduction to Phonetics – Speech Sounds – Vowels and Consonants.
ICS Lab:
Understand: Communication at Work Place- Spoken vs. Written language.
Practice: Ice-Breaking Activity and JAM Session- Situational Dialogues – Greetings –Taking Leave – Introducing Oneself and Others.

EXERCISE – II
CALL Lab:
CALL Lab:
Understand: Structure of Syllables – Word Stress and Rhythm– Weak Forms and Strong Forms in Context.
Practice: Basic Rules of Word Accent - Stress Shift - Weak Forms and Strong Forms in Context.
ICS Lab:
Understand: Features of Good Conversation – Non-verbal Communication.
Practice: Situational Dialogues – Role-Play- Expressions in Various Situations –Making Requests and Seeking Permissions - Telephone Etiquette.

EXERCISE – III
CALL Lab:
Understand: Intonation-Errors in Pronunciation-the Influence of Mother Tongue (MTI).
Practice: Common Indian Variants in Pronunciation – Differences in British and American Pronunciation.
ICS Lab:
Understand: How to make Formal Presentations. Practice: Formal Presentations.

EXERCISE – IV
CALL Lab:
Understand: Listening for General Details. Practice: Listening Comprehension Tests. ICS Lab:
Understand: Public Speaking – Exposure to Structured Talks.
Practice: Making a Short Speech – Extempore.

EXERCISE – V
CALL Lab:
Understand: Listening for Specific Details. Practice: Listening Comprehension Tests. ICS Lab:
Understand: Interview Skills.
Practice: Mock Interviews.

TEXTBOOKS:

1. ELCS Lab Manual
   (The course content is prescribed for the English Language and Communication Skills Lab based on Unit-6 of AICTE Model Curriculum 2018 for B.Tech. First English)

REFERENCE BOOKS:

1. Suresh Kumar, E. &Sreehari, P. 2009. A Handbook for English Language Laboratories. New Delhi: Foundation
2. Speaking English Effectively 2nd Edition by Krishna Mohan and N. P. Singh, 2011. Macmillan Publishers India Ltd. Delhi.
3. Sasi Kumar, V & Dhamija, P.V. How to Prepare for Group Discussion and Interviews. Tata McGrawHill
4. Hancock, M. 2009. English Pronunciation in Use. Intermediate. Cambridge: CUP
5. Spoken English: A Manual of Speech and Phonetics by R. K. Bansal &J. B. Harrison. 2013. Orient Black swan. Hyderabad.

TEEGALA KRISHNA REDDY ENGINEERING COLLEGE

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

(20EE1ES03) BASIC ELECTRICAL ENGINEERING LAB

Course Objectives: To learn.

1. To analyze and understand behavior given network by applying various electrical laws and network theorems.
2. To know the response of electrical circuits for different excitations.
3. To determine, measure and know the relation between basic electrical quantities.
4. To analyze the performance characteristics of DC and AC electrical machines.

Course outcomes:

1. Understand the basic electrical laws.
2. Sketch the response of different types of electrical circuits to different excitations.
3. Solve the response of electrical circuits under resonance condition.
4. Understand the measurement, calculation and relation between the basic electrical parameters.
5. Categorize the basic characteristics of transformers and electrical machines.

List of experiments/demonstrations:

1. Verification of Ohms Law.
2. Verification of KVL and KCL.
3. Transient Response of Series RL and RC circuits using DC excitation.
4. Transient Response of RLC Series circuit using DC excitation.
5. Resonance in series RLC circuit.
6. Calculations and Verification of Impedance and Current of RL, RC and RLC series circuits.
7. Measurement of Voltage, Current and Real Power in primary and Secondary Circuits of a Single-Phase Transformer.
8. Load Test on Single Phase Transformer (Calculate Efficiency and Regulation).
9. Three Phase Transformer: Verification of Relationship between Voltages and Currents (Star-Delta, Delta-Delta, Delta-star, Star-Star).
10. Measurement of Active and Reactive Power in a balanced Three-phase circuit.
11. Performance Characteristics of a Separately/Self Excited DC Shunt/Compound Motor.
12. Torque-Speed Characteristics of a Separately/Self Excited DC Shunt/Compound Motor.
13. Performance Characteristics of a Three-phase Induction Motor.
14. Torque-Speed Characteristics of a Three-phase Induction Motor.
15. No-Load Characteristics of a Three-phase Alternator.

TEEGALA KRISHNA REDDY ENGINEERING COLLEGE

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

(20MA2BS04) MATHEMATICS – II

Course Objectives: To learn.

1. Methods of solving the differential equations of first and higher order.
2. Evaluation of multiple integrals and their applications.
3. The physical quantities involved in engineering field related to vector valued functions.
4. The basic properties of vector valued functions and their applications to line, Surface and volume integrals.

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

1. Determine different types of ordinary differential equations of first order.
2. Apply the concepts of higher differential equation to solve real world problems.
3. Apply the concept of multiple integrals to find areas and volumes
4. Evaluate the Centre of mass and gravity for cubes, sphere and rectangular parallelepiped.
5. Calculate the line, surface and volume integrals and converting them from one toanother.

UNIT-I

First Order Ordinary Differential Equations: Exact, linear and Bernoulli's equations. **Applications:** Newton's law of cooling, Law of natural growth and decay. **Equations not of first degree:** equations solvable for p, equations solvable for y, equations solvable for x and Clairaut's type.

UNIT-II

Ordinary Differential Equations of Higher Order: Second order linear differential equations with constant coefficients. Non-Homogeneous terms of the type e^{ax} , $\sin ax$, $\cos ax$, polynomials in x, $e^{ax}V(x)$ and $xV(x)$. Method of variation of parameters. **Equations reducible to linear ODE with constant coefficients:** Legendre's equation, Cauchy-Euler equation.

UNIT-III

Multiple Integrals: 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), Centre of mass and Gravity (constant and variable densities) by double and triple integrals (applications involving cubes, sphere and rectangular parallelepiped).

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. Solenoidal and Irrotational vectors.

UNIT-V

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

TEXTBOOKS:

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010.
2. Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
3. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002.

REFERENCE BOOKS:

1. Paras Ram, Engineering Mathematics, 2nd Edition, CBS Publishers.
2. S. L. Ross, Differential Equations, 3rd Ed., Wiley India, 1984.

TEEGALA KRISHNA REDDY ENGINEERING COLLEGE

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

(20AP2BS05) APPLIED PHYSICS

Course Objectives: To learn.

1. Students will demonstrate skills in scientific inquiry, problem solving and laboratory techniques.
2. Students will be able to demonstrate competency and understanding of the concepts found in Quantum Mechanics, Fiber optics and lasers, Semiconductor physics and Electromagnetic theory and a broad base of knowledge in physics.
3. The graduates will be able to solve non-traditional problems that potentially draw on knowledge in multiple areas of physics.
4. To study applications in engineering like memory devices, transformer core and electromagnetic machinery.

Course outcomes: After learning the contents of the syllabus the student will be

1. Demonstrate the fundamentals concepts of modern physics and quantum mechanics.
2. Design various electronic circuits using fundamentals of Semiconductor physics.
3. Apply the concepts of optoelectronic in various optoelectronic devices.
4. Apply the learned knowledge of laser and fibre optics in communication system.
5. Analyze various magnetic and Electromagnetic properties applicable in magnetic materials.

UNIT-I

Quantum Mechanics: Introduction to quantum physics, Black body radiation, Planck's law, Photoelectric effect, Compton effect, de-Broglie's hypothesis, Wave-particle duality, Davisson and Germer experiment, Heisenberg's Uncertainty principle, Born's interpretation of the wave function, Schrodinger's time independent wave equation, Particle in one dimensional box

UNIT-II

Semiconductor Physics: Intrinsic and Extrinsic semiconductors, Dependence of Fermi level on carrier-concentration and temperature, Carrier generation and recombination. **Carrier transport**: diffusion and drift, Hall effect, p-n junction diode, Zener diode and their V-I Characteristics. **Bipolar Junction Transistor (BJT)**: Construction, Principle of operation.

UNIT-III

Optoelectronics: Radiative and non-radiative recombination mechanisms in semiconductors. **LED and semiconductor lasers**: Device structure, Materials, Characteristics and figures of merit, Semiconductor. **Photodetectors**: Solar cell, PIN and Avalanche and their structure, Materials, working principle and Characteristics.

UNIT-IV

Lasers and Fibre Optics Lasers: Introduction to interaction of radiation with matter, Coherence, Principle and working of Laser, Population inversion, pumping. Types of Lasers: Ruby laser, Carbon dioxide (CO_2) laser, He-Ne laser, Applications of laser. **Fibre Optics**: Introduction, Optical fibre as a dielectric wave guide, Total internal reflection, Acceptance angle, Acceptance cone and Numerical aperture, Step and Graded index fibres, Losses associated with optical fibres, Applications of optical fibres.

UNIT-V

Electromagnetism and Magnetic Properties of Materials: Laws of electrostatics, Electric current and the continuity equation, Ampere's and Faraday's laws, Maxwell's equations, Polarisation, Permittivity and Dielectric constant, Internal fields in a solid, Clausius- Mossotti equation, **Ferroelectrics and** Piezo electrics. Magnetisation, permeability and susceptibility, Classification of magnetic materials, Ferromagnetism and ferromagnetic domains, Hysteresis, Applications of magnetic materials.

TEXTBOOKS:

1. Engineering Physics, B.K. Pandey, S. Chaturvedi - Cengage Learning.
2. Halliday and Resnick, Physics - Wiley.
3. A textbook of Engineering Physics, Dr. M. N. Avadhanulu, Dr. P.G. Kshirsagar - S. Chand

REFERENCE BOOKS:

1. Richard Robinett, Quantum Mechanics
2. J. Singh, Semiconductor Optoelectronics: Physics and Technology, Mc Graw-Hill inc. (1995).
3. Online Course: “Optoelectronic Materials and Devices” by Monica Katiyar and Deepak Guptha on NPTEL

TEEGALA KRISHNA REDDY ENGINEERING COLLEGE

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

(20CS2ES04) PROGRAMMING FOR PROBLEM SOLVING

Course Objectives: To learn.

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

Course outcomes: After learning the contents of the syllabus the student will be

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

UNIT-I

Introduction to Programming Introduction to components of a computer system: disks, primary and secondary memory, processor, operating system, compilers, creating, compiling and executing a program etc., Number systems, **Introduction to Algorithms**: steps to solve logical and numerical problems. Representation of Algorithm, Flowchart/Pseudo code with examples, Program design and structured programming, Introduction to C Programming Language: variables (with data types and space requirements), Syntax and Logical Errors in compilation, object and executable code , Operators, expressions and precedence, Expression evaluation, Storage classes (auto, extern, static and register), type conversion, The main method and command line arguments, **Bitwise operations**: Bitwise AND, OR, XOR and NOT operators, Conditional Branching and Loops: Writing and evaluation of conditionals and consequent branching with it, if-else, switch-case, ternary operator, go to, 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, Strings, Structures and Pointers: Arrays: one- and two-dimensional arrays, creating, accessing and manipulating, elements of arrays. **Strings**: Introduction to strings, handling strings as array of characters, basic string functions available in C (strlen, strcat, strcpy, strstr 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 types.

UNIT-V

Introduction to Algorithms: Algorithms for finding roots of quadratic equations, finding minimum and maximum numbers of a given set, finding if a number is prime number, etc. 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.

TEXTBOOKS:

1. Byron Gottfried, Schaum's Outline of Programming with C, McGraw-Hill
2. B.A. Forouzan and R.F. Gilberg C Programming and Data Structures, Cengage Learning, (3rd Edition)

REFERENCE BOOKS:

1. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice Hall of India.
2. R.G. Dromey, how to solve it by Computer, Pearson (16th Impression).
3. Programming in C, Stephen G. Kochan, Fourth Edition, Pearson Education.
4. Herbert Schildt, C: The Complete Reference, Mc Graw Hill, 4th Edition.

TEEGALA KRISHNA REDDY ENGINEERING COLLEGE

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

(20ME2ES05) ENGINEERING GRAPHICS

Course Objectives: To learn.

1. To provide basic concepts in engineering drawing.
2. To impart knowledge about standard principles of orthographic projection of objects.
3. To draw sectional views and pictorial views of solids.

Course outcomes: After learning the contents of the syllabus the student will be

1. Apply the principles of engineering graphics to create engineering drawings of various geometric construction, conic section, 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 the principles of projections.
4. Draw the development of surfaces and intersections of solids in real time situations.
5. Develop isometric and orthographic views of the objects.

UNIT-I

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

UNIT-II

ORTHOGRAPHIC PROJECTIONS: Principles of Orthographic Projections – Conventions – Projections of Points and Lines, Projections of Plane regular geometric figures. —Auxiliary Planes.

UNIT-III

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

UNIT-IV

Development of Surfaces of Right Regular Solids – Prism, Cylinder, Pyramid and Cone, Intersection of Solids: Intersection of – Prism vs Prism- Cylinder Vs Cylinder.

UNIT-V

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

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

TEXTBOOKS:

1. Engineering Drawing N.D. Bhatt / Charotar.
2. Engineering Drawing / N. S. Parthasarathy and Vela Murali/ Oxford.

REFERENCE BOOKS:

1. Engineering Drawing / Basant Agrawal and McAgrawal/ McGraw Hill
2. Engineering Drawing/ M. B. Shah, B.C. Rane / Pearson.
3. Computer Aided Engineering Drawing – K Balaveera Reddy et al – CBS Publishers.

TEEGALA KRISHNA REDDY ENGINEERING COLLEGE

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

(20AP2BS06) APPLIED PHYSICS LAB

Course outcomes: The student will be

1. Compute the (V-I/P-I) characteristics of LED, LASER, and Solar cell.
2. Calculate the energy gap of semiconductor diode.
3. Interpret the theory of Hall Effect with experiment by determining the Hall coefficient.
4. Examine the bending losses for different Optical fiber Cables.
5. Construct various circuits –Resonance, Time constant and Magnetic field using LCR, RC, Stewart and Gees circuits.

List of Experiments:

1. Energy gap of P-N junction diode:
2. To determine the energy gap of a semiconductor diode.
3. Solar Cell:
4. To study the V-I Characteristics of solar cell.
5. Light emitting diode:
6. Plot V-I and P-I characteristics of light emitting diode.
7. Stewart – Gee's experiment:
8. Determination of magnetic field along the axis of a current carrying coil.
9. Hall effect:
10 To determine Hall co-efficient of a given semiconductor.

Note: Any 8 experiments are to be performed.

REFERENCE BOOKS:

1. Laboratory Manual of Engineering Physics by Dr.Y.Aparna & Dr.K.Venkateswara Rao (V.G.S Publishers)
2. Engineering physics practicals by Dr.B. Srinivasa Rao, V.K.V. Krishna.K.S.Rudramamba.

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

(20CS2ES06) PROGRAMMING FOR PROBLEM SOLVING LAB

Course Objectives: The students will learn the following:

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

Course outcomes: The student will be able to:

1. Formulate The Algorithms for Simple Problems.
2. Translate the given algorithms to C program.
3. Correct the logical errors found during program execution.
4. Make use of pointers in different types to modularize the code with functions.
5. Apply the appropriate sorting techniques for the given list of elements.

Practice sessions:

1. 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.
2. Write a simple program that converts one given data type to another using auto conversion and casting. Take the values form standard input.

Simple numeric problems:

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

Expression Evaluation:

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

Arrays and Pointers and Functions:

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

b. Write a function to compute mean, variance, Standard Deviation, sorting of n elements in single dimension array.
c. Write a C program that uses functions to perform the following:
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 column counts may not be same.
g. Write C programs that use both recursive and non-recursive functions

Files:

a. Write a C program to display the contents of a file to standard output device.Write a C program, which takes two integer operands and one operator from the user, performs the operation and then prints the result. (Consider the operators +, -, *, /, % and use Switch Statement)
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:
e. 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. Write a C program to find the sum of individual digits of a positive integer and test given number is palindrome.

Strings:

a. Write a C program to convert a Roman numeral ranging from I to L to its decimal equivalent.
b. Write a C program that converts a number ranging from 1 to 50 to Roman equivalent
c. Write a C program that uses functions to perform the following operations:
    i. To insert a sub-string in to a given main string from a given position.
    ii. To delete n Characters from a given position in a given string.
d. 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.)
e. Write a C program that displays the position of a character ch in the string S or – 1 if S doesn't 't contain ch.
f. Write a C program to count the lines, words and characters in a given text.

Miscellaneous:

1. 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.
2. 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 list of integers using linear search method.
b. Write a C program that uses non recursive function to search for a key value in a given sorted list of integers using binary search method.
c. Write a C program that implements the Bubble sort method to sort a given list of integers in ascending order.
d. Write a C program that sorts the given array of integers using selection sort in descending

order

e. Write a C program that sorts the given array of integers using insertion sort in ascending order

f. Write a C program that sorts a given array of names.

Suggested Reference Books for solving the problems:

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

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

(20MC2ES07) ENVIRONMENTAL SCIENCE

Course Objectives:

1. Understanding the importance of ecological balance for sustainable development.
2. Understanding the impacts of developmental activities and mitigation measures
3. Understanding the environmental policies and regulations

Course outcomes: 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.

The students should be able to:

1. Develop an understanding of ecological perspective and the value of the environment.
2. Understand the significance of various natural resources and its management.
3. Demonstrate a comprehensive understanding of the world's biodiversity and the importance of its conservation.
4. Identify different types of pollution and their control measures, discover effective methods of waste management and come out with best possible solutions.
5. Raise awareness about environmental laws and sustainable development.

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, Biomagnifications, 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**: Waste water Treatment methods: Primary, secondary and Tertiary. Overview of air pollution control technologies, Concepts of bioremediation. **Global Environmental Issues and Global Efforts:** Climate change and impacts on human environment. Ozone depletion and Ozone depleting substances (ODS). Deforestation and desertification. International conventions /Protocols: Earth summit, Kyoto protocol, and Montréal Protocol. NAPCC- GoI Initiatives.

UNIT-V

Environmental Policy, Legislation & EIA: Environmental Protection act, Legal aspects Air Act-

1981, Water Act, Forest Act, Wild life Act, Municipal solid waste management and handling rules, biomedical waste management and handling rules, hazardous waste management and handling rules. EIA: EIA structure, methods of baseline data acquisition. Overview on Impacts of air, 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 and its 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.

TEXTBOOKS:

1. Text book of Environmental Studies for Undergraduate Courses by Erach Bharucha for University Grants Commission.
2. Environmental Studies by R.Rajagopalan, Oxford University Press.

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, 4thEdition, 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.

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

(20MA3BS08) COMPUTER ORIENTED STATISTICAL METHODS

Course Objectives: To learn.

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

Course outcomes: After the end of the course students will be able to

1. Make use of concepts of probability and distributions to given case studies.
2. Calculate the Mean, Variance and covariance of given discrete random variable.
3. Apply the concept of Uniform Distributions to find out continuous distribution values.
4. Estimate the of test of hypothesis to take decision for profit or loss in a given problem.
5. Describe stochastic principles to simplify processes that satisfy Markov Property.

UNIT – I

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

UNIT – II

Mathematical Expectation: 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, Geometric Distributions and Poisson distribution.

UNIT – III

Continuous Probability Distributions: Continuous Uniform Distribution, Normal Distribution, Areas under the Normal Curve, Applications of the Normal Distribution, Normal Approximation to the Binomial, Gamma and Exponential Distributions. **Fundamental Sampling Distributions**: Random Sampling, Some Important Statistics, Sampling Distributions, Sampling Distribution of Means and the Central Limit Theorem, Sampling Distribution of S2, t–Distribution, F-Distribution.

UNIT – IV

Estimation & Tests of Hypotheses: Introduction, Statistical Inference, Classical Methods of Estimation: Estimating the Mean, Standard Error of a Point Estimate, Prediction Intervals, Tolerance Limits, Estimating the Variance, Estimating a Proportion for single mean, Difference between Two means, between Two Proportions for Two Samples and Maximum Likelihood Estimation.

Statistical Hypotheses: General Concepts, testing a Statistical Hypothesis, Tests Concerning a Single Mean, Tests on Two Means, Test on a Single Proportion.

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.

TEXTBOOKS:

1. R K Jain & S R K Iyengar - Advanced Engineering Mathematics - fifth Edition, Narosa Publications.
2. S C Gupta and V K Kapoor, Fundamentals of Mathematical statistics, Khanna publications.
3. S. D. Sharma, Operations Research, Kedarnath and Ramnath Publishers, Meerut, Delhi.

REFERENCE BOOKS:

1. T.T. Soong, Fundamentals of Probability and Statistics for Engineers, John Wiley & Sons Ltd, 2004.

2. Sheldon M Ross, Probability and statistics for Engineers and scientists, Academic Press.
3. Ronald E. Walpole, Raymond H. Myers, Sharon L. Myers, Keying Ye, Probability & Statistics for Engineers & Scientists, 9th Ed. Pearson Publishers.

TEEGALA KRISHNA REDDY ENGINEERING COLLEGE

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

(20CS3PC01) COMPUTER ORGANIZATION

Course Objectives:

1. Construction of computers out of a set of functional units and how the functional units operate, Interact, and communicate.
2. Representation of data at the machine level and how computations are performed at the machine level.
3. Working procedure of various input/output devices and transfer of data from different modes.
4. Advanced concepts like parallelism and pipelining.

Course outcomes: The Student will be able to

1. Demonstrate the functional organization of digital computer system.
2. Classify different addressing modes for fetching machine instructions.
3. Apply different data representation formats and perform arithmetic operations.
4. Tell the design of input/output organization and memory organization of computer.
5. Demonstrate the concepts of parallel processing, pipelining and inter process communication.

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.

TEXTBOOKS:

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

REFERENCE BOOKS:

1. Computer Organization – Car Hamacher, Zvonks Vranesic, Safea Zaky, Vth Edition, McGrawHill.
2. Computer Organization and Architecture – William Stallings Sixth Edition, Pearson/PHI.
3. Structured Computer Organization – Andrew S. Tanenbaum, 4th Edition, PHI/Pearson.

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

(20CD3PC01) OBJECT ORIENTED PROGRAMMING USING JAVA

Prerequisites: A course on "Programming for Problem Solving using C".

Course Objectives:

The main objective of this course is to understand the Object-Oriented programming issues in developing more complex software designs. Students will also learn the advantages of Object-Oriented programming over the normal and old paradigm structured programming languages. Examples which are demonstrated using java helps the students to understand the concepts and apply the features of Object Oriented
programming. The enhancements that are made in the latest certification exams for java are also kept in view. This helps students to keep their skills up to date.

Course outcomes:

1. Understand the key features of the Java programming language
2. Apply essential object-oriented programming concepts like dynamic polymorphism, abstract (virtual) methods using Java
3. Apply the principles behind good object-oriented design.
4. Exposure to the latest trends in java language and its compatibility in handling numerous complex domains.
5. Design Projects using object-oriented concepts.

UNIT - I

Java Basics and Anatomy:

Java Basics: OOP"s principles, Java History, advantages, Data types, operators, expressions, control statements, methods and recursion, sample programs**.**

Java Anatomy: Java Objects and References, Constructors, this keyword, Arrays (single and multi-dimensional), String and its immutability, Buffer &Builder Classes, String Tokenizer

UNIT - II

Inheritance (Extending and Implementing): Introduction, Derived Classes, Advantages and Types of Inheritance, Member Accessibility. Overriding, Super, Abstract classes and Methods, Final Classes and Final Methods, Polymorphism, Dynamic Binding.

Interfaces: Differences between classes and interfaces, defining an interface, implementing interface, variables in interface, extending interfaces

UNIT - III

Packaging and Java API Packages: Defining, Creating and Accessing a Package, importing packages, access controls (public, protected, default, and private). Wrapper Classes and Auto Boxing, I/O classes

UNIT - IV

Exception handling and Multithreading: Concepts of exception handling, benefits of exception handling, usage of try, catch, throw, throws and finally, built in exceptions, creating own exception.

Threads: Thread life cycle, creating threads, synchronizing threads

UNIT – V

Graphical User Interaction Graphical User Interaction: Swings- Introduction, limitations of AWT, components, containers, exploring swing-Frame and Component, Icons and Labels, text fields.
Layout managers– border, grid

Event Handling: Events, Event Delegation Model, Event classes, Listeners, handling mouse and keyboard Events

TEXTBOOKS:

1. Java Fundamentals, A Comprehensive Introduction, Herbert Schildt, 2014, McGraw-Hill.

REFERENCE BOOKS:

1. Introduction to Java Programming 7/e, Brief version, Y.Daniel Liang, Pearson
2. Java: The complete reference, 7/e, Herbert Scheldt, TMH.
3. Java How to Program, 7/E: Paul Deitel, Deitel & Associates, Inc.

TEEGALA KRISHNA REDDY ENGINEERING COLLEGE

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

(20CS3PC03) DATA STRUCTURES

Prerequisites: A course on "Programming for Problem Solving".

Course Objectives:

1. Introduce Analysis of Algorithm in terms of space and time complexity, exploring basic data structures such as stacks and queues.
2. Introduces a variety of data structures such as hash tables, search trees, tries, heaps, graphs.
3. Introduces sorting and Pattern matching algorithms.

Course outcomes: The Student will be able to

1. Choose appropriate data structures to represent data items in real world problems with linear data structures.
2. Apply dictionaries and hash tables to overcome problems of sequential data structures.
3. Develop the programs using trees for nonlinear data structures.
4. Measure the computational efficiency of the principal algorithms for sorting and searching.
5. Implement the graph traversal methods in nonlinear data structures.

UNIT - I

Introduction to Data Structures, Abstract Data types, Analysis of Algorithms-Big Oh and Theta Notations, Stacks using arrays, Queues using arrays, Linear list – singly linked list implementation, insertion, deletion and searching operations on linear list, linked representations of stacks, stack applications, linked representations of Queues.

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, and rehashing, extendible hashing.

UNIT - III

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

UNIT - IV

Sorting: Heap Sort, Internal Sorting- Bubble sort, Selection Sort and Insertion Sort, External Sorting-Model for external sorting, Merge Sort. **Searching**: Linear Search and Binary Search.

UNIT – V

Graphs – Introduction, Definition, Terminology, Graph ADT, Graph Representations- Adjacency matrix, Adjacency lists, Graph traversals- Depth First Search and Breadth First Search.

TEXTBOOKS:

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.

REFERENCE BOOKS:

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

TEEGALA KRISHNA REDDY ENGINEERING COLLEGE

II Year B.Tech. CSG-I Sem

L	T	P	C
3	0	0	3

(20CS3ES08) ANALOG AND DIGITAL ELECTRONICS

Course Objectives:

1. To introduce components such as diodes, BJTs and FETs.
2. To know the applications of components.
3. To give understanding of various types of amplifier circuits
4. To learn basic techniques for the design of digital circuits and fundamental concepts used in the design of digital systems.
5. To understand the concepts of combinational logic circuits and sequential circuits

Course outcomes: Upon completion of the Course, the students will be able to:

1. Identify the characteristics of various components and its utilization.
2. Compile the Construction, Operation and Characteristics of BJT, FET.
3. Make use of Boolean algebra Postulates to minimize combinational functions
4. Design and analyze combinational and sequential circuits
5. Categorize the logic families and realization of logic gates.

UNIT - I

Diodes and Applications: Junction diode characteristics: Open circuited p-n junction, p-n junction as a rectifier, V-I characteristics, effect of temperature, diode resistance, diffusion capacitance, diode switching times, breakdown diodes, Tunnel diodes, photo diode, LED. Diode Applications - clipping circuits, comparators, Half wave rectifier, Full wave rectifier, rectifier with capacitor filter.

UNIT - II

BJTs: Transistor characteristics: The junction transistor, transistor as an amplifier, CB, CE, CC configurations, comparison of transistor configurations. FETs: JFET, V-I characteristics, MOSFET, low frequency CS and CD amplifiers, CS and CD amplifiers.

UNIT - III

Digital Circuits: Digital (binary) operations of a system, OR gate, AND gate, NOT, EXCLUSIVE OR gate, De Morgan Laws, NAND and NOR DTL gates, modified DTL gates, HTL and TTL gates, output stages, RTL and DCTL, CMOS, Comparison of logic families.

UNIT - IV

Combinational Logic Circuits: Basic Theorems and Properties of Boolean Algebra, Canonical and Standard Forms, Digital Logic Gates, The Map Method, Product-of-Sums Simplification, Don't-Care Conditions, NAND and NOR Implementation, Exclusive-OR Function, Binary Adder-Subtractor, Decimal Adder, Binary Multiplier, Magnitude Comparator, Decoders, Encoders, Multiplexers.

UNIT – V

Sequential Logic Circuits: Sequential Circuits, Storage Elements: Latches and flip flops, Analysis of Clocked Sequential Circuits, State Reduction and Assignment, Shift Registers, Ripple Counters, Synchronous Counters, Random-Access Memory, Read-Only Memory.

TEXTBOOKS:

1. Electronic Devices and Circuits- Jacob Millman, McGraw Hill Education
2. Integrated Electronics: Analog and Digital Circuits and Systems, 2/e, Jaccob Millman, Christos Halkias and Chethan D. Parikh, Tata McGraw-Hill Education, India, 2010.
3. Switching and Finite Automata Theory - Zvi Kohavi & Niraj K. Jha, 3rd. Edition, Cambridge, 2010.

REFERENCE BOOKS:

1. Electronic Devices and Circuits theory– Robert L. Boylestead, Louis Nashelsky, 11th

Edition, 2009, Pearson.

2. Digital Design- Morris Mano, PHI, 4th Edition,2006
3. Introduction to Switching Theory and Logic Design – Fredriac J. Hill, Gerald R.Peterson, 3rd Ed, John Wiley & Sons Inc.

TEEGALA KRISHNA REDDY ENGINEERING COLLEGE

II Year B.Tech. CSG-I Sem

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(20CS3PC04) IT WORKSHOP LAB

Course Objectives: The IT Workshop for engineers is a training lab course spread over 60 hours. The modules include training on PC Hardware, Internet & World Wide Web and Productivity tools including Word, Excel, Power Point and Publisher.

Course outcomes:

1. Gain the knowledge of computer hardware.
2. Install the system software in the specified hardware.
3. Build the computer by assemble different parts and make sure of troubleshoots.
4. Make use of the Web browsers, email and news groups.
5. Craft professional word documents; excel spread sheet and power point presentations.

PC Hardware introduces the students to a personal computer and its basic peripherals, the process of assembling a personal computer, installation of system software like MS Windows, Linux and the required device drivers. In addition, hardware and software level troubleshooting process, tips and tricks would be covered. **The students should work on working PC to disassemble and assemble to working condition and install Windows and Linux on the same PC. Students are suggested to work similar tasks in the laptop scenario wherever possible. Internet & World Wide Web** module introduces the different ways of hooking the PC on to the internet from home and workplace and effectively usage of the internet. Usage of web browsers, email, newsgroups and discussion forums would be covered. In addition, awareness of cyber hygiene, i.e., protecting the personal computer from getting infected with the viruses, worms and other cyber-attacks would be introduced. Productivity tools module would enable the students in crafting professional word documents, excel spread sheets, power point presentations and personal web sites using the Microsoft suite of office tools and LaTeX

PC Hardware

Task 1: Identify the peripherals of a computer, components in a CPU and its functions. Draw the block diagram of the CPU along with the configuration of each peripheral and submit to your instructor.

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.

Task 5: Hardware Troubleshooting: Students have to be given a PC which does not boot due to improper assembly or defective peripherals. They should identify the problem and fix it to get the computer back to working condition. The work done should be verified by the instructor and followed up with a Viva.

Task 6: Software Troubleshooting: Students have to be given a malfunctioning CPU due to system software problems. They should identify the problem and fix it to get the computer back to working condition. The work done should be verified by the instructor and followed 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 are no internet connectivity preparations need to be made by the instructors to simulate the WWW on the LAN.

Task 2: 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 first install an antivirus software, configure their personal firewall and windows update on their computer. Then they need to customize their browsers to block pop ups, block active x downloads to avoid viruses and/or worms.

LaTeX and WORD

Task 1 – Word Orientation: The mentor needs to give an overview of LaTeX and Microsoft (MS) office 2007/ equivalent (FOSS) tool word: Importance of LaTeX and MS office 2007/ 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 project certificate. Features to be covered: - Formatting Fonts in word, Drop Cap in 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 2007/ 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.

Task 1: 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, St. Deviation, Charts, Renaming and Inserting worksheets, Hyper linking, Count function, LOOKUP/VLOOKUP

Task 3: Performance Analysis - Features to be covered: - Split cells, freeze panes, group and outline, Sorting, Boolean and logical operators, Conditional formatting LaTeX and MS/equivalent (FOSS)

Tool Power Point

Task 1: Students will be working on basic power point utilities and tools which help them create basic

power point presentation. Topic covered during this week includes: - PPT Orientation, Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Auto Shapes, Lines and Arrows in both LaTeX and PowerPoint. Students will be given model power point presentation which needs to be replicated (exactly how it's asked).

Task 2: Second week helps students in making their presentations interactive. Topic covered during this

week includes: Hyperlinks, Inserting –Images, Clip Art, Audio, Video, Objects, Tables and Charts.

Task 3: Concentrating on the in and out of Microsoft power point and presentations in LaTeX. Helps them learn best practices in designing and preparing power point presentation. Topic covered during this week includes: - Master Layouts (slide, template, and notes), Types of views (basic, presentation, slide slotter, notes etc.), and Inserting – Background, textures, Design Templates, Hidden slides.

REFERENCE BOOKS:

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

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II Year B.Tech. CSG-I Sem

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(20CS3PC05) DATA STRUCTURES LAB

Prerequisites: A course on "Programming for Problem Solving".

Course Objectives:

1. Introduce Analysis of Algorithm in terms of space and time complexity, exploring basic data It covers various concepts of Java programming language
2. It introduces searching and sorting algorithms
3. It provides an understanding of data structures such as stacks and queues, Hashing Techniques.
4. It provides and understanding of Tree, Graph Data Structures and also pattern matching algorithms.

Course outcomes:

1. Design an algorithm along with the complexity for a given problem.
2. Able to implement the stack, queues using static and dynamic data structures.
3. Develop the programs to perform different operations on linked list.
4. Make use of different tree traversal techniques for nonlinear data structures.
5. Develop programs for searching and sorting techniques by different methods.

List of Experiments:

1. Write a program that implement Stack (its operations) using Arrays.
2. Write a program that implement Queues (its operations) using Arrays.
3. Write a program that uses functions to perform the following operations on singly linked list:
   i). Creation ii) Insertion iii) Deletion iv) Traversal
4. Write a program that implements Stack (its operations) using Linked List.
5. Write a program that implement Queues (its operations) using Linked List.
6. Write a program that uses functions to perform the following operations on doubly linked list.
   i). Creation ii) Insertion iii) Deletion iv) Traversal
7. Write a program that uses functions to perform the following operations on circular linked list:
   i). Creation ii) Insertion iii) Deletion iv) Traversal
8. Write a program that uses functions to perform the following:
   a). Create a binary search tree of integers.
   b). Traverse the above Binary search tree non recursively in
   i) in order ii) preorder iii) post order.
9. Write a program that uses functions to perform the following operations on AVL trees:
   i). Rotation ii) Insertion iii) Deletion.
10. Write a program that implements the following sorting methods to sort a given list of integers in ascending order
    i). Bubble sort ii) Selection sort iii) Insertion sort.
11. Write a program that implements the following sorting methods to sort a given list of integers in ascending order
    i)Merge Sort ii) Heap sort.
12. Write a program that use both recursive and non-recursive functions to perform the following searching operations for a key value in a given list of integers:
    i). Linear search ii) Binary search
13. Write a program to implement the graph traversal methods.

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.

REFERENCE BOOKS:

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

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(20CD3PC02) OBJECT ORIENTED PROGRAMMING USING JAVA LAB

Course Objectives:

1. To write programs using abstract classes.
2. To write programs for solving real world problems using java collection frame work.
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. Write programs for given real world problems using 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

List of Experiments:

1. Use Eclipse or Net bean platform and acquaint 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 random integer every 1 second and if the value is even, second thread computes the square of the number and prints. If the value is odd, the third thread will print the value of 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 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.
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.

14 Write a Java program that implements Quick sort algorithm for sorting a list of names in ascending order.

15. Write a Java program that implements Bubble sort algorithm for sorting in descending order and also shows the number of interchanges occurred for the given set of integers.

REFERENCE BOOKS:

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.

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I I Year B.Tech. CSG-I Sem

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(20MC3HS01) PROFESSIONAL ENGINEERING AND ETHICS

Course Objectives:

1. To enable the students to imbibe and internalize the Values and Ethical Behavior in the personal and Professional lives.

Course outcomes:

1. To gain the knowledge on different codes of ethics, such as personal & professional, accountability, controllability, governability, life skills and consequentialism.
2. To perceive moral values in different fields in different ways.
3. To follow value-based education system by learning different techniques.
4. To asses workplace responsibilities by following different case studies.
5. To realize the work place responsibilities, honesty, integrity, and promise-keeping & trustworthiness, loyalty, fairness.

UNIT – I

Introduction to Professional Ethics: Basic Concepts, Governing Ethics, Personal & Professional Ethics, Ethical Dilemmas, Life Skills, Emotional Intelligence, Thoughts of Ethics, Value Education, Dimensions of Ethics, Profession and professionalism, Professional Associations, Professional Risks, Professional Accountabilities, Professional Success, Ethics and Profession.

UNIT – II

Basic Theories: Basic Ethical Principles, Moral Developments, Deontology, Utilitarianism, Virtue Theory, Rights Theory, Casuist Theory, Moral Absolution, Moral Rationalism, Moral Pluralism, Ethical Egoism, Feminist Consequentialism, Moral Issues, Moral Dilemmas, Moral Autonomy.

UNIT – III

Professional Practices in Engineering: Professions and Norms of Professional Conduct, Norms of Professional Conduct vs. Profession; Responsibilities, Obligations and Moral Values in Professional Ethics, Professional codes of ethics, the limits of predictability and responsibilities of the engineering profession. Central Responsibilities of Engineers - The Centrality of Responsibilities of Professional Ethics; lessons from 1979 American Airlines DC- 10 Crash and Kansas City Hyatt Regency Walk Away Collapse.

UNIT – IV

Work Place Rights & Responsibilities: Ethics in changing domains of Research, Engineers and Managers; Organizational Complaint Procedure, difference of Professional Judgment within the Nuclear Regulatory Commission (NRC), the Hanford Nuclear Reservation. Ethics in changing domains of research - The US government wide definition of research misconduct, research misconduct distinguished from mistakes and errors, recent history of attention to research misconduct, the emerging emphasis on understanding and fostering responsible conduct, responsible authorship, reviewing & editing.

UNIT – V

Global issues in Professional Ethics: Introduction – Current Scenario, Technology Globalization of MNCs, International Trade, World Summits, Issues, Business Ethics and Corporate Governance, Sustainable Development Ecosystem, Energy Concerns, Ozone Deflection, Pollution, Ethics in Manufacturing and Marketing, Media Ethics; War Ethics; Bio Ethics, Intellectual Property Rights.

TEXT BOOKS:

1. Professional Ethics: R. Subramanian, Oxford University Press, 2015.
2. Ethics in Engineering Practice & Research, Caroline Whitbeck, 2e, Cambridge University Press 2015.

REFERENCE BOOKS:

1. Engineering Ethics, Concepts Cases: Charles E Harris Jr., Michael S Pritchard, Michael J Rabins, 4e, Cengage learning, 2015.
2. Business Ethics concepts & Cases: Manuel G Velasquez, 6e, PHI, 2008.

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I I Year B.Tech. CSG-I Sem	**L**	**T**	**P**	**C**
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(20MC3BS02) QUANTITATIVE ANALYSIS-I

Course Objectives: The Students learn

1. To improve the problem-solving skills.
2. To enhance the employability skills among students to meet out the corporate expectations.
3. To enhance the student's interest towards industry expectations.
4. To prepare students for the campus recruitment program.
5. To produce the most competitive man power to fit in all scenario of the job market.

Course outcomes:

1. To Understand and Practice Simplifications.
2. To Understand and Practice the Problems on Ages.
3. To Understand and Practice the Quadratic Equations.
4. To Understand and Practice arrangement and selection in their daily life.
5. To Understand and Practice commercial mathematics.

UNIT – I

Numbers, H.C.F & L.C.M. of Numbers, Decimal Fractions & Simplifications.

UNIT – II

Square Roots & Cube Roots, Problems on Ages, Pipes & Cistern.

UNIT – III

Average, Time & Distance, Time & Work, Logarithm, Set Theory, Progressions, Quadratic Equations and Surds.

UNIT – IV

Permutation & Combination, Probability, Co-ordinate Geometry, Inequalities, Functions, Alligation & Mixtures, Number System.

UNIT – V

Partnership, Profit & Loss, Simple & Compound Interest, Percentage, Ratio & Proportion, Mensuration 2D & 3D.

TEXT BOOKS:

1. R.S. Aggarwal, Quantitative Aptitude for Competitive Examinations.
2. R.S. Aggarwal, A Modern Approach to Logical Reasoning.

REFERENCE BOOKS:

1. Arun Sharma, Teach Yourself Quantitative Aptitude.
2. Rajesh Verma, Fast Track Objective Arithmetic.
3. Dinesh Khattar, The Pearson Guide to Quantitative Aptitude for Competitive Examination.
4. Abhijit Gupta, Quantitative Aptitude for all Competitive Exam

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II Year B.Tech. CSG-II Sem

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(20MA4PC07) DISCRETE MATHEMATICS

Course Objectives: The Students learn

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

Course outcomes: learning the contents of this paper the students must able to.

1 Construct precise mathematical proofs.
2. Predict logic and set theory to formulate precise statements.
3. Apply the concept of group theory in given Algebraic System.
4. Calculate linear recurrence relations using advanced counting techniques.
5. Explain graph theory in solving computing problems.

UNIT – I

The Foundations: Logic and Proofs: Propositional Logic, Applications of Propositional Logic, Propositional Equivalence, Predicates and Quantifiers, Nested Quantifiers, Rules of Inference, Introduction to Proofs, Proof Methods and Strategy.

UNIT – II

Basic Structures: Sets, Functions, Sequences, Sums, Matrices and Relations Sets, Functions, Sequences & Summations, Cardinality of Sets and Matrices Relations, Relations and Their Properties, n-ary Relations and Their Applications, Representing Relations, Closures of Relations, Equivalence Relations, Partial Orderings

UNIT – III

Algebraic Structures: Algebraic Systems-Semi groups And Monoids –Groups-Sub Groups-Homomorphism's-Normal Subgroups-Cosets-Lagrange's Theorem-Definition's and Examples of Rings and Fields.

UNIT – IV

Discrete Probability and Advanced Counting Techniques: An Introduction to Discrete Probability, Probability Theory, Baye's Theorem, Expected Value and Variance Advanced Counting Techniques: Recurrence Relations, Solving Linear Recurrence Relations, Divide-and-Conquer Algorithms and Recurrence Relations, Generating Functions, Inclusion Exclusion, Applications of Inclusion-Exclusion.

UNIT – V

Graphs: Graphs and Graph Models, Graph Terminology and Special Types of Graphs, Representing Graphs and Graph Isomorphism, Connectivity, Euler and Hamilton Paths, Shortest-Path Problems, Planar Graphs, Graph Coloring. Trees: Introduction to Trees, Applications of Trees, Tree Traversal, Spanning Trees, Minimum Spanning Tree.

TEXT BOOKS:

1. Discrete Mathematics and its Applications with Combinatorics and Graph Theory - Kenneth H Rosen, 7th Edition, TMH.

REFERENCE BOOKS:

1. Discrete Mathematical Structures with Applications to Computer Science -J.P. Tremblay and R.Manohar, TMH,
2. Discrete Mathematics for Computer Scientists & Mathematicians: Joe L. Mott, Abraham Kandel, Teodore P. Baker, 2nd ed, Pearson Education.

3. Discrete Mathematics- Richard Johnsonbaugh, 7Th Edn., Pearson Education.

4. Discrete Mathematics with Graph Theory- Edgar G. Goodaire, Michael M. Parmenter.
5. Discrete and Combinatorial Mathematics - an applied introduction: Ralph.P.Grimald, 5th edition, Pearson Education

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II Year B.Tech. CSG-II Sem	**L**	**T**	**P**	**C**
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(20MS4HS03) BUSINESS ECONOMICS AND 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: learning the contents of this paper the students must able to.

1. Identify the various forms of business and its impact on economic variables.
2. To realize the demand fluctuations and factors influencing the demand.
3. To analyze different market structures, pricing strategies and forms of business organization.
4. To study the firms, financial position and the financial statements of a company.
5. To evaluate different types of financial ratios for knowing liquidity and profitability positions of business concern.

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 in 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 & 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, 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, and Preparation of Final Accounts.

UNIT – V

Financial Analysis through Ratios: Concept of Ratio Analysis, Liquidity Ratios, Turnover Ratios, Profitability Ratios, Proprietary Ratios, Solvency, Leverage Ratios (simple problems). Introduction to Fund Flow and Cash Flow Analysis (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 McGraw Hill, 2011.
3. Geethika Ghosh, Piyali Gosh, Purba Roy Choudhury, Managerial Economics, 2e, Tata McGraw Hill Education Pvt. Ltd. 2012

REFERENCE BOOKS:

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.

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II Year B.Tech. CSG-II Sem

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(20CS4PC09) OPERATING SYSTEMS

Prerequisites: A course on "Computer Programming and Data Structures".
A course on "Computer Organization and Architecture".

Course Objectives:

1. Provide an introduction to operating system concepts (i.e., processes, threads, scheduling, synchronization, deadlocks, memory management, file and I/O subsystems 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: The Student will be able to

1. Demonstrate the fundamental components of a computer operating system.
2. Identify appropriate scheduling algorithm for process management.
3. Solve the situations occurred by deadlock to maintain appropriate process synchronization.
4. Make use of page replacement algorithm for effective memory management.
5. Apply the various system calls to enable the operating system services.

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.

UNIT – II

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

System call interface for process management-fork, exit, wait, waitpid, and exec.

UNIT – III

Deadlocks - System Model, Deadlocks Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, and Recovery from Deadlock **Process Management and Synchronization** - The Critical Section Problem, Synchronization Hardware, Semaphores, and Classical Problems of Synchronization, Critical Regions, Monitors.

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

UNIT – IV

Memory Management and Virtual Memory - Logical versus Physical Address Space, Swapping, Contiguous Allocation, Paging, Segmentation, Segmentation with Paging, Demand Paging, Page Fault, 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, sleek, stat, IOCtl system calls, System Protection-Goals.

TEXT BOOKS:

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

REFERENCE BOOKS:

1. Operating Systems – Internals and Design Principles 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. CSG-II Sem

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(20CD4PC03) SOFTWARE ENGINEERING

Course Objectives:

1. 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
2. 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 be able to

1. Make use of the basic software engineering methods and process models.
2. Identify the different requirements, requirement engineering process and system models.
3. Analyze the software architectural styles, conceptual model of UML diagrams for software developing life cycle.
4. Choose different testing strategies and product metrics to verify the software quality.
5. Apply the various approaches in risk management and quality management for the software quality assurance

UNIT – I

Introduction to Software Engineering: The evolving role of software, changing nature of software, software myths. **A Generic view of process:** Software engineering- a layered technology, a process framework, the Capability Maturity Model Integration (CMMI), process patterns, process assessment, personal and team process models**. Process models:** The waterfall model, incremental process models, evolutionary process models, the unified process.

UNIT – II

Software Requirements: Functional and non-functional requirements, user requirements, system requirements, interface specification, the software requirements document**. Requirements engineering process:** Feasibility studies, requirements elicitation and analysis, requirements validation, requirements management**. System models:** Context models, behavioral models, data models, object models, structured methods.

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, 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. **Product metrics:** Software quality, metrics for analysis model, metrics for design model, metrics for source code, metrics for testing, metrics for maintenance.
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, RMMM plan. **Quality Management:** Quality concepts, software quality assurance, software reviews, formal technical reviews, statistical software quality assurance, software reliability, the ISO 9000 quality standards.

TEXT BOOKS:

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

REFERENCE BOOKS:

1. Software Engineering, an Engineering approach- James F. Peters, Witold Pedrycz, John Wiley.
2. Software Engineering principles and practice- Waman S Jawadekar, The Mc Graw-Hill Companies.
3. Fundamentals of object-oriented design using UML Meiler page-Jones: Pearson Education.

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II Year B.Tech. CSG-II Sem	**L**	**T**	**P**	**C**
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(20CS4PC10) DATABASE MANAGEMENT SYSTEMS

Course Objectives:

1. To learn the basic database concepts, applications and data models
2. To understand ER model and Relational models
3. To learn Relational algebra and calculus operations
4. To master the basics of SQL and write queries using SQL.
5. To learn transaction control, concurrency control, storage structures and access techniques

Course outcomes: The Student will be able to

1. Build the appropriate ER Model for the given problem.
2. Illustrate the concepts of Relational Model, Algebra and Calculus.
3. Apply the concepts of Normalization for the consistent database.
4. Write the proper SQL queries to access the database.
5. Apply the concurrency control protocol to maintain the ACID properties while designing the database.
6. Apply the proper indexing techniques for accessing the data.

UNIT – I

INTRODUCTION: A Historical Perspective, File Systems versus a DBMS, the Data Model, Levels of Abstraction in a DBMS, Data Independence, Structure of a DBMS.

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

THE RELATIONAL MODEL: Introduction to the relational model, Integrity constraint over relations, enforcing integrity constraints, querying relational data, logical data base design, introduction to views, destroying/altering tables and views.

RELATIONAL ALGEBRA AND CALCULUS: 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 data bases.

SCHEMA REFINEMENT AND NORMAL FORMS: Introduction to schema refinement, functional dependencies, 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 MANAGEMENT: Transaction Concept, Transaction State, Implementation of Atomicity and Durability, Concurrent Executions, Serializability, Recoverability, Implementation of Isolation, Testing for serializability.

CONCURRENCY CONTROL AND RECOVERY SYSTEM: Lock Based Protocols, Timestamp Based Protocols, Validation- Based Protocols, Multiple Granularity, Recovery and Atomicity, Log–Based Recovery, Recovery with Concurrent Transactions.

UNIT – V

OVERVIEW OF STORAGE AND INDEXING: Data on External Storage, File Organization and Indexing, Cluster Indexes, Primary and Secondary Indexes, Index data Structures, Hash Based

Indexing, Tree base Indexing, Comparison of File Organizations, Indexes and Performance Tuning.

TREE STRUCTURED INDEXING: Intuitions for tree Indexes, Indexed Sequential Access Methods (ISAM), B+ Trees: A Dynamic Index Structure.

TEXT BOOKS:

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

REFERENCE BOOKS:

1. Database Systems design, Implementation, and Management, Peter Rob & Carlos Coronel 7th Edition.
2. Fundamentals of Database Systems, Elmasri Navrate, Pearson Education
3. 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.

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II Year B.Tech. CSG-II Sem	**L**	**T**	**P**	**C**
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(20CS4PC11) 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. Implement programs based on operating system concept of scheduling.
2. Develop a program based on operating system concept of deadlock management.
3. Simulate the concept to implement programs based on operating system concept of file management.
4. Apply the concept of memory management for implementing a program.
5. Implement C programs using UNIX system calls.

List of Experiments:

1. Write C programs to simulate the following CPU Scheduling algorithms
2. a) FCFS b) SJF c) Round Robin d) priority
3. Write programs using the I/O system calls of UNIX/LINUX operating system (open, read, write, close, fcntl, seek, stat, open Dir, readdir)
4. Write a C program to simulate Bankers Algorithm for Deadlock Avoidance and Prevention.
5. Write a C program to implement the Producer – Consumer problem using semaphores using UNIX/LINUX system calls.
6. Write C programs to illustrate the following IPC mechanisms

   a) Pipes b) FIFOs c) Message Queues d) Shared Memory
7. Write C programs to simulate the following memory management techniques
8. a) Paging b) Segmentation.

TEXT BOOKS:

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

REFERENCE BOOKS:

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

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II Year B.Tech. CSG-II Sem

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(20CD4PC04) SOFTWARE ENGINEERING LAB

Prerequisites:

A course on "Programming for Problem Solving"

Course Objectives:

1. To have hands on experience in developing a software project by using various software engineering principles and methods in each of the phases of software development.

Course outcomes:

1. Ability to understand the problem statement and develop the software based on user requirement
2. Ability to generate a high-level design of the system using different tools
3. Will have experience and/or awareness of testing problems and will be able to develop a simple testing report.

List of Experiments:

Do the following 7 exercises for any two projects given in the list of sample projects or any other projects:

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

Sample Projects:

1. Passport automation System Book Bank
2. Online Exam Registration Stock Maintenance System
3. Online course reservation system E-ticketing
4. Software Personnel Management System Credit Card Processing
5. E-book management System. Recruitment system

TEXT BOOKS:

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

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II Year B.Tech. CSG-II Sem	**L**	**T**	**P**	**C**
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(20CS4PC13) Database Management Systems Lab

Course Objectives:

1. Introduce ER data model, database design and normalization
2. Learn SQL basics for data definition and data manipulation
3. Learn triggers, concurrency control mechanisms

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.

List of Experiments:

1. Concept design with E-R Model (Draw ER diagrams which includes key constraints and participation constraints also)
2. Relational Model (Convert ER model to Relational model)
3. Normalization
4. Practicing DDL commands: Creating tables along with primary key and foreign key. Altering tables, Dropping tables.
5. Practicing DML commands: Practicing insert, select, update and delete commands.
6. Practicing queries using ANY, ALL, IN, EXISTS, NOT EXISTS, UNION, INTERSECT, Constraints etc.
7. Practicing queries using Aggregate functions (COUNT, SUM, AVG, MIN, MAX), GROUP BY, HAVING and Creation and dropping of Views.
8. Triggers: Creation of trigger, insert trigger, delete trigger, update trigger.
9. Procedures: Creation procedures, executing procedures and modification of procedures.
10. Usage of Cursors.

TEXT BOOKS:

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

REFERENCE BOOKS:

1. Database Systems design, Implementation, and Management, Peter Rob & Carlos Corone 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 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.

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II Year B.Tech. CSG-II Sem

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(20MC4HS03) 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.

Course Objectives:

1. To develop students' sensibility with regard to issues of gender in contemporary India.
2. To provide a critical perspective on the socialization of men and women.
3. To introduce students to information about some key biological aspects of genders.
4. To expose the students to debates on the politics and economics of work.
5. To help students reflect critically on gender violence.
6. To expose students to more egalitarian interactions between men and women.

Course 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.
4. Students will acquire insight into the gendered division of labour and its relation to politics and economics.
5. Men and women students and professionals will be better equipped to work and live together as equals.
6. Students will develop a sense of appreciation of women in all walks of life.
7. 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

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 OutIs 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.

TEXT BOOKS: "Towards a World of Equals: A Bilingual Textbook on Gender" written by A. Suneetha, Uma Bhrugubanda, Duggirala Vasanta, Rama Melkote, Vasudha Nagaraj, Asma Rasheed, Gogu Shyamala, Deepa Sreenivas and Susie Tharu published by Telugu Academy, Telangana Government in 2015.

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II Year B.Tech. CSG-II Sem	**L**	**T**	**P**	**C**
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(20MC4BS03) Quantitative Logical and Reasoning

Course Objectives: To learn

1. To improve the Logical Ability and Reasoning skills among the students to meet the expectations of Industry.
2. To counsel the students to improve their career exposure across the industry
3. To improve the Data Sequences & Calendars problems.
4. To enhance Non-Verbal Reasoning among the students as per the industry requirements
5. To improve the graphical representation skills among the students.

Course outcomes: The Students able

1. To understand and practice logical reasoning
2. To understand and practice the different classifications
3. To understand and practice different Sitting Arrangements, Data Sequences.
4. To understand and practice the Non-Verbal Reasoning.
5. To understand and practice the graphs.

UNIT – I

Coding Decoding, Directions, Blood Relations & Alphabet Test

UNIT – II

Statements & Arguments, Analogy Classification & Clocks.

UNIT – III

Sitting Arrangements, Data Sequences & Calendars and Syllogism

UNIT – IV

Puzzle Test, Non-Verbal Reasoning, Cubs & Dice.

UNIT – V

Tabulation, Bar Graphs, Pie Charts and Line Graphs.

TEXT BOOKS:

1. R.S. Aggarwal, A Modern Approach to Logical Reasoning.
2. R.S. Aggarwal, A Modern Approach to Verbal & Non-Verbal Reasoning.

REFERENCE BOOKS:

1. R.V.Praveen, Quantitative Aptitude and Reasoning.
2. Praxis groups, Campus Recruitment Complete Reference.
3. BS Sijwalii & Indu Sijwali, A New Approach to Reasoning Verbal, Non-Verbal & Analytical

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III Year B.Tech. CSG-I Sem

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3	0	0	3

(20CS5PC14) Formal Languages & Automata Theory

Course Objectives:

1. To provide introduction to some of the central ideas of theoretical computer science from the perspective of formal languages.
2. To introduce the fundamental concepts of formal languages, grammars and automata theory.
3. Classify machines by their power to recognize languages.
4. Employ finite state machines to solve problems in computing.
5. To understand deterministic and non-deterministic machines.
6. To understand the differences between decidability and undesirability.

Course outcomes: The student will be able to

1. Make use of the concept of automata and to recognize the appropriate languages.
2. Model finite state machine for the given regular expression and languages.
3. Construct context free grammars for any given formal languages.
4. Construct Turing machine for the given grammar.
5. Distinguish between decidability and undesirability

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 a DFA Process Strings, The language of DFA, Conversion of NFA with €-transitions to NFA without €-transitions. Conversion of NFA to DFA, Moore and Melay machines, Conversions from Melay to Moore and Moore to 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 Tress, Applications of Context- Free Grammars, Ambiguity in Grammars and Languages. **Push Down Automata**: Definition of the Pushdown 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, and From PDA to CFG.

UNIT – IV

Normal Forms for Context- Free Grammars: Eliminating useless symbols, eliminating €-Productions, Eliminating unit productions, Chomsky Normal form Griebech Normal form, Conversion from Context Free Grammar to Chomsky Normal form (CNF) and Context Free Grammar to Griebech Normal form (GNF). **Pumping Lemma for Context-Free Languages**: Statement of pumping lemma, Applications. **Closure Properties of Context**-Free Languages: Closure properties of CFL's, Decision Properties of CFL's **Turing Machines**: Introduction to Turing Machine, Formal Description Instantaneous description, 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. Introduction to Automata Theory, Languages, and Computation, 3nd Edition, John E. Hopcroft, Rajeev Motwani, Jeffrey D. Ullman, Pearson Education.
2. Theory of Computer Science – Automata languages and computation, Mishra and Chandra shekaran, 2nd edition, PHI.

REFERENCE BOOKS:

1. Introduction to Languages and The Theory of Computation, John C Martin, TMH.
2. Introduction to Computer Theory, Daniel I.A. Cohen, John Wiley.
3. A Text book on Automata Theory, P. K. Srimani, Nasir S. 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

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III Year B.Tech. CSG-I Sem	**L**	**T**	**P**	**C**
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(20CD5PC05) SOFTWARE DESIGN & ARCHITECTURE

Course Objectives:

1. To understand the need, design approaches for software architecture to bridge the dynamic
2. requirements and implementation.
3. To learn the design principles and to apply for large scale systems.
4. To design architectures for distributed heterogeneous systems, environment through

Course outcomes: The student will be able to

1. Understand the need of software architecture for sustainable dynamic systems.
2. Identify a sound knowledge on design principles and to apply for large scale systems.
3. Ability to design architectures for distributed heterogeneous systems.
4. Develop a good knowledge on service oriented and model driven architectures.
5. Design a good knowledge on aspect-oriented architecture

UNIT – I

Introduction To Software Architecture: Bridging Requirements and Implementation, Design Guidelines, Software Quality attributes, Software Architecture Design Space, Agile Approach to Software
Architecture Design, Models for Software Architecture Description Languages (ADL).

UNIT – II

Object-Oriented Paradigm: Design Principles, Data-Centered Software Architecture, Repository Architecture, Blackboard Architecture. Hierarchical Architecture Main, Subroutine - Master-Slave, Layered, Virtual Machine - Interaction-Oriented Software Architectures: Model View Controller (MVC), Presentation Abstraction Control (PAC).

UNIT – III

Distributed Architecture: Client-Server, Middleware, Multi-tiers, Broker Architecture, MOM, CORBA, Message Broker Architecture, Service Oriented Architecture (SOA), SOAP, UDDI, SOA Implementation in Web Services - Grid/cloud Service Computing, Heterogeneous Architecture, Methodology of Architecture Decision, Quality Attributes.

UNIT – IV

Use Case and User Interface Patterns for Data Oriented Applications: Architecture of User Interfaces containers, case study, Web service, Product Line Architectures, methodologies, Processes and tools, Software Reuse and Product Lines, Product Line Analysis, Design and implementation, Configuration Models, Model Driven Architectures (MDA), Why MDA, Model transformation and software architecture,
SOA and MDA, Eclipse modeling framework**.**

UNIT – V

Aspect Oriented Architectures: Aspect Oriented Architectures, AOP in UML, AOP tools, Architectural aspects and middleware Selection of Architectures, Evaluation of Architecture Designs, Case Study, Online Computer Vendor, Order Processing, Manufacture & Shipping inventory, Supply Chain Cloud Service Management, Semantic Web Services.

TEXT BOOKS:

1. Ion Gorton, "Essentials of software Architecture", Second Edition, Springer- Verlag, 2011.
2. "Software Architecture Design Illuminated", Kai Qian Jones and Bartlett Publishers Canada, 2010.
3. Tanenbaum A.S., Van Steen M., "Distributed Systems: Principles and Paradigms", Pearson

Web References:

https:// Cosmo learning. org/ courses/ software- architecture- design/video-lectures/.

Online Resources:

https://nptel.ac.in/courses/106101061/

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III Year B.Tech. CSG-I Sem	**L**	**T**	**P**	**C**
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(20CS5PC16) Design and Analysis of Algorithms

Course Objectives:

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

Course outcomes: The student will be able to

1. Make use of divide and conquer methods for developing algorithms.
2. Apply the concept of backtracking to solve the optimization problems.
3. Solve the optimization problems using dynamic programming methodology.
4. Solve the optimization problem by using Greedy method.
5. Solve the optimization problem by using branch and bound method and NP-Hard and NP-Complete for the given example problems.

UNIT – I

Introduction: Algorithm, pseudo code for expressing algorithms, 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, Graph Traversals-Breadth first search and depth first search.

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

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, Matrix chain multiplication.

UNIT – IV

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

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 theory.

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

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III Year B.Tech. CSG-I Sem

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(20CS5PC17) Design and Analysis of Algorithms Lab

Course Objectives:

1. To write programs in C language to solve problems using Divide and Conquer problem solving method.
2. To write programs in C language to solve problems using Backtracking problem-solving technique.
3. To write programs in C language to solve problems suing Greedy Method.
4. To write programs in C language to solve problems using Dynamic Programming.

Course outcomes: The student will be able to

1. Write C programs using Divide & Conquer strategy (sorting algorithms)
2. Implement C program to solve the given problems using Backtracking (N-Queen's, sum of subset)
3. Develop C program using Greedy approach for job sequencing with deadlines, single source shortest path problems)
4. Implement C program to generate minimum cost spanning trees using Prims & Kruskals algorithm.
5. Design C program to implement 0/1 Knapsack & OBST using dynamic programming.

List of Experiments:

1. Write a C program to implement Quick sort algorithm for sorting a list of integers in ascending order
2. Write a C program to implement Merge sort algorithm for sorting a list of integers in ascending order.
3. Write a C program to implement the DFS algorithm for a graph.
4. Write a C program to implement the BFS algorithm for a graph.
5. Write a C program to implement Backtracking algorithm for the N-queens problem.
6. Write a C program to implement the Backtracking algorithm for the sum of subsets problem.
7. Write a C program to implement Greedy algorithm for job sequencing with deadlines.
8. Write a C program to implement Dijkstra's algorithm for the Single source shortest path problem.
9. Write a C program that implements Prim's algorithm to generate minimum cost spanning tree.
10. Write a C program that implements Kruskal's algorithm to generate minimum cost spanning tree
11. Write a C program to implement Floyd's algorithm for the all-pairs shortest path problem.
12. Write a C program to implement Dynamic Programming algorithm for the 0/1 Knapsack problem.
13. Write a C program to implement Dynamic Programming algorithm for the Optimal Binary Search Tree problem.

REFERENCE BOOKS:

1. Data structures, Algorithms and Applications in java, 2nd Edition, S. Sahani, Universities Press.
2. Data structures and Algorithms in java, 3rd edition, A. Drozdek, Cengage Learning.
3. Data structures with Java, J. R. Hubbard, 2nd edition, Schaum's Outlines, TMH.
4. Data structures and algorithms in Java, 2nd Edition, R. Lafore, Pearson Education.
5. Data Structures using Java, D. S. Malik and P.S. Nair, Cengage Learning.

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(20EN5HS04) Advanced Communication Skills Lab

Course Objectives: This Lab focuses on using multi-media instruction for language development to meet the following targets:

1. To improve the students' fluency in English, through a well-developed vocabulary and enable them to listen to English spoken at normal conversational speed by educated English speakers and respond appropriately in different socio-cultural and professional contexts.
2. Further, they would be required to communicate their ideas relevantly and coherently in writing.
3. To prepare all the students for their placements.

Course outcomes: The student will be able to

1. Develop LSRW skills and soft skills.
2. Demonstrate the nuances of language through group activities and oral presentations.
3. Build written communication skills to meet the needs of their academics and career endeavors.
4. Take part in interviews with confidence thereby enhancing their employability skills.
5. Choose appropriate language in their social and professional communication

UNIT – I

Activities on Fundamentals of Inter-personal Communication and Building Vocabulary - Starting a conversation – responding appropriately and relevantly – using the right body language – Role Play in different situations & Discourse Skills- using visuals - Synonyms and antonyms, word roots, one-word substitutes, prefixes and suffixes, study of word origin, business vocabulary, analogy, idioms and phrases, collocations & usage of vocabulary.

UNIT – II

General Vs Local comprehension, reading for facts, guessing meanings from context, scanning, skimming, inferring meaning, critical reading & effective googling

UNIT – III

Activities on Writing Skills – Subject-Verb Agreement (Concord), Structure and presentation of different types of writing – letter writing/Resume writing/ e-correspondence/Technical report writing/ – planning for writing – improving one's writing.

UNIT – IV

Oral presentations (individual and group) through JAM sessions/seminars/PPTs and written presentations through posters/projects/reports/ emails/assignments etc.

UNIT – V

Activities on Group Discussion and Interview Skills – Dynamics of group discussion, intervention, summarizing, modulation of voice, body language, relevance, fluency and organization of ideas and rubrics for evaluation- Concept and process, pre-interview planning, opening strategies, answering strategies, interview through tele-conference & video-conference and Mock Interviews.

REFERENCE BOOKS:

1. Kumar, Sanjay and PushpLata. English for Effective Communication, Oxford University Press, 2015.
2. Konar, Nira. English Language Laboratories – A Comprehensive Manual, PHI Learning Pvt. Ltd., 2011.

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(20MC5HS05) INTELLECTUAL PROPERTY RIGHTS

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 trademarks, acquisition of trade mark rights, protectable matter, selecting and evaluating trade mark, trade mark registration processes.

UNIT – III

Law of copy rights: Fundamental of copy right law, originality of material, rights of reproduction, rights to perform the work publicly, copy right ownership issues, copy right registration, notice of copy right, international copy right law. Law of patents: Foundation of patent law, patent searching process, ownership rights and transfer.

UNIT – IV

Trade Secrets: Trade secretes law, determination of trade secretes status, liability for misappropriations of trade secrets, and protection for submission, trade secretes litigation. Unfair competition: Misappropriation right of publicity, false advertising.

UNIT – V

New development of intellectual property: new developments in trade mark law; copy right law, patent law, intellectual property audits. International overview on intellectual property, international - trade mark law, copy right law, international patent law, and international development in trade secrets law.

TEXT & REFERENCE BOOKS:

1. Intellectual property right, Deborah. E. Bouchoux, Cengage learning.
2. Intellectual property right – Unleashing the knowledge economy, prabuddha ganguli, Tata McGraw Hill Publishing company ltd.

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(20MC5HS06) Personality Development & Soft Skills

Course Objectives:

1. Projecting the Right First Impression
2. Polishing manners to behave appropriately in social and professional circles
3. Enhancing the ability to handle casual and formal situations in terms of personal grooming, dining and entertaining etiquette
4. Developing and maintaining a positive attitude and being assertive
5. Mastering Cross Cultural Etiquette
6. Handling difficult situations with grace, style, and professionalism
7. To understand the importance of oral & written Communication Skills in Corporate Sector

Course outcomes:

1. Students will possess the personality development techniques and communication skills.
2. Students will possess knowledge about leadership.
3. Students will be able to acquire the skills to manage stress and conflict.
4. Students will able to acquire Problem Solving & Critical Thinking.
5. Students will able to acquire different resume preparation & Essay Writing Techniques.

UNIT – I

Personality Development Body Language: Professional and Casual attire, Public Speaking, Strengths & Weakness, Organizational Skills, Self-Assessment.

UNIT – II

Goal Setting: Time Management, Stress Management, Career Management, Confidence / Motivation, Tolerance of Change and Uncertainty.

UNIT – III

Soft Skills Grammar: Noun, Pronoun, Adjectives, Tenses, Verb, Subject + Verb, Agreement, Adverb, Preposition, Article, Conjunction. **Vocabulary**: Synonyms & Antonyms, Words often Confused & Misused **Verbal Ability**: Sentence Improvement, Reading Comprehension, Cloze Test, Sentence Rearrangements, Fill in the Blanks, Theme Detection Analogy.

UNIT – IV

Just A Minute (JAM), Group Discussion (GD), Debate, Role Play, Cognitive Skills, Leadership Qualities, Work Ethics, Problem Solving & Adaptability, Critical Thinking, Random Words, and Interview Skills: Tell me about yourself.

UNIT – V

Team Work, Self-Awareness and Presentation Skills, Resume Building: Normal Resume Preparation, Video Resume & Career Specific Resume, Email Etiquette, Essay Writing.

TEXT BOOKS:

1. Personality Development and Soft Skills - Barun K. Mitra.
2. Personality Development and Soft Skills: Preparing for Tomorrow - Shikha Kapoor.
3. Soft Skills Personality Development for Life Success – Prashanth Sharma.

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(20CD5PE11) ARTIFICIAL INTELLIGENCE
(Professional Elective - I)

Course Objectives:

1. To learn the distinction between optimal reasoning Vs. human like reasoning
2. To understand the concepts of state space representation, exhaustive search, heuristic search together with the time and space complexities.
3. To learn different knowledge representation techniques.
4. To understand the applications of AI, namely game playing, theorem proving, and machine learning.

Course outcomes:

1. Ability to formulate an efficient problem space for a problem expressed in natural language.
2. Select a search algorithm for a problem and estimate its time and space complexities.
3. Possess the skill for representing knowledge using the appropriate technique for a given problem.
4. Possess the ability to apply AI techniques to solve problems of game playing, and machine learning.
5. Ability to design Expert system.

UNIT – I

Problem Solving by Search-I: Introduction to AI, Intelligent Agents
Problem Solving by Search –II: 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: A* search, Heuristic Functions, Beyond Classical Search: Hill-climbing search, Simulated annealing search.

UNIT – II

Problem Solving by Search-II and Propositional Logic
Adversarial Search: Games, Optimal Decisions in Games, Alpha–Beta Pruning.
Constraint Satisfaction Problems: Defining Constraint Satisfaction Problems.
Propositional Logic: Knowledge-Based Agents, 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.
Knowledge Representation: Ontological Engineering, Categories and Objects, Events. Mental Events and Mental Objects, Reasoning Systems for Categories, Reasoning with Default Information.

UNIT – IV

Planning Classical Planning: Definition of Classical Planning, Algorithms for Planning with State-Space Search, Planning Graphs, other Classical Planning Approaches, Analysis of Planning approaches.
Planning and Acting in the Real World: Time, Schedules, and Resources, Hierarchical Planning, Planning and Acting in Nondeterministic Domains, Multi agent Planning.

UNIT – V

Uncertain knowledge and Learning
Uncertainty: Acting under Uncertainty, Basic Probability Notation, Inference Using Full Joint

Distributions, Independence, Bayes' Rule and Its Use,

Learning: Forms of Learning, Supervised Learning, Learning Decision Trees. Knowledge in Learning: Logical Formulation of Learning, Knowledge in Learning, Explanation-Based Learning, Learning Using Relevance Information, Inductive Logic Programming.

TEXT BOOKS:

1. Artificial Intelligence a Modern Approach, Third Edition, Stuart Russell and Peter Norvig, Pearson Education.
2. Artificial Intelligence by Saroj Koushik, IIT Delhi.

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.

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(20CD5PE12) ADVANCED COMPUTER ARCHITECTURE
(Professional Elective - I)

Course Objectives:

1. To impart the concepts and principles of parallel and advanced computer architectures.
2. To develop the design techniques of Scalable and multithreaded Architectures.
3. To Apply the concepts and techniques of parallel and advanced computer architectures to design modern.

Course outcomes: Gain knowledge of

1. Understand the concept of Computational models and Computer Architectures.
2. Concepts of parallel computer models.
3. Scalable Architectures, Pipelining, Super scalar processors, multiprocessors
4. Multisector & SIMD computers.
5. Multithreaded & Hybrid computers.

UNIT – I

Theory of Parallelism, Parallel computer models, The State of Computing, Multiprocessors and Multicomputer, Multisector 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

Principals 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, Memory Hierarchy Technology, Virtual Memory Technology.

UNIT – III

Bus Cache and Shared memory, Backplane bus systems, Cache Memory organizations, Shared-Memory Organizations, Sequential and weak consistency models, Pipelining and superscalar techniques, Linear Pipeline Processors, Non-Linear Pipeline Processors, Instruction Pipeline design, Arithmetic pipeline design, superscalar pipeline design.

UNIT – IV

Parallel and Scalable Architectures, Multiprocessors and Multi computers, Multiprocessor system interconnects, cache coherence and synchronization mechanism, Three Generations of Multicomputer, Message-passing Mechanisms, Multisector and SIMD computers, Vector Processing Principals, Multisector Multiprocessors, Compound Vector processing, SIMD computer Organizations, The connection machine CM5.

UNIT – V

Scalable, Multithreaded and Dataflow Architectures, Latency-hiding techniques, Principals of Multithreading, Fine-Grain Multi computers, Scalable and multithreaded Architectures, Dataflow and hybrid Architectures.

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, Special Indian edition, CRC, Taylor &

Francis.
3. Introduction to High Performance Computing for Scientists and Engineers,
4. G. Hager and G. Wellein, CRC Press, Taylor & Francis Group.
5. Advanced Computer Architecture, D. Sima, T. Fountain, P. Kacsuk, Pearson education.
6. Computer Architecture, B. Parhami, Oxford Univ. Press.

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(20CD5PE13) SERVICE ORIENTED ARCHITECTURE
(Professional Elective - I)

Course Objectives:

1. To learn fundamentals of XML.
2. To provide an overview of Service Oriented Architecture and Web services and their importance.
3. To learn web services standards and technologies.
4. To learn service-oriented analysis and design for developing SOA based applications.

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

1. Understand XML technologies.
2. Understand service orientation, benefits of SOA.
3. Understand web services and WS standards.
4. Use web services extensions to develop solutions.
5. Understand and apply service modeling, service-oriented analysis and design for application development.

UNIT – I

XML: document structure – Well-formed and valid documents – DTD – XML Schema – Parsing XML using, DOM, SAX – XPath – XML Transformation and XSL – Xquery.

UNIT – II

SERVICE ORIENTED ARCHITECTURE (SOA) BASICS: Characteristics of SOA, Benefits of SOA, Comparing SOA with Client-Server and Distributed architectures — Principles of Service Orientation – Service layers.

UNIT – III

WEB SERVICES (WS) AND STANDARDS: Web Services Platform – Service descriptions – WSDL –Messaging with SOAP – Service discovery – UDDI – Service-Level Interaction Patterns – Orchestration and Choreography.

UNIT – IV

WEB SERVICES EXTENSIONS: WS-Addressing – WS-Reliable Messaging – WS-Policy – WS-Coordination – WS -Transactions – WS-Security – Examples

UNIT – V

SERVICE ORIENTED ANALYSIS AND DESIGN: SOA delivery strategies – Service oriented analysis –Service Modelling – Service oriented design – Standards and composition guidelines — Service design –Business process design – Case Study.

TEXT BOOKS:

1. Thomas Erl, ― Service Oriented Architecture: Concepts, Technology, and Design, Pearson Education, 2005
2. Sandeep Chatterjee and James Webber, ―Developing Enterprise Web Services: An Architect's Guide, Prentice Hall, 2004

REFERENCE BOOKS:

1. James McGovern, Sameer Tyagi, Michael E Stevens, Sunil Mathew, ―Java Web Services Architecture,
2. Elsevier, 2003.
3. Ron Schmelzer et al. ― XML and Web Services, Pearson Education, 2002.
4. Frank P. Coyle, ―XML, Web Services and the Data Revolution, Pearson Education, 2002.

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(20CD5PE14) REQUIREMENT ENGINEERING
(Professional Elective - I)

Course Objectives:

1. Students will demonstrate knowledge of the distinction between critical and non- critical systems.
2. Students will demonstrate the ability to manage a project including planning, scheduling, and risk
3. assessment/management.
4. Students will author a software requirements document.
5. Students will demonstrate an understanding of the proper contents of a software requirement

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

1. Gain knowledge about software requirements.
2. Analyze requirement elicitation techniques and prototyping.
3. Gain knowledge about requirement management, their principles and practices.
4. Analyze use case modeling and different data diagrams.
5. Estimating the software in terms of size, cost, effort and schedule.

UNIT – I

Software Requirements: What and Why Essential Software requirement, good practices for requirements engineering, improving requirements processes, Software requirements and risk management Software Requirements Engineering Requirements elicitation, requirements analysis documentation, review, elicitation techniques, analysis models, Software quality attributes, risk reduction through prototyping, setting requirements priorities, verifying requirements quality.

UNIT – II

Software Requirements Management: Requirements management Principles and practices, Requirements attributes, Change Management Process, Requirements Traceability Matrix, Links in requirements chain Software Requirements Modeling Use Case Modeling, Analysis Models, Dataflow diagram, state transition diagram, class diagrams, Object analysis, Problem Frames

UNIT – III

Software Estimation: Components of Software Estimations, Estimation methods, Problems associated with estimation, Key project factors that influence estimation Size Estimation: Two views of sizing, Function Point Analysis, Mark II FPA, Full Function Points, LOC Estimation, Conversion between size measures.

UNIT – IV

Effort, Schedule and Cost Estimation: What is Productivity? Estimation Factors, Approaches to Effort and Schedule Estimation, COCOMO II, Putnam Estimation Model, Algorithmic models, Cos Estimation.

UNIT – V

Tools for Requirements Management and Estimation: Requirements Management Tools: Benefits of using a requirements management tool, commercial requirements management tool, Rational Requisite pro, Caliber –RM, implementing requirements management automation, Software Estimation Tools: Desirable features in software estimation tools, IFPUG, USC's COCOMO II, SLIM (Software Life Cycle Management) Tools.

TEXT BOOKS:

1. Software Requirements and Estimation by Rajesh Naik and Swapna Kishore, Tata Mc Graw Hill.

REFERENCE BOOKS:

1. Software Requirements by Karl E. Weigers, Microsoft Press.
2. Managing Software Requirements, Dean Leffingwell & Don Widrig, Pearson Education, 2003.
3. Mastering the requirements process, second edition, Suzanne Robertson & James Robertson, Pearson Education, 2006.
4. Estimating Software Costs, Second edition, Capers Jones, TMH, 2007.
5. Practical Software Estimation, M.A. Parthasarathy, Pearson Education, 2007.
6. Measuring the software process, William A. Florac & Anita D. Carleton, Pearson Education, 1999.

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(20CD5PE21) COMPONENT BASED TECHNOLOGIES
(PROFESSIONAL ELECTIVE-II)

Course Objectives:

1. Introduces in depth JAVA, Corba and .Net Components
2. Deals with Fundamental properties of components, Technology and architecture and middleware.
3. Component Frameworks and Development are covered in depth.

Course outcomes: The student will be able to

1. To introduce different software components and their application.
2. Principles of integrating and exchanging data
3. Master the use Enterprise java beans, DOM&RMI
4. Be familiar with building server applications, model driven architecture using JAVA &CORBA To
5. build the applications of cross-development environment, component-oriented programming using COMPONENT FRAMEWORKS.

UNIT – I

INTRODUCTION: Software components, objects, fundamental properties of Component technology , modules, interfaces, callbacks, directory services, component architecture, components and middleware

UNIT – II

JAVA BASED COMPONENT TECHNOLOGIES: Threads – Java Beans – Events and connections – properties – introspection – JAR files – reflection – object serialization – Enterprise Java Beans – Distributed Object models – RMI and RMI-IIOP

UNIT – III

CORBA COMPONENT TECHNOLOGIES: Java and CORBA – Interface Definition language – Object Request Broker – system object model – portable object adapter – CORBA services – CORBA component model – containers – application server – model driven architecture

UNIT – IV

NET BASED COMPONENT TECHNOLOGIES: COM – Distributed COM – object reuse – interfaces and versioning – dispatch interfaces – connectable objects – OLE containers and servers – Active X controls – .NET components - assemblies – appdomains – contexts – reflection – remoting

UNIT – V

COMPONENT FRAMEWORKS AND DEVELOPMENT: Connectors, contexts, EJB containers, CLR contexts and channels, Black Box component framework, directory objects, cross-development environment, component-oriented programming, Component design and implementation tools, testing tools, assembly tools

TEXT BOOKS:

1. Clemens Szyperski, "Component Software: Beyond Object-Oriented Programming", Pearson Education publishers, 2003

REFERENCE BOOKS:

1. Ed Roman, "Mastering Enterprise Java Beans", John Wiley & Sons Inc., 1999.
2. Mowbray, "Inside CORBA", Pearson Education, 2003.
3. Freeze, "Visual Basic Development Guide for COM & COM+", BPB Publication, 2001.
4. Hortsamann, Cornell, "CORE JAVA Vol-II" Sun Press, 2002.

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(20CD5PE22) WEB TECHNOLOGIES
(PROFESSIONAL ELECTIVE-II)

Course Objectives:

1. To understand the technologies used in Web Programming.
2. To know the importance of object-oriented aspects of Scripting.
3. To understand creating database connectivity using JDBC.
4. To learn the concepts of web-based application using sockets.

Course outcomes: The student will be able to

1. Apply The Concepts of PHP In Creating Web Pages and Connecting to Database (My Sql)
2. Apply The Concepts of XML For Structuring the Web Pages.
3. Make Use of Servlets to Create Dynamic Web Pages in Client-Server Architecture.
4. Make Use of JSP To Develop Interactive Web Pages.
5. Apply The Techniques of Java Script in Client-Side Scripting

UNIT – I

HTML Common tags- List, Tables, images, forms, Frames; Cascading Style sheets.
Introduction to PHP: Declaring variables, data types, arrays, strings, operators, expressions, control structures, functions, reading data from web form controls like text boxes, radio buttons, lists etc., Handling File Uploads. Connecting to database (MySQL as reference), executing simple queries, handling results, Handling sessions and cookies
File Handling in PHP: File operations like opening, closing, reading, writing, appending, deleting etc. on text and binary files, listing directories.

UNIT – II

XML: Introduction to XML, Defining XML tags, their attributes and values, Document Type Definition, XML Schemes, Document Object Model, XHTML Parsing XML Data – DOM and SAX Parsers in java.

UNIT – III

Introduction to Servlets: Common Gateway Interface (CGt), Life cycle of a Servlet, deploying a servlet, The Servlet API, Reading Servlet parameters, Reading Initialization parameters, Handling Http Request & Responses, Using Cookies and Sessions, connecting to a database using JDBC.

UNIT – IV

Introduction to JSP: The Anatomy of a JSP Page, JSP Processing, Declarations, Directives, Expressions, Code Snippets, implicit objects, Using Beans in JSP Pages, Using Cookies and session for session tracking, connecting to database in JSP.

UNIT – V

Client-side Scripting: Introduction to JavaScript, JavaScript language – declaring variables, scope of variables, functions. event handlers (onclick, on submit etc.), Document Object Model, Form validation.

TEXT BOOKS:

1. Harvey Deitel, Abbey Deitel, Internet and World Wide Web: How To Program 5th Edition.
2. Herbert Schildt, Java - The Complete Reference, 7th Edition. Tata McGraw- Hill Edition.
3. Michael Morrison XML Unleashed Tech media SAMS.

REFERENCE BOOKS:

1. John Pollock, Javascript - A Beginners Guide, 3rd Edition – Tata McGraw-Hill Edition.
2. Keyur Shah, Gateway to Java Programmer Sun Certification, Tata McGraw Hill, 2002.

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(20CD5PE23) OOAD THROUGH UML
(PROFESSIONAL ELECTIVE-II)

Course Objectives:

1. Develop the skills to analyze and design object-oriented problems.
2. Create design patterns to solve problems based on object-oriented concepts.
3. Understand the various processes and techniques for building object-oriented software systems.

Course outcomes: The student will be able to

1. Discuss the overview of object-oriented modeling and benefits of each.
2. Make use of the advance object-oriented approach from the traditional approach for design and development of system.
3. Implement Unified Modeling Language (UML) for representation of an object-oriented system using different modeling views.
4. Apply appropriate design patterns to model or design of the system.
5. Prepare unified modeling techniques for case studies

UNIT – I STRUCTURAL MODELLING

Introduction to UML: Importance of modeling, principles of modeling, object-oriented modeling, conceptual model of the UML, architecture, software development life cycle.

UNIT – II BASIC STRUCTURAL MODELLING

Classes, relationships, common mechanisms and diagrams. Advanced structural modeling: Advanced classes, advanced relationships, interfaces, types, roles and packages

UNIT – III CLASSES AND OBJECT DIAGRAMS

Terms, concepts, modeling techniques for class and object diagrams; Interactions: Interaction diagrams; Use cases: Use case diagrams, activity diagrams.

UNIT – IV ADVANCED BEHAVIORAL MODELING

Events and signals, state machines, processes and Threads, time and space, state chart diagrams.

UNIT – V ARCHITECTURALMODELING

Component, Deployment, Component diagrams, Deployment diagrams. Case Study: The Unified Library Application.

TEXT BOOKS:

1. Grady Booch, James Rumbaugh, IvarJacobson: The Unified Modeling Language User Guide, Pearson Education.
2. Hans-Erik Eriksson, Magnus Penker, Brian Lyons, David Fado: UML2Toolkit, WILEY-Dream tech India Pvt.Ltd.

REFERENCE BOOKS:

1. Meilir Page-Jones: Fundamentals of Object-Oriented Design in UML, Pearson Education.
2. Pascal Roques: Modeling Software Systems Using UML 2, WILEY-Dream tech India Pvt.Ltd.
3. Atul Kahate: Object Oriented Analysis & Design, The McGraw-Hill Companies.
4. Mark Priestley: Practical Object-Oriented Design with UML, TATA McGraw Hill
5. Appling UML and Patterns: An introduction to Object–Oriented Analysis and Design and Unified Process, Craig Larman, Pearson Education.

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(20CD5PE24) MIDDLEWARE TECHNOLOGIES
(PROFESSIONAL ELECTIVE-II)

Course Objectives:

1. This course provides details about the modern component platforms. Based on practical examples, details about modern middleware technologies are studied.
2. Students get the chance to gain in-depth knowledge popular middleware platforms.

Course outcomes:

1. Ability to design the integrated system with different software's.
2. Ability to create simple interface between the software and hardware

UNIT – I

INTRODUCTION TO CLIENT SERVER COMPUTING: Evolution of corporate computing models from centralized to distributed computing, client server models. Benefits of client server computing, pitfalls of client server programming.

UNIT – II

CORBA WITH JAVA: Review of Java concept like RMI, RMI API, JDBC. Client/Server CORBA-style, The object web: CORBA with Java. Introducing C# and the .NET Platform; Understanding .NET Assemblies; Object – Oriented Programming with C#; Callback Interfaces, Delegates, and Events.

UNIT – III

BUILDING C# APPLICATIONS: Type Reflection, Late Binding, and Attribute-Based Programming; Object Serialization and the .NET Remoting Layer; Data Access with ADO.NET; XML Web Services. Core CORBA / Java: Two types of Client/ Server invocations-static, dynamic. The static CORBA, first CORBA program, ORB lets with Applets, Dynamic CORBA-The portable count, the dynamic count multicount.

UNIT – IV

EXISTENTIAL CORBA: CORBA initialization protocol, CORBA activation services, CORBAIDL mapping CORBA java- to- IDL mapping, The introspective CORBA/Java object.
Java Bean Component Model: Events, properties, persistency, Introspection of beans, CORBA Beans.

UNIT – V

EJBS AND CORBA: Object transaction monitors CORBA OTM's, EJB and CORBA OTM's, EJB container frame work, Session and Entity Beans, The EJB client/server development Process the EJB container protocol, support for transaction EJB packaging EJB design Guidelines.

TEXT BOOKS:

1. Client/Server programming with Java and CORBA Robert Orfali and Dan Harkey, John Wiley &Sons, SPD2nd Edition
2. Java programming with CORBA 3rd Edition, G. Brose, A Vogel and K. Duddy, Wiley-dreamtech, India John wiley and sons.

REFERENCE BOOKS:

1. Distributed Computing, Principles and applications, M. L. Liu, Pearson Education
2. Client/Server Survival Guide 3rd edition Robert Orfali Dan Harkey & Jeri Edwards, John Wiley&Sons
3. Client/Server Computing, D T Dewire, TMH.
4. IBM Webspere Starter Kit Ron Ben Natan Ori Sasson, TMH, New Delhi
5. Programming C#, Jesse Liberty, SPD-O'Reilly.

6. C# Preciesely Peter Sestoft and Henrik I. Hansen, Prentice Hall of India
7. Introduction to C# Using .NET Pearson Education
8. C# How to program, Pearson Education
9. C# and the .NET Platform Andrew Troelsen, Apress Wiley - dreamtech, India Pvt Ltd

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III Year B.Tech. CSG-I Sem	**L**	**T**	**P**	**C**
	0	**0**	**3**	**1.5**

(20CD5PE25) COMPONENT BASED TECHNOLOGIES LAB
(Professional Elective-II)

Course Objectives:

1. To develop the applications of distributed name server RMI
2. To Create Develop a component Based application using java and .NET

Course outcomes:

1. On completion of the course, students will be familiar with the
2. Principles of integrating and exchanging data
3. Master the use Enterprise java beans, DOM&RMI
4. Be familiar with building server applications, model driven architecture using JAVA &CORBA
5. To build the applications of cross-development environment, component-oriented programming using

COMPONENT FRAMEWORKS

List of Experiments:

1. Create a distributed name server (like DNS) RMI.
2. Create a Java Bean to draw various graphical shapes and display it using or without using BDK
3. Develop an Enterprise Java Bean for student Information System.
4. Develop an Enterprise Java Bean for Library operations.
5. Create an Active-X control for Timetable.
6. Develop a component for converting the currency values using COM / .NET
7. Develop a component for browsing CD catalogue using COM / .NET
8. Develop a component for retrieving information from message box using DCOM/.NET
9. Develop a middleware component for retrieving Stock Market Exchange information using CORBA
10. Develop a middleware component for retrieving Bank Balance using CORBA.
11. Develop a middleware component for retrieving Stock Market Exchange information using CORBA.
12. Develop a middleware component for retrieving weather forecast information using CORBA

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(20CD5PE26) WEB TECHNOLOGIES LAB
(Professional Elective- II)

Course Objectives:

1. To develop an ability to design and implement static and dynamic website
2. To expose students to the basic tools and applications used in Web Programming
3. introduction to more advanced topics such as programming and scripting

Course outcomes:

1. To gain knowledge of client-side scripting, validation of forms and AJAX programming
2. To have understanding of server-side scripting with PHP language.
3. To have understanding of what is XML and how to parse and use XML Data with Java.
4. To introduce Server-side programming with Java Servlets and JSP.

List of Experiments:

1. Write a html program for Creation of web site with forms, frames, links, tables etc.
2. Design a web site using HTML and DHTML. Use Basic text Formatting, Images.
3. Create a script that asks the user for a name, and then greets the user with "Hello" and the user's name on the page.
4. Create a script that collects numbers from a page and then adds them up and prints them to a blank field on the page
5. Create a script that prompts the user for a number and then counts from 1 to that number displaying only the odd numbers.
6. Create a script that will check the field in Assignment 1 for data and alert the user if it is blank. This script should run from a button.
7. Creating simple application to access data base using JDBC Formatting HTML with CSS.
8. Write a Program for manipulating Databases and SQL.
9. Write a Program using PHP database functions.
10. Write a web application that functions as a simple hand calculator, but also keeps a "paper trail" of all your previous work.
11. Install Tomcat and use JSP and link it with any of the assignments above.
12. Reading and writing the files using .Net.
13. Write a program to implement web service for calculator application.
14 Implement RMI concept for building any remote method of your choice.

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(20CD5PE27) OOAD THROUGH UML LAB
(Professional Elective- II)

Course Objectives:

1. Understand how UML supports the entire GOAD process. Become familiar with all phases of GOAD.
2. Understand different software testing tools and their features.

Course outcomes:

1. Understand the history cost of using and building CASE tools.
2. Construct and evaluate hybrid CASE tools by integrating existing tools.
3. Design UML diagrams for given problems
    - Use Case Diagram.
    - Class Diagram.
    - Sequence Diagram
    - Collaboration Diagram.
    - State Diagram
    - Activity Diagram.
    - Component Diagram
    - Deployment Diagram.
    - Test Design.

Description for an ATM System

The software to be designed will control a simulated automated teller machine (ATM) having a magnetic stripe reader for reading an ATM card, a customer console (keyboard and display) for interaction with the customer, a slot for depositing envelopes. a dispenser for cash (in multiples of Rs. 100, Rs. 500 and Rs. 1000), a printer for printing customer receipts, and a key operated switch to allow an operator to start or stop the machine. The ATM will communicate with the bank's computer over an appropriate communication link. (The software on the latter is not part of the requirements for this problem.)

The ATM will service one customer at a time. A customer will be required to insert an ATM card and enter a personal identification number (PIN) – both of which will be sent to the bank for validation as part of each transaction. The customer will then be able to perform one or more transactions. The card will be retained in the machine until the customer indicates that he/she desires no further transactions, at which point it will be returned – except a: noted below.

The ATM must be able to provide the following services to the customer: A customer must be able to make a cash withdrawal from any suitable account linked to the card, in multiples of Rs. 100 or Rs. 500 or Rs 1000. Approval must be obtained from the bank before cash is dispensed.

A customer must be able to make a deposit to any account linked to the card, consisting of cash and/or checks in an envelope. The customer will enter the amount of the deposit into the ATM, subject to manual verification when the envelope is removed from the machine by an operator. Approval must be obtained from the bank before physically accepting the envelope.

A customer must be able to make a transfer of money between any two accounts linked to the card. A customer must be able to make a balance inquiry of any account linked to the card. A customer must be able to abort a transaction in progress by pressing the Cancel key instead of responding to a request from the machine The ATM will communicate each transaction to the bank and obtain verification that it was allowed by the bank. Ordinarily, a transaction will be considered complete by the bank once it has been approved. In the case of a deposit, a second message will be sent to the bank indicating that the customer has deposited the envelope. (If the customer fails to deposit the envelope within the timeout period, or presses cancel instead, no second message will be sent to the bank and the deposit will not be credited to the customer.

If the bank determines that the customer's PIN is invalid, the customer will be required to reenter the PIN before a transaction can proceed. If the customer is unable to successfully enter the PIN after three tries, the card will be permanently retained by the machine, and the customer will have to contact the bank to get it back.

If a transaction fails for any reason other than an invalid PIN, the ATM will display an explanation of the problem, and will then ask the customer whether he/she wants to do another transaction.

The ATM will provide the customer with a printed receipt for each successful transaction. The ATM will have a key-operated switch that will allow an operator to start and stop the servicing of customers. After turning the switch to the "on" position, the operator will be required to verify and enter the total cash on hand. The machine can only be turned off when it is not servicing a customer.

When the switch is moved to the "off" position, the machine will shut down, so that the operator may remove deposit envelopes and reload the machine with cash, blank receipts, etc.

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(20CD5PE28) MIDDLEWARE TECHNOLOGIES LAB
(Professional Elective- II)

Course Objectives:

- Understand the basic structure of distributed systems.
- Understand the motivation of using middleware.
- Understand the basic concepts underlying the ASP.net and C#.net.
- Learn to make judgment in choosing a suitable middleware for application problems.
- Understand the basic concepts of Web Services and EJB.

Course Outcomes:

- Choose appropriate client server computing model for given problem
- Design a dynamic remote application with RMI
- Develop client server applications using C#.net
- Design UI applications using PERL-CGI
- Develop real time projects by combining CORBA and database interfacing

Experiments:

1. Create a distributed name server (like DNS) RMI.
2. Develop an Enterprise Java Bean for student Information System.
3. Develop an Enterprise Java Bean for Library operations.
4. Develop a component for browsing CD catalogue using COM / .NET.
5. Develop a component for retrieving information from message box using DCOM/.NET
6. Develop a middleware component for retrieving Bank Balance using CORBA.
7. Develop a PERL-CGI program to handle user input.
8. Develop a PERL-CGI program to pass data from web components (text area, dropdown list etc.).
9. Develop Python programs for the following: (Prerequisite)
    a) Demonstrate user-defined functions
    b) Demonstrate Control Structures
    c) Demonstrate Caching a Template Fragment
10. A case study on Python-Django framework to develop any application

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(20CD6PC06) Design pattern

Course Objectives:

1. The aim of the course is to appreciate the idea behind Design Patterns in handling common problems faced during building application.
2. This course covers all pattern types from creational to structural, behavioral to concurrency and highlights the scenarios when one pattern must be chosen over others.

Course outcomes:

1. Analyze a software development problem and express its essence succinctly and precisely.
2. Design a module structure to solve a problem, and evaluate alternatives.
3. Implement a module so that it executes efficiently and correctly.
4. Understand how these patterns related to object-oriented design dependability
5. Have a deeper knowledge of the principles of object-oriented design.

UNIT – I

Introduction: What is a design pattern? Design patterns in Smalltalk MVC, Describing Design Patterns, The Catalog of Design Patterns, Organizing the Catalog, How Design Patterns Solve Design Problems, How to Select a Design Pattern, How to Use a Design Pattern.

UNIT – II

Designing a Document Editor: Design Problems, Document Structure, Formatting, Embellishing the User Interface, Supporting Multiple Look-and-Feel Standards, Supporting Multiple Window Systems, User Operations Spelling Checking and Hyphenation, Summary

UNIT – III

Creational Patterns: Definition Types of Creational Patterns- Abstract Factory, Builder, Factory Method,
Prototype, Singleton, Object pool Pattern, Discussion of Creational Patterns.

UNIT – IV

Structural Pattern: Definition Types of Structural Patterns-Adapter Design Pattern, Bridge Design Pattern, Composite Design Pattern, Decorator Design Pattern, Façade Design Pattern, Flyweight Design Pattern, Proxy Design Pattern, Representations and Uses of Structural Patterns.

UNIT – V

Behavioral Patterns: Definition Types of Behavioral Patterns-Chain of Responsibility, Command, Interpreter, Iterator, Mediator, Memento, Observer, State, Strategy, Template Method, Visitor, Discussion of Behavioral Patterns.

TEXT BOOKS:

1. Design Patterns, Erich Gamma, Pearson Education.

REFERENCE BOOKS:

1. Patterns in Java, Vol –I, Mark Grand, Wiley Dream Tech.
2. Patterns in Java, Vol-II, Mark Grand, Wiley Dream Tech.
3. Java Enterprise Design Patterns Vol-III, Mark Grand, Wiley Dream Tech.
4. Head First Design Patterns, Eric Freeman, O˝reily publications

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(20CD6PC07) SOFTWARE PROJECT MANAGEMENT

Course Objectives:

1. To acquire knowledge on software process management
2. To acquire managerial skills for software project development
3. To understand software economics

Course outcomes:

1. Gain knowledge of software economics, phases in the life cycle of software development, project organization, project control and process instrumentation.
2. Analyze the major and minor milestones, artifacts and metrics from management and technical perspective
3. Design and develop software product using conventional and modern principles of software project management

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, The old way and the new way. 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 architectures.

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. An Introduction to the Team Software Process, Watts S. Humphrey, Pearson Education, 2000
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.

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(20CS6PC18) COMPUTER NETWORKS

Course Objectives:

1. The objective of the course is to equip the students with a general overview of the concepts and fundamentals of computer networks.
2. 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 be able to

1. Demonstrate the concepts of Data communication procedures and various models of Networking.
2. Summarize the features of various protocols used in Data Link Layer.
3. Identify appropriate routing algorithm for broadcasting in Network Layer.
4. Demonstrate the services and features of TCP/UDP protocols in Transport Layer.
5. Summarize the services and features of Application Layer with respect to World Wide Web.

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.

UNIT – II

Data link layer: Design issues, framing, Error detection and correction.
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, 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, 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/PH

REFERENCE BOOKS:

1. An Engineering Approach to Computer Networks-S. Keshav, 2nd Edition, Pearson Education
2. Data Communications and Networking – Behrouz A. Forouzan. Third Edition TMH.

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2	0	0	2

(20CD6PC08) SOFTWARE TESTING

Prerequisite: A course on "Software Engineering"

Course Objectives:

1. To provide knowledge of the concepts in software testing such as testing process, criteria, strategies, and methodologies.
2. To develop skills in software test automation and management using latest tools.

Course outcomes: The student will be able to

1. Design and develop the best test strategies in accordance to the development model
2. Understand various test processes and continuous quality improvement
3. Understand methods of test generation from requirements
4. Apply software testing techniques in commercial environments

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. Dataflow testing: Basics of dataflow testing, strategies in dataflow testing, application of dataflow testing. Domain Testing: domains and paths, Nice & ugly domains, domain testing, domains and interfaces testing, domain and interface testing, domains and testability.

UNIT – 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, kv charts, specifications.

UNIT – IV

State, State Graphs and Transition testing: state graphs, 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 or Win-runner)

TEXT BOOKS:

1. Software Testing techniques - Baris Beizer, Dreamtech, second edition.
2. Software Testing Tools – Dr. K. V. K. K. Prasad, Dreamtech.

REFERENCE BOOKS:

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

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(20CD6PC09) COMPUTER NETWORKS LAB

Prerequisite: A course on "Software Engineering"

Course Objectives:

1. To understand the working principle of various communication protocols.
2. To understand the network simulator environment and visualize a network topology and observe its performance
3. To analyze the traffic flow and the contents of protocol frames

Course outcomes: The student will be able to

1. Implement data link layer farming methods
2. Analyze error detection and error correction codes.
3. Implement and analyze routing and congestion issues in network design.
4. Implement Encoding and Decoding techniques used in presentation layer
5. Work with different network tools

List of Experiments:

1. Implement the data link layer framing methods such as character, character-stuffing and bit stuffing.
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. **Wireshark**
    i. Packet Capture Using Wire shark
    ii. Starting Wire shark
    iii. Viewing Captured Traffic
    iv. Analysis and Statistics & Filters.
11. How to run Nmap scan
12. Operating System Detection using Nmap
13. 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

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(20CD6PC10) SOFTWARE TESTING LAB

Course Objectives:

1. Testing is a process of executing a program with the intent of finding an error.
2. A good test case is one that has a high probability of finding an as yet undiscovered error.
3. A successful test is one that uncovers an as yet undiscovered error.

Course Outcomes:

1. Understand the need and usage of software tools required for manual and automated testing
2. To test the sample application using various testing tools.

List of Experiments:

1. Write programs in „C" Language to demonstrate the working of the following a. constructs: i) do...while ii) while....do iii) if...else iv) switch v) for
2. A program written in „C" language for Matrix Multiplication fails Introspect the causes for its failure and write down the possible reasons for its failure
3. Take any system (e.g., ATM system) and study its system specifications and report the various bugs.
4. Write the test cases for any known application (e.g., Banking application)
5. Create a test plan document for any application (e.g., Library Management System)
6. Study of any testing tool (e.g., Win runner)
7. Study of any web testing tool (e.g., Selenium)
8. Study of any bug tracking tool (e.g., Bugzilla, bug bit)
9. Study of any test management tool (e.g., Test Director)
10. Study of any open source-testing tool (e.g., Test Link)

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(20MC6HS07) CONSTITUTION OF INDIA

The Constitution of India is the supreme law of India. Parliament of India cannot make any law which violates the Fundamental Rights enumerated under the Part III of the Constitution. The Parliament of India has been empowered to amend the Constitution under Article 368; however, it cannot use this power to change the "basic structure" of the constitution, which has been ruled and explained by the Supreme Court of India in its historical judgments. The Constitution of India reflects the idea of "Constitutionalism" – a modern and progressive concept historically developed by the thinkers of "liberalism" – an ideology which has been recognized as one of the most popular political ideology and result of historical struggles against arbitrary use of sovereign power by state. The historic revolutions in France, England, America and particularly European Renaissance and Reformation movement have resulted into progressive legal reforms in the form of "constitutionalism" in many countries. The Constitution of India was made by borrowing models and principles from many countries including United Kingdom and America. The Constitution of India is not only a legal document but it also reflects social, political and economic perspectives of the Indian Society. It reflects India's legacy of "diversity". It has been said that Indian onstitution reflects ideals of its freedom movement; however, few critics have argued that it does not truly incorporate our own ancient legal heritage and cultural values. No law can be "static" and here fore the Constitution of India has also been amended more than one hundred times. These mendments reflect political, social and economic developments since the year 1950. The Indian judiciary and particularly the Supreme Court of India has played an historic role as the guardian of people. It has been protecting not only basic ideals of the Constitution but also strengthened the same through progressive interpretations of the text of the Constitution. The judicial activism of the Supreme Court of India and its historic contributions has been recognized throughout the world and it gradually made it "as one of the strongest courts in the world"

Course content

1. Meaning of the constitution law and constitutionalism
2. Historical perspective of the Constitution of India
3. Salient features and characteristics of the Constitution of India
4. Scheme of the fundamental rights
5. The scheme of the Fundamental Duties and its legal status
6. The Directive Principles of State Policy – Its importance and implementation
7. Federal structure and distribution of legislative and financial powers between the Union and the States
8. Parliamentary Form of Government in India – The constitution powers and status of the President of India
9. Amendment of the Constitutional Powers and Procedure
10. The historical perspectives of the constitutional amendments in India
11. Emergency Provisions: National Emergency, President Rule, Financial Emergency
12. Local Self Government – Constitutional Scheme in India
13. Scheme of the Fundamental Right to Equality
14. Scheme of the Fundamental Right to certain Freedom under Article 19
15. Scope of the Right to Life and Personal Liberty under Article 21

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(20CD6PE31) INTRODUCTION TO STATISTICAL SOFTWARE
(PROFESSIONAL ELECTIVE-III)

Course Objectives:

This is an introductory course on how to use the R programming language and software environment for data manipulations and munging, exploratory data analysis and data visualizations.

Course Outcomes:

1. Understand the basic R programming.
2. Understand the basic frequency distribution.
3. Students will be familiar to the R ecosystem and learn how to use R for the most common data analysis tasks, including loading, cleaning, transforming, summarizing and visualizing data.
4. Interpretation of different error detection and correction.
5. Apply an advanced R programming ecosystem.

UNIT-1

INTRODUCTION

The basics of R- Firstsite's writing code; variables; functions; vectors; simple calculations. Working directory, reading and writing, loading and saving data, data frames. Vectors; matrices; indexing, Built-in Commands and Missing Data Handling

UNIT II

FREQUENCY DISTRIBUTION

Objectives, Steps and Basic Definitions, Variables and Types of Data, Absolute Frequency, Relative Frequency and Frequency Distribution. Frequency Distribution and Cumulative Distribution Function.

UNIT III

VISUALIZATION

Subdivided Bar Plots and Pie Diagrams, 3D Pie Diagram and Histogram Kernel Density and Stem – Leaf Plots- Arithmetic Mean- Median- Quantiles-Mode, Geometric Mean and Harmonic Mean.

UNIT IV

ERROR DETECTION AND CORRECTION.

Absolute Deviation and Absolute Mean Deviation- Range, Inter quartile Range and Quartile Deviation-Mean Squared Error, Variance and Standard Deviation-Coefficient of Variation and Box plots. Raw and Central Moments-Skewness and Kurtosis. Univariate and Bivariate Scatter Plots

UNIT V

R ECOSYSTEM.

Least Squares Method - R Commands and More than One Variables-Extending R with add-on packages and the R-ecosystem. Dynamic and web reporting: Knitr and Shiny. Running R as part of a business pipeline—the R terminal. Simulation

TEXT BOOKS:

1. Ugarte, M.D., Militino, A.F., Arnholt, A.T. (2008). Probability and Statistics with R. CRC Press.
2. Peter Daalgard (2008). Introductory Statistics with R, Springer.
3. Thomas Rahlf (2017). Data Visualization with R: 100 Examples, Springer

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(20CD6PE32) ANDROID APPLICATION DEVELOPMENT
(PROFESSIONAL ELECTIVE-III)

Course Objectives: This course is designed to learn basics of Android operating system, XML, and basic concepts of java programming like Classes, Packages, Thread, Exception Handling etc.

Course Outcomes:

1. Student understands the working of Android OS Practically.
2. Student will be able to develop Android user interfaces
3. Student will be able to develop, deploy and maintain the Android Applications.

UNIT-1
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 Lifecycle – Activities, Activity lifecycle, 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 disable and non-editable Text Views, 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 – Creating and Displaying notifications, Displaying Toasts

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 Android 4 Application Development, Reto Meier, Wiley India, (Wrox), 2012
2. Android Application Development for Java Programmers, James C Sheusi, Cengage Learning, 2013

REFERENCES:

1. Beginning Android 4 Application Development, Wei-Meng Lee, Wiley India (Wrox), 2013

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3	0	0	3

(20CD6PE33) INTERNET OF THINGS
(PROFESSIONAL ELECTIVE-III)

Course Objectives:

1. To introduce the terminology, technology and its applications.
2. To introduce the concept of M2M (machine to machine) with necessary protocols.
3. To introduce the Python Scripting Language which is used in many IoT devices.
4. To introduce the Raspberry PI platform, that is widely used in IoT applications.
5. To introduce the implementation of web-based services on IoT devices.

Course Outcomes

1. To interpret the knowledge on areas to be used and protocols of communication in IoT.
2. To compare and contrast software and hardware things in different networks.
3. To extend the knowledge on python and its libraries used in IoT.
4. To apply the skills to develop the small-scale things.
5. To illustrate different sensor technologies for sensing real world entities and identify the

UNIT-1

Introduction to Internet of Things –Definition and Characteristics of IoT, Physical Design of IoT – IoT protocols, IoT communication models, IOT Communication APIs IoT enabled Technologies-Wireless Sensor Networks, Cloud Computing, Big data analytics, Communication protocols, Embedded Systems, IoT Levels and Templates Domain Specific IoTs – Home, City, Environment, Energy, Retail, Logistics, Agriculture, Industry, health and Lifestyle.

UNIT II

IOT and M2M–Software defined networks, network function virtualization, difference between SDN and NFV for IoT Basics of IoT System Management with NETCONF, YANG- NETCONF, YANG, SNMP NETPEER.

UNIT III

Introduction to Python - Language features of Python, Data types, data structures, Control of flow, functions, modules, packaging, file handling, data / time operations, classes, Exception handling Python packages- JSON, XML, HTTP Lib, URL Lib, SMTP Lib.

UNIT –IV

IoT Physical Devices and Endpoints - Introduction to Raspberry PI-Interfaces (serial, SPI, I2C) Programming Python program with Raspberry PI with focus of interfacing external gadgets, controlling output, reading input from pins.

UNIT –V

IoT Physical Servers and Cloud Offerings – Introduction to Cloud Storage models and communication APIs Webserver – Web server for IoT, Cloud for IoT, Python web application framework designing a RESTful web API.

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.

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III Year B.Tech. CSG-II Sem

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(20CD6PE34) PYTHON PROGRAMMING
(PROFESSIONAL ELECTIVE-III)

Course Objectives:

1. Learn Syntax and Semantics and create Functions in Python.
2. Handle Strings and Files in Python.
3. Understand Lists, Dictionaries and Regular expressions in Python.
4. Implement Object Oriented Programming concepts in Python.
5. Build Web Services and introduction to Network and Database Programming in Python

Course Outcomes: The student will be able to

1. Apply Python syntax, semantics and be proficient in the use of Python functions.
2. Implement File operations, Exception handling and modules in using Python.
3. Use the Regular Expressions and create, run and manipulate Multithreaded Python programs.
4. Illustrate the concepts of GUI, Web and Network programming in Python.
5. Inspect exemplary applications related to Databases in Python.

UNIT-1

Python Basics, Objects- Python Objects, Standard Types, Other Built-in Types, Internal Types, Standard Type Operators, Standard Type Built-in Functions, Categorizing the Standard Types, Unsupported Types. Numbers - Introduction to Numbers, Integers, Floating Point Real Numbers, Complex Numbers, Operators, Built-in Functions, Related Modules. Sequences - Strings, Lists, and Tuples, Mapping and Set Types.

UNIT II

FILES: File Objects, File Built-in Function [open ()], File Built-in Methods, File Built-in Attributes, Standard Files, Command-line Arguments, File System, File Execution, Persistent Storage Modules, Related Modules. Exceptions: Exceptions in Python, Detecting and Handling Exceptions, Context Management, *Exceptions as Strings, Raising Exceptions, Assertions, Standard Exceptions, *Creating Exceptions, Why Exceptions (Now)? Why Exceptions at All? Exceptions and the sys Module, Related Modules. Modules: Modules and Files, Namespaces, Importing Modules, Importing Module Attributes, Module Built-in Functions, Packages, Other Features of Modules.

UNIT III

Regular Expressions: Introduction, Special Symbols and Characters, Res and Python. Multithreaded Programming: Introduction, Threads and Processes, Python, Threads, and the Global Interpreter Lock, Thread Module, Threading Module, Related Modules.

UNIT –IV

GUI Programming: Introduction, Tintern and Python Programming, Brief Tour of Other GUIs, Related Modules and Other GUIs. WEB Programming: Introduction, Web Surfing with Python, Creating Simple Web Clients, Advanced Web Clients, CGI-Helping Servers Process Client Data, Building CGI Application Advanced CGI, Web (HTTP) Servers.

UNIT –V

Database Programming: Introduction, Python Database App Location Programmer's Interface (DB-API), Object Relational Managers (ORMs), Related Modules.

TEXT BOOKS:

1. Core Python Programming, Wesley J. Chun, Second Edition, Pearson.
2. Python Tutorial by Guido Van Rossum, Fred L. Drake Jr. editor, Release 2.6.4.

REFERENCE BOOKS:

1. Learning Python – 2nd Ed., Mark Lutz and David Ascher, 2003, O'Reilly.

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(20CD6PE35) INTRODUCTION TO STATISTICAL SOFTWARE LAB
(Professional Elective- III)

Course Objectives:

1. This course on how to use the R programming language and software environment for data manipulations and
   munging, exploratory data analysis and data visualizations.

Course Outcomes:

1. Apply statistical methods to data for inferences and introduce the concepts of R
2. Analyze the libraries for data manipulation and data visualization in R
3. Analyze data-sets to create testable hypotheses and identify appropriate statistical tests
4. Analyze and summarize data-sets to fit linear and nonlinear models

List of Experiments

1. Program to handle vectors and perform simple statistics on the vectors using R.
2. Program to create a data frame in R and perform operations on it.
3. a) Program to read data from files(.csv) and handle the data using functions like plot, hist, summary and mean, mode, median and standard deviation.
   b) Merge the datasets, transformation of variables and creating subsets of the dataset.
4. a) Program to find the factorial of a number using recursion in R
   b) Program to print numbers from 1 to 100 using while loop and for loop in R
5. Program to plot graphs -scatter plot, box plot and bar plot.
6. . Program to create a list in R and perform operations on it like list Slicing, sum and mean functions, head and tail functions and finally delete the list using rm () function.
7. a) Program to implement simple and multiple linear regression.
   b) Program to implement non- linear regression.
8. Program to implement logistic regression.
9. Program to perform ANOVA test (one-way, two way).
10. Program to perform Principal component analysis (PCA) on the dataset.
11. Program to perform matrix operations (transpose, inverse, least square estimates, eigen values).

12 Program to handle mathematical functions with single argument.

TEXT BOOKS:

1. Norman Matloff, The Art of R Programming, No Starch Press, San Francisco 2011
2. Jared P. Lander, R for Everyone, Addison Wesley Data & Analytics Series, Pearson, 2014.

REFERENCE BOOKS:

1. Rob Kabacoff and Dale Ogden, R in Action, Manning, Second Edition, 2018
2. G. Jay Kerns, Introduction to Probability and Statistics using R, First Edition, 2010

E-RESOURCES AND OTHER DIGITAL MATERIAL

1. Mine Çetinkaya-Rundel, David Banks, Colin Rundel, Merlise A Clyde, Duke University,
   (08,08,2019). Statistics with R Specialization.
   Available: https://www.coursera.org/specializations/statistics
2. Rafael Irizarry, Michael Love, Statistics with R, Harvard University (08, 08, 2019) Available:
   https://www.edx.org/course/statistics-r-harvardx-ph5251x-1

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(20CD6PE36) ANDROID APPLICATION DEVELOPMENT LAB
(Professional Elective- III)

Course Objectives:

1. To learn how to develop Applications in android environment.
2. To learn how to develop user interface applications.
3. To learn how to develop URL related applications.

Course Outcomes:

1. Implement the working of Android OS Practically.
2. Develop user interfaces.
3. Develop, deploy and maintain the Android Applications.
4. Create text files for authentication.
5. Develop alarm-based applications.

LIST OF EXPERIMENTS

1. Installation of Android studio.
2. Development Of Hello World Application
3. Create an application that takes the name from a text box and shows hello message along with the name entered in text box, when the user clicks the OK button
4. Create a screen that has input boxes for User Name, Password, Address, Gender (radio buttons formal and female), Age (numeric), Date of Birth (Date Picket), State (Spinner) and a Submit button. On clicking the submit button, print all the data below the Submit Button (use any layout)
5. Design an android application to create page using Intent and one Button and pass the Values from one Activity to second Activity
6. Design an android application Send SMS using Intent
7. Create an android application using Fragments
8. Design an android application Using Radio button
9. Design an android application for menu
10. Create a user registration application that stores the user details in a database table.

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(20CD6PE37) INTERNET OF THINGS LAB
(Professional Elective- III)

Course Objectives:

1. Students will be explored to the interconnection and integration of the physical world and the cyber space.
2. They are also able to design & develop IOT Devices

Course Outcomes:

1. Understand the concept of Internet of Things
2. Implement interfacing of various sensors with Arduino/Raspberry Pi.
3. Demonstrate the ability to transmit data wirelessly between different devices.
4. Show an ability to upload/download sensor data on cloud and server.

LIST OF EXPERIMENTS

1. Functional Testing of Devices Flashing the OS on to the device into a stable functional state by porting desktop environment with necessary packages.
2. Exporting Display on To Other Systems Making use of available laptop/desktop displays as a display for the device using SSH client & X11display server.
3. GPIO Programming of available GPIO pins of the corresponding device using native programming language. Interfacing of I/O devices like LED/Switch etc., and testing the functionality.
4. ON/OFF Control Based on Light Intensity Using the light sensors, monitor the surrounding light intensity & automatically turn ON/OFF the high intensity LED' s by taking some pre-defined threshold light intensity value.
5. Battery Voltage Range Indicator Monitor the voltage level of the battery and indicating the same using multiple LED' s (for ex: for 3V battery and 3 led' s, turn on 3 led' s for 2-3V, 2 led' s for 1-2V, 1 led for 0.1-1V & turn off all for 0V).
6. Dice Game Simulation Instead of using the conventional dice, generate a random value similar to dice value and display the same using a 16X2 LCD. A possible extension could be to provide the user with option of selecting single or double dice game.
7. Displaying RSS News Feed on Display Interface Displaying the RSS news feed headlines on a LCD display connected to device. This can be adapted to other websites like twitter or other information websites. Python can be used to acquire data from the internet.
8. Porting Open wrt To the Device Attempt to use the device while connecting to a WIFI network using a USB dongle and at the same time providing a wireless access point to the dongle.
9. Hosting a website on Board Building and hosting a simple website (static/dynamic) on the device and make it accessible online. There is a need to install server (e.g., Apache) and thereby host the website.
10. Webcam Server Interfacing the regular USB webcam with the device and turn it into fully functional IP webcam & test the functionality.
11. FM Transmission Transforming the device into a regular fm transmitter capable of transmitting audio at desired frequency (generally 88- 108 Mhz).

    Note: Devices mentioned in the above lists include Arduino, Raspbery Pi, Beaglebone.

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(20CD6PE38) PYTHON PROGRAMMING LAB

(Professional Elective- III)

Course Objectives:

1. To be able to introduce core programming basics and program design with functions using Python
2. programming language.
3. To understand a range of Object-Oriented Programming, as well as in-depth data and information

Course Outcomes:

1. Implement simple Python programs
2. Use control structures to write Python programs.
3. Develop Python programs by defining functions.
4. Use Python Lists, Tuples, Dictionaries for representing compound data.
5. Implement File operations in Python.

LIST OF EXPERIMENTS

1. Write a program to demonstrate different number data types in Python.
2. Write a program to perform different Arithmetic Operations on numbers in Python.
3. Write a program to create, concatenate and print a string and accessing sub-string from a given string.
4. Write a python script to print the current date in the following format "Sun May 29 02:26:23 IST 2017"
5. Write a program to create, append, and remove lists in python.
6. Write a program to demonstrate working with tuples in python.
7. Write a program to demonstrate working with dictionaries in python.
8. Write a python program to find largest of three numbers.
9. Write a Python program to convert temperatures to and from Celsius, Fahrenheit. [Formula: c/5 = f-32/9]
10. Write a Python program to construct the following pattern, using a nested for loop

```
*
* *
* * *
* * * *
* * * * *
* * * *
* * *
* *
*
```

11. Write a Python script that prints prime numbers less than 20.
12. Write a python program to find factorial of a number using Recursion.
13. Write a program that accepts the lengths of three sides of a triangle as inputs. The program output should indicate whether or not the triangle is a right triangle (Recall from the Pythagorean Theorem that in a right triangle, the square of one side equals the sum of the squares of the other two sides).
14. Write a python program to define a module to find Fibonacci Numbers and import the module to another program.
15. Write a python program to define a module and import a specific function in that module to

Another program.

16. Write a script named copyfile.py. This script should prompt the user for the names of two text files. The contents of the first file should be input and written to the second file.
17. Write a program that inputs a text file. The program should print all of the unique words in the file in alphabetical order.
18. Write a Python class to convert an integer to a roman numeral
19. Write a Python class to implement Pow (x, n).
20. Write a Python class to reverse a string word by word.
21. Write a Python program to find whether given text is matched or not using regular expression.
22. Write a Python program to create a Button, Canvas, combo box by importing Tkinter module.
23. Write a Python program to handle division by zero error.

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(20CS6OE11) JAVA
(Open Elective- I)

Course Objectives:

1. To introduce the object-oriented programming concepts.
2. To understand object-oriented programming concepts, and apply the minsolving problems.
3. To introduce the principles of inheritance and polymorphism; and demonstrate how they relate to the design of abstract classes.
4. To introduce the implementation of packages and interfaces.
5. To introduce the concepts of exception handling and multithreading.
6. To introduce the design of Graphical User Interface using applets and swing controls.

Course Outcomes:

1. Demonstrate the concepts of OOPS using java.
2. Implement complex programs using java standard AP I library.
3. Build java programs using multithreading and exception handling techniques.
4. Solve the problems using java collection framework.
5. Develop inter active programs using applets and swings for the given problem.

UNIT-1

Object-Oriented Thinking- A way of viewing world – Agents and Communities, messages and methods, Responsibilities, Classes and Instances, Class Hierarchies- Inheritance, Method binding, Overriding and Exceptions, Summary of Object-Oriented concepts. Java buzzwords, An Overview of Java, Data types, Variables and Arrays, operators, expressions, control statements, Introducing classes, Methods and Classes, String handling.

I**nheritance**–Inheritance concept, Inheritance basics, Member access, Constructors, Creating Multilevel hierarchy, super uses, using final with inheritance, Polymorphism-ad hoc polymorphism, pure polymorphism, method overriding, abstract classes, Object class, and forms of in heritance: specialization, specification, construction, extension, limitation, combination, benefits of inheritance, costs of inheritance.

UNIT II

Packages- Defining a Package, CLASSPATH, Access protection, importing packages. Interfaces- defining an interface, implementing interfaces, Nested interfaces, applying interfaces, variables in interfaces and extending interfaces. Stream based I/O (java.io) – The Stream classes- Byte streams and Character streams, reading console Input and Writing Console Output, File class, Reading and writing Files, Random-access file operations, The Console class, Serialization, Enumerations, auto boxing, generics.

UNIT III

Exception handling - Fundamentals of exception handling, Exception types, Termination or presumptive models, Uncaught exceptions, using try and catch, multiple catch clauses, nested try statements, throw, throws and finally, built- in exceptions, creating own exception sub classes. Multithreading- Differences between thread- based multitasking and process-based multitasking, Java thread model, creating threads, thread priorities, synchronizing threads, inter thread communication.

UNIT –IV

The Collections Framework (java. util)-Collections overview, Collection Interfaces, The Collection classes- Array List, Linked List, Hash Set, Tree Set, Priority Queue, Array Deque. Accessing a Collection via an Iterator, Using an Iterator, The For-Each alternative, Map Interfaces and Classes, Comparators, Collection algorithms, Arrays, The Legacy Classes and Interfaces- Dictionary, Hash table, Properties, Stack, Vector More Utility classes, String Tokenizer, Bit Set, Date, Calendar, Random, Formatter, Scanner.

UNIT –V

GUI Programming with Swing–

Introduction, limitations of AWT, MVC architecture, components, containers. Understanding Layout

Managers, Flow Layout, Border Layout, Grid Layout, Card Layout, Grid Bag Layout.

Event Handling- The Delegation event model- Events, Event sources, Event Listeners, Event classes, Handling mouse and keyboard events, Adapter classes, Inner classes, Anonymous Inner classes.

A Simple Swing Application, Applets – Applets and HTML, Security Issues, Applets and Applications, passing parameters to applets. Creating a Swing Applet, Painting in Swing, A Paint example, Exploring Swing Controls- J Label and Image Icon, Jet Field, The Swing Buttons J Button, J Toggle Button, J Check Box, J Radio Button, J Tabbed Pane, J Scroll Pane, J List, J Combo Box, Swing Menus, Dialogs.

TEXT BOOKS:

1. Java The complete reference,9th edition, Herbert Schildt, McGrawHill Education (India)Pvt. Ltd.
2. Under Standing Object-Oriented Programming with Java Updated edition T Budd Person Education.

REFERENCE BOOKS:

1. An Introduction to programming and OO design using Java, J.Nino and F.A.Hosch, John Wiley &sons.
2. Introduction to Java programming, Y.DanielLiang, Pearson Education.
3. Object Oriented Programming through Java, P.RadhaKrishna, and University Press.
4. Programming in Java, S. Malhotra, S. Chudhary,2ndedition, Oxford Univ. Press.
5. Java Programming and Object- oriented Application Development, R.A.Johnson, Cengage learning.

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3	0	0	3

(20CS6OE12) Computer Organization & Architecture
(Open Elective- I)

Course Objectives: To learn

1. To have a thorough understanding of the basic structure and operation of a digital computer.
2. To discuss in detail the operation of the arithmetic unit including the algorithms & implementation of fixed-point and floating-point addition, subtraction, multiplication & division.
3. To study the different ways of communicating with I/O devices and standard I/O interfaces.
4. To study the hierarchical memory system including cache memories and virtual memory.
5. To demonstrate the knowledge of functions of operating system memory management scheduling, file system and interface, distributed systems, security and dead locks.
6. To implement a significant portion of an Operating System.

Course Outcomes: Upon completion of the course, students will have through knowledge about:

1. Sketch the basic structure of a digital computer.
2. Sketch the Arithmetic operations of binary number system.
3. Identify the organization of the Control Unit, Arithmetic and Logical Unit, Memory Unit.
4. Illustrate the design of Memory unit and overview of Principles of Deadlock.
5. Compile the major activities of OS with regard to file management

UNIT-1

Basic Structure of Computers: Computer Types, Functional UNIT, Basic Operational Concepts, Bus, Structures, Software, Performance, Multiprocessors and Multi Computers, Data Representation, Fixed Point Representation, Floating - Point Representation.

Register Transfer Language and Micro Operations: Register Transfer Language, Register Transfer Bus and Memory Transfers, Arithmetic Micro Operations, Logic Micro Operations, Shift Micro Operations, Arithmetic Logic Shift Unit, Instruction Codes, Computer Registers Computer Instructions - Instruction Cycle.

Memory - Reference Instructions, Input - Output and Interrupt, STACK Organization, Instruction Formats, Addressing Modes, DATA Transfer and Manipulation, Program Control, Reduced Instruction Set Computer.

UNIT II

Micro Programmed Control: Control Memory, Address Sequencing, Micro program Examples, Design of Control Unit, Hard Wired Control, Micro programmed Control.

The Memory System: Basic Concepts of Semiconductor RAM Memories, Read-Only Memories, Cache Memories Performance Considerations, Virtual Memories secondary Storage, Introduction to RAID.

UNIT III

Input-Output Organization: Peripheral Devices, Input-Output Interface, Asynchronous Data Transfer Modes, Priority Interrupt, Direct Memory Access, Input-Output Processor (IOP), Serial Communication; Introduction to Peripheral Components, Interconnect (PCI) Bus, Introduction to Standard Serial Communication Protocols like RS232, USB, IEEE1394.

UNIT –IV

Operating Systems Overview: Overview of Computer Operating Systems Functions, Protection and Security, Distributed Systems, Special Purpose Systems, Operating Systems Structures-Operating System Services and Systems Calls, System Programs, Operating System Generation.

Memory Management: Swapping, Contiguous Memory Allocation, Paging, Structure of the Page Table, Segmentation, Virtual Memory, Demand Paging, Page-Replacement Algorithms, Allocation of Frames, Thrashing Case Studies - UNIX, Linux, Windows

Principles of Deadlock: System Model, Deadlock Characterization, Deadlock Prevention, Detection and Avoidance, Recovery from Deadlock.

UNIT –V

File System Interface: The Concept of a File, Access Methods, Directory Structure, File System Mounting, File Sharing, Protection.

File System Implementation: File System Structure, File system Implementation, Directory Implementation, Allocation Methods, Free-Space Management.

TEXT BOOKS:

1. Computer Organization - Carl Hamacher, ZvonksVranesic, SafeaZaky, 5th Edition, McGraw Hill.
2. Computer System Architecture - M. moris mano, 3rd edition, Pearson
3. Operating System Concepts - AbrehamSilberchatz, Peter B. Galvin, Greg Gagne, 8th Edition, John Wiley

REFERENCE BOOKS:

1. Computer Organization and Architecture - William Stallings 6th Edition, Pearson
2. Structured Computer Organization - Andrew S. Tanenbaum, 4th Edition, PHI
3. Fundamentals of Computer Organization and Design – Sivaraama Dandamudi, Springer Int. Edition
4. Operating Systems - Internals and Design Principles, Stallings, 6th Edition - 2009, Pearson Education.
5. Modern Operating Systems, Andrew S Tanenbaum 2nd Edition, PHI
6. Principles of Operating System, B. L. Stuart, Cengage Learning, India Edition.

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IV Year B.Tech. CSG-I Sem	**L**	**T**	**P**	**C**
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(20CD7PC11) Extreme Programming

Course Objectives:

1. The Extreme Programming methodology is intended to improve software quality and responsiveness, as well as handle changing software requirements.
2. The benefits of Extreme Programming, including the interconnected set of thirteen practices and how the methodology as a whole is helping to integrate Agile into software development for an efficient and dynamic team.

Course Outcomes:

1. Analyse software engineering trends in a nut shell.
2. Apply extreme programming practices to develop real time projects in software industry.
3. Apply extreme programming artifacts for the development of planning game and refactoring.
4. Implement hybrid tools for scrum & extreme programming in agile process model

UNIT-1

Extreme Programming – Introduction What is Agile? Agile Manifesto, Software Engineering Trends, what is Extreme Programming? Extreme Programming in a Nutshell, why is it called "Extreme? History of Extreme Programming, Success in Industry, Extreme Programming Advantages, Extreme Programming – Values and Principles, Extreme Programming Values, Extreme Programming Principles.

UNIT II

Extreme Programming – Practice Four Areas of Extreme Programming, The Planning Game, Short Releases, Metaphor, Simple Design, Testing, Refactoring, Pair Programming, Collective Ownership.
Extreme Programming – Practices, Four Areas of Extreme Programming, The Planning Game, Short Releases, Metaphor, Simple Design, Testing, Refactoring, Pair Programming, Collective Ownership, Continuous Integration, On-Site Customer, Coding Standards.

UNIT III

Extreme Programming – Process Cycle, Extreme Programming Process Cycle, Extreme Programming – Pair Programming, Pair Programming Advantages, Adapting to Pair Programming, Extreme Programming – Roles, Roles in Extreme Programming, Developer, Customer Manager Coach, Extreme Programming – Activities and Artifacts, XP – Activities, Release Planning, Iteration Planning, Implementation

UNIT –IV

Extreme Programming Artifacts, Extreme Programming – Rules, Rules of Planning Game, Extreme Programming – Additional Features, Feedback Loops, Project Management, Learnings from the XP , Practices, Scaling Extreme Programming, Documentation, Misconceptions of XP, Extreme Programming – Scrum & Extreme Programming – Flexibility as Technique.

UNIT –V

Agile Methodologies, How Scrum makes the Difference? Scrum + Extreme Programming Hybrid, Tools for Scrum& XP Hybrid Projects, Extreme Programming – Tools, Extreme Planner, Project Planning and Tracking System, Target process, Plone Extreme Management Tool, XP Tools for Java Developers, XP Tools for .Net Developers, Adopting XP in your Organization.

TEXT BOOKS:

1. Extreme Programming Explained by Kent Beck -Publisher(s): Addison-Wesley Professional.
2. Effective Project Management: Traditional, Agile, Extreme" by Robert K Wysocki.

REFERENCE BOOKS:

1. Extreme Programming Explained by Jeffries Ron, Ann Anderson & Chet Hendrickson.
2. A Panoramic study on Extreme Research: Extreme Programming by Ch. V. Phani Krishna, K.

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(20CD7PC12) DEVOPS

Prerequisites:

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

Course Objectives:

1. Devops improves collaboration and productivity by automating infrastructure and workflows and continuously measuring applications performance.

Course Outcomes:

1. Enumerate the principles of continuous development and deployment, automation of configuration management, inter-team collaboration, and IT service agility.
2. Describe DevOps & DevSecOps methodologies and their key concepts. Illustrate the types of version control systems, continuous integration tools, continuous monitoring tools, and cloud models.
3. Set up complete private infrastructure using version control systems and CI/CD tools.

UNIT-1

Phases of Software Development life cycle - Phases of Software Development life cycle.
Values and principles of agile software development.

UNIT II

Fundamentals of DevOps - Fundamentals of DevOps: Architecture, Deployments, Orchestration, Need, Instance of applications, DevOps delivery pipeline, DevOps eco system.

UNIT III

DevOps adoption in projects - DevOps adoption in projects: Technology aspects, Agiling capabilities, Tool stack implementation, People aspect, processes

UNIT –IV

CI/CD - CI/CD: Introduction to Continuous Integration, Continuous Delivery and Deployment, Benefits of CI/CD, Metrics to track CICD practices

UNIT –V

Devops Maturity Model - Devops Maturity Model: Key factors of DevOps maturity model, stages of Devops maturity model, DevOps maturity Assessment.

TEXT BOOKS:

1. The DevOps Handbook: How to Create World-Class Agility, Reliability, and Security in Technology Organizations, Gene Kim, John Willis, Patrick Debois, Jez Humb,1st Edition, O'Reilly publications,2016.
2. What is Devops? Infrastructure as code, 1st Edition, Mike Loukides, O'Reilly publications,2012.

REFERENCE BOOKS:

1. Building a DevOps Culture, 1st Edition, Mandi Walls, O'Reilly publications, 2013.
2. The DevOps 2.0 Toolkit: Automating the Continuous Deployment Pipeline with Containerized Microservices, 1st Edition, Viktor Farcic, CreateSpace Independent Publishing Platform publications,2016
3. Continuous Delivery: Reliable Software Releases Through Build, Test, and Deployment Automation, 1st Edition, Jez Humble and David Farley, 2010.
4. Achieving DevOps: A Novel About Delivering the Best of Agile, DevOps, and microservices,1st Edition, Dave Harrison, Knox

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(20CD7PC13) DEVOPS – LAB

Course Objectives:

1. The objective of this course is to familiarize learners to different development frameworks.
2. Learn the principles and process of software engineering and design thinking.

Course Outcomes:

1. Remember the importance of DevOps tools used in software development life cycle
2. Understand the importance of Jenkins to Build, Deploy and Test Software Applications
3. Examine the different Version Control strategies
4. Analyze & Illustrate the Containerization of OS images and deployment of applications over Docker
5. Summarize the importance of Software Configuration Management in DevOps
6. Synthesize the provisioning using Chef/Puppet/Ansible or Salt stack.

LIST OF EXPERIMENTS

1. Installing Git
   a) Installing on Linux
   b) Installing on Windows
   c) Initial setup
2. Workstation Setup
   a) How to configure knife
   b) Execute some commands to test connection between knife and workstation
3. Organization Setup
   a) Create organization
   b) Add yourself and node to organization
4. Test Node Setup
   a) Create a server and add to organization
   b) Check node details using knife
5. Node Objects and Search
   a) How to Add Run list to Node
   b) Check node Details
6. Environments
   a) How to create Environments
   b) Add servers to environments
7. Roles
   a) Create roles
   b) Add Roles to organization
8. Attributes
   a) Understanding of Attributes
   b) Creating Custom Attributes
   c) Defining in Cookbooks
9. Data bags
   a) Understanding the data bags
   b) Creating and managing the data bags
   c) Creating the data bags using CLI and Chef Console
   d) Sample data bags for Creating Users.

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(20CD7PE41) DISTRIBUTED DATABSE
(Professional Elective - IV)

Course Objectives:

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

Course Outcomes:

1. Understand theoretical and practical aspects of distributed database systems.
2. Study and identify various issues related to the development of distributed database system.
3. Understand the design aspects of object-oriented database system and related development.

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, McGraw Hill.

REFERENCE BOOKS:

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

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(20CD7PE42) AGILE PROGRAMMING
(Professional Elective – IV)

Course Objectives:

1. To provide students with a theoretical as well as practical understanding of agile software development
2. practices and how small teams can apply them to create high-quality software.
3. To provide a good understanding of software design and a set of software technologies and APIs.
4. To do a detailed examination and demonstration of Agile development and testing techniques.
5. To understand the benefits and pitfalls of working in an Agile team.

Course Outcomes:

1. Interpret the concept of agile software engineering and its advantages in software development.
2. Identify the roles and responsibilities in agile projects and their difference from projects following traditional methodologies.
3. Access implications of functional testing, unit testing, and continuous integration.
4. Determine the role of design principles in agile software design.
5. Make use of various tools available to agile teams to facilitate the project.

UNIT-1

Introduction: Need of Agile software development, agile context– Manifesto, Principles, Methods, Values, Roles, Artifacts, Stakeholders, and challenges. Business benefits of software agility.

UNIT II

Project Planning: Recognizing the structure of an agile team– Programmers, Managers, Customers. User stories– Definition, Characteristics and content. Estimation– Planning poker, Prioritizing, and selecting user stories with the customer, projecting team velocity for releases and iterations.

UNIT III

Project Design: Fundamentals, Design principles–Single responsibility, Open-closed, Liskov substitution, Dependency-inversion, Interface-segregation.

UNIT –IV

Design Methodologies: Need of scrum, Scrum practices –Working of scrum, Project velocity, Burn down chart, Sprint backlog, Sprint planning and retrospective, Daily scrum, Scrum roles– Product Owner, Scrum Master, Scrum Team. Extreme Programming- Core principles, values and practices. Kanban, Feature-driven development, Lean software development.

UNIT –V

Testing: The Agile lifecycle and its impact on testing, Test driven development– Acceptance tests and verifying stories, writing a user acceptance test, Developing effective test suites, Continuous integration, Code refactoring. Risk based testing, Regression tests, Test automation**.**

TEXT BOOKS:

1. Ken Schawber, Mike Beedle, “Agile Software Development with Scrum”, International Edition, Pearson.
2. Robert C. Martin, “Agile Software Development, Principles, Patterns and Practices”, First International Edition, Prentice Hall.
3. Pedro M. Santos, Marco Consolaro, and Alessandro Di Gioia, “Agile Technical Practices Distilled:A learning journey in technical practices and principles of software design”, First edition, Packt Publisher.

REFERENCE BOOKS:

1. Lisa Crispin, Janet Gregory, “Agile Testing: A Practical Guide for Testers and Agile

Teams", International edition, Addison Wesley.

2. Alistair Cockburn, "Agile Software Development: The Cooperative Game", 2nd Edition, Addison- Wesley

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(20CD7PE43) Software Metrics
Professional Elective – IV

Course Objectives:

1. To analyze basics of Measurement.
2. To learn about different Methods of Data Collection.
3. 3To learn about measuring Internal and External Product Attributes.
4. Analyze software quality measurements and metrics.
5. Plan measurement programs.

Course Outcomes:

1. Analyze measurement in software engineering.
2. Classify software measures and data collection.
3. Analyze internal and external product attributes.
4. Learn about measurement and management techniques.
5. Analyze about customer satisfaction.

UNIT-1

Measurement: Measurement in Everyday Life, Measurement in Software Engineering, Scope of Software Metrics. Frame Basics of Measurement: Representational Theory of Measurement, Measurement and Models, Measurement Scales and Scale Types.

UNIT II

Work For Software Measurement: Classifying Software Measures, Applying Frame Work, Software Measurement Validation. Software Methods in Data Collection: Good Data, Definition of Data, Collecting, Storing and Extracting Data.

UNIT III

Measuring Internal Product Attributes: Measuring Size and Structure. Measuring External Product Attributes: Modeling Software Quality, Measuring Aspects of Quality.

UNIT –IV

Measurement and Management: Planning a Measurement Program, Measurement in Practice. Measuring software: reliability, Reliability concepts and definitions, Software reliability models and metrics, Fundamentals of software reliability engineering (SRE), Reliability management models.

UNIT –V

Customer Satisfaction: Empirical Research in Software Engineering, Measuring and Analyzing Customer Satisfaction: Customer Satisfaction Surveys, Analyzing Satisfaction Data, Satisfaction with Company.

TEXT BOOKS:

1. Fenton, Pfleeger, Software Metrics, A Rigorous and Practical Approach, 2nd Edition, Thomson, 1998.
2. Stephen H. Kan, Metrics & Models in Software Quality Engineering, 2nd Edition, Addision- weseley Pearson Education, 2002.

REFERENCE BOOKS:

1. Sheppard, Software Engineering Metrics, 1st Edition, Mc Graw Hill Publications, 1994.
2. Pertis et al, Software Metrics, An Analysis and Evaluation, 1st Edition, MIT Press, 1981

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(20CD7PE44) Cloud Computing
Professional Elective – IV

Pre-requisites

1. A course on "Computer Networks"
2. A course on "Operating Systems"
3. A course on "Distributed Systems"

Course Objectives:

1. This course provides an insight into cloud computing
2. Topics covered include- distributed system models, different cloud service models, service-oriented architectures, cloud programming and software environments, resource management.

Course Outcomes:

1. To discuss the concepts of computing paradigm.
2. To understand the virtualization and cloud computing concepts.
3. To get the knowledge of cloud computing architecture layer management.
4. To discuss the various service delivery models.
5. To describe the various cloud service providers.

UNIT-1

Computing Paradigms: High-Performance Computing, Parallel Computing, Distributed Computing, Cluster Computing, Grid Computing, Cloud Computing, Bio computing, Mobile Computing, Quantum Computing, Optical Computing, Nano computing.

UNIT II

Cloud Computing Fundamentals: Motivation for Cloud Computing, The Need for Cloud Computing, Defining Cloud Computing, Definition of Cloud computing, Cloud Computing Is a Service, Cloud Computing Is a Platform, Principles of Cloud computing, Five Essential Characteristics, Four Cloud Deployment Models

UNIT III

Cloud Computing Architecture and Management: Cloud architecture, Layer, Anatomy of the Cloud, Network Connectivity in Cloud Computing, Applications, on the Cloud, Managing the Cloud, Managing the Cloud Infrastructure Managing the Cloud application, Migrating Application to Cloud, Phases of Cloud Migration Approaches for Cloud Migration.

UNIT –IV

Cloud Service Models: Infrastructure as a Service, Characteristics of IaaS. Suitability of IaaS, Pros and Cons of IaaS, Summary of IaaS Providers, Platform as a Service, Characteristics of PaaS, Suitability of PaaS,
Pros and Cons of PaaS, Summary of PaaS Providers, Software as a Service, Characteristics of SaaS, Suitability of SaaS, Pros and Cons of SaaS, Summary of SaaS Providers, Other Cloud Service Models.

UNIT –V

Cloud Service Providers: EMC, EMC IT, Captiva Cloud Toolkit, Google, Cloud Platform, Cloud Storage, Google Cloud Connect, Google Cloud Print, Google App Engine, Amazon Web Services, Amazon Elastic Compute Cloud, Amazon Simple Storage Service, Amazon Simple Queue ,service, Microsoft, Windows Azure, Microsoft Assessment and Planning Toolkit, SharePoint, IBM, Cloud Models, IBM Smart Cloud, SAP Labs, SAP HANA Cloud Platform, Virtualization Services Provided by SAP, Sales force, Sales Cloud, Service Cloud: Knowledge as a Service, Rack space, VMware, Manjra soft, Aneka Platform.

TEXT BOOKS:

1. Essentials of cloud Computing: K. Chandrasekhran, CRC press, 2014

REFERENCE BOOKS:

1. Cloud Computing: Principles and Paradigms by Rajkumar Buyya, James Broberg and Andrzej M.Goscinski, Wiley, 2011.
2. Distributed and Cloud Computing, Kai Hwang, Geoffery C. Fox, Jack J. Dongarra, Elsevier, 2012.
3. Cloud Security and Privacy: An Enterprise Perspective on Risks and Compliance, Tim Mather, Subra Kumaraswamy, Shahed Latif, O"Reilly, SPD, rp 2011.

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(20CD7PE51) Advanced Algorithms
Professional Elective – V

Prerequisites:
1. A course on "Computer Programming & Data Structures".
2. A course on "Advanced Data Structures & Algorithms".

Course Objectives:
1. Introduces the recurrence relations for analyzing the algorithms
2. Introduces the graphs and their traversals.
3. Describes major algorithmic techniques (divide-and-conquer, greedy, dynamic programming, Brute Force, transform and Conquer approaches) and mention problems for which each technique is appropriate.
4. Describes how to evaluate and compare different algorithms using worst-case, average-case and best-case analysis.
5. Introduces string matching algorithms.
6. Introduces linear programming.

Course Outcomes:
1. Ability to analyze the performance of algorithms.
2. Ability to choose appropriate data structures and algorithm design methods for a specified application.
3. Ability to understand how the choice of data structures and the algorithm design methods impact the performance of programs.

UNIT-1

Introduction: Role of Algorithms in computing, Order Notation, Recurrences, Probabilistic Analysis and Randomized Algorithms. Sorting and Order Statistics: Heap sort, Quick sort and Sorting in Linear Time. Advanced Design and Analysis Techniques: Dynamic Programming- Matrix chain Multiplication, Longest common Subsequence and optimal binary Search trees.

UNIT II

Greedy Algorithms - Huffman Codes, Activity Selection Problem. Amortized Analysis. Graph Algorithms: Topological Sorting, Minimum Spanning trees, Single Source Shortest Paths, Maximum Flow algorithms.

UNIT III

Sorting Networks: Comparison Networks, Zero-one principle, bitonic Sorting Networks, Merging Network, Sorting Network. Matrix Operations- Strassen's Matrix Multiplication, Inverting matrices, Solving system of linear Equations.

UNIT –IV

String Matching: Naive String Matching, Rabin-Karp algorithm, matching with finite Automata, Knuth-Morris - Pratt algorithm.

UNIT –V

NP-Completeness and Approximation Algorithms: Polynomial time, polynomial time verification, NP-Completeness and reducibility, NP-Complete problems. Approximation Algorithms- Vertex cover Problem, Travelling Sales person problem.

TEXT BOOKS:

1. Introduction to Algorithms," T.H. Cormen, C.E. Leiserson, R.L. Rivest, and C. Stein, Third Edition, PHI.

REFERENCE BOOKS:

1. Fundamentals of Computer Algorithms, Ellis Horowitz, Satraj Sahni and Raja sekharam, Galgotia publications pvt. Ltd
2. Design and Analysis Algorithms - Parag Himanshu Dave, Himanshu Bhalchandra Dave Publisher: Pearson.
3. Algorithm Design: Foundations, Analysis and Internet examples, M.T. Goodrich and R. Tomassia, John

   Wiley and sons. Data structures and Algorithm Analysis in C++, Allen Weiss, Second edition, Pearson education.

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(20CD7PE52) DATA SCIENCE
Professional Elective – V

Course Objectives:

1. Learn concepts, techniques and tools they need to deal with various facets of data science practice, including data collection and integration.
2. Understand the basic types of data and basic statistics.
3. Identify the importance of data reduction and data visualization techniques.

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

1. Understand basic terms what Statistical Inference means.
2. Identify probability distributions commonly used as foundations for statistical modeling. Fit a model to data
3. Describe the data using various statistical measures
4. Utilize R elements for data handling
5. Perform data reduction and apply visualization techniques.

UNIT-1

Introduction: Definition of Data Science- Big Data and Data Science hype – and getting past the hype - Datafication - Current landscape of perspectives - Statistical Inference - Populations and samples - Statistical modeling, probability distributions, fitting a model – Over fitting. Basics of R: Introduction, R Environment Setup, Programming with R, Basic Data Types.

UNIT II

Data Types & Statistical Description Types of Data: Attributes and Measurement, what is an Attribute? The Type of an Attribute, The Different Types of Attributes, Describing Attributes by the Number of Values, Asymmetric Attributes, Binary Attribute, Nominal Attributes, Ordinal Attributes, Numeric Attributes, Discrete versus Continuous Attributes. Basic Statistical.

UNIT III

Vectors: Creating and Naming Vectors, Vector Arithmetic, Vector sub setting, Matrices: Creating and Naming Matrices, Matrix Sub setting, Arrays, Class. Factors and Data Frames: Introduction to Factors: Factor Levels, summarizing a Factor, Ordered Factors, Comparing Ordered Factors.

UNIT –IV

Conditionals and Control Flow: Relational Operators, Relational Operators and Vectors, Logical Operators, Logical Operators and Vectors, Conditional Statements. Iterative Programming in R: Introduction, While Loop, For Loop, Looping Over List. Functions in R: Introduction, writing a Function in R, Nested Functions, Function Scoping, Recursion, Loading an R Package, Mathematical Functions in R.

UNIT –V

Data Reduction: Overview of Data Reduction Strategies, Wavelet Transforms, Principal Components Analysis, Attribute Subset Selection, Regression and Log-Linear Models: Parametric Data Reduction, Histograms, Clustering, Sampling, Data Cube Aggregation. Data Visualization: Visualization Techniques, Geometric Projection Visualization Techniques, Icon-Based Visualization Techniques, Hierarchical Visualization Techniques, Visualizing Complex Data and Relations.

TEXT BOOKS:

1. Doing Data Science, Straight Talk from The Frontline. Cathy O'Neil and Rachel Schutt, O'Reilly, 2014.
2. Jiawei Han, Micheline Kamber and Jian Pei. Data Mining: Concepts and Techniques, 3rd ed. The Morgan Kaufmann Series in Data Management Systems.
3. K G Srinivas, G M Siddesh, "Statistical programming in R", Oxford Publications.

REFERENCE BOOKS:

1. Introduction to Data Mining, Pang-Ning Tan, Vipin Kumar, Michael Steinbanch, Pearson Education.
2. Brain S. Everitt, "A Handbook of Statistical Analysis Using R", Second Edition, 4 LLC, 2014
3. Dalgaard, Peter, "Introductory statistics with R", Springer Science & Business Media, 2008.
4. Paul Teetor, "R Cookbook", O'Reilly, 2011.

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(20CD7PE53) SOFTWARE QUALITY MANAGEMENT
Professional Elective – V

Course Objectives:

Software quality models

1. Quality measurement and metrics.
2. Quality plan, implementation and documentation.
3. Quality tools including CASE tools.
4. Quality control and reliability of quality process.
5. Quality management system models.
6. Complexity metrics and Customer Satisfaction.
7. International quality standards – ISO, CMM.

Course Outcomes:

1. Become Familiar with The Planning of The Sqm (Software Quality Management) Processes
2. Analyze Sqm Processes
3. Evaluate and Design the Quality of a Software Product

UNIT-1

INTRODUCTION TO SOFTWARE QUALITY: Software Quality – Hierarchical models of Boehm and McCall – Quality measurement – Metrics measurement and analysis – Gilb's approach – GQM Model.

UNIT II

SOFTWARE QUALITY ASSURANCE: Quality tasks – SQA plan – Teams – Characteristics Implementation – Documentation – Reviews and Audits.

UNIT III

QUALITY CONTROL AND RELIABILITY: Tools for Quality – Ishikawa's basic tools – CASE tools Defect prevention and removal – Reliability models – Rayleigh model – Reliability growth models for quality assessment.

UNIT –IV

QUALITY MANAGEMENT SYSTEM: Elements of QMS – Rayleigh model framework – Reliability growth models for QMS – Complexity metrics and models – Customer satisfaction analysis.

UNIT –V

QUALITY STANDARDS: Need for standards – ISO 9000 Series – ISO 9000-3 for software development – CMM and CMMI – Six Sigma concepts.

TEXT BOOKS:

1. Allan C. Gillies, "Software Quality: Theory and Management", Thomson Learning, 2003. (UI: Ch 1-4; UV: Ch 7-8)
2. Stephen H. Kan, "Metrics and Models in Software Quality Engineering", Pearson Education (Singapore) Pte Ltd., 2002. (UI Ch 3-4; UIII: Ch 5-8; UIV: Ch 9-11)

REFERENCE BOOKS:

1. Norman E. Fenton and Shari Lawrence Pfleeger, "Software Metrics" Thomson, 2003.
2. Mordechai Ben – Menachem and Garry S.Marliss, "Software Quality", Thomson Asia Pte Ltd,2003.
3. Mary Beth Chrissis, Mike Konrad and Sandy Shrum, "CMMI", Pearson Education (Singapore) Pte Ltd, 2003.

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(20CD7PE54) COMPUTER VISION
Professional Elective – V

Course Objectives:

1. To review image processing techniques for computer vision.
2. To understand shape and region analysis.
3. To understand Hough, Transform and its applications to detect lines, circles, ellipses.
4. To understand three-dimensional image analysis techniques.
5. To understand motion analysis.
6. To study some applications of computer vision algorithms.

Course Outcomes: Upon completion of this course, the students should be able to

1. Implement fundamental image processing techniques required for computer vision.
2. Perform shape analysis.
3. Implement boundary tracking techniques.
4. Apply chain codes and other region descriptors.
5. Apply Hough Transform for line, circle, and ellipse detections

UNIT-1

IMAGE PROCESSING FOUNDATIONS: Review of image processing techniques – classical filtering operations – thresholding techniques – edge detection techniques – corner and interest point detection – mathematical morphology – texture.

UNIT II

SHAPES AND REGIONS: Binary shape analysis – connectedness – object labeling and counting – size filtering – distance functions – skeletons and thinning – deformable shape analysis – boundary tracking procedures – active contours – shape models and shape recognition – centroidal profiles – handling occlusion – boundary length measures – boundary descriptors – chain codes – Fourier descriptors – region descriptors moments.

UNIT III

HOUGH TRANSFORM: Line detection – Hough Transform (HT) for line detection – foot-of-normal method – line localization – line fitting – RANSAC for straight line detection – HT based circular object detection – accurate center location – speed problem – ellipse detection – Case study: Human Iris location – hole detection – generalized Hough Transform (GHT) – spatial matched filtering – GHT for ellipse detection object location – GHT for feature collation.

UNIT –IV

3D VISION AND MOTION: Methods for 3D vision – projection schemes – shape from shading photometric stereo – shape from texture – shape from focus – active range finding – surface representations point-based representation – volumetric representations – 3D object recognition – 3D reconstruction – introduction to motion – triangulation – bundle adjustment – translational alignment – parametric motion – spline-based motion – optical flow – layered motion.

UNIT –V

APPLICATIONS: Photo album – Face detection – Face recognition – Eigen faces – Active appearance and 3D shape models of faces Application: Surveillance – foreground-background separation – particle filters –
Chamfer matching, tracking, and occlusion – combining views from multiple cameras – human gait analysis Application: In-vehicle vision system: locating roadway – road markings – identifying road signs – locating pedestrians.

REFERENCE BOOKS:

1. D. L. Baggio et al., ―Mastering OpenCV with Practical Computer Vision Projects‖, Packt Publishing, 2012.
2. 2.E. R. Davies, ―Computer & Machine Vision‖, Fourth Edition, Academic Press, 2012.
3. Jan Erik Solem, ―Programming Computer Vision with Python: Tools and algorithms for analyzing images‖, O'Reilly Media, 2012.
4. Mark Nixon and Alberto S. Aquado, ―Feature Extraction & Image Processing for Computer Vision‖, Third Edition, Academic Press, 2012.
5. R.Szeliski, ―Computer Vision: Algorithms and Applications‖, Springer 2011
6. Simon J. D. Prince, ―Computer Vision: Models, Learning, and Inference‖, Cambridge University Press,2012.

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(20CS7OE21) Operating System
Open Elective–II

Prerequisites:

- **A course on "Computer Programming and Data Structures".**
- **A course on "Computer Organization and Architecture".**

Course Objectives: To learn

1. Provide an introduction to operating system concepts (i.e., processes, threads, scheduling, synchronization, dead locks, 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, interposes communication and I/O in Unix.

Course Outcomes: Upon completion of the course, students will have through knowledge about:

1. Demonstrate the fundamental components of a computer operating system.
2. Identify appropriate scheduling algorithm for process management.
3. Solve the situations occurred by deadlock to maintain appropriate process synchronization.
4. Make use of page replacement algorithm for effective memory management.
5. Apply the various system calls to enable the operating system services.

UNIT-1

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.

UNIT II

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

System call inter face for process management-fork, exit, wait, waitpid, and exec.

UNIT III

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

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

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

UNIT –IV

Memory Management and Virtual Memory-Logical versus Physical Address Space, Swapping, Contiguous Allocation, Paging, Segmentation, Segmentation with Paging, Demand Paging, Page Fault, 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, System Protection-Goals.

TEXT BOOKS:

1. Operating System Principles-Abraham Silberchatz peter
   B. Galvin, GregGagne7thEdition, JohnWiley
2. Advanced programming in the UNIX environment, W.R.Stevens, Pearson education

REFERENCE BOOKS:

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

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(20CS7OE22) ARTIFICIALINTELLIGENCE
Open Elective–II

Course Objectives: To learn

1. To learn the distinction between optimal reasoning Vs. human like reasoning
2. To understand the concepts of state space representation, exhaustive search, heuristic search together with the time and space complexities.
3. To learn different knowledge representation techniques.
4. To understand the applications of AI, namely game playing, theorem proving, and machine learning.

Course Outcomes:

1. Ability to formulate an efficient problem space, expressed in natural language.
2. Select a search algorithm for a problem and estimate its time and space complexities.
3. Possess the skill for representing knowledge using the appropriate technique for a given problem.
4. Apply AI techniques to solve problems of game playing, and machine learning.
5. Acquire the knowledge on machine learning techniques.

UNIT-1

Problem Solving by Search-I: Introduction to AI, Intelligent Agents

Problem Solving by Search –II: 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, Searching with Non-Deterministic Actions, Searching with Partial Observations, Online Search Agents and Unknown Environment .

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.

Knowledge Representation: Ontological Engineering, Categories and Objects, Events. Mental Events and Mental Objects, Reasoning Systems for Categories, Reasoning with Default Information.

UNIT –IV

Planning: Classical Planning: Definition of Classical Planning, Algorithms for Planning with State-Space Search, Planning Graphs, other Classical Planning Approaches, Analysis of Planning approaches.

Planning and Acting in the Real World: Time, Schedules, and Resources, Hierarchical Planning, Planning and Acting in Nondeterministic Domains, Multi agent Planning.

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.

Learning: Forms of Learning, Supervised Learning, Learning Decision Trees. Knowledge in Learning: Logical Formulation of Learning, Knowledge in Learning, Explanation-Based Learning, Learning Using Relevance Information, Inductive Logic Programming.

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.
4. Artificial Intelligence and Expert systems – Patterson, Pearson Education.

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(20HS8MS02) ORGANIZATIONAL BEHAVIOR

Course Objectives: To provide the students with the conceptual framework and the theories underlying Organizational Behavior.

Course Outcomes:

1. Upon the completion of the subject, the student will be able to analyze the behavior of individuals and groups in organizations in terms of the key factors that influence organizational behavior.
2. Assess the potential effects of organizational level factors (such as structure, culture and change) on organizational behavior.
3. Critically evaluate the potential effects of important developments in the external environment (such as globalization and advances in technology) on organizational behavior.
4. Analyse organizational behavioral issues in the context of organizational behavior theories, models and concepts.

UNIT-1

Introduction to OB - Definition, Nature and Scope –Environmental and organizational context Impact of IT, globalization, Diversity, Ethics, culture, reward systems and organizational design on Organizational Behavior. Cognitive Processes-I: Perception and Attribution: Nature and importance of Perception – Perceptual selectivity and organization - Social perception – Attribution Theories – Locus of control – Attribution Errors –Impression Management.

UNIT II

Cognitive Processes-II: Personality and Attitudes - Personality as a continuum – Meaning of personality - Johari Window and Transactional Analysis - Nature and Dimension of Attitudes – Job satisfaction and organizational commitment-Motivational needs and processes- Work- Motivation Approaches Theories of Motivation- Motivation across cultures - Positive organizational behavior: Optimism – Emotional intelligence – Self-Efficacy.

UNIT III

Dynamics of OB-I: Communication – types - interactive communication in organizations – barriers to communication and strategies to improve the follow of communication - Decision Making: Participative decision-making techniques – creativity and group decision making. Dynamics of OB –II Stress and Conflict: Meaning and types of stress –Meaning and types of conflict - Effect of stress and intra-individual conflict - strategies to cope with stress and conflict

UNIT –IV

Dynamics of OB –III Power and Politics: Meaning and types of power – empowerment - Groups Vs. Teams – Nature of groups –dynamics of informal groups – dysfunctions of groups and teams, teams in modern work place.

UNIT –V

Leading High performance: Job design and Goal setting for High performance- Quality of Work Life- Socio technical Design and High-performance work practices - Behavioral performance management: reinforcement and punishment as principles of Learning –Process of Behavioral modification - Leadership theories - Styles, Activities and skills of Great leaders.

TEXT BOOKS:

1. Luthans, Fred: Organizational Behavior 10/e, McGraw-Hill, 2009.
2. Mc Shane: Organizational Behavior, 3e, TMH, 2008
3. Nelson: Organizational Behavior, 3/e, Thomson, 2008.
4. New strom W. John& Davis Keith, Organizational Behavior-- Human Behavior at Work, 12/e, TMH, New Delhi, 2009.
5. Pierce and Gardner: Management and Organizational Behavior: An Integrated perspective, Thomson, 2009.
6. Robbins, P. Stephen, Timothy A. Judge: Organizational Behavior, 12/e, PHI/Pearson, New Delhi, 2009. 7. Pareek Udai: Behavioral Process at Work: Oxford & IBH, New Delhi, 2009.

REFERENCE BOOKS:

1. Schermerhorn: Organizational Behavior 9/e, Wiley, 2008.
2. Hitt: Organizational behavior, Wiley, 2008.
3. Aswath Appa: Organizational behavior, Himalaya, 2009.
4. Mullins: Management and Organizational behavior, Pearson, 2008.
5. McShane, Glinow: Organizational behavior--Essentials, TMH, 2009.
6. Ivancevich: Organizational behavior and Management, 7/e, TMH, 2008.

TEEGALA KRISHNA REDDY ENGINEERING COLLEGE

IV Year B.Tech. CSG-II Sem

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(20CD8PE61) Software Security Engineering
(Professional Elective - VI)

Course Objectives:

1. The course aims in providing hands on approach to understand the concepts of Secure Software Engineering. It covers most of the software engineering part with the blend of security.
2. It covers the process model of software engineering with secure software development models.
3. It demonstrates knowledge of the distinction between critical and non-critical systems.
4. It demonstrates the ability to manage a project including planning, scheduling, and risk assessment management.

Course Outcomes:

1. Understand and argue the importance of security during the development of software systems
2. specify with the security properties for a software system
3. evaluate software design that incorporate security and process models
4. Apply tools and approaches for identifying security defects and vulnerabilities in software systems

UNIT-1

Software security life cycle, Software quality attributes, Security requirement gathering principles and guidelines. Software Assurance and Software Security, Threats to software security, Sources of software insecurity, Benefits of Detecting Software Security.

UNIT II

Properties of Secure Software, Influencing the security properties of software, Asserting and specifying the desired security properties.

UNIT III

Requirements Engineering for secure software: Introduction, the SQUARE process Model, Requirements elicitation and prioritization. Secure Software Architecture and Design: Introduction, software security practices for architecture and design: architectural risk analysis, software security knowledge for architecture and design: security principles, security guidelines and attack patterns.

UNIT –IV

Secure coding and Testing: Code analysis, Software Security testing, Security testing considerations throughout the SDLC.

UNIT –V

Security and Complexity: System Assembly Challenges: introduction, security failures, functional and attacker perspectives for security analysis, system complexity drivers and security.

TEXT BOOKS:

1. "SOFTWARE SECURITY: Building security In Gary McGraw", Addison – Wesley Software Security Series, 2006.
2. Software Security Engineering: Julia H. Allen, Pearson Education.

REFERENCE BOOKS:

1 Developing Secure Software: Jason Grembi, Cengage Learning.
2. 2Software Security: Richard Sinn, Cengage Learning.

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(20CD8PE62) Data Warehousing & Data Mining
(Professional Elective - VI)

Course Objectives:

Study data warehouse principles and its working learn data mining concepts understand association rules mining. Discuss classification algorithms learn how data is grouped using clustering techniques.

Course Outcomes:

1. Student should be able to understand why the data warehouse in addition to database systems.
2. Ability to perform the preprocessing of data and apply mining techniques on it.
3. Ability to identify the association rules, classification and clusters in large data sets.
4. Ability to solve real world problems in business and scientific information using data mining

UNIT-1

Data warehouse: Introduction to Data warehouse, Difference between operational database systems and data warehouses, Data warehouse Characteristics, Data warehouse Architecture and its Components, Extraction-Transformation-Loading, Logical (Multi-Dimensional), Data Modeling, Schema Design, Star and Snow-Flake Schema, Fact Constellation, Fact Table, Fully Addictive, Semi-Addictive, Non-Addictive Measures; Fact-Less-Facts, Dimension Table Characteristics; OLAP Cube, OLAP Operations, OLAP Server Architecture-ROLAP, MOLAP and HOLAP.

UNIT II

Introduction: Fundamentals of data mining, Data Mining Functionalities, Classification of Data Mining systems, Data Mining Task Primitives, Integration of a Data Mining System with a Database or Data Warehouse System, Major issues in Data Mining.

Data Preprocessing: Need for Preprocessing the Data, Data Cleaning, Data Integration &Transformation, Data Reduction, Discretization and Concept Hierarchy Generation.

UNIT III

Association Rules: Problem Definition, Frequent Item Set Generation, The APRIORI Principle, Support and Confidence Measures, Association Rule Generation; APRIOIRI Algorithm, The Partition Algorithms, FP- Growth Algorithms, Compact Representation of Frequent Item Set- Maximal Frequent Item Set, Closed Frequent Item Set.

UNIT –IV

Classification: Problem Definition, General Approaches to solving a classification problem, Evaluation of Classifiers, Classification techniques, Decision Trees-Decision tree Construction, Methods for Expressing attribute test conditions, Measures for Selecting the Best Split, Algorithm for Decision tree Induction ; Naive- Bayes Classifier, Bayesian Belief Networks; K- Nearest neighbor classification-Algorithm and Characteristics, prediction: Accuracy and Error measures, Evaluating the accuracy of a classifier or a predictor, Ensemble methods.

UNIT –V

Clustering: Clustering Overview, A Categorization of Major Clustering Methods, partitioning methods, hierarchical methods, partitioning clustering-k-means algorithm, pam algorithm; hierarchical clustering-agglomerative methods and divisive methods, Basic Agglomerative Hierarchical Clustering Algorithm, Key Issues in Hierarchical Clustering, Strengths and Weakness, Outlier Detection.

TEXT BOOKS:

1. Data Mining- Concepts and Techniques- Jiawei Han, Micheline Kamber, Morgan Kaufmann Publishers, Elsevier, 2 Edition, 2006.
2. Introduction to Data Mining, Pang-Ning Tan, Vipin Kumar, Michael Steinbach, Pearson Education.

REFERENCE BOOKS:

1 Data Mining Techniques, Arun K Pujari, 3rd Edition, Universities Press
2. Data Warehousing Fundamentals, Pualraj Ponniah, Wiley Student Edition.
3. The Data Warehouse Life Cycle Toolkit – Ralph Kimball, Wiley Student Edition.
4. Data Mining, Vikaram Pudi, P Radha Krishna, Oxford University Press.

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(20CD8PE63) Software Verification & Validation
(Professional Elective - VI)

Course Objectives:

1. Apply the concepts and theory related to software verification and validation.
2. Identify different testing techniques and design test plans, develop test suites, and evaluate test suite coverage
3. Use testing frameworks and testing tools.

UNIT-1 Introduction

Quality Assurance Through Verification, Attributes of Quality Software, Verification Throughout the Lifecycle

UNIT II

Software Verification and Validation Introduction, principles of software verification and validation, reviews, tracing, formal proof, testing.

UNIT III

Software Verification and Validation Methods Introduction, software inspections, formal methods, program verification techniques, clean room method, structured testing, structured integration testing.

UNIT –IV

Software Verification and Validation Tools Introduction, tools for reviewing, tools for tracing, tools for formal proof, tools for testing.

UNIT –V

The Software Verification and Validation Plan Introduction, style, responsibility, medium, service information, content of svvp/sr, svvp/ad & svvp/dd sections, content of svvp/ut, svvp/it, svvp/st & svvp/at sections, evolution.

TEXT BOOKS:

1. Software Verification and Validation for Practitioners and Managers Artech House Publishers Steven R. Rakitin (Author)

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IV Year B.Tech. CSG-II Sem

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(20CD8PE64) Data Analytics
(Professional Elective - VI)

Course Objectives:

1. To explore the fundamental concepts of data analytics
2. To learn the principles and methods of statistical analysis
3. Discover interesting patterns, analyze supervised and unsupervised models and estimate the accuracy of the algorithms
4. To understand the various search methods and visualization techniques

Course Outcomes:

1. Understand the impact of data analytics for business decisions and strategy
2. Carry out data analysis/statistical analysis
3. To carry out standard data visualization and formal inference procedures
4. Design Data Architecture
5. Understand various Data Sources

UNIT-1

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 Modeling in Business, Databases & Types of Data and variables, Data Modeling Techniques, Missing Imputations etc. Need for Business Modeling.

UNIT III

Regression – Concepts, Blue property assumptions, Least Square Estimation, Variable Rationalization, and Model Building etc. Logistic Regression: Model Theory, Model fit Statistics, Model Construction, Analytics applications to 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 Trees etc. 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 Handbook for Associate Analytics – II, III.
2. Data Mining Concepts and Techniques, Han, Kamber, 3rd Edition, Morgan Kaufmann Publishers.

REFERENCE BOOKS:

1 Introduction to Data Mining, Tan, Steinbach and Kumar, Addision Wisley, 2006.
2. Data Mining Analysis and Concepts, M. Zaki and W. Meira
3. Mining of Massive Datasets, Jure Leskovec Stanford Univ. Anand Rajaraman Milliway Labs Jeffrey D Ullman Stanford Univ.

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IV Year B.Tech. CSG-II Sem

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(20CS8OE31) CYBER SECURITY
(OPEN ELECTIVE-III)

Course Objectives: To learn

1. Protect your information from getting intercepted on the way while being transferred to a trusted entity.
2. Protect your information from getting discovered by an eavesdropper.
3. Protect an organization from losing internal data.
4. Protect a software from getting cracked.

Course Outcomes:

1. Identify various cybercrimes and attacks-global study.
2. Study of various cybercrimes and bottlenecks.
3. Apply critical thinking and problem-solving skills to detect current and future attacks on an organization's computer systems and networks.
4. Study of various tools involved in cybercrime.
5. Apply critical thinking and problem-solving skills to detect current and future attacks on an organization's computer systems and networks.

UNIT-1

Introduction to Cybercrime: Introduction, Cybercrime and Information Security, who are Cybercriminals, Classifications of Cybercrimes, Cybercrime: The legal Perspectives and Indian Perspective, Cybercrime and the Indian ITA 2000, A Global Perspective on Cybercrimes.

UNIT II

Cyber Offenses: How Criminals Plan Them: Introduction, How Criminals plan the Attacks, Social Engineering, Cyber stalking, Cyber Cafe and Cybercrimes, Botnets: The Fuel for Cybercrime, Attack Vector, Cloud Computing.

UNIT III

Cybercrime: Mobile and Wireless Devices: Introduction, Proliferation of Mobile and Wireless Devices, Trends in Mobility, Credit card Frauds in Mobile and Wireless Computing Era, Security Challenges Posed by Mobile Devices, Registry Settings for Mobile Devices, Authentication service Security, Attacks on Mobile/Cell Phones, Mobile Devices: Security Implications for Organizations, Organizational Measures for Handling Mobile, Organizational Security Policies an Measures in Mobile Computing Era, Laptops.

UNIT –IV

Tools and Methods Used in Cybercrime: Introduction, Proxy Servers and Anonymizers, Phishing, Password Cracking, Key loggers and Spywares, Virus and Worms, Trojan Horse and Backdoors, Steganography, DoS and DDoS attacks, SQL Injection, Buffer Overflow.

UNIT –V

Cyber Security: Organizational Implications, Introduction, Cost of Cybercrimes and IPR issues, Web threats for Organizations, Security and Privacy Implications, Social media marketing: Security Risks and Perils for Organizations, Social Computing and the associated challenges for Organizations.

TEXT BOOKS:

1. Cyber Security: Understanding Cyber Crimes, Computer Forensics and Legal Perspectives, Nina Godbole and Sunil Belapure, Wiley INDIA.

REFERENCE BOOKS:

1 Cyber Security Essentials, James Graham, Richard Howard and Ryan Otson, CRC Press. 2
2. Introduction to Cyber Security, Chwan-Hwa (john) Wu, J. David Irwin. CRC Press T&F Group

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IV Year B.Tech. CSG-II Sem

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(20CS8OE32) SCRIPTING LANGUAGES
(OPEN ELECTIVE-III)

Prerequisites:

1. A course on "Computer Programming and Data Structures."
2. A course on "Object Oriented Programming Concepts."

Course Objectives: To learn

1. This course introduces the script programming paradigm. Introduces scripting languages such as Perl, Ruby and TCL. Learning TCL.

Course Outcomes:

1. Comprehend the differences between typical scripting languages and typical system and application programming languages.
2. Gain knowledge of the strengths and weakness of Perl, TCL and Ruby; and select an appropriate language for solving a given problem.
3. Acquire programming skills in scripting language.

UNIT-1

Introduction: Ruby, Rails, the structure and Execution of Ruby Programs, Package Management with RUBYGEMS, Ruby and web: Writing CGI scripts, cookies, Choice of Web servers, SOAP and web services RubyTk – Simple Tk Application, widgets, Binding events, Canvas, scrolling

UNIT II

Extending Ruby: Ruby Objects in C, the Jukebox extension, Memory allocation, Ruby Type 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, Uses for Scripting Languages, Web Scripting, and the universe of Scripting Languages. 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, file system, eval, data structures, 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 up level commands, Name spaces, trapping errors, event driven programs, making applications internet aware, Nuts and Bolts Internet Programming, Security Issues, C Interface.TK: TK-Visual Tool Kits, 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 Pragmatic Programmers 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, Larry Wall, T. Christiansen and J. Orwant, O'Reilly, SPD.

4. Tcl and the Tk Tool kit, Ousterhout, Pearson Education.
5. Perl Power, J.P. Flynt, Cengage Learning.

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)