ACADEMIC REGULATIONS (R17)

COURSE STRUCTURE AND DETAILED SYLLABUS

(CHOICE BASED CREDIT SYSTEM (CBCS))

COMPUTER SCIENCE & ENGINEERING

For

B. Tech. - Regular Four Year Degree Course
(Applicable for the batches admitted from 2017 - 2018)
&
B. Tech. - Lateral Entry Scheme
(Applicable for the batches admitted from 2018 - 2019)

CMR INSTITUTE OF TECHNOLOGY

(UGC - Autonomous)

Approved by AICTE, Permanently Affiliated to JNTUH, Accredited by NAAC with A Grade and NBA
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FOREWORD

CMR Institute of Technology, established in the year 2005 has been bestowed with autonomous status by the UGC from the Academic Year 2017-18 for its remarkable academic accomplishments accompanied by its unflinching spirit and dedication to impart quality technical education to the deserving aspirants. The institution has commenced functioning independently within the set norms prescribed by UGC and AICTE. The performance of the institution manifests the confidence that the prestigious monitoring body, the UGC has on it, in terms of upholding its spirit and sustenance of the expected standards of functioning on its own consequently facilitating the award of degrees for its students. Thus, an autonomous institution is provided with the necessary freedom to have its own **curriculum, examination system and monitoring mechanism**, independent of the affiliating University but under its observance.

CMR Institute of Technology takes pride for having won the confidence of such distinguished academic bodies meant for monitoring the quality in technology education. Besides, the institution is delighted to sustain the same spirit of discharging the responsibilities that it has been conveying since a decade to attain the current academic excellence, if not improving upon the standards and ethics. Consequently, statutory bodies such as the Academic Council and the Boards of Studies have been constituted under the supervision of the Governing Body of the College and with the recommendations of the JNTU Hyderabad, to frame the regulations, course structure and syllabi for autonomous status.

The autonomous regulations, course structure and syllabi have been framed in accordance with the vision and mission of the institution along with certain valuable suggestions from professionals of various ancillary fields such as the academics, the industry and the research, all with a noble vision to impart quality technical education and contribute in catering full-fledged engineering graduates to the society.

All the faculty members, the parents and the students are requested to study all the rules and regulations carefully and approach the Principal to seek any clarifications, if needed, without presumptions, to avoid unwanted subsequent inconveniences and embarrassments. The cooperation of all the stake holders is sought for the successful implementation of the autonomous system in the larger interests of the institution and for brightening the career prospects of engineering graduates.

PRINCIPAL

CMR INSTITUTE OF TECHNOLOGY

Vision: To create world class technocrats for societal needs.

Mission: Impart global quality technical education for a better future by providing appropriate learning environment through continuous improvement and customization.

Quality Policy: Strive for global excellence in academics & research to the satisfaction of students and stakeholders.

Department of Computer Science & Engineering (CSE)

Vision: To be a model for academic excellence and research in the field of computer science and engineering that prepares competent professionals with innovative skills, moral values and societal concern.

Mission: Impart quality education through state-of-art curriculum, conducive learning environment and research with scope for continuous improvement leading to overall professional success.

I. PROGRAMME EDUCATIONAL OBJECTIVES (PEO's)

PEO1: Graduate will be capable of practicing principles of computer science & engineering, mathematics and scientific investigation to solve the problems that are appropriate to the discipline.

PEO2: Graduate will be an efficient software engineer in diverse fields and will be a successful professional and/or pursue higher education and research.

PEO3: Graduate exhibits professional ethics, communication skills, teamwork and adapts to changing environments of engineering and technology by engaging in lifelong learning.

II. PROGRAMME OUTCOMES (PO's)

1. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

2. **Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

3. **Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

4. **Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

5. **Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

6. **The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

7. **Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

8. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

9. **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

10. **Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

11. **Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

12. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

13. **PSO1:** Design and Develop computer based systems across various domains related to Algorithms, Software Development, Networking, Security, Web Development, Artificial Intelligence, IoT, Cloud Computing, Big Data Analytics and Machine Learning.

14. **PSO2:** Apply technical and research based skills learnt through professional society activities, internships and projects to provide solutions to real world problems in environment and society.

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B.Tech. - Regular Four Year Degree Program
(For batches admitted from the academic year 2017 - 18)
&
B.Tech. - Lateral Entry Scheme
(For batches admitted from the academic year 2018 - 19)

PREAMBLE

For pursuing four year under graduate Bachelor Degree Programme in Engineering (B.Tech.) offered by **CMR Institute of Technology** under Autonomous status will herein be referred to as CMRIT (Autonomous).

All the specified rules are herein approved by the Academic Council. These rules will be in force and are applicable to students admitted from the Academic Year 2017-18 onwards. Any reference to "Institute" or "College" in these rules and regulations stand for CMRIT (Autonomous).

All the rules and regulations specified shall hereafter be read as a whole for the purpose of interpretation, as and when a doubt arises, the interpretation of the Chairman, Academic Council is final. As per the requirements of statutory bodies, the Principal, CMRIT (Autonomous) shall be The Chairman, Academic Council.

1. UNDER GRADUATE PROGRAMS OFFERED (E&T)

CMR Institute of Technology, an autonomous college affiliated to JNTUH, offers 4 Year (8 Semesters) **Bachelor of Technology** (B.Tech.) Degree Programme, under Choice Based Credit System (CBCS) with effect from the Academic Year 2017 - 18 onwards, in the following Branches of Engineering:

1) B.Tech.- Civil Engineering
2) B.Tech. - Mechanical Engineering
3) B.Tech. - Electronics and Communication Engineering
4) B.Tech. - Computer Science and Engineering

2. ADMISSION CRITERIA AND MEDIUM OF INSTRUCTION

2.1. Admission into first year of four year B.Tech. (Regular) Degree Programme:

2.1.1. Eligibility: A candidate seeking admission into the first year of four year B. Tech. Degree Programme should have:

(i) Passed either Intermediate Public Examination (IPE) conducted by the Board of Intermediate Education, Telangana, with Mathematics, Physics and Chemistry as optional subjects or any equivalent examination recognized by Board of Intermediate Education, Telangana or a Diploma in Engineering conducted by the Board of Technical Education, Telangana or equivalent Diploma recognized by Board of Technical Education for admission as per guidelines defined by the Regulatory bodies of Telangana State Council for Higher Education (TSCHE) and AICTE.

(ii) Secured a rank in the TSEAMCET examination conducted by TSCHE for allotment of a seat by the Convener, TSEAMCET.

2.1.2. Admission Procedure: Admissions are made into the first year of four year B.Tech. Degree Programme as per the stipulations of the TSCHE.

(a) Category A: 70% of the seats are filled through TSEAMCET counseling.
(b) Category B: 30% of the seats are filled by the Management.

2.2.   **Admission into the second year of four year B. Tech. (Regular) Degree Programme Under Lateral Entry Scheme.**

2.2.1   **Eligibility**: A candidate seeking admission under Lateral Entry Scheme (LES) into the II year I Semester B. Tech. Regular Degree Programme should have passed the qualifying examination (B.Sc. Mathematics or Diploma in concerned course) and have secured a rank at Engineering Common Entrance Test TSECET (FDH). Admissions are made in accordance with the instructions received from the Convener, TSECET and Government of Telangana State.

2.2.2   **Admission Procedure:** Admissions are made into the II year of four year B.Tech. (Regular) Degree Programme through Convenor, TSECET (FDH) against the sanctioned intake in each Programme of study as lateral entry student.

2.3.   **Branch Transfers:** There shall be no Branch transfers after the completion of Admission Process.

2.4.   **Medium of Instruction:** The Medium of Instruction and Examinations for the entire B.Tech. programme will be in **English** only.

3.   B.Tech. PROGRAMME STRUCTURE

3.1   **Admitted under Four year B. Tech. (Regular) degree Programme:**

3.1.1   A student after securing admission shall pursue the under graduate programme in B.Tech. in a minimum period of **four** academic years (8 semesters), and a maximum period of **eight** academic years (16 semesters) starting from the date of commencement of first year first semester, failing which, students shall forfeit their seat in B.Tech course.

3.1.2   Each semester is structured to provide 24 credits, totaling to 192 credits for the entire B.Tech. programme.

3.1.3   Each student shall secure 192 credits (with CGPA $\geq$ 5) required for the completion of the under graduate programme and award of the B.Tech. degree.

3.2   **Admitted under Lateral Entry Scheme (LES) into B. Tech. degree Programme:**

3.2.1   The LES students after securing admission shall pursue a course of study for not less than three academic years (6 Semesters) and not more than six academic years (12 Semesters), failing which students shall forfeit their seat in B.Tech programme.

3.2.2   The student shall register for 144 credits and secure 144 credits with CGPA $\geq$ 5 from II year to IV year B.Tech. programme (LES) for the award of B.Tech. degree.

3.3   **UGC / AICTE** specified definitions / descriptions are adopted appropriately for various terms and abbreviations used in these Academic Regulations / Norms, which are listed below:

3.3.1   **Semester Scheme:**

     Each B.Tech. (Regular) Programme is of 4 Academic Years (8 Semesters) and B.Tech. (LES) Programme is of 3 Academic Years (6 Semesters)), with the academic year being divided into two semesters of 22 weeks ($\geq$ 90 Instructional days per semester), each Semester having - 'Continuous Internal Evaluation (CIE)' and 'Semester End Examination (SEE)', Choice Based Credit System (CBCS) and Credit Based Semester System (CBSS) as indicated by UGC and Curriculum / Course Structure as suggested by AICTE.

3.3.2   Credit Courses:

a) All Subjects / Courses are to be registered by a student in a Semester to earn Credits. Credits shall be assigned to each Subject / Course in a L: T: P: C (Lecture Periods: Tutorial Periods: Practical Periods : Credits) Structure based on the following general pattern:

- One Credit - for One hour /Week / Semester for Theory /Lecture (L) Courses; and
- One Credit - for Two / Week / Semester for Laboratory / Practical (P) Courses

All Mandatory Courses, Study Tour, Guest Lecture, Tutorials, etc., will not carry any Credits.

b) Contact : Weekly contact - equal to 33 per week (i.e. 1 hour = 60 Minutes) including credit and non-credit courses.

3.3.3   Subject / Course Classification and Nomenclature:

CMRIT has followed almost all the guidelines specified by AICTE / UGC / JNTUH for the classification of all subjects / courses offered at B.Tech. programme and are mentioned below.

S. No.	Broad Course Classification	Course Group / Category	Course Description	Range of Credits
1	Foundation Courses (FnC)	BS – Basic Sciences	Includes - Mathematics, Physics and Chemistry Subjects	15%-20%
2		ES – Engg. Sciences	Includes fundamental engineering subjects.	15%-20%
3		HS – Humanities and Social Sciences	Includes subjects related to Humanities, Social Sciences and Management.	5%-10%
4	Core Courses (CoC)	PC – Professional Core	Includes core subjects related to the Parent Discipline/ Department/ Branch of Engg.	30%-40%
5	Elective Courses (EℓC)	PE – Professional Electives	Includes Elective subjects related to the Parent Discipline / Department / Branch of Engg.	10%-15%
6		OE – Open Electives	Elective subjects which include inter-disciplinary subjects or subjects in an area outside the Parent Discipline/ Department / Branch of Engg.	5%-10%
7	Core Courses	Project Work	B.Tech. Project or UG Project or UG Major Project.	10%-15%
8		Industrial Training / Mini-Project	Industrial Training/ Internship/ UG Mini-Project/ Mini-Project.	
9		Technical Seminar	Seminar / Colloquium based on core contents related to Parent Discipline/ Department/ Branch of Engg.	
10	Minor Courses	Minor Courses	1 or 2 Credit Courses (subset of HS)	-
11	Mandatory Courses (MC)	MC - Mandatory Courses	These courses are non-credit courses with evaluation.	-
12	Audit Courses (AC)	AC - Audit Courses	These courses are non-credit courses without evaluation	-
Total Credits for UGP (B. Tech.) Programme				**192 (100%)**

4. COURSE REGISTRATION

4.1 A '**faculty advisor or counselor**' shall be assigned to each student, who advises the student about the B.Tech. programme, its course structure and curriculum, choice / option for subjects / courses, based on his/her competence, progress, pre-requisites and interest.

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

4.3 A student can apply for **online** registration, **only after** obtaining the '**written approval**' from his faculty advisor or counselor, which should be submitted to the college academic section through the Head of the Department. A copy of it shall be retained with Head of the Department, faculty advisor and the student.

4.4 A student may be permitted to register for his/her subjects/course of **choice** with a total of 24 credits per semester (minimum of 20 credits and maximum of 28 credits, permitted deviation being± 17%), based on the student's **progress** and SGPA / CGPA, and completion of the '**pre-requisites**' as indicated for various subjects/courses, in the department course structure and syllabus contents. However, a **minimum** of 20 credits per semester must be registered to ensure the **studentship** in any semester.

4.5 Choice for '**additional subjects / courses**' to reach the maximum permissible limit of 28 credits (above the typical 24 credit norm) must be clearly indicated, which needs the specific approval and signature of the faculty advisor / counselor.

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

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

4.8 Dropping of subjects / courses may be permitted, only after obtaining prior approval from the faculty advisor / counselor (subject to retaining a minimum of 20 credits), '**within a period of 15 days**' from the commencement of that semester.

4.9 **Open electives**: Students have to choose one open elective wherever offered from the list of open electives given for their stream. However, student cannot opt for an open elective subject offered by their own (parent) department, if it is already listed under any category of the subjects offered by parent department in any semester.

4.10 **Professional electives**: Students have to choose professional elective wherever offered from the list of professional electives given. However, students may opt for professional elective subjects offered in the related area.

4.11 **Mandatory Courses (Non-Credit):** All mandatory courses where ever offered require prior registration.

4.11.1 NSS / Physical Education / Yoga Requirements:

i)   The student has to enroll for NSS / Physical Education / Yoga programme from the date of commencement of class work for I year I semester.

ii)   The NSS / Physical Education / Yoga programme schedule will be announced time to time by the respective coordinator(s).

iii) The Student has to submit the NSS / Physical Education / Yoga certificate on or before the last instruction day of I year I semester, otherwise his / her Semester End Examination results will not be declared.

4.11.2 Micro Project Requirements:

i)   The student has to enroll for Micro-Project from the date of commencement of I Year II Semester class work in any topic of their choice, in consultation with the class coordinator / Counselor.

ii)   The student has to collect relevant information on Science / Engineering & Technological advancements, prepare and present a report to the department evaluation committee for assessment.

4.11.3 Internship / Industrial Training / Certification Course / MOOCs :

i)   Student has to Enroll for Internship / Industrial Training / Certification Course / MOOCs under the guidance and approval from the concerned faculty advisor / Counselor on or before the date of commencement of class work for II Year I Semester.

ii)   Internship / Industrial Training / Certification Course / MOOCs completion certificate must be submitted to the Head of the Department on or before the last instruction day of III Year II Semester, otherwise his / her Semester End Examination results will be withheld.

5.   SUBJECTS / COURSES TO BE OFFERED

5.1   A subject/course may be offered to the students, **if only** a minimum 1/3 of students register to the course.

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

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

6.   ATTENDANCE REQUIREMENTS

6.1   A student shall be eligible to appear for the semester end examinations, if the student acquires a minimum 75% of attendance in aggregate (excluding the days of midterm examinations) for all the subjects / courses (excluding attendance in mandatory courses) in that semester.

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

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

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

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

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

7.   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 academic requirements and earned the credits allotted to each subject/course, if student secures not less than 35% marks in the semester end examination (SEE), and a minimum of 40% of marks in the sum total of the Continuous Internal Evaluation (CIE) and Semester End Examination (SEE) taken together; in terms of letter grades, this implies securing **C** grade or above in that subject / course.

7.2   A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to industry oriented mini-project and seminar, if student secures not less than 40% of the total marks in each of them. The student would be treated as failed, if student (i) does not submit a report on his industry oriented mini-project, or does not make a presentation of the same before the evaluation committee as per the schedule, or   (ii) does not present the seminar as required in the IV year I/II semester, or (iii) secures less than 40% of marks in industry oriented mini-project / seminar evaluations. Student may reappear once for each of the above evaluations, when they are scheduled again; if he fails in such 'one re-appearance' evaluation also, student has to reappear for the same in the next subsequent semester, as and when it is scheduled.

7.3   Promotion Rules

7.3.1   Four year B.Tech. (Regular):

S. No.	Promotion	Conditions to be fulfilled
1	First year first semester to first year second semester	Regular course of study of first year first semester.
2	First year second semester to second year first semester	**(i)** Regular course of study of first year second semester. **(ii)** Must have secured at least 24 credits out of 48 credits i.e., 50% credits upto first year second semester from all the relevant regular and supplementary examinations whether the student takes those examinations or not.
3	Second year first semester to second year second semester	Regular course of study of second year first semester.
4	Second year second semester to third year first semester	**(i)** Regular course of study of second year second semester. **(ii)** Must have secured at least 58 credits out of 96 credits i.e., 60% credits upto second year

		second semester from all the relevant regular and supplementary examinations, whether the student takes those examinations or not.
5	Third year first semester to third year second semester	Regular course of study of third year first semester.
6	Third year second semester to fourth year first semester	**(i)** Regular course of study of third year second semester. **(ii)** Must have secured at least 86 credits out of 144 credits i.e., 60% credits upto third year second semester from all the relevant regular and supplementary examinations, whether the student takes those examinations or not.
7	Fourth year first semester to fourth year second semester	Regular course of study of fourth year first semester.

7.3.2 Four year B.Tech. (LES):

S. No.	Promotion	Conditions to be fulfilled
1	Second year first semester to second year second semester	Regular course of study of second year first semester.
2	Second year second semester to third year first semester	**(i)** Regular course of study of second year second semester. **(ii)** Must have secured at least 29 credits out of 48 credits i.e., 60% credits up to second year second semester from all the relevant regular and supplementary examinations, whether the student takes those examinations or not.
3	Third year first semester to third year second semester	Regular course of study of third year first semester.
4	Third year second semester to fourth year first semester	**(i)** Regular course of study of third year second semester. **(ii)** Must have secured at least 58 credits out of 96 credits i.e., 60% credits upto third year second semester from all the relevant regular and supplementary examinations, whether the student takes those examinations or not.
5	Fourth year first semester to fourth year second semester	Regular course of study of fourth year first semester.

7.4 A student has to register for all subjects covering 192 credits (144 credits in case of LES) as specified and listed (with the relevant course / subject classifications as mentioned) in the course structure, fulfill all the attendance and academic requirements for 192 credits (144 credits in case of LES) securing a minimum of **'C'** grade or above in each subject, and 'earn all 192 credits (144 credits in case of LES) securing SGPA ≥ 5.0 (in each semester), and CGPA (at the end of each successive semester) ≥ 5.0, to successfully complete the under graduate programme.

7.5 After securing the necessary 192 credits (144 credits in case of LES) as specified for the successful completion of the entire under graduate programme, the student can avail exemption of two subjects up to 6 credits, that is, one open elective and one professional elective subject or two professional elective subjects for optional drop out from these 192 credits (144 credits in case of LES) earned; resulting in 186 credits (138 credits in case of LES) for under graduate programme performance evaluation, i.e., the performance of the student in these 186 credits (138 credits in case of LES) shall alone be taken into account for the calculation of 'the final CGPA (at the end of under graduate programme, which takes the SGPA of the IV year II semester into account)', and shall be indicated in the grade card of IV year II semester. However, the performance of student in the earlier individual semesters, with the corresponding SGPA and CGPA for which grade cards have already been given will not be altered.

7.6   If a student registers for some more '**extra subjects'** (in the parent department or other departments / branches of engineering) other than those listed subjects totaling to 192 credits (144 credits in case of LES) as specified in the course structure of parent department, the performances in those '**extra subjects**' (although evaluated and graded using the same procedure as that of the required 192 credits (144 credits in case of LES)) will not be taken into account while calculating the SGPA and CGPA. For such '**extra subjects'** registered, % of marks and letter grade alone will be indicated in the grade card as a performance measure, subject to completion of the attendance and academic requirements as stated in regulations 6 and 7.1 to 7.5 above.

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

7.8   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 student has been readmitted shall be applicable. However, no grade allotments or SGPA / CGPA calculations will be done for the entire semester in which student has been detained.

7.9   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 student has been readmitted shall be applicable.

8.   EVALUATION - DISTRIBUTION AND WEIGHTAGE OF MARKS

8.1   The performance of a student in each semester shall be evaluated subject-wise / course-wise (irrespective of credits assigned) with a maximum of 100 marks. These evaluations shall be based on 30 marks allotted for CIE (Continuous Internal Evaluation) and 70 marks for SEE (Semester End Examination), and a letter grade corresponding to the percentage of marks obtained shall be given.

8.2   **Evaluation of Theory Subjects / Courses**

   A) **Continuous Internal Evaluation:** For each theory subject, during the semester, there shall be 2 mid-term examinations of 30 marks each. Each mid-term examination consists of subjective paper for 25 marks & assignment for 5 marks and the average of the two mid-term examinations marks shall be taken as the final marks.

   I.   The first mid-term examination shall be conducted for the first 50% of the syllabus, and the second mid-term examination shall be conducted for the remaining 50% of the syllabus.

   II.   The subjective paper shall be conducted for duration of 2 . Each subjective paper shall contain 2 parts (Part-A and Part-B). Part-A consists of one compulsory question with five sub questions carrying two marks each. Part-B consists of 3 essay questions carrying five marks each with internal choice; the student has to answer all 3 questions.

   III. First assignment should be submitted before the commencement of the first mid-term examinations, and the second assignment should be submitted before the commencement of the second mid-term examinations. The assignments shall be specified / given by the concerned subject teacher.

IV. **Absence in mid-term examination(s):**

i)   If any student is absent in one mid-term examination for any course on health grounds / any valid reasons approved by the college academic committee, only one test shall be conducted on all units by the college in each course at the end of each semester on payment of prescribed fee.

ii) If any student is absent in both mid-term examinations for any course on health grounds / any valid reasons approved by the college academic committee, only one test for 25 marks shall be conducted on all units and the marks secured out of 25 shall be divided by two, which shall be awarded against the said mid-term examination(s) on payment of prescribed fee.

B)   **Semester End Examinations:** The duration of SEE is 3 . The details of the question paper pattern are as follows:

- The end semester examinations will be conducted for 70 marks consisting of two parts viz. i) **Part- A** for 20 marks, ii) **Part - B** for 50 marks.

- Part-A is compulsory question which consists of ten sub-questions (two from each unit) carry 2 marks each.

- Part-B consists of five questions (numbered from 2 to 6) carrying 10 marks each. One question from each unit (may contain sub-questions) with internal choice.

8.3   **Evaluation of Practical Subjects / Courses:** In any semester, a student has to complete a minimum of 10 experiments / exercises in each laboratory course and get the record certified by the concerned Head of the Department to be eligible for Semester End Examination.

For practical subjects, there shall be a Continuous Internal Evaluation (CIE) during the Semester for 30 internal marks and 70 marks for Semester End Examination (SEE).

A)   **Continuous Internal Evaluation (CIE):** Out of the 30 marks, 15 marks are allocated for day-to-day work evaluation and for the remaining 15 marks - two mid-term examinations of each 15 marks will be conducted by the concerned laboratory teacher for a duration of two and the average of the two mid-term examinations is taken into account.

I. **Absence in Laboratory Internal Examinations:**

a.   If any student is absent in one laboratory internal examination for any laboratory course on health grounds / for any valid reasons approved by the college academic committee, only one test shall be conducted for 15 marks on all experiments of that laboratory course, by the college at the end of the semester.

b.   If any student is absent in both the laboratory internal examinations on health grounds / for any valid reasons approved by the college academic committee, only one test shall be conducted on all experiments and the marks secured out of 15 marks shall be divided by two, which shall be awarded against the said laboratory internal examinations.

B)   **Semester End Examination (SEE):** The SEE for practical subject / course shall be conducted at the end of the semester with duration of 3 by one internal and one external examiner appointed by the Head of the Institution as per the recommendation of the concerned Head of the Department.

8.4   Evaluation of Design / Drawing Subjects / Courses: For the subjects such as Engineering Graphics, Machine Drawing and estimation, the distribution shall be 30 marks for CIE (15 marks for day-to-day work and 15 marks for internal examination) and 70 marks for SEE. 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   Evaluation of Industry-Oriented Mini-Project: There shall be an industry-oriented mini-project, in collaboration with an industry of their specialization, to be registered immediately after III year II semester examinations, and taken up during the summer vacation for four weeks duration. The industry 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 marks by the committee consisting of Head of the Department, concerned supervisor and two senior faculty members of the department. There shall be no internal marks for industry-oriented mini- project.

8.6   Evaluation of Technical Seminar: The student has to enroll and get approval for technical seminar on a specialized topic from the concerned advisor / counselor in the beginning of IV year II semester. The student should collect the information on a specialized topic, prepare a technical report, give seminar presentation on the topic and submit it to the department as notified by the concerned Head of the Department. It shall be evaluated by the departmental committee consisting of Head of the Department, seminar supervisor and two senior faculty members. The seminar report and the seminar presentation shall be evaluated for 100 marks. There shall be no semester end examination for the seminar.

8.7   Evaluation of Major Project: Student shall enroll for the project work during the IV year I semester, as per the instructions of the project guide / supervisor assigned by the Head of Department. Out of total 100 marks allotted for the project work 30 marks shall be for continuous internal evaluation and 70 marks for the end semester viva-voce examination. Out of 30 marks allocated for CIE, 15 marks shall be awarded by the project supervisor (based on the continuous evaluation of student's performance throughout the project work period), and the other 15 marks shall be awarded by a Departmental Committee consisting of Head of the Department and Project Supervisor, and two senior faculty members, based on the work carried out and the presentation made by the student during internal reviews (at least two internal reviews shall be conducted). The project viva-voce shall be conducted by a committee comprising an external examiner, Head of the Department and Project Supervisor.

8.8   Evaluation of Mandatory Non-Credit Courses: For Mandatory non credit courses '**Satisfactory**' or "**Unsatisfactory'** shall be indicated instead of marks or letter grade and this will not be counted for the computation of SGPA / CGPA.

(i)   For mandatory non-credit theory or practical courses such as Environmental Science & Technology, Gender Sensitization Lab, Human Values & Professional Ethics, Verbal Ability, Analytical Skills, Soft Skills, Quantitative Aptitude, the student has to secure $\geq 65\%$ attendance and not less than 40 marks out of 100 marks in the CIE, then the student is declared as **pass** and will be qualified for the award of the degree.

(ii)   For mandatory non-credit courses such as NSS / Physical Education / Yoga, Micro Project, Internship / Industrial Training / Certification Course / MOOCs, the student has to submit **satisfactory participation certificate** from the concerned authority.

9.   GRADING PROCEDURE

9.1   Marks will be awarded to indicate the performance of each student in each theory subject, lab/practical's, design/drawing practice, technical seminar, industry oriented mini-project and major project. Based on the percentage of marks obtained in Continuous Internal Evaluation plus Semester End Examination, both taken together, as specified in item 8 above, a corresponding letter grade shall be given.

9.2 As a measure of the student's performance, a 10-point Absolute Grading System using the following letter grades (UGC Guidelines) and corresponding percentage of marks shall be followed...

% of Marks Secured (Class Intervals)	Letter Grade (UGC Guidelines)	Grade Points
90% and above ($\geq$ 90% , $\leq$ 100%)	O (Outstanding)	10
Below 90% but not less than 80% ($\geq$ 80% , < 90%)	A$^+$ (Excellent)	9
Below 80% but not less than 70% ($\geq$ 70% , < 80%)	A (Very Good)	8
Below 70% but not less than 60% ($\geq$ 60% , < 70%)	B$^+$ (Good)	7
Below 60% but not less than 50% ($\geq$ 50% , < 60%)	B (above Average)	6
Below 50% but not less than 40% ($\geq$ 40% , < 50%)	C (Average)	5
Below 40% (< 40%)	F (Fail)	0
Absent	Ab	0

9.3 A student obtaining '**F**' grade in any subject shall be considered '**failed**' and will be required to reappear as '**supplementary student**' in the end semester examination (SEE), as and when offered. In such cases, his internal marks (CIE marks) in those subject(s) will remain same as those he obtained earlier.

9.4 A letter grade does not imply any specific % of marks.

9.5 In general, a student shall not be permitted to repeat any subject/course (s) only for the sake of '**grade improvement**' or 'SGPA/CGPA improvement'. However, he has to repeat all the subjects/courses pertaining to that semester if he is detained.

9.6 A student earns grade point (GP) in each subject/course, on the basis of the letter grade obtained by him in that subject/course (excluding mandatory non-credit courses). Then the corresponding '**credit points**' (CP) are computed by multiplying the grade point with credits for that particular subject/course.

Credit Points (CP) = Grade Point (GP) x Credits

9.7 The student passes the subject/course only when he gets GP $\geq$ 5 (C grade or above).

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

SGPA (S_i) = $\sum (C_i \times G_i) / \sum C_i$

Where C_i is the number of credits of the ith course and G_i is the grade point scored by the student in the ith course.

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

CGPA = $\sum (C_i \times S_i) / \sum C_i$

where S_i is the SGPA of the ith semester and C_i is the total number of credits in that semester.

Illustration of calculation of SGPA					Illustration of calculation of CGPA			
Course /Subject	Credits	Letter Grade	Grade Points	Credit Points	Semester	Credits	SGPA	Credits x SGPA
Course 1	4	A	8	4 x 8 = 32	Sem I	24	7	24 x 7= 168
Course 2	4	O	10	4 x 10 = 40	Sem II	24	6	24 x 6= 144
Course 3	4	C	5	4 x 5 = 20	Sem III	24	6.5	24 x 6.5 =156
Course 4	3	B	6	3 x 6 = 18	Sem IV	24	6	24 x 6 = 144
Course 5	3	A$^+$	9	3 x 9 = 27	Sem V	24	7.5	24 x 7.5 =180
Course 6	3	C	5	3 x 5 = 15	Sem VI	24	8	24 x 8 = 192
Total	**21**			**152**	Sem VII	24	8.5	24 x 8.5 =204
					Sem VIII	24	8	24 x 8 = 192
SGPA = 152/21 = 7.23					**Total**	**192**		**1380**
					CGPA = 1380/192 = 7.18			

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

9.11 For calculations listed in Item 9.6–9.10, performance in failed subjects/courses (securing **F** grade) will also be taken into account, and the credits of such subjects/courses will also be included in the multiplications and summations. However, mandatory courses will not be taken into consideration.

10 PASSING STANDARDS

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

10.2 A Student shall be declared '**successful**' or '**passed**' in any non-credit subject/ course, if he secures a '**Satisfactory Participation Certificate**' for that mandatory course.

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

11 DECLARATION OF RESULTS

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

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

Percentage of Marks = (final CGPA – 0.5) x 10

12 AWARD OF DEGREE

12.1 After a student has satisfied the requirement prescribed for the completion of the program and is eligible for the award of B. Tech. degree he shall be placed in one of the following four classes based on CGPA:

Class Awarded	Grade to be Secured	Remarks
First Class with Distinction	≥ 8 CGPA	From the aggregate marks secured from 192 Credits for Regular Students and 144 Credits for Lateral Entry Students.
First Class	≥ 6.5 to < 8 CGPA	
Second Class	≥ 5.5 to < 6.5 CGPA	
Pass Class	≥ 5.00 to < 5.5 CGPA	
FAIL	CGPA < 5	

12.2 First class with distinction will be awarded to those students who clear all the subjects in single attempt during his / her regular course of study by fulfilling the following conditions:

(i) Should have passed all the subjects/courses in '**first appearance'** within the first 4 academic years (or 8 sequential semesters) for B.Tech. (Regular) and first 3 academic years (or 6 sequential semesters) for B.Tech. (LES) from the date of commencement of first year first semester for B.Tech. (Regular) and II year I semester for B.Tech. (LES).

(ii) Should have secured a CGPA ≥ 8.00, at the end of each of the 8 sequential semesters (6 sequential semesters for LES), starting from I year I semester (starting from II year I semester for LES) onwards.

(iii) Should not have been detained or prevented from writing the end semester examinations in any semester due to shortage of attendance or any other reason, shall be placed in '**first class with distinction'**.

12.3 **Award of Medals:** Students fulfilling the conditions listed under item 12.2 alone will be eligible for award of '**College Ranks**' and '**Medals**'.

12.4 **Graduation Day:** The College shall have its own Annual Graduation Day for the award of Degrees issued by the University.

12.5 **Transcripts:** After successful completion of prerequisite credits for the award of degree a transcript containing performance of all academic years will be issued as a final record. Duplicate transcripts will also be issued if required after the payment of requisite fee and also as per norms in vogue.

13 WITH HOLDING OF RESULTS

If the student has not paid the fee to college at any stage, or has dues pending against his/her name due to any reason what so ever, or if any case of indiscipline is pending against him/her, the result of the student may be withheld, and he/she will not be allowed to go into the next higher semester.

14 SUPPLEMENTARY EXAMINATIONS

Supplementary examinations for odd semester subjects will be conducted along with even semester regular examinations and vice versa.

15. TRANSITORY REGULATIONS

A. For students detained due to shortage of attendance:

1. A Student who has been detained in I year of R09/R13/R15/R16 Regulations due to lack of attendance, shall be permitted to join I year I semester of R17 Regulations and he is required to complete the study of B.Tech. programme within the stipulated period of eight academic years from the date of first admission in I Year.

2. A student, who has been detained in any semester of II, III and IV years of R09/R13/R15/R16 regulations for want of attendance, shall be permitted to join the corresponding semester of R17 regulations and is required to complete the study of B.Tech. within the stipulated period of eight academic years from the date of first admission in I Year. The R17 Academic Regulations under which a student has been readmitted shall be applicable to that student from that semester.

See rule (C) for further Transitory Regulations.

B. For students detained due to shortage of credits:

3. A student of R09/R13/R15/R16 Regulations, who has been detained due to lack of credits, shall be promoted to the next semester of R17 Regulations only after acquiring the required credits as per the corresponding regulations of his/her first admission. The student is required to complete the study of B.Tech. within the stipulated period of eight academic years from the year of first admission. The R17 Academic Regulations are applicable to a student from the year of readmission onwards.

See rule (C) for further Transitory Regulations.

C. For readmitted students in R17 Regulations:

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

5. The maximum credits that a student acquires for the award of degree, shall be the sum of the total number of credits secured in all the regulations of his/her study including R17 Regulations. The performance evaluation of the student will be done after the exemption of two subjects if total credits acquired are ≤ 206, three subjects if total credits acquired are > 206 (see R16 Regulations for exemption details).

6. If a student readmitted to R17 Regulations, has any subject with 80% of syllabus common with his/her previous regulations, that particular subject in R17 Regulations will be substituted by another subject to be suggested by the CMRIT Academic Council.

Note: If a student readmitted to R17 Regulations, has not studied any subjects/topics in his/her earlier regulations of study which is prerequisite for further subjects in R17 Regulations, the Principal shall conduct remedial classes to cover those subjects/topics for the benefit of the students.

D. Promotion Rule: Where the credits allotted to a semester/year under the regulations studied in are different from that under R17 regulations for the corresponding semester/year, the promotion rules of R17 vide section 7.3 shall be applied after normalization. Normalization is done by scaling down or up the number of credits of a semester/year under the previous regulations to equal the number of credits of the corresponding semester/year under R17 regulations and revising the secured credits also in the same proportion.

16   STUDENT TRANSFERS

There shall be no transfers from other colleges / streams.

17   RULES OF DISCIPLINE

17.1   Any attempt by any student to influence the teachers, examiners, faculty members and staff of Controller of Examination office for undue favours in the exams, and bribing them either for marks or attendance will be treated as malpractice case and the student can be debarred from the college.

17.2   When the performance of the student in any subject(s) is cancelled as a punishment for indiscipline, student is awarded zero marks in that subject(s).

17.3   When the student's answer book is confiscated for any kind of attempted or suspected malpractice the decision of the Malpractice Prevention Committee is final.

18. MALPRACTICE

18.1 Malpractice Prevention Committee: The committee shall examine the student's malpractice and indiscipline cases occurred, while conducting the examinations and recommend appropriate punishment to the Academic Council after taking explanation from the student and concerned invigilator as per the malpractice rules mentioned below. The committee consists of

- a) Controller of Examinations - Chairman
- b) Addl. Controller of Examinations.- Convener
- c) Subject Expert - Member
- d) Head of the Department of which the student belongs to - Member
- e) The Invigilator concerned - Member

18.2 Malpractice Rules: Disciplinary Action for Improper Conduct in Examinations

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

		academic regulations in connection with forfeiture of seat. If the imposter is an outsider, he will be handed over to the police and a case is registered against him.
4	Smuggles in the Answer book or additional sheet or takes out or arranges to send out the question paper during the examination or answer book or additional sheet, during or after the examination.	Expulsion from the examination hall and cancellation of performance in that subject and all the other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.
5	Uses objectionable, abusive or offensive language in the answer paper or in letters to the examiners or writes to the examiner requesting him to award pass marks.	Cancellation of the performance in that subject.
6	Refuses to obey the orders of the Addl. Controller of examinations / 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 addl. Controller of examinations or any person on duty in or outside the examination hall of any injury to his person or to any of his relations whether by words, either spoken or written or by signs or by visible representation, assaults the addl. Controller of examinations, or any person on duty in or outside the examination hall or any of his relations, or indulges in any other act of misconduct or mischief which result in damage to or destruction of property in the examination hall or any part of the College campus or engages in any other act which in the opinion of the officer on duty amounts to use of unfair means or misconduct or has the tendency to disrupt the orderly conduct of the examination.	In case of students of the college, they shall be expelled from examination halls and cancellation of their performance in that subject and all other subjects the candidate(s) has (have) already appeared and shall not be permitted to appear for the remaining examinations of the subjects of that semester/year. The candidates also are debarred and forfeit their seats. In case of outsiders, they will be handed over to the police and a police case is registered against them.
7	Leaves the exam hall taking away answer script or intentionally tears of the script or any part thereof inside or outside the examination hall.	Expulsion from the examination hall and cancellation of performance in that subject and all the other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with

		forfeiture of seat.
8	Possess any lethal weapon or firearm in the examination hall.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred and forfeits the seat.
9	If student of the college, who is not a candidate for the particular examination or any person not connected with the college indulges in any malpractice or improper conduct mentioned in clause 6 to 8.	Student of the colleges expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred and forfeits the seat. Person(s) who do not belong to the College will be handed over to police and, a police case will be registered against them.
10	Comes in a drunken condition to the examination hall.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year.
11	Copying detected on the basis of internal evidence, such as, during valuation or during special scrutiny.	Cancellation of the performance in that subject and all other subjects the candidate has appeared including practical examinations and project work of that semester/year examinations.
12	If any malpractice is detected which is not covered in the above clauses 1 to 11 shall be reported to the principal for further action to award suitable punishment.	

19. SCOPE

i)   The Academic Regulations should be read as a whole, for the purpose of any interpretation.

ii) The above mentioned rules and regulations are applicable in general to both B.Tech. (Regular) and B.Tech. (LES), unless and otherwise specific.

iii) In case of any doubt or ambiguity in the interpretation of the above rules, the decision of the Chairman of the Academic Council is final.

20. REVISION AND AMENDMENTS TO REGULATIONS

The Academic Council may revise or amend the academic regulations, course structure or syllabi at any time, and the changes or amendments made shall be applicable to all students with effect from the dates notified by the Academic Council.

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COURSE STRUCTURE

B.Tech. – R-17 COURSE STRUCTURE

(Applicable from the batch admitted during 2017-18 and onwards)

S. No.	Subject Code	Subject	POs	L	T	P	Credits
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S. No.	Subject Code	Subject	POs	Hours Per Week			Credits
				L	T	P	
1	17CS1101BS	Engineering Mathematics – I	1,2,12	4	1	-	4
2	17CS1102BS	Applied Physics	1,2,12	4	1	-	4
3	17CS1103BS	Engineering Chemistry	1,2,12	4	1	-	4
4	17CS1104ES	Fundamentals of Information Technology	1,2,3,12	3	-	-	3
5	17CS1105ES	Computer Programming	1,2,3,12	3	1	-	3
6	17CS1106BS	Applied Physics / Engineering Chemistry Lab	4	-	-	3	2
7	17CS1107ES	C Programming Lab	4	-	-	3	2
8	17CS1108ES	IT & Engineering Workshop	1,5,9,10	-	-	3	2
		TOTAL		**18**	**4**	**9**	**24**
Mandatory Course (Non-Credit)							
9	17AC1109MC	NSS / Physical Education /Yoga	3,6,8,9,12	-	-	2	-

I – B.Tech. – I - Semester

S. No.	Subject Code	Subject	POs	Hours Per Week			Credits
				L	T	P	
1	17CS1201BS	Engineering Mathematics – II	1,2,12	4	1	-	4
2	17CS1202HS	Professional Communication in English	10,12	3	-	-	3
3	17CS1203ES	Basic Electrical & Electronics Engineering	1,2,3,12	4	1	-	4
4	17CS1204ES	Engineering Graphics	1,5,10	2	-	3	4
5	17CS1205ES	Data Structures through C	1,2,3,12	3	1	-	3
6	17CS1206HS	English Language Communication Skills Lab	5,10	-	-	3	2
7	17CS1207ES	Data Structures through C Lab	4	-	-	3	2
8	17CS1208ES	Basic Electrical & Electronics Engineering Lab	4	-	-	3	2
		TOTAL		**18**	**1**	**9**	**24**
Mandatory Course (Non-Credit)							
9	17AC1209MC	Micro Project	1 to 14	-	-	2	-

I – B.Tech. – II - Semester

S. No.	Subject Code	Subject	POs	L	T	P	Credits
**II – B.Tech. – I – Semester**							

S. No.	Subject Code	Subject	POs	Hours Per Week			Credits
				L	T	P	
1	17CS2101BS	Discrete Mathematical Structures	1,2,12	4	-	-	4
2	17CS2102ES	Digital Logic Design	1,2,3,6,12	3	-	-	3
3	17CS2103PC	Computer Organization	1,2,3,6,12	3	1	-	3
4	17CS2104PC	OOPS through JAVA	1,2,3,12	4	1	-	4
5	17CS2105PC	Database Management Systems	1,2,3,12	4	-	-	4
6	17CS2106PC	Computer Organization Lab	4,5	-	-	3	2
7	17CS2107PC	OOPS through JAVA Lab	4,5	-	-	3	2
8	17CS2108PC	Database Management Systems Lab	4,5	-	-	3	2
**TOTAL**	**18**	**2**	**9**	**24**				
**Mandatory Course (Non-Credit)**							
9	17HS2109MC	Gender Sensitization Lab	9,12	-	-	2	-
10	17HS2110MC	Verbal Ability	9,10	-	-	2	

S. No.	Subject Code	Subject	POs	L	T	P	Credits
**II – B.Tech. – II – Semester**							

S. No.	Subject Code	Subject	POs	Hours Per Week			Credits
				L	T	P	
1	17CS2201BS	Statistical and Numerical Methods	1,2,12	4	-	-	4
2	17CS2202PC	Operating Systems	1,2,12	4	-	-	4
3	17CS2203PC	Computer Networks	1,2,12,13	3	1	-	3
4	17CS2204PC	Design & Analysis of Algorithms	2,3,12,13	4	-	-	4
5	17CS2205HS	Financial Analysis, Management & Economics	11,12	3	-	-	3
6	17CS2206PC	Computer Networks & Operating Systems Lab	4,5,14	-	-	3	2
7	17CS2207PC	Design & Analysis of Algorithms Lab	4,5,14	-	-	3	2
8	17CS2208PC	Scripting Languages Lab	1,2,3,4,5,14	-	-	3	2
**TOTAL**	**18**	**1**	**9**	**24**				
**Mandatory Course (Non-Credit)**							
9	17HS2209MC	Environmental Science and Technology	1,6,7,12	3	-	-	-
10	17BS2210MC	Analytical Skills	9,10	-	-	2	-

Note: 1. Enrollment of Internship / Industrial training / Certification course / MOOCs initiation from II-B.Tech.-I-Semester

S. No.	Subject Code	Subject	POs	Hours Per Week			Credits
				L	T	P	
1	17CS3101PC	Linux Programming	1,2,12	3	1	-	3
2	17CS3102PC	Formal Languages and Automata Theory	1,2,3,12	4	-	-	4
3	17CS3103PC	Data Mining & Data Warehousing	1,2,3,12,13	4	-	-	4
4	17CS3104PC	Web Technologies	2,3,6,12,13	4	-	-	4
5	**Open Elective – I**			3	-	3	-
	17CE3105OE	Disaster Management	2,7,8,12				
	17ME3105OE	Operations Research	1,2,12				
	17EC3105OE	Electronic Measurements and Instrumentation	1,2,12				
	17CS3105OE	JAVA Programming	1,2,3,5,12				
6	17CS3106PC	Linux Programming Lab	4,5,14	-	-	3	2
7	17CS3107PC	Data Mining & Data Warehousing Lab	4,5,14	-	-	3	2
8	17CS3108PC	Web Technologies Lab	4,5,14	-	-	3	2
	TOTAL			**18**	**1**	**9**	**24**
Mandatory Course (Non-Credit)							
9	17HS3109MC	Human Values & Professional Ethics	6,7,8,12	3	-	-	-
10	17HS3110MC	Soft Skills	9,10	-	-	2	-

The table is titled **III – B.Tech. – I - Semester**

		III – B.Tech. – II – Semester				

S. No.	Subject Code	Subject	POs	Hours Per Week			Credits
				L	T	P	
1	17CS3201PC	Compiler Design	2,3,4,12,13	4	-	-	4
2	17CS3202PC	Cloud Computing	1,2,3,12,13	4	1	-	4
3	17CS3203PC	Software Engineering	2,3,8,11,12,13	4	1	-	4
4	**Open Elective – II**			3	-	-	3
	17CE3204OE	Global Warming & Climate Change	2,6,7,8,12				
	17ME3204OE	Fundamentals of Robotics	1,2,5,12				
	17EC3204OE	Principles of Communication Systems	1,2,3,12				
	17CS3204OE	Database Management Systems	1,2,3,5,12				
5	**Professional Elective – I**			3	-	-	3
	17CS3205PE	Multimedia Computing	2,5,12,13				
	17CS3206PE	Computer Graphics	2,3,5,12,13				
	17CS3207PE	Mobile Application Development	1,2,3,5,12,13				
	17CS3208PE	Principles of Programming Languages	2,3,5,8,12,13				
6	17CS3209PC	Compiler Design & Mobile Application Development (Android) Lab	4,5,14	-	-	3	2
7	17CS3210PC	Cloud Application Development Lab	4,5,14	-	-	3	2
8	17CS3211HS	Advanced English Communication Skills Lab	5,10	-	-	3	2
		TOTAL		18	2	9	24
Mandatory Course (Non-Credit)							
9	17BS3212MC	Quantitative Aptitude	9,10	3	-	-	-
10	17AC3213MC	Internship / Industrial training / Certification Course / MOOCs Certificate	1 to 14				

Note: 1. Industry Oriented Mini Project Carried out during summer vacation between III - B.Tech. – II – Sem. & IV- B.Tech. – I Sem. and evaluated in IV-B.Tech.-I-Semester

2. Internship / Industrial training / Certification course / MOOCs certificate submission on or before last instruction day of III-B.Tech.-II semester

S. No.	Subject Code	Subject	POs	Hours Per Week			Credits
				L	T	P	
		IV – B.Tech. – I - Semester					
1	17CS4101PC	Network Security & Cryptography	2,3,6,8,12,13	4	1	-	4
2	17CS4102PC	Big Data Analytics	2,3,4,12,13	4	1	-	4
3	17CS4103PC	Machine Learning	1,2,3,6,12,13	4	1	-	4
4	**Open Elective – III**			3	-	-	3
	17CE4104OE	Environmental Impact Assessment	6,7,10,12				
	17ME4104OE	Principles of Entrepreneurship	7,8,9,11,12				
	17EC4104OE	Principles of Embedded Systems	1,2,3,12				
	17CS4104OE	Web Technologies	2,3,5,6,12				
5	**Professional Elective – II**			3	-	-	3
	17CS4105PE	Artificial Intelligence	1,2,3,6,12,13				
	17CS4106PE	Human Computer Interaction	1,2,3,5,8,12,13				
	17CS4107PE	Social Network Analysis	2,3,5,6,8,12,13				
	17CS4108PE	Distributed Systems	3,4,12,13				
6	17CS4109PC	Network Security & Cryptography Lab	4,5,14	-	-	3	2
7	17CS4110PC	Big Data Engineering Lab	4,5,14	-	-	3	2
8	17CS4111CC	Industry Oriented Mini Project	1 to 14	-	-	-	2
		TOTAL		18	3	06	24
Mandatory Course (Non-Credit)							
9	17HS4112MC	Foreign Language: French	9,10	2	-	-	-
	17HS4113MC	Foreign Language: German					

S. No.	Subject Code	Subject	POs	Hours Per Week			Credits
				L	T	P	
		IV – B.Tech. – II - Semester					
1	17CS4201PC	Internet of Things	2,3,6,7,12,13	4	1	-	4
2	**Professional Elective – III**			3	-	-	3
	17CS4202PE	Ethical Hacking	2,3,5,8,12,13				
	17CS4203PE	Software Testing Methodologies	3,4,5,12,13				
	17CS4204PE	Web Mining	2,3,5,12,13				
	17CS4205PE	Neural Networks	2,3,5,6,12,13				
3	**Professional Elective - IV**			3	-	-	3
	17CS4206PE	Information Retrieval Systems	2,3,4,12,13				
	17CS4207PE	Computer Forensics	2,3,5,8,12,13				
	17CS4208PE	Natural Language Processing	2,3,5,6,12,13				
	17CS4209PE	Software Project Management	3,4,5,11,12,13				
4	17CS4210CC	Technical Seminar	1 to 14	-	-	3	2
5	17CS4211CC	Major Project	1 to 14	-	-	18	12
		TOTAL		10	01	21	24

I-B.TECH.-I-SEMESTER SYLLABUS

ENGINEERING MATHEMATICS – I
(Differential Equations & Matrix Algebra)
(Common to all Branches)

I -B.Tech.-I-Sem   **L T P C**
Subject Code: 17CS1101BS   **4 1 0 4**

Course Outcomes (COs) & CO-PO Mapping (3-Strong; 2-Medium; 1-Weak Correlation)

COs	Upon completion of course the students will be able to	PO1	PO2	PO12
CO1	solve linear and non-linear ordinary differential equations	3	2	1
CO2	solve system of linear equations by using matrices	3	2	1
CO3	find Eigen values and Eigen vectors	3	2	1
CO4	find the extreme values of functions of several variables and evaluation of improper integrals by using Beta and Gamma functions	3	2	1
CO5	evaluate multiple integrals and find the line, surface and volume integrals and convert them by using multiple integrals	3	2	1

Unit- I

Differential Equations: Introduction, exact & Reducible to exact, Linear and Bernoulie's Differential Equations Applications to Newton's Law of cooling, Law of natural growth and decay, orthogonal trajectories, Non-homogeneous linear differential equations of second and higher order with constant coefficients with RHS term of the type e^{ax}, Sin ax, cos ax, polynomials in x, $e^{ax}V(x)$, $xV(x)$, method of Variation of parameters. Applications: Simple Harmonic Motion (SHM)

Unit-II

Linear System of Equations: Types of real matrices and complex matrices, rank, Echelon form, normal form consistency and solution of linear systems (homogeneous and No- homogeneous) – Gauss Elimination, Gauss Jordon and LU decomposition methods-Applications: Finding current in the electrical circuits.

Unit –III

Eigen values, Eigen vectors and Quadratic forms: Eigen values, Eigen vectors and their properties, Cayley – Hamilton theorem (without proof),Inverse and powers of a matrix using Cayley – Hamilton, Diagonalization, Quadratic forms, Reduction of Quadratic forms into their canonical form, rank and nature of the Quadratic forms – index and signature.

Unit IV

Functions of Several Variables: Functions of several variables-Partial differentiation, Functional dependence, Jacobian, Maxima and Minima of functions of two variables with constraints and without constraints.
Beta and Gamma Functions: Beta and Gamma functions, properties, relation between Beta and Gamma functions, evaluation of integrals using Beta and Gamma functions.

Unit V

Multiple Integrals: Double and triple integrals, Change of variables, Change of order of integration.
Applications: Finding areas, volumes& Center of gravity (evaluation using Beta and Gamma functions).

Text Books:
1. B.S. Grewal, Higher Engineering Mathematics, 42nd Ed., Khanna Publishers, New Delhi, 2012
2. E. Kreyszig,Advanced Engineering Mathematics, 9th Ed., Wiley, 2012
3. R. K. Jain, S. R. K. Iyengar, Advanced Engineering Mathematics, 4th Ed., Narosa Publishing House, NewDelhi,2014

Reference(s):

1. B. V. Ramana,Engineering Mathematics, 4th Ed., Tata McGraw Hill, New Delhi, 2009
2. D.S. Chandrashekharaiah, Engineering Mathematics, Volume 1, Prism Publishers, 2010
3. T.K.V.Iyengar, B. Krishna Ghandhi, S. Ranganathan and M.V. S.S.N. Prasad, Engineering Mathematics, Volume-I, 12th Ed.,S. Chand Publishers, 2014
4. U. M. Swamy, P. VijayaLaxmi, K. L. Sai Prasad and M. Phani Krishna Kishore, A Text Book of Engineering Mathematics–I, Excel Books, New Delhi, 2010

APPLIED PHYSICS

I-B.Tech.-I-Sem   **L T P C**
Subject Code: 17CS1102BS   **4 1 0 4**

Course Outcomes (COs) & CO-PO Mapping (3-Strong; 2-Medium; 1-Weak Correlation)

COs	Upon completion of course the students will be able to	PO1	PO2	PO12
CO1	analyze the crystal structures and X-ray diffraction techniques	3	2	1
CO2	explain the particle behavior in solids using quantum mechanics and band theory of solids	3	2	1
CO3	outline Dielectric and magnetic properties of materials and their applications	3	2	1
CO4	illustrate principles and applications of lasers and optical fibers	3	2	1
CO5	classify semiconductors & Nano-materials and illustrate functioning of various semiconductor devices	3	2	1

Unit: I

1. Crystallography and Crystal Structures: Space Lattice, Unit Cell, Basis, Lattice parameters, Crystal Systems, Bravais Lattices, Atomic Radius, Co-ordination Number and Packing Factor of SC, BCC, FCC, Diamond Structure, Crystal Planes and Directions, Miller Indices, Inter Planar Spacing of Cubic Crystal Systems.

2. X-ray Diffraction: Basic Principles of **X**-ray Diffraction, Bragg's Law, Laue Method, Powder Method, Applications of X-ray Diffraction.

Unit: II

3. Principles of Quantum Mechanics & Statistical Mechanics : Waves and Particles, De Broglie Hypothesis, Matter Waves, Davisson and Germer's Experiment, Heisenberg's Uncertainty principle, Physical Significance of the Wave Function, Schrodinger's Time -Independent Wave Equation, Particle in One Dimensional Potential Box.
Maxwell – Boltzmann, Bose – Einstein and Fermi – Dirac statistics (Qualitative).

4. Electron theory of Metals: Bloch Theorem (Qualitative), Kronig-Penny Model (Qualitative Treatment), E-K Curve, Origin of Energy Band Formation in Solids, Classification of Materials into Conductors, Semiconductors and insulators, Effective mass of an electron.

Unit: III

5. Dielectric Properties: Basic definitions: Electric dipole, Dipole moment, Permittivity, Dielectric constant, Polarizability, Electric susceptibility, Displacement vector; Electronic Polarization, Ionic Polarization and Orientation Polarization (Qualitative), Internal Fields in Solids, Clausius - Mossotti Equation ,Piezo electricity , Ferro electricity.

6. Magnetic Properties: Basic definitions , Origin of Magnetic moment, Bohr magneton, Classification of Dia, Para and Ferro Magnetic Materials on the basis of Magnetic Moment, Explanation of Hysteresis Curve on the basis of Domain Theory of Ferro magnetism.

Unit IV

7. Lasers: Characteristics of Lasers, Spontaneous and stimulated Emission of Radiation, Einstein's Coefficients, Population Inversion, Lasing Action, Ruby Laser, Helium- Neon Laser, Semiconductor Laser and Applications of Lasers.

8. Fiber Optics: Basic Principles & construction of an Optical Fiber, Acceptance Angle, Numerical Aperture, Types of Optical Fibers, Losses in Optical Fibers, Application of Optical fibers in communication system.

Unit: V

9. Semiconductor Physics: Introduction, Estimation of Position of Fermi Level and Carrier concentration in Intrinsic and Extrinsic (p-type & n-type) Semiconductors, Direct and Indirect Band

gap Semiconductors, Hall Effect.

10. Nanotechnology: Origin of Nanotechnology, Nano Scale, Surface to Volume Ratio, Quantum Confinement, Bottom-up Fabrication: Sol-Gel, Top-Down Fabrication: Chemical Vapor Deposition, Characterization Techniques (SEM &TEM) and Applications of Nanotechnology.

Text books:

1. Engineering Physics by P K.Palanisamy, Scitech Publishers
2. Modern Engineering Physics by Dr.K.Vijay kumar, Dr.S.Chandralingam, S.Chand & Company LTD.
3. Applied Physics by P.K.Mittal, I K International Publishers.
4. Engineering Physics by Dr. M.Armugam, Anuradha Publication.
5. Applied Physics for Engineers by P. Madhusudana Rao, Academic Publishing company.

References:

1. Principles of physics by Halliday, Resnick, Walker, Wiley India Pvt Ltd, 9thEdition.
2. Introduction to solid state physics by Charles Kittel, Wiley India Pvt Ltd,7thEdition
3. Engineering Physics by R. K. GAUR & S.L.GUPTA, Dhanpat Rai Publications.
4. Solid State Physics by AJ Dekker, Macmillan INDIA LTD.

ENGINEERING CHEMISTRY

I-B.Tech.-I-Sem	**L**	**T**	**P**	**C**
Subject Code: 17CS1103BS	**4**	**1**	**0**	**4**

Course Outcomes (COs) & CO-PO Mapping (3-Strong; 2-Medium; 1-Weak Correlation)

COs	Upon completion of course the students will be able to	PO1	PO2	PO12
CO1	identify the properties of water and various treatment methods	3	2	1
CO2	apply the concepts of electrochemistry and corrosion control	3	2	1
CO3	make use of polymers in domestic and industrial fields	3	2	1
CO4	analyze the quality of fuels used in automobiles, industry and aerospace	3	2	1
CO5	illustrate the properties of various engineering materials	3	2	1

Unit-I: 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 complexometric method. Numerical problems. Boiler troubles: Sludges, scales and Caustic embrittlement. Internal treatment of Boiler feed water – Calgon conditioning – Phosphate conditioning – Colloidal conditioning – Softening of water by ion exchange processes. Potable water and its specification- Steps involved in the treatment of potable water - Disinfection of potable water by chlorination and Ozonization Desalination of water – Reverse osmosis. Deflouridation - Nalgonda technique.

Unit-II: Electrochemistry and Corrosion:

Electrochemistry: Introduction, conductance-specific,equivalent and molar conductance,Electrode-Types of electrodes – Construction and functioning of Standard hydrogen electrode calomel and glass electrode. Nernst equation – electrochemical series and its applications. Electrochemical cells: Daniel cell – cell notation, cell reaction and cell EMF – Numerical problems.
Batteries: Cell and battery – Primary battery (dry cell, alkaline and Lithium cell) and Secondary battery (lead acid, Ni-Cd and lithium ion cell),
Fuel cells: Hydrogen –oxygen and methanol-oxygen fuel cells – Applications.
Corrosion and its Prevention: introduction-theories of corrosion: dry corrosion-wet corrosion-types: galvanic corrosion-concentration cell corrosion-waterline and pitting corrosion-factors influencing rate of corrosion by environment-Corrosion control methods-cathodic protection-metallic coatings: galvanization and tinning.

Unit-III

Polymers: Definition – Classification of polymers with examples – Types of polymerization – addition(free radical mechanism),Co-Polymerization and condensation polymerization with examples.
Plastics: Definition and characteristics- thermoplastic and thermosetting plastics, compounding and fabrication of plastics (compression and injection moulding). Preparation, properties and engineering applications of PVC and Bakelite.
Fibers: Characteristics of fibers – preparation, properties and applications of Nylon -6, 6 and Dacron. Fiber reinforced plastics (FRP) – Applications.
Rubbers and Elastomers: Natural rubber and its vulcanization – compounding of rubber. – Preparation – properties and applications of Buna-S and Thiokol rubber.
Conducting polymers: Characteristics and Classification with examples – mechanism of conduction in trans- polyacetylene and applications of conducting polymers.

Unit-IV: ENERGY SOURCES

Fuels: Classification of fuels: coal – analysis of coal – proximate and ultimate analysis and their significance. Liquid fuels – petroleum and its refining, cracking – moving bed catalytic cracking, Knocking – octane and cetane rating, synthetic petrol-Fischer- Tropsch's process; Gaseous fuels – composition and uses of natural gas, LPG and CNG. Analysis of Flue gas by using Orsat's apparatus.
Combustion: Definition, Calorific value of fuel – HCV, LCV; Determination of calorific value of solid fuels by using Bomb Calorimeter.

Unit-V: ENGINEERING MATERIALS:

Cement: Portland cement, its composition, setting and hardening of Portland cement.

Refractories: Classification and characteristics of refractories, properties and application of Refractories.

Lubricants Classification of lubricants with examples – characteristics of a good lubricants-mechanism of lubrication (thick film, thin film and extreme pressure) –properties of lubricants: viscosity cloud point, pour point, flash point and fire point.

Nano materials: Introduction to nano technology, preparation ,properties and applications of carbon nano tubes(CNTs)

Text books:

1) Engineering Chemistry by P.C Jain and M.Jain, Dhanpatrai Publishing Company, New Delhi(2010)
2) Engineering Chemistry by Rama Devi ,Venkata Ramana Reddy and Rath, Cengage learning, New Delhi.(2016)

Reference Books:

1) Engineering Chemistry by Shikha Agarwal, Cambridge University Press, Delhi(2015)
2) Engineering Chemisty by Shashi Chawla, Dhanpatrai and Company (P) Lid. Delhi(2011)

FUNDAMENTALS OF INFORMATION TECHNOLOGY

I-B.Tech.-I-Sem   **L T P C**
Subject Code: 17CS1104ES   **3 0 0 3**

Course Outcomes (COs) & CO-PO Mapping (3-Strong; 2-Medium; 1-Weak Correlation)

COs	Upon completion of course the students will be able to	PO1	PO2	PO3	PO12
CO1	explain the computing fundamentals essential to information technology	3	3	2	2
CO2	demonstrate the functions of operating systems and classify the programming languages	3	3	2	2
CO3	make use of office automation tools	3	3	2	2
CO4	adapt the various file organization and security techniques	3	3	2	2
CO5	outline the basics of computer networks	3	3	2	2

Unit - I
Introduction to Information Technology: Basic concepts of IT, Data Processing: Data and Information.
Introduction to Computers: Classification, History, Types of Computers.
Elements of a Computer System: Block Diagram of The Computer System, Introduction to various units.
Hardware: CPU, Memory, Input and Output devices, Auxiliary storage devices.
Software: System and Application Software, Utility packages,
Configuration of Computer System
Applications of Information Technology: Wide range of applications in: Home, Education and Training, Entertainment, Science, Medicine, Engineering etc.

Unit - II
Operating Systems: Introduction, Functions of an operating System, Classification of Operating Systems-Batch Operating System, Multiprogramming Operating System, Time Sharing Operating System, Personal Computer Operating System, The Unix Operating System, Microkernel Based Operating System, On-Line and Real Time Systems.
Programming Languages: Introduction, machine language, assembly language, high level language, types of high level languages.

Unit-III
Office Automation Tools:
Word Processing: Introduction, Basic Capabilities of Word Processors, Advanced Features of Word Processors.
Electronic spreadsheets: Fundamentals, Electronic Spreadsheets, Characteristics of a Spreadsheet, Spreadsheet Packages
Presentation software: Introduction, Presentation Basics, The ingredients of a Good Presentation, Presentation Packages.

Unit – IV
Business Files: Concept of Character, Field, Record and File.
Types of Data Files: Master File, Transaction File, Archival File.
File Organization: Sequential file, Indexed Sequential file, Random files. Comparison of various type of file organization. Choice of Files Organization, Design of Computer Data Files, Files Security and Back-Up.
Information Security and Integrity: Basic Concepts, Perverse Software, Preventive Measures and treatments.

Unit –V
Computers and Communication: Introduction to Computer Networks, Internet. Features of Internet, Milestones of Internet, Internet application, Services of Internet, Configurations of Internet, www, ISP, URL, Web Browsers, Various Browsers, Features of Browsers, Search Engine. FTP, Electronic Mail.

Text Books:

1. Introduction to Computers, Peter Norton, VI Edition, TATA McGRAW Hill Publication.
2. Fundamentals of Computers, V Rajaraman, V Edition, PHI Publications. 2010.
3. Cisco Systems Networking Academy: First Year Companion Guide – Vitp Amato – Techmedia Publication.
4. Internet for everyone – Alexis Leon and Mathews Leon – Leon TechWorld Publication

References:

1. Trainer T., et al, "Computers‖, McGraw Hill.
2. B. Ram, ―Computer Fundamentals‖, New Age International Pvt. Ltd.
3. S.Jaiswal, ―Fundamental of Computer & IT‖, Wiley dreamtech. India.

COMPUTER PROGRAMMING

I-B.Tech.-I-Sem
Subject Code: 17CS1105ES

L T P C
3 1 0 3

Course Outcomes (COs) & CO-PO Mapping (3-Strong; 2-Medium; 1-Weak Correlation)

COs	Upon completion of course the students will be able to	PO1	PO2	PO3	PO12
CO1	write simple programs using C language	3	3	2	2
CO2	design structured programs using functions	3	3	2	2
CO3	develop programs using arrays, strings and pointers	3	3	2	2
CO4	construct programs for heterogeneous data	3	3	2	2
CO5	implement various file operations in C programming	3	3	2	2

Unit – I

Introduction to Computers – Computer Systems, Computing Environments, Computer Languages, Creating and running programs, Program Development, algorithms and flowcharts. Introduction to C Language – Background, C Programs, Identifiers, Types, Variables, Constants, Input / Output, Operators(Arithmetic, relational, logical, bitwise etc.), Expressions, Precedence and Associativity, Expression Evaluation, Type conversions, Statements- Selection Statements(making decisions) – if and switch statements, Repetition statements (loops)-while, for, do-while statements, Loop examples, other statements related to looping – break, continue, goto, Simple C Program examples.

Unit – II

Functions-Designing Structured Programs, Functions, user defined functions, inter function communication, Standard functions, Scope, Storage classes-auto, register, static, extern, scope rules, type qualifiers, recursion- recursive functions, Limitations of recursion, example C programs.
Arrays – Concepts, using arrays in C, inter function communication, array applications- linear search, binary search and bubble sort, two – dimensional arrays, multidimensional arrays, C program examples.

Unit – III

Pointers – Introduction (Basic Concepts), Pointers for inter function communication, pointers to pointers, compatibility, Pointer Applications-Arrays and Pointers, Pointer Arithmetic and arrays, Passing an array to a function, memory allocation functions, array of pointers, programming applications, pointers to void, pointers to functions.
Strings – Concepts, C Strings, String Input / Output functions, arrays of strings, string manipulation functions, string / data conversion, C program examples.

Unit – IV

Enumerated, Structure and Union Types – The Type Definition (typedef), Enumerated types, Structures –Declaration, initialization, accessing structures, operations on structures, Complex structures-Nested structures, structures containing arrays, structures containing pointers, arrays of structures, structures and functions, Passing structures through pointers, self referential structures, unions, bit fields, C programming examples, command–line arguments, Pre processor commands.

Unit – V

Input and Output – Concept of a file, streams, text files and binary files, Differences between text and binary files, State of a file, Opening and Closing files, file input / output functions (standard library input / output functions for files), file status functions (error handling), Positioning functions (fseek, rewind and ftell), C program examples.

Text Books:

1. Computer Science: A Structured Programming Approach Using C, B. A. Forouzan and R. F. Gilberg, Third Edition, Cengage Learning.
2. Programming in C. P. Dey and M Ghosh , Second Edition, Oxford University Press.

References:

1. The C Programming Language, B.W. Kernighan and Dennis M. Ritchie, Second Edition, Pearson education.
2. Programming with C, B. Gottfried, 3rdedition, Schaum's outlines, McGraw Hill Education (India) Pvt. Ltd.
3. C From Theory to Practice, G S. Tselikis and N D. Tselikas, CRC Press.
4. Basic computation and Programming with C, Subrata Saha and S. Mukherjee, Cambridge University Press.

APPLIED PHYSICS / ENGINEERING CHEMISTRY LAB

I -B.Tech.-I-Sem   **L   T   P   C**
Subject Code: 17CS1106BS   **0   0   3   2**

Course Outcomes (COs) & CO-PO Mapping (3-Strong; 2-Medium; 1-Weak Correlation)

COs	Upon completion of course the students will be able to	PO4
CO1	identify modulus of elastic materials , determine the characteristics & applications of LED and SOLAR CELL, find the energy gap of a semiconductor and analyze the wavelength of laser source	3
CO2	demonstrate the resonance of LCR circuit, determine Time Constant of RC circuit & find variation of the magnetic field and determine losses in optical fiber	3
CO3	determine the hardness, viscosity and pH of various samples	3
CO4	synthesize the drug used in pharmaceutical industry	3
CO5	estimate the strength of solutions and amount of coloured solutions	3

List of Engineering Physics Lab Experiments: (Any 08 experiments compulsory)

1. To determine the Rigidity modulus of a wire - Torsional pendulum.
2. Study the characteristics of LED and LASER Diode.
3. Verify the characteristics of a Solar Cell.
4. Determination of wavelengths of a LASER source-Diffraction Grating.
5. Bending Losses of Fibers & Evaluation of numerical aperture of given fiber.
6. Energy gap of a semiconductor diode.
7. Determination of Resonance frequency of an LCR circuit.
8. To calculate the Time constant of an R-C Circuit.
9. Determination of frequency of an Electronic Vibrator – Melde's Exp.
10. Magnetic field along the axis of current carrying coil-Stewart and Gee's method.
11. Newton's Rings-Radius of curvature of Plano convex lens.
12. Dispersive power of the material of a prism – Spectrometer.

Laboratory Manual:

1. Laboratory Manual of Engineering Physics by Dr.Y.Aparna & Dr.K.Venkateswara Rao (V.G.S Publishers)
2. Solar photo voltaic – Technology Fundamentals system: A manual for Technics, Trainers & Engineers.

List of Engineering Chemistry Lab Experiments: (Any 08 experiments compulsory)

I)   Volumetric Analysis:

1. Estimation of Ferrous ion by Permanganometry.
2. Estimation of Ferrous and ferric ions in a given mixture by Dichrometry.
3. Estimation of hardness of water by Complexometric method using EDTA
4. Estimation of copper by Iodometry.
5. Estimation of percentage of purity of MnO_2 in pyrolusite.

II) Instrumental methods of Analysis:

Conductometry:

6. Estimation of HCl by Conductometry.
7. Estimation of HCl and Acetic acid in a given mixture by Conductometry.

Potentiometry:

8. Estimation of HCl by potentiometry.

Colorimetry:

9.   Estimation of manganese in $KMnO_4$ by colorimetric method

p^H meter:

10. Estimation of HCl by p^H meter.

Physical property:

11. Determination of viscosity of oil by redwood / Oswald's Viscometer.

Preparations:

12. Preparation of Aspirin.

Laboratory Manual:

1.   Vogel's Text Book of quantitative chemical Analysis, 5th Edition (2015) G.H.Jeffery, J.Bassett, J.Mendham and R.C.Denney.
2.   A text Book on experiments and calculations in Engineering Chemistry by S.S. Dara S.chand & company Ltd., Delhi (2003).

COMPUTER PROGRAMMING IN C LAB

I-B.Tech.-I-Sem　　　　　　　　　　　　　　　　　　　　　　　**L　T　P　C**
Subject Code: 17CS1107ES　　　　　　　　　　　　　　　　　**0　0　3　2**

Course Outcomes (COs) & CO-PO Mapping (3-Strong; 2-Medium; 1-Weak Correlation)

COs	Upon completion of course the students will be able to	PO4
CO1	execute simple programs using C compiler	3
CO2	apply control statements in designing programs	3
CO3	design programs using functions, arrays, strings and pointers	3
CO4	construct programs for heterogeneous data	3
CO5	implement various file operations in C programming	3

Week1: Basics

1. Write a program to print sample strings like "hello world", "Welcome to C Programming" with different formats using escape sequences.
2. Write a Program to print different data types in „C" and their ranges.
3. Write a Program to initialize, assignment & printing variables of different data types.

Week2: Operators

1. Write a Program to demonstrate arithmetic operators. (+,-,*,/,%)
2. Write a Program to demonstrate logical operators.(logical AND, logical OR)
3. Write a Program to read radius value from the keyboard and calculate the area of circle and print the result in both floating and exponential notation.
4. Write a Program to calculate simple interest.
5. Write a Program to convert temperature. (Fahrenheit –Centigrade and vice-versa)

Week3: Operators

1. Write a Program to demonstrate relational operators.(<,>,<=,>=,==,!=)
2. Write a program to check equivalence of two numbers using conditional operator.
3. Write a Program to demonstrate pre increment and post increment.(++a, a++ where a is a Value to be initialized)
4. Write a program for computing the volume of sphere, cone and cylinder assume that Dimensions are integers use type casting where ever necessary.

Week4: Decision Statements

1. Write a Program to read marks of a student in six subjects and print whether pass or fail (Using if-else).
2. Write a Program to calculate roots of quadratic equation (using if-else).
3. Write a Program to calculate electricity bill. Read starting and ending meter reading.

　　　The charges are as follows.
　　　No. of Units Consumed Rate in(Rs)
　　　1-100 1.50 per unit
　　　101-300 2.00 per unit for excess of 100 units
　　　301-500 2.50 per unit for excess of 300 units
　　　501-above 3.25 per unit for excess of 500 units

Week5: Switch operations

1. Write a Program to perform arithmetic operations using switch case.
2. Write a Program to display colors using switch case (VIBGYOR).
3. Write a Program to display vowels and consonants using switch case.
4. Write a Program to display names of days in a Week using switch case.

Week6: Basic Loop operations

Do the Following Programs Using for, while, do-while loops.
1. Write a program to calculate sum of individual digits of a given number.
2. Write a program to check whether given number is palindrome or not.
3. Write a program to print prime numbers in the given range.
4. Write a program to display multiplication tables from 1 to 10 except 3 and 5.

Week7: Advanced loops

1. Write a program to print the Fibonacci series for given „N" value.
2. Write a program to check whether a given number is a Fibonacci number or not.
3. Write a program to read 2 numbers x and n then compute the sum of the Geometric Progression.
   $1+x+ x2+x3+ - - - - - - - +xn$
4. Write a program to print the following formats.
   ```
   1               *
   1 2             * *
   1 2 3           * * *
   1 2 3 4         * * * *
   ```
5. Write a C Program to construct pyramid of numbers.

Week8: 1-D arrays

1. Write a program to store 10 elements in the 1-D array and print sum of the array.
2. Write a program to print minimum and maximum elements in the 1-D array.
3. Write a program to count no. of positive numbers, negative numbers and zeros in the array.
4. Write a program to search the given element by using linear search and binary search.
5. Write a program to sort the given elements using bubble sort technique.

Week9: 2-D arrays

1. Write a program to perform matrix addition
2. Write a program to perform matrix multiplication by checking the compatibility.
3. Write a program to print the transpose of a matrix.

Week10: Functions

1. Write a program to find sum of two numbers using functions.
2. Write a program to find product of two numbers using functions without arguments, without return type.
3. Write a program to find difference of two numbers using functions without arguments, with return type.
4. Write a program to find sum of two numbers using functions with arguments &without return type.
5. Write a program to find product of two numbers using functions with arguments, with return type.

Week11: Functions and Recursion

1. Write a program to swap two numbers using
   a) Call By Value B) Call By Reference.
2. Write a program to calculate factorial, gcd using recursion and non-recursion functions.
3. Write C program that reads two integers x and n and calls a recursive function to compute x^n
4. Write a C program that reads two integers and calls a recursive function to compute ncr

Week 12: Math Functions and I/O Functions

1. Write a program to read values from keyboard and find the values using
   abs(),sqrt(),floor(),ceil()and pow().
2. Write a program to read and display a value using getch () and putch().
3. Write a program to read and display a value using getchar(),
   putchar(),gets() and puts().

Week 13: Strings

1. Write a program to perform various string manipulations using built-in functions.
2. Write a program to print the given strings in ascending order.
3. Write a program to verify the given string is palindrome or not (without built-in functions, with using built-in functions).
4. Write a program to concatenate two strings using arrays

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Week14: Structures

1. Write a program to create structure for an account holder in a bank with following Fields: name, account number, address, balance and display the details of five account holders.
2. Write a program to find total marks of individual student and average marks for 10 students using structures.
3. Write a program to create structure called traveler and members of structure are train no, coach no, seat no, source ,destination , gender, age, name and departure date.
4. Write a program to illustrate passing an entire structure to a function.
5. Write a C Program to perform addition and multiplication of two complex numbers using structures.

Week15: File operations

1. Write a program which copies the contents of one file to another file.
2. Write a program to reverse the first n characters in a file.
3. Write a C program to merge two files into a third file (i.e., the contents of the firs t file followed by those of the second are put in the third file).
4. Write a C program to count the number of times a character occurs in a text file.

Reference Books:

1. Problem Solving and Program Design in C, 4th edition, by jeri R. Hanly and Elli B.Koffman.
2. Programming in C by Pradip Dey, Manas Ghosh 2nd edition Oxford University Press.
3. E.Balaguruswamy, Programming in ANSI C 5th Edition McGraw-Hill
4. A first book of ANSI C by Gray J.Brosin 3rd edition Cengagedelmer Learning India P.Ltd
5. AL Kelly, Iraphol,Programming in C,4th edition Addison-Wesley – Professional
6. Brain W.Kernighan & Dennis Ritchie, C Programming Language, 2nd edition, PHI

IT & ENGINEERING WORKSHOP

I-B.Tech.-I-Sem.   **L T P C**
Subject Code: 17CS1108ES   **0 0 3 2**

Course Outcomes (COs) & CO-PO Mapping (3-Strong; 2-Medium; 1-Weak Correlation)

COs	Upon completion of course the students will be able to	PO1	PO5	PO9	PO10
CO1	install and make use of operating systems and MS office tools	3	3	2	2
CO2	configure fire walls and trouble shoot network connections	3	3	2	2
CO3	apply safety norms while handling the workshop equipment	3	1	3	2
CO4	prepare required models using various engineering trades	3	1	3	2
CO5	make use of various power tools	3	1	3	2

LIST OF EXPERIMENTS

Part A- IT Workshop

Week-1: WINDOWS OPERATING SYSTEM & DRIVERS INSTALLATION
Windows 7, Windows 8 and Windows 10. LAN, graphics, audio, video and command prompt, commands.

Week-2: NETWORK CONNECTIONS & TROUBLESHOOTING
IP configurations, connecting devices in LAN through bridge, hub, switch; Wi-Fi, Li-Fi and Bluetooth settings; Crimping: Crossover, strait over.
Hardware, troubleshoots, software troubleshooting.

Week-3: Cyber Hygiene: Introduction to Virus, worms, threats. Threats on internet, Configure the Systems to be internet safe, Install antivirus, personal firewall, block pop-ups, block active x downloads.

Week-4: MS WORD
Prepare the project document and resume.

Week-5 : MS EXCEL
Spreadsheet basics, modifying worksheets, formatting cells, formulas and functions, sorting and filtering, charts.

Week-6: MS POWER POINT
Power point screen, working with slides, add content, work with text, working with tables, graphics, slide animation, reordering slides, adding sound to a presentation.

Part B- Engineering Workshop

Week-7: HOUSE WIRING
Power point, light fitting and switches.

Week-8 & 9: CARPENTRY
Study of tools and joints; Practice in planning, chiseling, marking and sawing; Joints: Cross joint, T joint, Dove tail joint.

Week-10,11 &12: FITTING
Study of tools, practice in filing, cutting, drilling and tapping; Male and female joints, stepped joints.

Week-13 & 14: Tin Smithy & Black Smithy
Tin smithy:-Preparation of Open scoop, Cylinder, square/rectangular tray, **Black Smithy**:-S-Hook,

Square /Hexagonal   headed bolt.

Week 15: Demonstration of Power Tools: - Bench drilling machine, hand drilling machine, power hacksaw, grinding machine and wood cutting machine.

Text Books:

1. Peter Norton, ―Introduction to Computers, Tata Mc Graw Hill Publishers, 6th Edition, 2010.
2. Scott Muller, Que,-Upgrading and Repairing‖, Pearson Education, PC's 18th Edition, 2009.
3. Microsoft Office 2016 Step by Step (Microsoft)
4. H. S. Bawa, -Workshop Practice‖, Tata Mc Graw Hill Publishing Company Limited, New Delhi, 2nd Edition, 2007.

NATIONAL SERVICE SCHEME (NSS) / PHYSICAL EDUCATION / YOGA MANDATORY COURSE (NON-CRIDIT)

I-B.Tech.-I-Sem.   **L T P C**
Subject Code: 17AC1109MC   **0 0 2 -**

Course Outcomes (COs) & CO-PO Mapping (3-Strong; 2-Medium; 1-Weak Correlation)

COs	Upon completion of course the students will be able to	PO3	PO6	PO8	PO9	PO12
CO1	harness physical literacy and lifelong engagement	3	3	3	3	3
CO2	use aesthetic appreciation	2	1	2	3	3
CO3	build competence and confidence to face challenges	1	2	1	3	3
CO4	develop Sports related values and attitudes	3	3	2	2	3
CO5	follow appropriate etiquette and sports	1	1	2	3	3

Aim of NSS Programme: The programme aims to inculcate social welfare in students, and to provide service to society without bias. NSS volunteers work to ensure that everyone who is needy gets help to enhance their standard of living and lead a life of dignity. In doing so, volunteers learn from people in villages how to lead a good life despite a scarcity of resources. It also provides help in natural and man-made disasters by providing food, clothing and first aid to the disaster victims. The Main Objectives and outcomes are:

S.No.	Name of the Activity	S.No.	Name of the Activity
1	First-aid	9	Anti-Ragging Awareness
2	Blood donation camp	10	Social Activities Awareness
3	Traffic awareness program	11	Cyber Crime
4	Environmental Awareness	12	Digital India
5	Swachh Bharat Abhiyan	13	Substance Abuse Awareness Program (SAAP)
6	Health awareness program	14	Telanganaku Haritha Haram (Sapling Plantation)
7	Fire Safety Awareness	15	Garments / Essential Education Material Collection and distribution
8	Non-formal education			

Aim of Physical Education: The aim of course is to make Physical Education as an integral part of Educational System. Students studying in the colleges should have the benefit of Physical Education to improve their health during the course of college education. It is designed to ensure that on completion of this training they would attain the minimum prescribed standard.

Name of the Individual Event		Name of the Team Event	
S.No.	Event	S.No.	Event
1	Badminton	1	Basketball
2	Gymnastics	2	Football
3	Judo	3	Hockey
4	Swimming	4	Kabaddi
5	Table Tennis	5	Kho –Kho
6	Tennis	6	Volleyball
7	Weight Lifting and Power Lifting	7	Cricket
8	Wrestling	8	Hand ball
9	**Yoga**	9	Throw ball
10	Archery	10	Badminton
11	Body Building	11	Table Tennis
12	Carroms	12	Tennis
13	Chess	13	Swimming
14	Boxing	14	Carroms
15	Taekwondo	15	Taekwondo
16	Fencing	16	Fencing
17	Athletics	17	Athletics

I-B.TECH.-II-SEMESTER SYLLABUS

ENGINEERING MATHEMATICS – II
(Vector Calculus, Fourier Analysis & PDE)
(Common to all Branches)

I-B.Tech.-II-Sem.
Subject Code: 17CS1201BS

L	T	P	C
4	1	0	4

Course Outcomes (COs) & CO-PO Mapping (3-Strong; 2-Medium; 1-Weak Correlation)

COs	Upon completion of course the students will be able to	PO1	PO2	PO12
CO1	solve ODE by using Laplace transforms	3	2	1
CO2	determine vector field, scalar field, gradient, divergence and curl by using vector differentiation	3	2	1
CO3	solve the line, surface and volume integrals by using vector integration	3	2	1
CO4	find periodic functions in terms of Fourier series and non-periodic functions of Fourier transform	3	2	1
CO5	formulate Partial Differential Equation, solve Linear and non-linear Differential Equations and analyze one dimensional heat and wave equation	3	2	1

Unit I

Laplace Transforms: Laplace transforms of standard functions–Shifting Theorems, Transforms of derivatives and integrals–Unit step function–Dirac delta function Laplace Transform of Periodic Functions.
Inverse Laplace transforms by Partial fractions–Convolution theorem (with proof)-Application of Laplace transforms to ordinary differential equations with constant coefficients

Unit II

Vector Differentiation: Scalar and vector point functions, Gradient, Divergence, Curl and their physical and geometrical interpretation, Laplacian operator, Vector identities.

Unit III

Vector Integration: Line Integral, Work done, Potential function, area, surface and volume integrals, Vector integral theorems: Greens, Stokes and Gauss divergence theorems (without proof) and related problems

Unit IV

Fourier series and Transformations
Fourier series–even and odd functions–Half-range sine and cosine series, Fourier integral theorem (without proof)–Fourier transforms–sine and cosine transforms–properties–inverse transforms–Finite Fourier transforms
Fourier Transform of Convolution Products (Without Proof)

Unit V

Partial Differential Equations and Applications
Formation of partial differential equations-by elimination of arbitrary constants and arbitrary functions– solutions of first order linear (Lagrange) equations and nonlinear equations (Four standard types)–Method of Separation of Variables-Applications to wave equation, heat conduction equation in one dimension.

Textbook (s):

1. B. S. Grewal, Higher Engineering Mathematics, 42nd Ed.,Khanna Publishers, New Delhi, 2012
2. S. R. K. Iyengar, R. K. Jain,Advanced Engineering Mathematics,4th Ed., Narosa Publishing House, New Delhi, 2014
3. Advanced Engineering Mathematics, V.O.Neil, Cengage Publications

Reference (s)

1. T.K.V.Iyengar, B. Krishna Ghandhi, S. Ranganathan and M.V. S.S.N. Prasad, Engineering Mathematics, 12th Ed.,Volume–I, S. Chand Publishers, 2014
2. U. M. Swamy, P. VijayaLaxmi, K. L. Sai Prasad and M. Phani Krishna Kishore,A Text Book of Engineering Mathematics–II, Excel Books, New Delhi, 2010
3. D.S.Chandrashekharaiah, Engineering Mathematics, Vol–1, Prism Publishers, 2010
4. Erwin Kreyszig, Advanced Engineering Mathematics, 9th Ed.,Wiley, 2012

PROFESSIONAL COMMUNICATION IN ENGLISH

I-B.Tech.-II-Sem.
Subject Code: 17CS1202HS

L T P C
3 0 0 3

Course Outcomes (COs) & CO-PO Mapping (3-Strong; 2-Medium; 1-Weak Correlation)

COs	Upon completion of course the students will be able to	PO10	PO12
CO1	apply appropriate vocabulary and grammar	3	1
CO2	use effective writing skills in formal and informal situations	3	1
CO3	demonstrate reading skills to pursue research and academic activities	3	1
CO4	apply and exhibit professional and social Etiquette	3	1
CO5	employ reference and study skills for lifelong learning	3	1

SYLLABUS

Reading Skills:

Objectives:

To develop an awareness in students about the significance of silent reading and comprehension.
To develop students' ability to guess meanings of words from the context and grasp the overall message of the text, draw inferences, etc., by way of:
- Skimming and Scanning the text
- Intensive and Extensive Reading
- Reading for Pleasure
- Identifying the topic sentence
- Inferring lexical and contextual meaning
- Recognizing Coherence/Sequencing of Sentences

NOTE: The students will be trained in reading skills using the prescribed texts for detailed study. They will be tested in reading comprehension of different 'unseen' passages which may be taken from authentic texts, such as magazines/newspaper articles.

Writing Skills:

Objectives:

1. To develop an awareness in the students about writing as an exact and formal skill
2. To create an awareness in students about the components of different forms of writing, beginning with the lower order ones through;
   - Writing of sentences
   - Use of appropriate vocabulary
   - Paragraph writing
   - Coherence and cohesiveness
   - Narration / description
   - Note Making
   - Formal and informal letter writing
   - Describing graphs using expressions of comparison

In order to improve the proficiency of the students in the acquisition of language skills mentioned above, the following text and course contents, divided into Five Units, are prescribed:

Text Books:

- "Fluency in English – A Course book for Engineering Students" by Board of Editors: Hyderabad: Orient Black Swan Pvt. Ltd. 2016. Print.
- "Fluency in English – A Practice Manual" for B.Tech I year I Sem (ECE&CE) & II Sem (CSE & ME) comprising the Five Units and practice exercises for all the topics.

Note: Listening and Speaking skills are covered in the syllabus of ELCS Lab.

Unit –I: Motivation

Chapter entitled '**Presidential Address' by Dr. A.P.J. Kalam** from "Fluency in English– A Course book for Engineering Students" published by Orient Blackswan, Hyderabad.

- **Vocabulary**: Word Formation — Root Words –The Use of Prefixes and Suffixes– Changing Words from one form to another – Transition Words - Exercises for Practice.
- **Grammar:** Punctuation – Parts of Speech- Articles – Prepositions-Types & Kinds –Exercises for Practice with focus on identifying Errors.
- **Reading:** Double Angels by David Scott-Reading and Its Importance- Techniques for Effective Reading- Signal Words- Exercises for Practice
- **Writing:** Writing Sentences- Techniques for Effective Writing– Paragraph Writing-Types, Structure and Features of a Paragraph-Coherence and Cohesiveness: Logical, Lexical and Grammatical Devices – Patterns of Writing - Cause and Effect - Classification and Division - Compare and Contrast - Definition - Description - Exemplification - Narration - Persuasion - Process - Exercises for Practice

Unit –II: Leadership

Chapter entitled Satya Nadella: **Email to Employees on his First Day as CEO** from "Fluency in English– A Course book for Engineering Students" Published by Orient Black Swan, Hyderabad.

- **Vocabulary**: Collocations - Synonyms and Antonyms – Homonyms, Homophones, Homographs-Exercises for Practice
- **Grammar:** Verbs-Transitive, Intransitive and Non-finite Verbs –Gerund – Exercises for Practice with focus on identifying Errors.
- **Reading:** Sub-skills of Reading- Skimming, Scanning, Extensive Reading and Intensive Reading – **The Road Not Taken by Robert Frost** — Exercises for Practice
- **Writing**: Letter Writing –Format, Styles, Parts, Language to be used in Formal Letters- Letter of Apology – Letter of Complaint-Letter of Inquiry with Reply – Letter of Requisition –- Exercises for Practice

Unit –III: Human Relations

Chapter entitled The **Gift of the Magi** by **O Henry** from the Course/Study Material.

- **Vocabulary:** Introduction- A Brief History of Words – Using the Dictionary and Thesaurus– Confusables- Spellings
- **Grammar:** Tenses: Present Tense- Past Tense- Future Tense- Active Voice – Passive Voice-Conditional Sentences – Adjective and Degrees of Comparison – Adverbs - Exercises for Practice with focus on identifying Errors.
- **Reading: The Cuddalore Experience** by **Anu George** -Improving Comprehension Skills – Techniques for Good Comprehension- Skimming and Scanning- Non-verbal Signals – Structure of the Text – Structure of Paragraphs – Punctuation – Author's viewpoint (Inference)
- **Anticipation:** Determining the Meaning of Words – Summarizing- Typical Reading Comprehension Questions.
- **Writing:** Introduction- Letter Writing-Writing the Cover Letter- Cover Letters Accompanying Resumes- E-Correspondence – Emails – Social Networks – Dos and Don'ts.

Unit –IV: Human Values and Professional Ethics

Chapter entitled **'Good Manners' by J.C. Hill** from Fluency in English – A Course book for Engineering Students" published by Orient Blackswan, Hyderabad.

- **Vocabulary**: Phrasal Verbs - Idiomatic Expressions –One- word Substitutes – Analogies (Exercises for Practice.)
- **Grammar:** Sequence of Tenses- Concord (Subject in Agreement with the Verb) – Exercises for Practice with focus on identifying Errors.

- **Reading: 'If' poem by Rudyard Kipling**–Tips for Writing a Review — Author's Viewpoint – Reader's Anticipation– Herein the Students will be required to Read and Submit a Review of a Book (Literary or Non-literary) of their choice – Exercises for Practice.
- **Writing**: Information Transfer-Bar Charts-Flow Charts-Tree Diagrams etc., — Exercises for Practice. Introduction – Steps to Effective Précis Writing – Guidelines- Samples

Unit –V: Wisdom

Chapter entitled '**Father Dear Father' by Raj Kinger** from Fluency in English – A Course book for Engineering Students" Published by Orient Black Swan, Hyderabad

- **Vocabulary:** Foreign Words—Words borrowed from other Languages- Exercises for Practice
- **Grammar**: Direct and Indirect Speech- Question Tags- Common Errors in English - Exercises for Practice with focus on identifying Errors**.**
- **Reading**: Predicting the Content- Understanding the Gist – SQ3R Reading Technique- Study Skills – Note Making - Understanding Discourse - Coherence – Sequencing Sentences.
- **Writing:** Technical Reports- Introduction – Characteristics of a Report – Categories of Reports – Formats- Prewriting – Structure of Reports (Manuscript Format) – Types of Reports – Writing the Report - Exercises from both the texts not prescribed shall be used for classroom tasks.

References

1. Prof. N. Krishna Swamy Modern English A Book of Grammar, Usage and Composition
2. Prof. Krishna Swamy and Sri Ram
3. Green, David. Contemporary English Grammar –Structures and Composition. MacMillan India. 2014 (Print)
4. Rizvi, M. Ashraf. Effective Technical Communication. Tata Mc Graw –Hill. 2015 (Print)
5. Raman, Meenakshi and Sharma, Sangeeta. "Technical Communication- Principles and Practice". Third Edition. New Delhi: Oxford University Press. 2015. Print.
6. Text for Communication Skills- Current English for Colleges – N. Krishnaswamy & T. Sriram - Mc Millian.
7. English for Science and Technology by.Prof.P.Ramani, Mc Millan
8. The Structure of Technical English - A.J.Hebert, Orient Longman
9. Communication in English for Technical Students – Curriculum Development Centre, Calcutta, Orient Longman
10. Business letters for Different Occasions - A.N. Kapoor, S.Chand & Company Pvt. Ltd.
11. Writing That Works: How to Communicate Effectively in Business by Kenneth Roman
12. Words that Sell by Richard Bayan
13. Business Writing Today: A Practical Guide by Natalie Canavor
14. A Course in English Grammar by Raj N Bakshi Orient Black Swan Pvt. Ltd. 2000. Print
15. O Henry 100 Short Stories
16. Novels and Short Story collections of W. Somerset Maugham
17. Selected Writings of R.K Narayan
18. Wings of Fire by APJ Kalam
19. Literary Horizon Orient Black Swan Pvt. Ltd. 2013
20. The Gardener by Rabindranath Tagore

BASIC ELECTRICAL & ELECTRONICS ENGINEERING

I-B.Tech.-II-Sem.
Subject Code: 17CS1203ES

L	T	P	C
4	1	0	4

Course Outcomes (COs) & CO-PO Mapping (3-Strong; 2-Medium; 1-Weak Correlation)

COs	Upon completion of course the students will be able to	PO1	PO2	PO3	PO12
CO1	solve electrical circuits using circuit laws and explain single phase AC circuits	3	3	2	1
CO2	solve electrical circuits using network theorems and illustrate diode characteristic	3	3	2	1
CO3	identify special purpose devices and use diode circuits for various applications	3	3	2	1
CO4	illustrate the configurations and biasing techniques of Bi-polar junction transistor	3	3	2	1
CO5	characterize JFET	3	3	2	1

Unit-I: Introduction to Electrical Circuits & Single Phase AC Circuits

Electrical Circuits: R-L-C Parameters, Voltage and Current, Independent and Dependent Sources, Source Transformation – V-I relationship for passive elements, Kirchhoff's Laws, Network reduction techniques – series, parallel, series-parallel, star-to-delta, delta-to-star transformation, Nodal Analysis & Mesh Analysis.

Single Phase AC Circuits: R.M.S. and Average values, Form and peak factor, steady state analysis of series, parallel and series-parallel combinations of R, L and C with sinusoidal excitation, concept of reactance, impedance, susceptance and admittance – phase and phase difference, Concept of power factor, j-notation, complex and polar forms of representation.

Unit-II: Network Theorems & P-N Junction Diode

Network Theorems: Thevenin's, Norton's, Maximum power transfer, Superposition, Reciprocity, Tellegen's Millman's and compensation theorems for DC and AC excitations.

P-N Junction Diode: Diode equation, Energy Band diagram, Volt-Ampere characteristics, Temperature dependence, Ideal versus practical, Static and dynamic resistances, Equivalent circuit, Load line analysis, Diffusion and Transition Capacitances.

Unit- III: Special Purpose Devices & Diode Circuits

Special Purpose Devices: Breakdown Mechanisms in Semi-Conductor Diodes, Zener diode characteristics, Use of Zener diode as simple regulator, Principle of operation and Characteristics of Tunnel Diode (With help of Energy band diagram) and Varactor Diode.

Rectifiers and Filters: P-N junction as a rectifier - Half Wave Rectifier, Ripple Factor - Full Wave Rectifier, Bridge Rectifier, Harmonic components in Rectifier Circuits, Filters – Inductor Filters, Capacitor Filters, L- section Filters, π- section Filters.

Unit- IV: Bipolar Junction Transistor

Bipolar Junction Transistor (BJT): Construction, Principle of Operation, Symbol, Amplifying Action, Common Emitter, Common Base and Common Collector configurations. Comparison of CE, CB and CC configurations

Transistor Biasing And Stabilization - Operating point, DC & AC load lines, Biasing - Fixed Bias, Emitter Feedback Bias, Collector to Emitter feedback bias, Voltage divider bias, Bias stability, Stabilization against variations in V_{BE} and β, Bias Compensation using Diodes and Transistors. Principle of operation of SCR.

Unit- V: Junction Field Effect Transistor

Junction Field Effect Transistor: Construction, Principle of Operation, Symbol, Pinch-Off Voltage, Volt-Ampere Characteristic, Comparison of BJT and FET, Small Signal Model, Biasing FET.

Text Books:

1. Circuit Thoery (Analysis and synthesis) - A. Chakrabarti, Dhanpat Rai&co (Pvt) Ltd 7th Ed,2015
2. Electrical Technology Vol-I B.L. Theraja. S. Chand publications
3. Electronic Devices and Circuits – R.L. Boylestad and Louis Nashelsky, PEI/PHI, 9th Ed, 2006.
4. Integrated Electronics – J.Millman and C.C.Halkias, Satyabratajit, TMH.
5. Basic Electrical and electronics Engineering- M S Sukija TK Nagasarkar Oxford University.

References:

1. Engineering circuit analysis- by William Hayt and Jack E. Kemmerly, Mc Graw Hill Company, 6th edition
2. Introduction to Electronic Devices and Circuits-Rober T. Paynter, Pearson Education.
3. Electronic Devices and Circuits - K. Lal Kishore, B.S. Publications, 2nd Edition, 2005.
4. Electronic Devices and Circuits – Anil K. Maini, Varsha Agarwal –Wiley India Pvt. Ltd. 1/e 2009.
5. Linear circuit analysis (time domain phasor and Laplace transform approaches)- 2nd edition by Raymond A. De Carlo and Pen-Min-Lin, Oxford University Press-2004.
6. Network Theory by N.C.Jagan & C.Lakshminarayana, B.S. Publications.
7. Network Theory by Sudhakar, Shyam Mohan Palli, TMH.
8. Electronic Devices and Circuits – 2nd Edition by Muhammad H.Rashid, Cengage Learning.

ENGINEERING GRAPHICS

I-B.Tech.-II-Sem.
Subject Code: 17CS1204ES

L	T	P	C
2	0	3	4

Course Outcomes (COs) & CO-PO Mapping (3-Strong; 2-Medium; 1-Weak Correlation)

COs	Upon completion of course the students will be able to	PO1	PO5	PO10
CO1	apply engineering drawing concepts in technical graphic communication	3	3	2
CO2	construct conic sections using various methods	3	3	2
CO3	draw orthographic projections of points, lines, planes and solids	3	3	2
CO4	draw development of solid surfaces	3	3	2
CO5	draw the conversions of orthographic to isometric projections & vice versa	3	3	2

Unit – I: Introduction to Engineering Drawing:
Principles of Engineering Graphics and their significance, Conic Sections - ellipse, parabola, hyperbola, including the Rectangular Hyperbola. Cycloid, Epicycloid and Hypocycloid, Involute. Scales – Plain and Diagonal.

Unit- II: Orthographic Projections
Principles of Orthographic Projections – Conventions – Projections of Points and Straight Lines. Projections of Plane regular geometric figures. - Auxiliary Planes.

Unit – III:
Projections of Regular Solids - Auxiliary Views.

Unit – IV
Sections and developments; Sectional views of Right Regular Solids – Prism, Cylinder, Pyramid, Cone – Auxiliary views.
Development of Surfaces of Right Regular Solids – Prism, Cylinder, Pyramid and Cone.

Unit – V: Isometric And Orthographic Projections
Principles of Isometric Projection – Isometric Scale – Isometric Views – Conventions – Isometric Views of Lines, Plane Figures, Simple Solids. Conversion of Isometric Views to Orthographic Views and Vice-versa.

Text Books:
1. Engineering Drawing N.D. Bhatt / Charotar
2. A Text Book of Engineering Drawing / basant agarwal.
3. Engineering Drawing and Graphics Rane and Shah/ Pearson Edu.
4. Text book on Engineering Drawing / KL Narayana/ P Kannaih/SciTech
5. Engineering Drawing / N.S. Parthasarathy and Vela Murali / Oxford

References:
1. A Text Book of Engineering Drawing / Dhawan R K / S. Chand
2. Engineering Graphics with Auto CAD / James D Bethune / Pearson Edu.
3. Engineering Graphics / K R Mohan / Dhanpat Rai.

DATA STRUCTURES THROUGH C

I-B.Tech.-II-Sem.   **L   T   P   C**
Subject Code: 17CS1205ES   **3   1   -   3**

Course Outcomes (COs) & CO-PO Mapping (3-Strong; 2-Medium; 1-Weak Correlation)

COs	Upon completion of course the students will be able to	PO1	PO2	PO3	PO12
CO1	classify different data structures to design efficient programs	3	3	2	2
CO2	identify appropriate sorting and searching techniques	3	2	2	2
CO3	illustrate operations and applications of linear data structures	3	3	2	2
CO4	explain various concepts of non-linear data structures	3	3	2	2
CO5	choose an appropriate hashing technique for a given problem	3	3	2	2

Unit – I: Introduction to Data Structures, Searching and Sorting

Basic concepts: Introduction to data structures, classification of data structures, operations on data structures, abstract data type, algorithms, different approaches to design an algorithm, recursive algorithms; Searching techniques: Linear search, binary search and Fibonacci search; Sorting techniques: Bubble sort, selection sort, insertion sort, quick sort, merge sort, and comparison of sorting algorithms.

Unit – II: Linear Data Structures

Primitive operations, implementation of stacks using Arrays, applications of stacks arithmetic expression conversion and evaluation; Queues: Primitive operations; Implementation of queues using Array, applications of linear queue, circular queue and double ended queue (deque).

Unit – III: Linked Lists

Linked lists: Introduction, singly linked list, representation of a linked list in memory, operations on a single linked list; Applications of linked lists: Polynomial representation and sparse matrix manipulation. Types of linked lists: Circular linked lists, doubly linked lists; linked list representation and operations of Stack, linked list representation and operations of queue.

Unit – IV: Non Linear Data Structures

Trees: Basic concept, binary tree, binary tree representation, array and linked representations, binary tree traversal, binary search tree, tree variants, application of trees; Graphs: Basic concept, graph terminology, graph implementation, graph traversals, Application of graphs, Priority Queue.

Unit – V: Binary Trees and Hashing

Binary search trees: Binary search trees, properties and operations; Balanced search trees: AVL trees; Introduction to M-Way search trees, B trees; Hashing and collision: Introduction, hash tables, hash functions, collisions, applications of hashing.

Text Books:

1. Mark A. Weiss, "Data Structures and Algorithm Analysis in C", Pearson, 2nd Edition, 1996.
2. Ellis Horowitz, Satraj Sahni, Susan Anderson Freed, "Fundamentals of Data Structures in C", Universities Press, 2nd Edition, 2008.

References:

1. Reema Thareja, "Data Structures using C", Oxford University Press, 2nd Edition, 2014.
2. S. Lipschutz, "Data Structures", Tata McGraw Hill Education, 1st Edition, 2008.
3. D. Samanta, "Classic Data Structures", PHI Learning, 2nd Edition, 2004.
4. Tanenbaum, Langsam, Augenstein, "Data Structures Using C", Pearson, 1st Edition, 2003.

ENGLISH LANGUAGE COMMUNICATION SKILLS LAB

I-B.Tech.-II-Sem.   **L T P C**
Subject Code: 17CS1206HS   **0 0 3 2**

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

Course Outcomes (COs) & CO-PO Mapping (3-Strong; 2-Medium; 1-Weak Correlation)

COs	Upon completion of course the students will be able to	PO5	PO10
CO1	apply the sounds of English for proper pronunciation	3	3
CO2	use the right accent and intonation in formal and informal situations	3	3
CO3	distinguish and neutralize various accents for intelligibility	3	3
CO4	develop speaking and listening skills through audio-visual experiences	3	3
CO5	demonstrate employability skills through various activities	3	3

COMPUTER ASSISTED LANGUAGE LEARNING (CALL) LAB

Exercise – I
Introduction to Phonetics -Speech Sounds -Vowels and Consonants
Minimal Pairs- Consonant Clusters
Past Tense Marker and Plural Marker

Exercise – II
Structure of Syllables
Word Stress-Sentence Stress – Intonation
Basic Rules of Word Accent - Stress Shift

Exercise - III
Errors in Pronunciation-the Influence of Mother Tongue (MTI)
Common Indian Variants in Pronunciation – Differences between British and American Pronunciation

Exercise – IV
Listening for General Details
Listening Comprehension Tests

Exercise – V
Listening for Specific Details
Listening Comprehension Tests

Online Resources for Teaching Listening Skills
Listening for General & Specific Details
www.learnenglishteens.britishcouncil.org
http://learnenglishteens.britishcouncil.org/skills/listening-skills-practice
https://www.skillsyouneed.com/ips/listening-skills.html
https://www.youtube.com/watch?v=qYb0LCqqJbU
https://www.englishlistening.com/
http://esl-lab.com/
http://www.trainyouraccent.com/

Listening Comprehension Test
www.examenglish.com/IELTS/IELTS_listening.html
https://www.englishlistening.com/index.php/listen-to-passages/
www.examenglish.com/TOEFL/toefl_listening.html

INTERACTIVE COMMUNICATION SKILLS (ICS) LAB

Exercise – I
Ice-Breaking Activity - Introducing Oneself and Others
JAM Session

Exercise – II
Situational Dialogues – Greetings – Taking Leave
Role-Play- Expressions in Various Situations
Making Requests and Seeking Permissions
Telephone Etiquette

Exercise – III
Descriptions- Narrations
Giving Directions and Guidelines

Exercise – IV
Public Speaking – Exposure to Structured Talks
Non-verbal Communication
Presentation Skills
Making a Short Speech
Extempore- Making a Presentation

Exercise – V
Group Discussion- Interview Skills
Group Discussion Activity - Mock Interviews

Minimum Requirement of infrastructural facilities for ELCS Lab:

1. **Computer Assisted Language Learning (CALL) Lab:**
    The Computer aided Language Lab for 40 students with 40 systems, one master console, LAN facility and English language software for self- study by learners.

System Requirement (Hardware component):
Computer network with LAN facility (minimum 40 systems with multimedia) with the following specifications:
  i)   Computers with Suitable Configuration   ii) High Fidelity Headphones

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

Lab Manuals:
1) A book entitled "***ELCS Lab Manual – A Workbook for CALL and ICS Lab Activities***" by Board of Editors: Hyderabad: Orient BlackSwan Pvt. Ltd. 2016. Print.
2) Hart Steve; Nair, Aravind R.; Bhambhani, Veena. "***EMBARK- English for undergraduates***" Delhi: Cambridge University Press. 2016. Print.

References:
1. Jayashree Mohanraj. *Let Us Hear Them Speak*. New Delhi: Sage Texts. 2015. Print. Hancock, M. *English Pronunciation in Use. Intermediate Cambridge*: Cambridge University Press. 2009. Print.

DATA STRUCTURES THROUGH C LAB

I-B.Tech.-II-Sem.
Subject Code: 17CS1207ES

		L	T	P	C
		-	-	3	2

Course Outcomes (COs) & CO-PO Mapping (3-Strong; 2-Medium; 1-Weak Correlation)

COs	Upon completion of course the students will be able to	PO4
CO1	implement various searching and sorting techniques	3
CO2	demonstrate basic operations of stack and queues using arrays and linked lists	3
CO3	apply stack data structure to solve various computing problems	3
CO4	demonstrate and apply different methods for traversing graphs	3
CO5	construct binary search tree	3

Week-1: Searching Techniques

Write C programs for implementing the following searching techniques.
   a. Linear search.
   b. Binary search.
   c. Fibonacci search.

Week-2: Sorting Techniques

Write C programs for implementing the following sorting techniques to arrange a list of integers in ascending order.
   a. Bubble sort.
   b. Insertion sort.
   c. Selection sort.

Week-3: Sorting Techniques

Write C programs for implementing the following sorting techniques to arrange a list of integers in ascending order.
   a. Quick sort.
   b. Merge sort.

Week-4: Implementation of Stack And Queue

Write C programs to
   a. Design and implement Stack and its operations using Arrays.
   b. Design and implement Queue and its operations using Arrays.

Week-5: Applications of Stack

Write C programs for the following:
   a. Uses Stack operations to convert infix expression into postfix expression.
   b. Uses Stack operations for evaluating the postfix expression.

Week-6: Implementation of Single Linked List

Write a C program that uses functions to perform the following operations on single linked list.
      (i) Creation   (ii) insertion   (iii) deletion   (iv) traversal

Week-7: Implementation of Circular Single Linked List

Write a C program that uses functions to perform the following operations on Circular linked list.
      (i) Creation (ii) insertion (iii) deletion (iv) traversal

Week-8: Implementation of Double Linked List

Write a C program that uses functions to perform the following operations on double linked list.
      (i) Creation (ii) insertion (iii) deletion (iv) traversal in both ways.

Week-9: Implementation of Stack Using Linked List

Write a C program to implement stack using linked list.

Week-10: Implementation of Queue Using Linked List

Write a C program to implement queue using linked list.

Week-11: Graph Traversal Techniques

Write C programs to implement the following graph traversal algorithms:
    a.   Depth first search.
    b.   Breadth first search.

Week-12: Implementation of Binary Search Tree

Write a C program that uses functions to perform the following:
    a.   Create a binary search tree.
    b.   Traverse the above binary search tree recursively in pre-order, post-order and in-order.
    c.   Count the number of nodes in the binary search tree.

Reference Books:

1. Kernighan Brian W, Dennis M. Ritchie, "The C Programming Language", Prentice Hall of India, Re-Print, 2008.
2. Balagurusamy E, "Programming in ANSI C", Tata Mc Graw Hill, 6th Edition, 2008.
3. Gottfried Byron, "Schaum's Outline of Programming with C", Tata Mc Graw Hill, 1st Edition, 2010.
4. Lipschutz Seymour, " Data Structures Schaum's Outlines Series", Tata Mc Graw Hill, 3rd Edition, 2014
5. Horowitz Ellis, Satraj Sahni, Susan Anderson, Freed, "Fundamentals of Data Structures in C", W. H.Freeman Company, 2nd Edition, 2011.

BASIC ELECTRICAL & ELECTRONICS ENGINEERING LAB

I-B.Tech.-II-Sem.   **L T P C**
Subject Code: 17CS1208ES   **0 0 3 2**

Course Outcomes (COs) & CO-PO Mapping (3-Strong; 2-Medium; 1-Weak Correlation)

COs	Upon completion of course the students will be able to	PO4
CO1	design electrical circuits to verify circuit laws and network theorems	3
CO2	verify the V-I characteristics of various electronic devices	3
CO3	determine the efficiency of various rectifiers	3
CO4	illustrate the configurations of Bi-polar junction transistor	3
CO5	demonstrate the characteristics of FET and SCR	3

PART A: ELECTRICAL & ELECTRONIC WORKSHOP PRACTICE (in 3 lab sessions)

1. Identification, Specifications, Testing of R, L, C Components (Color Codes), Potentiometers, Switches (SPDT, DPDT, and DIP), Coils, Gang Condensers, Bread Boards,
2. Identification, Specifications and Testing of Active Devices, Diodes, BJT's, Low power JFET's, Power Transistors, LED's, LCD's, SCR.
3. Study and operation of
   - Multimeters (Analog and Digital)
   - Function Generator
   - Regulated Power Supplies
   - CRO.

PART B: (Minimum of 10 experiments to be conducted)

PART-1 ELECTRICAL LAB

1. Verification of KVL & KCL.
2. Verification of Superposition and Reciprocity theorems.
3. Verification of maximum power transfer theorem. Verification on DC, verification on AC with Resistive and Reactive loads.
4. Experimental determination of Thevenin's Theorem equivalent circuits and verification by direct test.
5. Experimental determination of Norton's Theorem equivalent circuits and verification by direct test.

PART-2 ELECTRONICS LAB

6. Forward and reverse bias characteristics of PN-Junction Diode.
7. Zenor diode V-I characteristics and Zenor diode as voltage regulator.
8. Half wave rectifier with & without filters.
9. Full wave rectifier with & without filters.
10. Input & output characteristics of Transistor in CB/CE configuration.
11. FET Characteristics.
12. SCR Characteristics.

Equipment required for Laboratory:

1. Regulated Power supplies (RPS) : 0-30 V
2. CRO's: 0-20 MHz
3. Function Generators: 0-1 MHz
4. Multimeters
5. Decade Resistance Boxes/Rheostats
6. Decade Capacitance Boxes
7. Ammeters (Analog or Digital) : 0-20 µA, 0-50µA, 0-100µA, 0-200µA,10mA,20 mA
8. Voltmeters (Analog or Digital) : 0-30V,0-50V,
9. Electronic Components: Resistors, Capacitors, BJTs, SCRs, FETs, LEDs, Diodes-Ge & Si type, Transistors – NPN, PNP type

MICRO PROJECT
(MANDATORY NON-CREDIT COURSE)

I-B.Tech.-II-Sem.   **L T P C**
Subject Code: 17AC1209MC   **0 0 2 -**

Course Outcomes (COs) & CO-PO Mapping (3-Strong; 2-Medium; 1-Weak Correlation)

COs	Upon completion of course the students will be able to	PO1 to PO14
CO1	select problem and evaluate	3
CO2	review the literature related to the problem	3
CO3	implement principles of science and Engineering	3
CO4	analyze the problem	3
CO5	present the essence of project work	3

EVALUATION OF MICRO PROJECT:

1. The student has to select one suitable topic in consultation with course counselor /advisor and get it approved and register with the Head of the Department.
2. The project is evaluated for 30 marks for internal and 70 marks for external.
3. The students shall be required to submit the rough draft of the project before the commencement of first mid examination.
4. Faculty shall make suggestions for modification in the rough draft.
5. Two copies of the final report should be submitted by the student within a week thereafter.
6. Presentation schedules will be prepared by Department in line with the academic calendar.

Guidelines for preparation and presentation of Micro Project:

The report should be prepared in the prescribed format which is available with concerned course advisor/counselor. Similarly a 15 minutes power point presentation in a prescribed format should be given.

The evaluation of the Micro Project is based upon the following.

S.No	Description	Internal	External
1.	Content Covered	05 Marks	10 Marks
2.	Technicality involved	05 Marks	10 Marks
3.	Report quality	05 Marks	10 Marks
4.	Summary and findings	05 Marks	10 Marks
5.	PPT presentation	10 Marks	30 Marks
	Total	**30 Marks**	**70 Marks**

II-B.TECH.-I-SEMESTER SYLLABUS

DISCRETE MATHEMATICAL STRUCTURES

II-B.Tech.-I-Sem.   **L T P C**
Subject Code: 17CS2101BS   **4 0 0 4**

Course Outcomes (COs) & CO-PO Mapping (3-Strong; 2-Medium; 1-Weak Correlation)

COs	Upon completion of course the students will be able to	PO1	PO2	PO12
CO1	verify logical statements using connectives	3	3	2
CO2	perform various operations with relational algebra	3	3	2
CO3	validate arguments using predicate calculus	3	3	2
CO4	solve problems using combinatorics	3	3	2
CO5	simplify real-life situations using graph theory	3	3	3

Unit-I: Mathematical logic: Introduction, Statements and Notation, Connectives, Well formed formulas, tautologies ,equivalence of formulas, duality law, functionally complete set of connectives, other connectives.

Unit-II: Set theory: Basic Concepts, Representation of sets, operations on sets, Relations and Ordering, Properties of binary relation, Functions, Partial ordered set, Lattice.

Unit-III: Predicate Calculus: Normal Forms, Rules of Inference, Automatic theorem proving, The Predicate Calculus, Mathematical induction.

Unit-IV: Elementary Combinatorics: Basics of Counting, Combinations and Permutations, Enumeration of Combinations and Permutations, Enumerating Combinations and Permutations with Repetitions, Enumerating Permutation with Constrained Repetitions, Principle of inclusion-exclusion, Pigeon hole principle
Recurrence Relations: Generating functions of sequences, Solving recurrence relations by substitution and generating functions.

Unit-V: Graph Theory: Basic Concepts, Isomorphism and Sub-graphs, Planar Graphs, Euler's Formula, Multi-graphs and Euler Circuits, Hamiltonian Graphs, Chromatic Numbers, The Four-Color Problem.

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

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

DIGITAL LOGIC DESIGN

		L	**T**	**P**	**C**
II-B.Tech.-I-Sem.		**3**	**0**	**0**	**3**
Subject Code: 17CS2102ES					

Course Outcomes (COs) & CO-PO Mapping (3-Strong; 2-Medium; 1-Weak Correlation)

COs	Upon completion of course the students will be able to	PO1	PO2	PO3	PO6	PO12
CO1	distinguish different number systems and digital codes	3	3	2	2	2
CO2	minimize logical functions using Karnaugh Maps	3	3	2	2	3
CO3	construct different combinational logic circuits	3	3	2	2	2
CO4	solve sequential circuits using state reduction methods	3	3	2	2	3
CO5	design complex logical functions using PLDs	3	3	2	2	3

Unit – I

DIGITAL SYSTEMS AND BINARY NUMBERS: Digital systems, binary numbers, number base conversions, octal and hexadecimal numbers, complements, signed binary numbers, binary codes, error detection and error correction codes.

BOOLEAN ALGEBRA AND LOGIC GATES: Basic definitions, axiomatic definition of Boolean algebra, basic theorems and properties of Boolean algebra, Boolean functions, canonical and standard forms, other logic operations, digital logic gates.

Unit – II

GATE LEVEL MINIMIZATION: The k-map method, four-variable map, five-variable map, product of sums simplification, don't-care conditions, NAND and NOR implementation, determination and selection of Prime Implicants, Essential and Non essential prime Implicants.

Unit – III

COMBINATIONAL CIRCUITS: Design procedure, Binary Adder, Binary Subtractor, Binary Multiplier, Magnitude Comparator, Decoders, Encoders, Multiplexers, and Demultiplexers.

Unit – IV

SYNCHRONOUS SEQUENTIAL LOGIC: Sequential circuits, latches, flip-flops, analysis of clocked sequential circuits, State reduction and assignment, design procedure.

REGISTERS AND COUNTERS: Registers, shift registers, ripple counters, synchronous counters, counters with unused states, ring counter, Johnson counter.

Unit – V

MEMORY AND PROGRAMMABLE LOGIC: Introduction**,** Random access memory, memory decoding, error detection and correction, read only memory, programmable logic array, programmable array logic, sequential programmable devices.

Text Books:

1. Digital Design, M. Morris Mano, M.D.Ciletti, 5th edition, Pearson.(Units I, II, III, IV, Part of UnitV)
2. Computer System Architecture, M.Morris Mano, 3rd edition, Pearson.(Part of UnitV)

References:

1. Switching and Finite Automata Theory, Z. Kohavi, Tata McGrawHill.
2. Fundamentals of Logic Design, C. H. Roth, L. L. Kinney, 7th edition, Cengage Learning.
3. Fundamentals of Digital Logic & Micro Computer Design, 5th Edition, M. Rafiquzzaman, JohnWiley.

COMPUTER ORGANIZATION

II-B.Tech.-I-Sem.　　　　　　　　　　　　　　　　　　　　　　　　**L　T　P　C**
Subject Code: 17CS2103PC　　　　　　　　　　　　　　　　　　**3　1　0　3**

Course Outcomes (COs) & CO-PO Mapping (3-Strong; 2-Medium; 1-Weak Correlation)

COs	Upon completion of course the students will be able to	PO1	PO2	PO3	PO6	PO12
CO1	identify basic components and design of control unit	3	3	2	2	2
CO2	illustrate the functioning of CPU using 8086 processor	3	3	2	2	3
CO3	solve real time problems using ALP	3	3	2	2	2
CO4	analyze arithmetic operations, I/O operations and memory	3	3	2	2	3
CO5	distinguish pipelining and multiprocessors	3	3	2	2	3

Unit – I

Digital Computers: Introduction, Block diagram of Digital Computer, Definition of Computer Organization, Computer Design and Computer Architecture.
Basic Computer Organization and Design: Instruction codes, Computer Registers, Computer instructions, Timing and Control, Instruction cycle, Memory Reference Instructions, Input – Output and Interrupt, Complete Computer Description.
Micro Programmed Control: Control memory, Address sequencing, micro program example, design of control unit.

Unit – II

Central Processing Unit: The 8086 Processor Architecture, Register organization, Physical memory organization, General Bus Operation, I/O Addressing Capability, Special Processor Activities, Minimum and Maximum mode system and timings.
8086 Instruction Set and Assembler Directives-Machine language instruction formats, Addressing modes, Instruction set of 8086, Assembler directives and operators.

Unit – III

Assembly Language Programming with 8086- Machine level programs, Machine coding the programs, Programming with an assembler, Assembly Language example programs.
Stack structure of 8086, Interrupts and Interrupt service routines, Interrupt cycle of 8086, Interrupt programming, Passing parameters to procedures, Macros, Timings and Delays.

Unit - IV

Computer Arithmetic: Introduction, Addition and Subtraction, Multiplication Algorithms, Division Algorithms, Floating - Point Arithmetic Operations.
Input-Output Organization: Peripheral Devices**,** Input-Output Interface, Asynchronous data transfer, Modes of Transfer, Priority Interrupt, Direct Memory Access, Input –Output Processor (IOP),Intel 8089IOP.

Unit - V

Memory Organization: Memory Hierarchy, Main Memory, Auxiliary memory, Associative Memory, Cache Memory, Virtual Memory.
Pipeline and Vector Processing: Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline, RISC Pipeline, Vector Processing, Array Processors.
Multi Processors: Characteristics of Multiprocessors, Interconnection Structures, Inter Processor Arbitration, Inter processor Communication, and Synchronization.

Text Books:

1. Computer System Architecture, M. Moris Mano, Third Edition, Pearson.(UNIT-I, IV, V)
2. Advanced Microprocessors and Peripherals, K M Bhurchandi, A.K Ray ,3rd edition, McGraw Hill India Education Private Ltd. **(UNITS - II,III).**

References:

1. Microprocessors and Interfacing, D V Hall, SSSP Rao, 3rd edition, McGraw Hill India Education Private Ltd.
2. Carl Hamacher, Zvonko Vranesic, Safwat Zaky: Computer Organization, 5th Edition, Tata McGraw Hill, 2002
3. Computer Organization and Architecture, William Stallings, 9th Edition, Pearson.
4. David A. Patterson, John L. Hennessy: Computer Organization and Design – The Hardware / Software Interface ARM Edition, 4th Edition, Elsevier,2009.

OBJECT ORIENTED PROGRAMMING THROUGH JAVA

II-B.Tech.-I-Sem.
Subject Code: 17CS2104PC

L	**T**	**P**	**C**
4	**1**	**0**	**4**

Course Outcomes (COs) & CO-PO Mapping (3-Strong; 2-Medium; 1-Weak Correlation)

COs	Upon completion of course the students will be able to	PO1	PO2	PO3	PO12
CO1	write simple java programs using OOP concepts	3	3	2	2
CO2	interpret programs using the concepts of inheritance, polymorphism, packages and interfaces	3	3	2	2
CO3	build efficient and error free codes using the concepts of multithreading and exception handling	3	3	3	3
CO4	design GUI programs using the concepts of AWT and event handling	3	3	3	2
CO5	develop real-time applications using applets and swings	3	3	3	3

Unit I:

Object-oriented thinking and Java Basics: Object-oriented thinking- Need for OOP paradigm, summary of OOP concepts, coping with complexity, abstraction mechanisms. A way of viewing world – Agents, responsibility, messages, methods.

Java Basics-History of Java, Java buzzwords, data types, variables, scope and life time of variables, arrays, operators, expressions, control statements, type conversion and casting, simple java programs, concepts of classes, objects, constructors, methods, access control, this keyword, garbage collection, overloading methods and constructors, parameter passing, recursion, exploring String class.

Unit II:

Inheritance, Polymorphism, Packages and Interfaces: Inheritance- Hierarchical abstractions, Base class object, subclass, subtype, substitutability, forms of inheritance- specialization, specification, construction, extension, limitation, combination. Benefits of inheritance, costs of inheritance. Member access rules, super uses, using final with inheritance, the Object class and its methods.

Polymorphism- method overriding, dynamic binding, abstract classes and methods.

Packages- Defining, Creating and Accessing a Package, Understanding CLASSPATH, importing packages. Exploring java.io.

Interfaces- Differences between classes and interfaces, defining an interface, implementing interface, applying interfaces, variables in interface and extending interfaces.

Unit III:

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

Unit IV:

Event Handling: Events, Event sources, Event classes, Event Listeners, Delegation event model, handling mouse and keyboard events, Adapter classes, nested and inner classes. The AWT class hierarchy, user interface components- labels, buttons, canvas, scrollbars, text components, checkbox, checkbox groups, choices, lists panels – scrollpane, dialogs, menubar, graphics, Layout Managers- Flow Layout, Border Layout, Grid Layout, Card Layout, Grid Bag Layout.

Unit V:

Applets and Swings: Applets – Concepts of Applets, differences between applets and applications, life cycle of an applet, types of applets, creating applets, passing parameters to applets.

Swings – Introduction, limitations of AWT, MVC architecture, components, containers, exploring swing- JApplet, JFrame and JComponent, ImageIcon, JLabel, JTextfield, JButton, JCheckbox, JList, JRadiobutton, JComboBox, JTabbedPane, JScrollPane, JTree and JTable.

Text Books:

1. Java the complete reference, 8\ :sup:`th`\ editon, Herbert Schildt, TMH.
2. Understanding OOP with Java, updated edition, T. Budd, Pearson Eduction.

References:

1. An Introduction to programming and OO design using Java, J.Nino and F.A. Hosch, John Wiley & sons.
2. Java How to Program, H.M.Dietel and P.J.Dietel, Sixth Edition, Pearson Education/PHI.
3. Introduction to Java programming, Y. Daniel Liang, Pearson Education.
4. An introduction to Java programming and object oriented application development, Richard A. Johnson.

DATABASE MANAGEMENT SYSTEMS

II-B.Tech.-I-Sem.   **L T P C**
Subject Code: 17CS2105PC   **4 0 0 4**

Course Outcomes (COs) & CO-PO Mapping (3-Strong; 2-Medium; 1-Weak Correlation)

COs	Upon completion of course the students will be able to	PO1	PO2	PO3	PO12
CO1	design simple databases using basic concepts of database architectures	3	3	3	2
CO2	construct databases using ER Modelling to formulate SQL queries	3	3	3	2
CO3	apply normalization on database to eliminate redundancy	3	3	3	2
CO4	illustrate transaction management, concurrency control and recovery techniques	3	3	3	2
CO5	make use of query processing, query optimization and indexing techniques	3	3	3	2

Unit – I

Introduction: Introduction and applications of DBMS, Purpose of data base, History of database, Database architecture- Abstraction Levels, Data Independence, Database Languages , Database users and DBA.
Introduction to Database Design: Database Design Process, Data Models ,ER Diagrams - Entities, Attributes, Relationships, Constraints, keys, extended ER features, Generalization, Specialization, Aggregation, Conceptual design with the E-R model for large Enterprise.

Unit – II

The Relational Model: Introduction to the relational model, Integrity constraints over relations, Enforcing integrity constraints, Querying relational data, Logical database design: E-R to relational, Introduction to views, Destroying/altering tables and views.
Relational Algebra and Calculus: Preliminaries, relational algebra operators, relational calculus - Tuple and domain relational calculus.
SQL: Basics of SQL, DDL,DML,DCL, structure – creation, alteration, defining constraints – Primary key, foreign key, unique, not null, check, IN operator, Functions - aggregate functions, Built-in functions – numeric, date, string functions, set operations, sub-queries, correlated sub-queries, Use of group by, having, order by, join and its types, Exist, Any, All , view and its types. Transaction control commands – Commit, Rollback, Save point, cursors, stored procedures, Triggers

Unit – III

Schema Refinement and Normal Forms: Introduction to schema refinement, functional dependencies, reasoning about FDs. Normal forms: 1NF, 2NF, 3NF, BCNF, Muli valued dependency-forth normal form-Join dependency-fifth normal form, Properties of decomposition, dependency preservation, lossless design, normalization, schema refinement in database design.

Unit – IV

Transactions Management: Transaction concept, transaction state, implementation of atomicity and durability, concurrent executions, Serializability, testing for Serializability, recoverability, implementation of isolation.
Concurrency Control and Recovery SystEM: Concurrency control, lock based protocols, time-stamp protocols, validation protocols, multiple granularity, deadlock handling. Recovery system - failure classification, storage structure, recovery and atomicity, log- based recovery, shadow paging, buffer management, failure with loss of non-volatile storage, Crash Recovery, Remote backup system.

Unit – V

Query Processing & Query Optimization: Overview, measures of query cost, selection operation, sorting, join, evaluation of expressions, transformation of relational expressions, estimating statistics of expression results, evaluation plans, and materialized views

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Overview of Storage And Indexing: Tree structured indexing - intuition for tree indexes, indexed sequential access method (ISAM), B+ Trees - a dynamic tree structure, Hash Based Indexing.

Text Books:

1. Raghurama Krishnan, Johannes Gehrke , Database Management Systems, 3rdedition, Tata McGraw Hill, New Delhi,India.
2. Elmasri Navate, Fundamentals of Database Systems, Pearson Education, India.

References:

1. Abraham Silberschatz, Henry F. Korth, S. Sudarshan (2005), Database System Concepts, 5th edition, McGraw-Hill, New Delhi,India.
2. Peter Rob, Carlos Coronel (2009), Database Systems Design, Implementation and Management, 7th edition.
3. Database Management System Oracle SQL, Pranab Kumar Das Guptha and P Radha Krishna PHI.

COMPUTER ORGANIZATION LAB

II-B.Tech.-I-Sem.   **L T P C**
Subject Code: 17CS2106PC   **0 0 3 2**

Course Outcomes (COs) & CO-PO Mapping (3-Strong; 2-Medium; 1-Weak Correlation)

COs	Upon completion of course the students will be able to	PO4	PO5
CO1	design logic gates using NAND and NOR gates	3	3
CO2	construct the combinational and sequential logic circuits	3	3
CO3	solve simple problems using ALP	3	3
CO4	implement string handling operations using ALP	3	3
CO5	develop programs using procedures and macros	3	3

Exercises in Digital Logic Design:

1. Implement Logic gates using NAND and NOR gates
2. Design a Full adder using gates
3. Design and implement the 4:1 MUX, 8:1 MUX using gates/ICs.
4. Design and Implement a 3 to 8 decoder using gates
5. Design a 4 bit comparator using gates/IC
6. Design and Implement a 4 bit shift register using Flip flops
7. Design and Implement a Decade counter

Exercises in Micro Processor programming:

Write assembly language programs for the following using GNU Assembler.

1. Write assembly language programs to evaluate the expressions:
   i) $a = b + c - d *e$
   ii) $z = x * y + w - v +u /k$
   a. Considering   8-bit, 16 bit and 32 bit binary numbers as b, c, d, e.
   b. Considering 2 digit, 4 digit and 8 digit BCD numbers.
   Take the input in consecutive memory locations and also Display the results by using "int xx" of 8086. Validate program for the boundary conditions.
2. Write an ALP of 8086 to take N numbers as input. And do the following operations on them.
   a. Arrange in ascending and descending order.
3. Write an ALP of 8086 to take N numbers as input. And do the following operations on them.
   a. Find max and minimum
   b. Find average
   Considering 8-bit, 16 bit binary numbers and 2 digit, 4digit and 8 digit BCD numbers. Display the results by using "int xx" of 8086. Validate program for the boundary conditions.
4. Write an ALP of 8086 to take a string of as input (in 'C' format) and do the following Operations on it.
   a. Find the length
   b. Find it is Palindrome or n.
   Considering 8-bit, 16 bit binary numbers and 2 digit, 4digit and 8 digit BCD numbers. Display the results by using "int xx" of 8086. Validate program for the boundary conditions.

5. Write an ALP of 8086 to take a string of as input (in 'C' format) and do the following Operations onit.
   a. Find whether given string substring or not.

6. Write an ALP of 8086 to take a string of as input (in 'C' format) and do the following Operations onit
   a. Find the Armstrong number
   b. Find the Fibonacci series for n numbers
   Display the results by using "int xx" of8086.

7. Write the ALP to implement the above operations as procedures and call from the main procedure.

8. Write an ALP of 8086 to find the factorial of a given number as a Procedure and call from the main program which display the result.

References:

1. Switching theory and logic design –A. Anand Kumar PHI,2013
2. Advanced microprocessor & Peripherals-A. K. Ray and K. M. Bherchandavi, TMH, 2ndedition.
3. Switching and Finite Automatic theory-Zvi Kohavi, Niraj K.Jha Cambridge, 3rd edition
4. Digital Design –Morris Mano, PHI, 3rdedition
5. Microprocessor and Interfacing –Douglas V. Hall, TMGH 2ndedition.

OBJECT ORIENTED PROGRAMMING THROUGH JAVA LAB

II-B.Tech.-I-Sem.   **L T P C**
Subject Code: 17CS2107PC   **0 0 3 2**

Course Outcomes (COs) & CO-PO Mapping (3-Strong; 2-Medium; 1-Weak Correlation)

COs	Upon completion of course the students will be able to	PO4	PO5
CO1	write, compile and execute simple java programs	3	3
CO2	develop programs using inheritance, polymorphism, packages and Interfaces	3	3
CO3	demonstrate multithreading and exception handling mechanisms	3	3
CO4	design GUI using the concepts of AWT and event handling	3	3
CO5	build real-time applications using applets and swings	3	3

Use Eclipse or Netbeans platform and get acquainted with the various menus. Create a test project, add a test class and run it. See how you can use auto suggestions and auto fill. Try code formatter and code refactoring like renaming variables, methods and classes. Try debugging 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.

Week 1: 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 Num2 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 exception in a message dialog box. [Use JOptionPane]

Week 2: Write a Java program to create an abstract class named Shape that contains two integers and an empty method named printArea(). Provide three classes named Rectangle, Triangle and Circle such that each one of the classes extends the class Shape. Each one of the classes contains only the method printArea () that prints the area of the given shape.

Week 3: 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.

Week 4: Write a Java program that correctly implements the producer – consumer problem using the concept of inter-thread communication.

Week 5: 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.

Week 6: 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 divide by zero.

Week 7: a) Develop an applet in Java that displays a simple message.
     a) Develop an applet in Java that receives an integer in one text field, and computes its
     b) factorial value and returns it in another text field, when the button named "Compute" is clicked.

Week 8: 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.

Week 9: 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).

Week10: Write a Java program to demonstrate MouseListener, MouseMotionListener and KeyListener.

Week 11: Develop Swing application which uses JList, JTree, JTable, JTabbedPane and JScrollPane.

Text Books:

1. Java the complete reference, 8th editon, Herbert Schildt, TMH.
2. Understanding OOP with Java, updated edition, T. Budd, Pearson Eduction.

References:

1. An Introduction to programming and OO design using Java, J.Nino and F.A. Hosch, John Wiley & sons.
2. Java How to Program, H.M.Dietel and P.J.Dietel, Sixth Edition, Pearson Education/PHI.
3. Introduction to Java programming, Y. Daniel Liang, Pearson Education.
4. An introduction to Java programming and object oriented application development, Richard A. Johnson.

DATABASE MANAGEMENT SYSTEMS LAB

II-B.Tech.-I-Sem.　　　　　　　　　　　　　　　　　　　　　　**L　T　P　C**
Subject Code: 17CS2108PC　　　　　　　　　　　　　　　　　**0　0　3　2**

Course Outcomes (COs) & CO-PO Mapping (3-Strong; 2-Medium; 1-Weak Correlation)

COs	Upon completion of course the students will be able to	PO4	PO5
CO1	construct databases using SQL commands	3	3
CO2	apply normalization techniques to eliminate redundancy	3	3
CO3	design a database schema for a given domain	3	3
CO4	solve queries based on joins, nested queries and aggregate functions	3	3
CO5	execute PL / SQL programs for a given application	3	3

Note: Take any database application and follow up the following experiments and make expertise in different case studies.

List of Experiments:

Experiment 1: Student should decide on a case study, analyse and then formulate the problem statement by populating object (entities) and their role.

Experiment 2: Conceptual Designing using ER Diagrams (Identifying entities, attributes, keys and relationships between entities, cardinalities, generalization, specialization etc.)
Note: Student is required to submit a document by drawing ER Diagram to the Lab teacher.

Experiment 3: Converting ER Model to Relational Model (Represent entities and relationships in Tabular form, Represent attributes as columns, identifying keys)
Note: Student is required to submit a document showing the database tables created from ER Model.

Experiment 4: Normalization -To remove the redundancies and anomalies in the above relational tables, Normalize upto Third Normal Form

Experiment 5: Creation of Tables using SQL- Overview of using SQL tool, Data types in SQL, **Practicing DDL Commands-**Creating Tables (along with Primary and Foreign keys), Altering Tables and Dropping Tables

Experiment 6: Practicing DML commands- Insert, Select, Update, Delete of Tables.

Experiment 7: Practicing Queries using ANY, ALL, IN, EXISTS, NOT EXISTS, UNION, INTERSECT, EXCEPT ,CONSTRAINTS etc.

Experiment 8: Practicing Sub queries (Nested, Correlated) and Joins (Inner, Outer and Equi).

Experiment 9: Practice Queries using Aggregate Operators - COUNT, SUM, AVG, MAX, MIN. GROUP BY, HAVING, VIEWS Creation and Dropping.

Experiment 10: Practicing on Triggers - creation of trigger, Insertion using trigger, Deletion using trigger, Updating using trigger

Experiment 11: Procedures- Creation of Stored Procedures, Execution of Procedure, and Modification of Procedure.

Experiment 12: Cursors- Declaring Cursor, Opening Cursor, Fetching the data, closing the cursor.

Text Books:

1. Database Management Systems, Raghurama Krishnan, Johannes Gehrke, Tata Mc Graw Hill 3rd Edition
2. Mastering Oracle SQL By Sanjay Mishra,Alan Beauleu .O'Reilly Media

References:

1. Database Systems design, Implementation, and Management, Peter Rob & Carlos Coronel 7th Edition.
2. Database System Concepts, Silberschatz, Korth, Mc Graw hill, V edition.
3. Fundamentals of Database Systems, Elmasri Navrate Pearson Education
4. Introduction to Database Systems, C.J.Date Pearson Education
5. Oracle for Professionals, The X Team, S.Shah and V. Shah, SPD.
6. Database Systems Using Oracle: A Simplified guide to SQL and PL/SQL,Shah,PHI.
7. Fundamentals of Database Management Systems, M. L. Gillenson, Wiley Student Edition

Note: Take any database application and follow up the following experiments and make expertise in different case studies.

GENDER SENSITIZATION LAB
MANDATORY COURSE (NON-CRIDIT)

II-B.Tech.-I-Sem.   **L T P C**
Subject Code: 17HS2109MC   **0 0 2 -**

Course Outcomes (COs) & CO-PO Mapping (3-Strong; 2-Medium; 1-Weak Correlation)

COs	Upon completion of course the students will be able to	PO9	PO12
CO1	identify gender issues in contemporary India	2	3
CO2	explain gender roles, spectrum, relationships etc	3	2
CO3	analyze gender issues related to sexual harassment and violence	3	3
CO4	assess gender and human rights	3	3
CO5	adapt to the societal need to end prejudices and achieve gender equality	2	3

Unit I: Understanding Gender

Gender: Why Should We Study It? (Towards a World of Equals: Unit -1)
Socialization: Making Women, Making Men (Towards a World of Equals: Unit -2)
Introduction. Preparing for Womanhood. Growing up Male. First lessons in Caste. Different Masculinities.
Just Relationships: Being Together as Equals (Towards a World of Equals: Unit -12)
Mary Kom and onler tiler. Love and Acid just do not Mix. Love Letters. Mothers and Fathers, Further Reading: Rosa Parks-The Brave Heart.

Unit II: Gender and Biology

Missing Women: Sex Selection and Its Consequences (Towards a World of Equals: Unit -4) Declining Sex Ratio. Demographic Consequences. Gender Spectrum: Beyond the Binary (Towards a World of Equals: Unit -10) Two or Many? Struggles with Discrimination. Additional Reading: Our Bodies, Our Health (Towards a World of Equals:Unit -13)

Unit III: Gender and Labour

Housework: the Invisible Labour (Towards a World of Equals: Unit -3) "My Mother doesn't Work." "Share the Load." Women's Work: Its Politics and Economics (Towards a World of Equals: Unit -7) Fact and Fiction. Unrecognized and Unaccounted work. Further Reading: Wages and Conditions of Work.

Unit IV: Issues of Violence

Sexual Harassment: Say Nol (Towards a World of Equals: Unit -6)
Sexual Harassment, not Eve-teasing- Coping with Everyday Harassment - Further Reading: "Chupulu". Domestic Violence: Speaking Out (Towards a World of Equals: Unit -8) Is Home a Safe Place? -When Women Unite [Film]. Rebuilding Lives. Further Reading: New Forums for Justice. Thinking about Sexual Violence (Towards a World of Equals: Unit -11) Blaming the Victim-"I Fought for my Life...." - Further Reading: The Caste Face of Violence.

Unit V: Gender Studies

Knowledge: Through the Lens of Gender (Towards a World of Equals: Unit -5)
Point of View. Gender and the Structure of Knowledge. Further Reading: Unacknowledged Women Artists o Telangana.
Whose History? Questions for Historians and Others (Towards a World of Equals: Unit -9) Reclaiming a Past. Writing other Histories. Further Reading: Missing Pages from Modern Telangana History.

References:
1. Agnes. Flavia. My Story … Our Story of Re-building Broken Lives. Delhi: Forum Against Oppression of Woment (FAOW), 1988. 2nd Edition. Print

2. Brady. Judy 'I want a wife,' Literature for Composition: Essays. Faction, Poetry and Drama. Ed. Sylvan Barnet. Morton Berman. Willam Burto and Marcia Stubbs. 3rd Edition. New York: HarperCollins Customs Books, 1971. Available online at: http://www.columbia. Edu/~sss31/rainbow/wife.html.Web.

3. NCERT History Textbook for Class IX. Ch 8: Clothing .

4. Roy, Rahul.A Little Book on Men. New Delhi: Yoda Books, 2007

5. Sen. Amartya. " More than One Million Women are Missing." New Yark Review of Books 37.20 (20 December 1990) . Print

6. Vimala. " Vantillu (The Kitchen). Women Writing in India: 600 BC to the Present. Volume II: The 20th Century. Ed. Susie Thanru and K Lalita. Delhi: Oxford University Press. 1995. 599-601. Print.

7. Sen, Arnartya. 'More than One Million Women are Missing." New York Review of Books 37.20 (20 December 1990). Print. We Were Making History.. ' Life Stories of Women in the Telangana People's Struggle. New Delhi: Kali for Women, 1989.

8. Tripti Lahiri. "By the Numbers: Where Indian Women Work." Women's Studies Journal (14
 November 2012) Available online at: http:// blogs.wsj.com/ India real time/2012111/14/by - the numbers-where-Indian-women-work/>

9. K. Satyanarayana and Susie Tharu (Ed.) Steel Nibs Are Sprouting: New Dalit Writing From South India, Dossier 2: Telugu And Kannada http://harpercollins.co.in/BookDetail.aso?Book   Code=3732

VERBAL ABILITY
MANDATORY COURSE (NON-CREDIT)

II-B.Tech.-I-Sem.   **L   T   P   C**
Subject Code: 17HS2110MC   **0   0   2   -**

Course Outcomes (COs) & CO-PO Mapping (3-Strong; 2-Medium; 1-Weak Correlation)

COs	Upon completion of course the students will be able to	PO9	PO10
CO1	recall grammatical and basic sentence structures for communication	3	3
CO2	list out various vocabulary forms and improve verbal ability	3	3
CO3	use sentence structures without errors	3	3
CO4	apply the sentence structure for effective paraphrasing	3	3
CO5	demonstrate effective verbal skills	3	3

Unit - I
Grammar Fundamentals
Basic Sentence Structure
Parts of Speech
- The Noun
- The Adjective
- Articles
- Pronouns
- The Verb
- The Adverb
- The Preposition
- The Conjunction
- The Interjection

Unit - II
Synonyms and Antonyms
Homonyms and Homophones,
Word Formation,
Idioms and Phrases,
Analogy
One-word Substitutes.

Unit - III
Integrated Grammar Exercises on Common Errors, Vocabulary Enhancement, Using a dictionary

Unit - IV
Paragraph writing, Essay writing, Letter Writing, E-mail Writing, Picture Description

Unit - V
Sentence Equivalence, Text Completion, Comparison and Parallelism

Activities
1. Regular practice tests.
2. Quiz, Crossword, Word-search and related activities.
3. Picture Description including Description of Photos / Images / Posters / Advertisement Analysis etc.,

Text Books
1. Contemporary English Grammar Structure and Compositionby David Green.
2. Text for Communication Skills – Current English for Colleges by N Krishnaswamy and T.Sriram..

References
1. The Oxford English Grammar by Sidney Greenbaum.

II-B.TECH.-II-SEMESTER SYLLABUS

STATISTICAL AND NUMERICAL METHODS

II-B.Tech.-II-Sem.
Subject Code: 17CS2201BS

	L	T	P	C
	4	**0**	**0**	**4**

Course Outcomes (COs) & CO-PO Mapping (3-Strong; 2-Medium; 1-Weak Correlation)

COs	Upon completion of course the students will be able to	PO1	PO2	PO12
CO1	differentiate among random variables involved in the probability models	3	2	1
CO2	test hypothesis for large samples	3	2	1
CO3	test hypothesis for small samples	3	2	1
CO4	solve transcendental, linear and non-linear system of equations using numerical methods	3	2	1
CO5	find the numerical solutions for first order initial value problems and integrals	3	2	1

Unit- I
Probability, Random variables and Distributions:
Random variables, Discrete random variable, Continuous random variable, Probability distribution function, Probability density function, Expectation, Moment generating function.
Discrete distributions: Binomial and geometric distributions. Continuous distribution: Normal distributions.

Unit – II
Sampling Theory: Introduction, Population and samples, Sampling distribution of means and variances
Test of Hypothesis For Large Samples : Introduction, Hypothesis, Null and Alternative Hypothesis, Type I and Type II errors, Level of significance, One tail and two-tail tests, Tests concerning one mean and proportion, two means-proportions and their differences- Point estimation, Maximum error of estimate, Interval estimation.

Unit – III
Test of Hypothesis For small Samples: Tests concerning small samples- t– Test, F-Test and χ^2-Test and their properties, applications. Point estimation, Maximum error of estimate, Interval estimation.

Unit-IV
Algebraic and transcendental Equations & Curve Fitting: Introduction, Bisection Method, Method of Flase position, Iteration methods: fixed point iteration and Newton Raphson methods. Solving linear system of equations by Gauss – Jacobi's, Gauss-Seidal Methods.
Curve Fitting: Fitting a linear, second degree, exponential, power curve by method of least squares.

Unit-V
Numerical Integration and solution of Ordinary Differential equations: Trapezoidal rule-Simpson's $1/3^{rd}$ and $3/8^{th}$ rule-Solution of ordinary differential equations by Taylor's series, Picard's method of successive approximations, Euler's method, Runge-Kutta method (second and fourth order)

Text Books:
1. Probability and statistics for Engineers by Richard Arnold Johnson, Irwin Miller and Jhon E. Freund, New Delhi, Prentice Hall.
2. Probability and Statistics for Engineers and Sciences by Jay L. Devore, Cengage Learning.
3. Numerical Methods for Scientific and Engineering Computation by M. K. Jain, S.R.K. Iyengar and R. K. Jain, New Age International Publishers.

References:
1. Fundamentals Of Mathematical Statistics by S. C. Guptha & V. K. Kapoor, S.Chand.

OPERATING SYSTEMS

II-B.Tech.-II-Sem.
Subject Code: 17CS2202PC

	L	T	P	C
	4	0	0	4

Course Outcomes (COs) & CO-PO Mapping (3-Strong; 2-Medium; 1-Weak Correlation)

COs	Upon completion of course the students will be able to	PO1	PO2	PO12
CO1	outline various concepts and structures of operating systems	3	3	2
CO2	solve synchronization problems by using process management	3	3	2
CO3	adapt various deadlock handling and memory management mechanism	3	3	2
CO4	analyze various file management system	3	3	2
CO5	make use of I/O Management and security mechanisms	3	3	2

Unit – I

Operating Systems Overview: Introduction, operating system operations, process management, memory management, storage management, protection and security, distributed systems.
Operating Systems Structures: Operating system services and systems calls, system programs, operating system structure, operating systems generations.

Unit – II

Process Management: Process concepts, process state, process control block, scheduling queues, process scheduling, multithreaded programming, threads in UNIX, comparison of UNIX and windows.
Concurrency and Synchronization: Process synchronization, critical section problem, Peterson's solution, synchronization hardware, semaphores, classic problems of synchronization, readers and writers problem, dining philosophers problem, monitors, synchronization examples(Solaris), atomic transactions. Comparison of UNIX and windows.

Unit – III

Deadlocks: System model, deadlock characterization, deadlock prevention, detection and avoidance, recovery from deadlock banker's algorithm.
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 study - UNIX.

Unit - IV

File System: 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, efficiency and performance, comparison of UNIX and windows.

Unit – V

I/O System: Mass storage structure - overview of mass storage structure, disk structure, disk attachment, disk scheduling algorithms, swap space management, stable storage implementation, tertiary storage structure.
I/O: Hardware, application I/O interface, kernel I/O subsystem, transforming I/O requests to hardware operations, streams, performance.

Text Books:

1. Abraham Silberschatz, Peter Baer Galvin, Greg Gagne (2006), Operating System Principles, 7th edition, Wiley India Private Limited, New Delhi.

References:

1. Stallings (2006), Operating Systems, Internals and Design Principles, 5th edition, Pearson Education, India.
2. Andrew S. Tanenbaum (2007), Modern Operating Systems, 2nd edition, PHI, India.
3. Deitel & Deitel (2008), Operating systems, 3rd edition, Pearson Education, India.

COMPUTER NETWORKS

II-B.Tech.-II-Sem.　　　　　　　　　　　　　　　　　　　　　　　**L　T　P　C**
Subject Code:　17CS2203PC　　　　　　　　　　　　　　　　　　　**4　0　0　4**

Course Outcomes (COs) & CO-PO Mapping (3-Strong; 2-Medium; 1-Weak Correlation)

COs	Upon completion of course the students will be able to	PO1	PO2	PO12	PO13
CO1	outline the basics of computer networks and various layers	3	3	2	3
CO2	demonstrate data link layer and multiple access protocols	3	3	2	3
CO3	interpret network layer and routing algorithms	3	3	3	3
CO4	illustrate various transport protocols	3	3	3	3
CO5	make use of various protocols of application layer	3	3	2	3

Unit – I

Introduction: Network applications, network hardware, network software, reference models: OSI, TCP/IP, Internet, Connection oriented network - X.25, frame relay.
The Physical Layer: Theoretical basis for communication, guided transmission media, wireless transmission, the public switched telephone networks, mobile telephone system.

Unit – II

The Data Link Layer: Design issues, error detection and correction, elementary data link protocols, sliding window protocols, example data link protocols - HDLC, the data link layer in the internet.
The Medium Access Sublayer: Channel allocations problem, multiple access protocols, Ethernet, Data Link Layer switching, Wireless LAN, Broadband Wireless, Bluetooth

Unit – III

The Network Layer: Network layer design issues, routing algorithms, Congestion control algorithms, Internetworking, the network layer in the internet (IPv4 and IPv6), Quality of Service.

Unit – IV

The Transport Layer: Transport service, elements of transport protocol, Simple Transport Protocol, Internet transport layer protocols: UDP and TCP.

Unit – V

The Application Layer: Domain name system, electronic mail, World Wide Web: architectural overview, dynamic web document and http. **APPLICATION LAYER PROTOCOLS:** Simple Network Management Protocol, File Transfer Protocol, Simple Mail Transfer Protocol, Telnet.

Text books:

1. A. S. Tanenbaum (2003), Computer Networks, 4th edition, Pearson Education/ PHI, New Delhi, India.

References:

1. Behrouz A. Forouzan (2006), Data communication and Networking, 4th Edition, Mc Graw-Hill, India.
2. Kurose, Ross (2010), Computer Networking: A top down approach, Pearson Education, India.

DESIGN AND ANALYSIS OF ALGORITHMS

II-B.Tech.-II-Sem.
Subject Code: 17CS2204PC

	L	T	P	C
	4	1	0	4

Course Outcomes (COs) & CO-PO Mapping (3-Strong; 2-Medium; 1-Weak Correlation)

COs	Upon completion of course the students will be able to	PO2	PO3	PO12	PO13
CO1	measure time and space complexity of algorithms	3	3	3	3
CO2	solve problems using disjoint sets and divide-and-conquer techniques	3	3	2	2
CO3	apply greedy method and dynamic programming paradigm to solve the problems	3	3	2	2
CO4	adapt back-tracking and branch-bound methods to solve problems	3	3	2	2
CO5	interpret NP-hard and NP-complete problems	3	3	2	2

Unit - I

Introduction: Algorithm, Algorithm specification, performance analysis, Divide and Conquer- The general method. Running time calculation of Divide and Conquer technique.
Divide and Conquer: Finding maximum and Minimum, Merge sort, quick sort, Strassen's matrix multiplication.

Unit - II

The Greedy Method: The general method, Knapsack Problem, Tree vertex splitting, Job sequencing with deadlines.
The Greedy Method: Minimum-cost spanning trees – Kruskal, Prims, Single source shortest paths.

Unit - III

Dynamic Programming: The General method, Multi-stage graph, All pairs shortest path, Single-source shortest path, Optimal Binary search trees.
Dynamic Programming: String Editing, 0/1 Knapsack, Reliability design, The traveling salesman problem.

Unit - IV

Basic traversal & search techniques: Traversal techniques for graphs, connected components & spanning trees, Bi-connected components.
Backtracking: The General Method, The 8-Queens Problem, Graph coloring, Hamiltonian cycle, Knapsack problem.

Unit - V

Branch and Bound: The general method, 0/1 Knapsack problem, Traveling salesperson.
NP hard and NP Complete Problems: Basic concepts, Cook's Theorem statement.

Text Book:

1. L Ellis Horwitz, SartajSahni and Sanguthevar Rajasekaran, Fundamentals of Computer Algorithms, Second edition, Galgotia Publications.

Reference Books:

1. Hopcraft.J.E, Ullman.J.D, The design and analysis of algorithms ANOVA, First edition, Pearson publishers.
2. Thomos H Cormen, Charles E Leisevson, Ronald ,Revart Clifford stein, Introduction to algorithms, Third edition,PHI.

FINANCIAL ANALYSIS, MANAGEMENT & ECONOMICS

II-B.Tech.-II-Sem.   **L T P C**
Subject Code: 17CS2205HS   **3 0 0 3**

Course Outcomes (COs) & CO-PO Mapping (3-Strong; 2-Medium; 1-Weak Correlation)

COs	Upon completion of course the students will be able to	PO11	PO12
CO1	analyze financial performance of an enterprise using final accounts and ratio	3	2
CO2	apply principles of management in professional career	3	2
CO3	make use of principles of economics for decision making	3	2
CO4	identify business environment and laws of demand	2	3
CO5	solve problems in the areas of production, cost, price and markets	3	3

Unit – I: Introduction to Financial Statement Analysis

Types & Objectives of Business Enterprises, Conventional & Non Conventional Sources of Financing Business Enterprise.
Identification of Financial Statement Formats-Manufacturing A/c, Trading A/c, Profit & Loss A/c, Balance Sheet.
Techniques of Analyzing Financial Statements: Analysis & Interpretation through Liquidity, Leverage, Coverage, Activity, Turnover, Profitability Ratios-Simple Problems on Liquidity, Leverage and Activity Ratios.

Unit – II: Introduction of Management Concepts

Concept, Origin, Growth, Nature, Characteristics, Scope and Principles of Management.
Functions of Management: Planning, Organizing, Staffing, Directing, Coordinating, Reporting and Budgeting.
Scientific Management- FW Taylor Contributions to Management
Modern Management- Henry Fayol Contributions to Management
Human Relations Approach to Management: Theories of Motivation and Leadership

Unit – III: Functional areas of Management

Production Management: Systems of Production, PPC functions & Plant Layout.
Financial Management: Objectives, Goals, & Functions of Financial Management.
Marketing Management: Recent Trends in Marketing & Marketing Mix.
Human Resources Management: Nature, Objectives, Scope & Functions of HR Management.

Unit – IV: Introduction to Managerial Economics & Business Environment

Definition, Nature, Scope and Functions Managerial Economics, Difference between Micro & Macro Economics- Internal & External Scanning of Business Environment,
Importance of National Income, Inflation, Deflation, Stagflation, Business Cycle & Product Life Cycle Concepts.
Concept & Law of Demand, Factors Influencing and Limitations.
Concept of Elasticity of Demand, Types of Elasticity, Methods of Measuring Elasticity.
Introduction to Demand Forecasting, Objectives, Scope, Types and Methods.

Unit –V: Theory of Production, Cost, Price & Markets:

Production Function, Assumptions, Limitations & Types
Cost Concepts, Cost-Output Relationship, Break Even Analysis Assumptions, Limitations & Applications (Simple Problems).
Theory of Pricing, Objectives, Situations & Types.
Introductions Markets, Demand-Supply Schedule for Equilibrium Price, Nature & Types of Competition.

Note: Student also expected to attempt following projects as a part of assignment

Project-1: Submission of a report on Recent Economic Policy Reforms in view of demonetization, IT & GST

Project-2: Submission of a report on financial performance of any listed public limited company either through its website or through website of nse.org or bse.org

Project-3: Submission of a report by visiting any organization to observe how management functions are carried out.

Text Books:

1. Varshney, Maheswari (2003), Managerial Economics, Sultan Chand, New Delhi, India.
2. Stoner, Freeman, Gilbert, Management, 6th Ed, Pearson Education, New Delhi, 2004.

References:

1. Kotler Philip & Keller Kevin Lane: Marketing Mangement 12/e, PHI, 2005
2. Koontz & Weihrich: Essentials of Management, 6/e, TMH, 2005 Thomas N.Duening & John M.Ivancevich Management—Principles and Guidelines, Biztantra, 2003.
3. Ambrish Gupta (2004), Financial Accounting for Management, Pearson Education, New Delhi, India.
4. Domnick Salvatore (2011), Managerial Economics in a Global Economy, 7th edition, Oxford University Press, United States of America.
5. Narayanaswamy (2005), Financial Accounting, A Managerial Perspective, Prentice Hall of India private Ltd, New Delhi, India.
6. Aryasri (2005), Managerial Economics and Financial Analysis, 2nd edition, Tata McGraw Hill, New Delhi, India

COMPUTER NETWORKS & OPERATING SYSTEMS LAB

II-B.Tech.-II-Sem.	L	T	P	C
Subject Code: 17CS2206PC	0	0	3	2

Course Outcomes (COs) & CO-PO Mapping (3-Strong; 2-Medium; 1-Weak Correlation)

COs	Upon completion of course the students will be able to	PO4	PO5	PO14
CO1	make use of the NS2/NS3 tools	3	3	3
CO2	analyze media and tools include coaxial cable, UTP cable and crimping tool	3	3	3
CO3	apply appropriate network model for data communications	3	3	3
CO4	simulate operating system concepts	3	3	3
CO5	write C programs using UNIX system calls	3	3	3

List of Experiments:

1. Implement the data link layer framing methods
   a) Character stuffing   b) Bit stuffing.

2. Write a program to compute CRC code for the polynomials CRC-12/CRC-16/CRC CCIP

3. Develop a simple data link layer that performs the flow control using the sliding window protocol.

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 instance vector routing algorithm for obtaining routing tables at each node.

7. Implement data encryption and data decryption using RSA algorithm.

8. Write C programs to simulate the following CPU Scheduling algorithms:
   a) FCFS   b) SJF   c) Round Robin   d) priority

9. Write a C program to simulate Bankers Algorithm for Deadlock Avoidance.

10. Write C programs to simulate the following IPC mechanisms:
    a) Pipes   b) Message queues   c) Shared memory

11. Write C programs to simulate the following memory management techniques:
    a) Variable Memory technique   b) Fixed Memory Technique   c) Paging

12. Write programs using the I/O system calls of UNIX/LINUX operating system:
    (Open, read, write, close, fcntl, seek, stat, opendir, readdir)

13. Write C programs to simulate the following file organization Techniques:
    a) Hierarchical b) DAG

14. Write C programs to simulate the following Page Replacement Techniques:
    a) FIFO   b) LRU   c) Optimal

Text Books:

1. Computer Networks -- Andrew S Tanenbaum, David. J. Wetherall, 5th Edition. Pearson Education/PHI
2. Operating System Principles- Abraham Silberchatz, Peter B. Galvin, Greg Gagne 7th Edition, John Wiley
3. Advanced programming in the Unix environment, W. R. Stevens, Pearson education

References:

1. Data Communications and Networking – Behrouz A. Forouzan. Third Edition TMH
2. Operating Systems: Internals and Design Principles - Stallings, Fifth Edition–2005, Pearson Education/PHI
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

DESIGN AND ANALYSIS OF ALGORITHMS LAB

II-B.Tech.-II-Sem.
Subject Code: 17CS2207PC

	L	T	P	C
	0	0	3	2

Course Outcomes (COs) & CO-PO Mapping (3-Strong; 2-Medium; 1-Weak Correlation)

COs	Upon completion of course the students will be able to	PO4	PO5	PO14
CO1	analyze the complexities of various problems in different domains	3	3	3
CO2	design algorithms using the dynamic programming	3	3	3
CO3	develop an algorithms for sorting, graph related, combinatorial based problems	3	3	3
CO4	distinguish the performance of algorithms using language features	3	3	3
CO5	apply earned algorithm design techniques real world problems	3	3	3

Design, develop, and implement the specified algorithms for the following problems using C/C++/Java language under Windows environment. If Java then NetBeans /Eclipse IDE tool can be used for development and demonstration

List of Programs:

1. Write a program to find min-max using DAC.
2. Write a program to find the kth smallest element using DAC.
3. Write a program to find the optimal profit of a Knapsack using Greedy method
4. Write a program to determine the path length from a source vertex to the other vertices in a given graph. (Dijkstra'salgorithm)
5. Write a program to find the minimum cost of a spanning tree for the given graph. (Kruskal's algorithm)
6. Write a program to determine shortest path in a multi stage graph using forward and backward approach
7. Write a program to find all pair shortest path from any node to any other node within a graph.
8. Write a program to find the spanning trees using DFS and BFS graph traversals.
9. Write a program to find the bi-connected components in a graph
10. Write a program to find the non attacking positions of Queens in a given chess board using backtracking
11. Write a program to color the nodes in a given graph such that no two adjacent can have the same color usingbacktracking
12. Write a program to find the optimal profit of a Knapsack using Branch and Bound Technique.

Note: A minimum of 10 programs should be completed and recorded by the candidate to attain eligibility for Semester End Practical Examination.

SCRIPTING LANGUAGES LAB

II-B.Tech.-II-Sem.   **L   T   P   C**
Subject Code: 17CS2208PC   **0   0   3   2**

Course Outcomes (COs) & CO-PO Mapping (3-Strong; 2-Medium; 1-Weak Correlation)

COs	Upon completion of course the students will be able to	PO1	PO2	PO3	PO4	PO5	PO14
CO1	comprehend the differences between typical scripting languages	3	3	3	3	3	3
CO2	perceive strengths and weakness of Perl, PHP and Python	3	3	3	3	3	3
CO3	demonstrate the uses of PHP methodologies arrays, associative array and files	3	3	3	3	3	3
CO4	analyze the performance of perl features	3	3	3	3	3	3
CO5	illustrate various features of python	3	3	3	3	3	3

I Personal Home Page (PHP).

1. Write a PHP script to print prime numbers between 1-50.
2. PHP script to
a) Find the length of a string.   b) Count no of words in a string.
   c) Reverse a string.   d) Search for a specific string.
3. Write a PHP script to merge two arrays and sort them as numbers, in descending order.
4. Write a PHP script that reads data from one file and write into another file.
5. Write a PHP script to validate user login page (i.e. user name and password).

II Practical Extraction Reporting Language (PERL)

1. a) Write a Perl script to find the largest number among three numbers.
   b) Write a Perl script to print the multiplication tables from 1-10 using subroutines.
2. Write a Perl program to implement the following list of manipulating functions
a) Shift   b) Unshift   c) Push
3. Write a Perl script to substitute a word, with another word in a string.
4. Write a Perl script to validate IP address and email address.
5. Write a Perl script to print the file in reverse order using command line arguments

III Python.

1. Write a python program to solve a quadratic equation.
2. a) Write a python program to find the factorial of a number.
   b) Write a python program to generate Fibonacci series.
3. Write a python program to make a simple calculator.
4. Write a python program to sort words in alphabetical order.
5. Write a python program to add two matrices.

Text Books:

1. The complete reference PHP Steven Hozner Tata McGraw-Hill
2. Programming PHP, 3rd edition. RasmusLerdorf, Kevin Tatroe, and Peter MacIntyre. O'Reilly, 2013.
3. Programming Perl, 4th edition. Larry Wall, Tom Christiansen, and Jon Orwant. O'Reilly, 2012

ENVIRONMENTAL SCIENCE AND TECHNOLOGY
MANDATORY COURSE (NON-CREDIT)

II-B.Tech.-II-Sem.		L	T	P	C
Subject Code: 17HS2209MC		3	0	0	-

Pre requisites: Basic knowledge in Science & Technology

Course Outcomes (COs) & CO-PO Mapping (3-Strong; 2-Medium; 1-Weak Correlation)

COs	Upon completion of course the students will be able to	PO1	PO6	PO7	PO12
CO1	identify the role of ecosystem for livelihood	3	3	3	2
CO2	interpret methods to sustain environmental resources	3	3	3	2
CO3	outline bio-diversity and its relevance to ecological balance	3	3	3	2
CO4	explain laws and legislations on environmental protection	3	3	3	3
CO5	evaluate technologies for achieving sustainable development	3	3	3	2

Unit - I: Ecosystem

Introduction to ecosystem: Definition, Scope and Importance; Classification of ecosystem; Structure and functions of ecosystem food chain, food web, ecological energetic, eco-pyramids, carrying capacity); Biogeochemical cycles (Carbon and Nitrogen Cycles), flow of energy; Institutions (BNHS, BVIEER, ZSI, BSI) Environment movement in India (MedhaPatkar, SundarlalBahuguna, Indira Gandhi, Rachael Carson).
Biotic and abiotic components–Case studies of forest/aquatic/desert ecosystem.

Unit - II: Natural Resources

Renewable and Non–renewable resources–Importance, uses, classification of natural resources(i) forest: deforestation, timber extraction & conservation (ii) water: conflicts over water, dams –benefits &effects; use and over exploitation of water resources , floods, droughts (iii) mineral :use and exploitation, effects on mining, (iv) energy resources: growing needs, renewable and non renewable energy sources, use of alternative energy (v) land resources: land degradation, landslides, soil erosion and desertification; role of an individual in conservation of natural resources and equitable use.

Unit - III: Biodiversity

Definition and levels of biodiversity, Values of biodiversity Bio– geographical classification of India; hot spots of biodiversity; India as a mega diversity nation; Threats to biodiversity; Endangered and endemic species of India; Conservation of biodiversity: In–situ and Ex–situ conservation; Case studies on conservation of biodiversity. National biodiversity Act.

Unit - IV: Environmental Pollution & Control Technologies:

Types of environmental pollution; **Air pollution**: major air pollutants, sources ,effects, control measures , National Air Quality Standards. Water pollution :,sources,impacts & control technologies-STP, ETP, watershed management, rain water harvesting, Water Quality standards. Soil pollution: sources, causes & impacts on modern agriculture. Noise pollution. Solid waste Management- causes, effects and control measures; E-waste. Disaster management (floods and cyclones); **Global Environmental Issues and Treaties**: Global warming, ozone layer depletion. International protocol: earth summit, Kyoto protocol and Montreal protocol. Population Explosion

Unit - V: Environmental Acts , EIA & Sustainable Development :

Environment Protection Acts: Air (Prevention and Control of Pollution) Act, Water (Prevention and control of Pollution) Act, Wildlife Protection Act and Forest Conservation Act, Environment (Protection) Act, 1986. Handling rules of biomedical waste,municipal waste & hazardous waste. EIA: conceptual facts, base line data acquisition, EIS, EMP, Technology and Environmental Impact. **Sustainable development**-causes & threats, strategies for achieving sustainable development; Environmental Ethics and economics; CDM and concept of green building, life cycle

assessment(LCA); Ecological foot print; low carbon life style; carbon sequestration; crazy consumerism; urban sprawl. **Role of Information Technology** in Environment- Remote Sensing,GIS,Environmental Modeling

Textbooks:

1. Erach Bharucha (2005), textbook of environmental studies for UG, Universities press, Hyderabad.
2. Environmental Science by Y. Anjaneyulu, B S Publications(2004)
3. Environmental studies by Rajagopalan R (2009), Oxford University Press, New Delhi.

References:

1. Environmental Science and Technology by M. Anji Reddy(2007), B.S Publications,
2. Perspectives in Environmental Science by Anubha Kaushik (2006), 3rd edition ,New age International Publications
3. Environmental Studies by Anubha Kaushik (2006), 4th edition ,New age International Publications

ANALYTICAL SKILLS
MANDATORY COURSE (NON-CREDIT)

II-B.Tech.-II-Sem.　　　　　　　　　　　　　　　　　　　　　　　　**L　T　P　C**
Subject Code: 17BS2210MC　　　　　　　　　　　　　　　　　　**0　0　2　-**

Course Outcomes (COs) & CO-PO Mapping (3-Strong; 2-Medium; 1-Weak Correlation)

COs	Upon completion of course the students will be able to	PO9	PO10
CO1	apply operations like searching, insertion, deletion, traversing mechanism etc. on various data structures	3	3
CO2	apply measurement techniques to data collection and utilize their innovative thinking skills to project themselves for finding fresh approaches towards tribulations	3	3
CO3	use the skills for effective communication	3	3
CO4	identify different types of arguments as well as their premises and conclusions	3	3
CO5	demonstrate the mathematical reasoning, including the ability to prove simple results and/or make statistical inferences	3	3

Unit-I

Data Interpretation: Introduction to Data Interpretation, quantitative and qualitative data, Tabular Data, Line Graphs, Bar Chart, Pie Charts, X-Y Charts.

Unit-II

Reasoning: Number Series, Letter Series, Series completion, Coding and Decoding,

Unit-III

Verbal Analogy: Classifications, Word analogy-Applied analogy, verbal classification.

Unit-IV

Reasoning Logical Diagrams: Simple Diagrammatic Relationship, Multi diagrammatic relationship, Venn-diagramms, Analytical reasoning.

Unit-V

Reasoning Ability: Blood Relations, Seating arrangements, Directions, Decision making.

Text Books:

1. GL Barrons, Mc Graw Hills, Thorpe's verbal reasoning, LSAT Materials
2. R S Agarwal, S.Chand, 'A modern approach to Logical reasoning'
3. Verbal and non verbal Reasoning by S.Agarwal
4. Analytical Reasoning by M.K.Pandey

III-B.TECH.-I-SEMESTER SYLLABUS

LINUX PROGRAMMING

III-B.Tech. I-Sem   **L T P C**
 Subject Code: 17CS3101PC   **3 1 0 3**

Course Outcomes (COs) & CO-PO Mapping (3-Strong; 2-Medium; 1-Weak Correlation)

COs	Upon completion of course the students will be able to	PO1	PO2	PO12
CO1	perceive the Linux operating systems and its utilities	3	3	2
CO2	illustrate various bash shell commands	3	3	2
CO3	create the file and management with various system calls	3	3	2
CO4	demonstrate process control and its management	3	3	2
CO5	develop inter process communication between two different systems with LAN connection	3	3	2

Unit-I

Introduction to Linux: Architecture of Linux, Features of Linux
Linux Utilities: File handling utilities, Security by file permissions, Process utilities, Disk utilities, Networking commands, Filters, Text processing utilities and Backup utilities, grep family
Sed-scripts: operation, addresses, commands.
Awk-script: execution, fields and records, scripts, operation, patterns, actions, Associative arrays, strings and mathematical functions.
Shell programming with the Bourne again shell(bash): Introduction, shell responsibilities, pipes and Redirection, here documents, shell meta characters, file name substitution, shell variables, command substitution, shell commands, quoting, test command, control structures, arithmetic in shell, shell script examples.

Unit –II

Files and Directories-File Concept, File Types, Files System Structure, file metadata - Inodes, Kernel support for files,
System calls: for file IO operations, stat family, file and record locking, File permissions soft links and hard links
Directories: creating, Removing and changing directories, scanning directories.

Unit –III

Kernel support for process, Process identification, process control-process creation, replacing a process image, waiting for a process, & termination, Zombie process, Orphan process, **System cal**l interface for process management fork, vfork, exit, wait , waitpid ,exec family, Process groups, sessions, controlling terminals difference between threads and process.
Inter Process Communications: Introduction to IPC, Pipe and FIFOs

Unit-IV

Message Queues- Kernel support for messages, APIs for messages.
Semaphores- Kernel support for semaphores, APIs for semaphores.
Shared Memory- Kernel support for shared memory, APIs for shared memory, semaphore and shared memory example.

Unit-V

Sockets-Introduction to Berkeley sockets, IPC over a network client server model, Socket Address structures (UNIX domain and internet domain), Socket system calls for connection oriented protocol and connectionless protocol, example client/server programs- single server –client connection, Multiple Simultaneous clients. Comparison of IPC Mechanisms

Text books:

1. Unix Concepts and Applications, 4th edition, Sumitabha Das, TMH.
2. Beginning Linux Programming, 4th edition, N. Mathew, R. Stones, Wrox, Wiley India Edition.
3. Unix System Programming using C++, T.Chan , PHI

References:

1. Unix Network Programming, W. R. Stevens, PHI
2. Unix for programmers and users, 3rd Edition, Graham Glass, King Ables, Pearson.
3. System programming with C and Unix, A. Hoover, Pearson.
4. Unix system programming, Communication, Concurrency and Threads, K. A. Robbins, Pearson Education.
5. Unix shell programming, S. G. Kochan and P.Wood,3rd edition, Pearson Education.
6. Shell Scripting, S. Parker, Wiley India Pvt. Ltd.
7. Advanced Programming in the Unix environment, 2nd Edition, W. R. Stevens, Pearson Education.
8. UNIX and Shell programming, B. A. Forouzan and R. F. Gilberg, Cengage Learning.
9. Linux System Programming, Robert Love, O'Reilly, SPD, rp-2007.
10. C Programming Language, Kernighan and Ritchie, PHI

FORMAL LANGUAGES AND AUTOMATA THEORY

III -B.Tech.-I-Sem.
Subject Code: 17CS3102PC

L	**T**	**P**	**C**
4	**0**	**0**	**4**

Course Outcomes (COs) & CO-PO Mapping (3-Strong; 2-Medium; 1-Weak Correlation)

COs	Upon completion of course the students will be able to	PO1	PO2	PO3	PO12
CO1	explain the concepts of formal languages and finite automata techniques	3	3	3	2
CO2	design various finite automata and its conversion	3	3	3	2
CO3	build finite automata for different regular expressions and languages	3	3	3	2
CO4	summarize context free grammar and construction of PDA	3	3	3	2
CO5	construct turing machines and analyze undecidability	3	3	3	2

Unit-I:

Formal Language Theory: Symbols, Alphabets and Strings, Operations on Strings, Formal Languages, Operations on Languages, Grammar Hierarchy: Chomsky Hierarchy of languages
Fundamentals of Automata: Finite State Machine, Components of Finite State Automata, Elements of Finite State System, Mathematical representation of Finite State Machine.

Unit-II:

Finite Automata: Introduction, Deterministic Finite Automata(DFA), Design of DFAs, Non Deterministic Finite Automata(NFA), Non-Deterministic Automata with Є-moves , Design of NFA-Є s, Advantages of Non-Deterministic Finite Automata, NFA Versus DFA
Equivalent Automata: Equivalent Finite-State Automata, Equivalence of NFA/NFA- ε and DFA, Equivalence of NFA, with Є moves to NFA, without Є – moves, Minimization of Finite Automata

Unit-III:

Transducers: Moore Machine, Mealy Machine, Difference between Moore and Mealy Machines, Properties / Equivalence of Moore and Mealy Machines.
Regular Expressions and Languages: Regular languages, Regular expressions, Components of Regular Expression, Properties of Regular Expressions, Uses of Regular Expressions.
Finite Automata and Regular Expressions: Properties of Regular Sets and Regular Languages, Arden's Theorem, Equivalence of Finite Automata and Regular Expressions, Equivalence of DFA and Regular Expression, Equivalence of NFA and Regular Expression, , Relation between Regular Grammar and Finite Automata.

Unit-IV:

Context-Free Grammars and Context-Free Languages: Types of Grammar, Ambiguous and Unambiguous Grammars, Simplification of Context-Free Grammars, Elimination of Є - Productions, Elimination of Unit Productions, Normal Forms for Context Free Grammars, Chomsky Normal Form, Greibach Normal Form, Chomsky Vs. Greibach Normal Form, Application of Context- Free Grammars
Push Down Automata: Push down automata, definition, model, acceptance of CFL, Acceptance by final state and acceptance by empty state and its equivalence. Equivalence of CFL and PDA, interconversion.

Unit-V:

Turing Machine: Introduction, Components of Turing Machine, Description of Turing Machine, Elements of TM, Moves of a TM, Language accepted by a TM, Role of TM's , Design of TM's
TM Extensions and Languages: Computable functions, recursively enumerable languages. types of Turing machines (proofs not required), linear bounded Automata, context sensitive languages, undecidable problems.

Text Books:

1. Introduction to Automata Theory Languages and Computation, Hopcroft H.E. and Ullman J. D. Pearson Education
2. Theory of Computer Science automata, languages and computations, K.L.P.Mishra, N.Chandrashekaran, PHI Publications

References:

1. Introduction to Theory of Computation – Sipser 2nd edition Thomson
2. A Text Book on Automata Theory, Nasir S.F.B, P.K. Srimani, Cambridge university Press

DATA MINING & DATA WAREHOUSING

III-B.Tech.-I-Sem   **L T P C**
Subject Code: 17CS3103PC   **4 0 0 4**

Course Outcomes (COs) & CO-PO Mapping (3-Strong; 2-Medium; 1-Weak Correlation)

COs	Upon completion of course the students will be able to	PO1	PO2	PO3	PO12	PO13
CO1	importance of Data Warehouses in addition to database systems	3	2	2	2	2
CO2	perform the pre processing of data and apply mining techniques on it	3	3	2	2	3
CO3	perceive the concepts and functionalities of Data Mining	3	3	3	2	3
CO4	analyze the importance of Descriptive Data Mining tasks	3	2	2	2	3
CO5	solve real world problems in business and scientific information using data mining	3	3	3	3	3

Unit-I

Data Warehouse: Introduction to Data Warehouse, Differences between Operational Database Systems and Data Warehouses, Data Warehouse Characteristics, DWH Architecture, Extraction-Transformation-Loading, Stars-Snowflakes-Fact Constellations: Schemas for Multidimensional Data Models, OLAP operations , OLAP Server Architectures: ROLAP versus MOLAP versus HOLAP.

Unit-II

Introduction to Data Mining: KDD process, Challenges, What Kinds of Patterns Can Be Mined.
Data Preprocessing: Needs for Preprocessing the Data, Data Cleaning, Data Integration, Data Reduction, Data Transformation and Data Discretization.

Unit-III

Mining Frequent, Associations and Correlations: Basic Concepts, Frequent Itemset Mining Methods: Apriori Algorithm: Finding Frequent Itemsets by Confined Candidate Generation, Generating Association Rules from Frequent Itemsets, Improving the Efficiency of Apriori, A Pattern Growth Approach for Mining Frequent Itemsets, Mining Frequent Itemsets Using Vertical Data Format, From Association Analysis to Correlation Analysis.

Unit-IV

Classification: Basic Concepts, Algorithm for Decision Tree Induction, Attribute Selection Measures, Bayes Classification Methods, Bayesian Belief Networks, A Multilayer Feed-Forward Neural Network, k-Nearest-Neighbor Classifiers.

Unit-V

Clustering: Cluster Analysis, Partitioning Methods: k-Means and k-Medoids, Hierarchical Methods: Agglomerative versus Divisive Hierarchical Clustering, BIRCH, Chameleon.

Textbooks:

1. Data Mining – Concepts and Techniques – Jiawei Han, Micheline Kamber, Morgan Kaufmann Publishers, Elsevier, 3rd Edition, 2012.

References:

1. Introduction to Data Mining, Pang – Ning Tan, Vipin Kumar, Michael Steinbanch, Pearson Education.
2. Data Mining Techniques – ARUN K PUJARI, Universities Press.

WEB TECHNOLOGIES

III – B.Tech. I - Sem   **L T P C**
Subject Code: 17CS3104PC   **4 0 0 4**

Course Outcomes (COs) & CO-PO Mapping (3-Strong; 2-Medium; 1-Weak Correlation)

COs	Upon completion of course the students will be able to	PO2	PO3	PO6	PO12	PO13
CO1	apply the design principles of HTML and Java Script to create static and dynamic web pages	3	2	2	3	3
CO2	develop server side scripting with PHP language	3	2	2	3	3
CO3	illustrate server side programming with java Servlets	3	3	3	3	3
CO4	demonstrate server side programming with java JSP	3	3	3	3	3
CO5	design web application using MVC	3	3	3	3	3

Unit-I:
Introduction to Web: introduction to Internet and Web, World Wide Web, Web Browsers Webservers, protocols: HTTP, MIME, URL
Introduction HTML: History of HTML, HTML Basics: Elements, Attributes, Tags:images, list, Tables, Forms, Frames.div and span tags.
CSS: Introduction to cascading style sheet, Types of style sheets, selectors
JAVA SCRIPT: Introduction to scripting, control structures, conditional statements, Arrays Functions, objects

Unit-II:
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 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, deleting etc.

Unit-III:
XML: Basics of XML, Elements, Attributes, Name space.
Introduction to DTD: internal and external DTD, Elements of DTD, DTD Limitations, XML Schema, Schema structure, XHTML.
Parsing XML Data: DOM and SAX Parsers.

Unit-IV:
Servlets: Introduction, Lifecycle, Generic and HTTP servlet, passing parameters to servlet, HTTP servlet Request & Response interfaces, Deploying web Applications,
Session Tracking: Hidden form fields, cookies, URL- Rewriting, session.
Filters for Web applications: What is a Filter, Sample Filter, Filter API, and Deployment Descriptor for Filters, simple web Application with Filters.

Unit-V:
JSP: Introduction, Difference Between servlets & JSP, Anatomy of JSP page, JSP elements: Directives, comments, Expressions, scriptlets, Declaration, Implicit JSP objects, using Action elements.
JDBC: Introduction, JDBC Drivers, Loading Driver, establishing connection, Executing SQL statement in JSP pages, MVC architecture

Textbooks:
1. WebTechnologies, Uttam K Roy, Oxford University Press
2. The Complete Reference PHP- Steven Hozner, Tata McGraw-Hill
3. Web Programming, building internet applications, Chris Bates 2ndedition,WileyDreamtech

References:
1. Java Server Pages-Hans Bergsten, SPD O'Reilly
2. JavaScript, D. Flanagan O'Reilly, SPD.
3. Beginning Web Programming-Jon Dckett WROX.

DISASTER MANAGEMENT
(Open Elective-I)

III-B.Tech.-I-Sem.   **L T P C**
Subject Code: 17CE3105OE   **3 0 0 3**

Course Outcomes (COs) & CO-PO Mapping (3-Strong; 2-Medium; 1-Weak Correlation)

COs	Upon completion of course the students will be able to	PO2	PO7	PO8	PO12
CO1	analyze impact of disasters	3	2	3	3
CO2	choose suitable disaster management mechanism	3	3	3	3
CO3	make use of appropriate measures for capacity building to reduce risks	2	2	3	2
CO4	develop strategies to cope up with disasters	3	3	3	3
CO5	build disaster management plan	2	3	3	3

Unit – I: Environmental Hazards & Disasters:

Meaning of Environmental hazards, Environmental Disasters and Environmental stress. Concept of Environmental Hazards, Environmental stress & Environmental Disasters. Different approaches & relation with human Ecology - Landscape Approach - Ecosystem Approach - Perception approach - Human ecology & its application in geographical researches.

Unit – II: Types of Environmental hazards & Disasters:
Natural hazards and Disasters - Man indeced hazards & Disasters - Natural Hazards - Planetary Hazards / Disasters - Extra Planetary Hazards / disasters - Planetary Hazards - Endogenous Hazards - Exogenous Hazards

Unit – III: Endogenous Hazards:

Volcanic eruption - Earthquakes - landslides - Volcanic Hazards / Disasters - Causes and distribution of Volcanoes - Hazardous effects of volcanic eruptions - Environmental impacts of volcanic eruptions- Earthquake Hazards / disasters - Causes of Earthquakes - Distribution of earthquakes - Hazardous effects of - earthquakes - Earthquake Hazards in India - Human adjustment, perception & mitigation of earthquake.

Unit – IV:

Exogenous hazards / disasters – Infrequent events - Cumulative atmospheric hazards / disasters
Infrequent events: Cyclones - Lightning - Hailstorms
Cyclones: Tropical cyclones & Local stroms - Destruction by tropical cyclones & local stroms (causes, distribution human adjustment, perception & mitigation) Cumulative atmospheric hazards/ disasters :- Floods - Droughts - Cold waves - Heal waves
Floods: Causes of floods - Flood hazards India - Flood control measures (Human adjustment, perception & mitigation)
Droughts :- Impacts of droughts - Drought hazards in India - Drought control measures - Extra Planetary Hazards / Disasters - man induced Hazards / Disasters - Physical hazards / Disasters - Soil erosion
Soil Erosion: Mechanics & forms of Soil Erosion - Factors 7 causes of Soil Erosion - Conservation measures of Soil Erosion.
Chemical hazards / disasters: Release of toxic chemicals, nuclear explosion - Sedimentation processes Sedimentation processes: Global Sedimentation problems - Regional Sedimentation problems - Sedimentation & Environmental problems - Corrective measures of Erosion & Sedimentation
Biological hazards / disasters: Population Explosion.

Unit - V: Emerging approaches in Disaster Management:

Three stages
1.   Pre-disaster Stage (preparedness)

2. Emergency Stage
3. Post Disaster stage - Rehabilitation

Text Books:

1. Disaster Mitigation: Experiences And Reflections by Pradeep Sahni
2. Natural Hazards & Disasters by Donald Hyndman & David Hyndman - Cengage Learning

References:

1. R. B. Singh (Ed) Environmental Geography, Heritage Publishers New Delhi, 1990
2. Savinder Singh Environmental Geography, Prayag Pustak Bhawann 1997
3. Kates, B. I & White, G. F The Environment as Hazards, oxford, New York, 1978
4. R. B. Singh (Ed) Disaster Management, Rawat Publication, New Delhi, 2000
5. H. K. Gupta (Ed) Disaster Management, Universities Press, India, 2003
6. R. B. Singh, Space Technology for Disaster Mitigation in India (INCED), University of Tokyo, 1994
7. Dr. Satender, Disaster Management in Hills, Concept Publishing Co., New Delhi, 2003
8. S. Arya Action Plan For Earthquake, Disaster, Mitigation in V. K. Sharma (Ed) Disaster Management IIPA Publication New Delhi, 1994
9. R. K. Bhandani An overview on Natural & Man made Disaster & their Reduction, CSIR, New Delhi
10. M. C. Gupta Manuals on Natural Disaster Management in india, National Centre for Disaster Management, IIPA, New Delhi, 2001.

OPERATIONS RESEARCH
(Open Elective-I)

III-B.Tech.-I-Sem.   **L T P C**
Subject Code: 17ME3105OE   **3 - - 3**

Course Outcomes (COs) & CO-PO Mapping (3-Strong; 2-Medium; 1-Weak Correlation)

COs	Upon completion of course the students will be able to	PO1	PO2	PO12
CO1	formulate and solve linear programming problem using various methods	3	2	3
CO2	solve transportation and assignment problems	3	3	3
CO3	compute sequencing and inventory model problems	2	2	3
CO4	analyze waiting lines and game theory problems	3	3	3
CO5	evaluate replacement and dynamic programming problems	2	3	3

Unit-I
Introduction to Operations Research: Basics definition, scope, objectives, phases, models, applications and limitations of Operations Research.
Linear Programming Problem Formulation, Graphical solution, Simplex method, Artificial variables techniques: Two-phase method, Big M method.

Unit-II
Transportation Problem: Formulation, solution, unbalanced Transportation problem. Finding basic feasible solutions – Northwest corner rule, least cost method and Vogel's approximation method. Optimality test: MODI method.
Assignment model: Formulation. Hungarian method for optimal solution. Solving unbalanced problem. Traveling salesman problem and assignment problem.

Unit—III
Sequencing: Introduction, Flow-Shop sequencing, n jobs through two machines, n jobs through three machines, Job shop sequencing, two jobs through m machines.
Inventory: Introduction, Single item, Deterministic models - Purchase inventory models with one price break and multiple price breaks -Stochastic models - demand may be discrete variable or continuous variable - Single Period model and no setup cost.

Unit—IV
Theory of Games: Introduction, Terminology- Solution of games with saddle points and without saddle points- 2 x 2 games, dominance principle, m x 2 & 2 x n games -graphical method.
Waiting Lines: Introduction, Terminology-Single Channel-Poisson arrivals and Exponential Service times-with infinite population and finite population models-Multichannel-Poisson arrivals and exponential service times with infinite population.

Unit—V
Dynamic Programming: Introduction, Terminology - Bellman's Principle of Optimality - Applications of dynamic programming- Project network - CPM and PERT networks - Critical path scheduling.

Text Books:
1. Operations Research, J.K.Sharma 4th Edition, Mac Milan.
2. Introduction to O. RIHilIier & Libermannf, TMH.

References:
1. Introduction to O.R, Hamdy A. Taha, PHl.
2. Operations Research, A.M.Natarajan, P. Balasubramaniam, A.Tamilarasi, Pearson Education.
3. Operations Research I Wagner, PHI Publications.

ELECTRONIC MEASUREMENTS AND INSTRUMENTATION
(Open Elective-I)

III B.Tech. I-Sem
Subject Code: 17EC3105OE

L T P C
3 0 0 3

Course Outcomes (COs) & CO-PO Mapping (3-Strong; 2-Medium; 1-Weak Correlation)

COs	Upon completion of course the students will be able to	PO1	PO2	PO12
CO1	apply the fundamental concepts of measuring instruments	3	2	2
CO2	distinguish signal generators and signal analyzers	3	3	2
CO3	make use of oscilloscopes	3	2	2
CO4	identify various transducers	3	3	2
CO5	develop bridges for various measuring parameters	3	2	2

Unit - I: Block Schematics of Measurement
Performance characteristics, Static characteristics, Accuracy, Precision, Resolution, Types of Errors, Gaussian Error, Root Sum Squares formula, Dynamic Characteristics, Repeatability, Reproducibility, Fidelity, Lag; Measuring Instruments: DC Voltmeters, D' Arsonval Movement, DC Current Meters, AC voltmeters and Current Meters, Ohmmeters, Multimeters. Meter protection, Extension of Range, True RMS Responding voltmeters, Specifications of Instruments.

Unit - II: Signal Analyzers
AF, HF Wave Analyzers, Harmonic Distortion, Heterodyne wave Analyzers, Power Analyzers, Capacitance-Voltage Meters, Oscillators. Signal Generators, Sweep Frequency Generators: AF, RF Signal Generators, Sweep Frequency Generators, Pulse and Square Wave Generators, Function Generators, Arbitrary Waveform Generator, Video Signal Generators, and Specifications

Unit - III:
Oscilloscopes: CRT, Block Schematic of CRO, Time Base Circuits, Lissajous Figures, CRO Probes, High Frequency CRO Considerations, Delay lines.Applications:Measurement of Time, Period and Frequency Specifications.
Special Purpose Oscilloscopes: Dual Trace, Dual Beam CROs, Sampling Oscilloscopes, Storage Oscilloscopes, Digital Storage CROs.

Unit - IV
Transducers: Classification, Strain Gauges, Bounded, Unbounded; Force and Displacement Transducers, Resistance Thermometers, Hotwire Anemometers, LVDT, Thermocouples, Synchros, Special Resistance Thermometers, Digital Temperature Sensing System, Piezoelectric, Variable Capacitance Transducers, Magneto Strictive Transducers.

Unit -V
Bridges: Wheat Stone Bridge, Kelvin Bridge, and Maxwell Bridge.
Measurement of Physical Parameters: Flow Measurement, Displacement Meters, level of Measurement, Measurement of Humidity and Moisture, Force, Pressure-High pressure, Vacuum level, Temperature Measurements, Data Acquisition Systems.

Text Books:
1. Electronic Instrumentation: H.S.Kalsi-TMH 2nd Edition 2004
2. Modern Electronic Instrumentation and Measurement Techniques: A.D. Helbincs, W.D.Cooper: PHI 5th Edition2003

References:
1. Electronic Instrumentation and Measurements- David A. Bell, Oxford Univ.Press, 1997.
2. Electronic Measurements and Instrumentation: B.M. Oliver, J.M.Cage TMH Reprint 2009.

JAVA PROGRAMMING
(Open Elective-I)

III-B.Tech.-I-Sem.   **L T P C**
Subject Code: 17CS3105OE   **3 0 0 3**

Course Outcomes (COs) & CO-PO Mapping (3-Strong; 2-Medium; 1-Weak Correlation)

COs	Upon completion of course the students will be able to	PO1	PO2	PO3	PO5	PO12
CO1	write simple java programs using OOP concepts	3	2	2	3	2
CO2	develop programs using inheritance and polymorphism	3	2	3	3	2
CO3	build efficient code using multithreading and exception handling	3	2	3	3	2
CO4	illustrate event handling mechanism	3	2	3	3	2
CO5	make use if applets and swing concepts	3	2	3	3	2

Unit-I

Object-oriented thinking- Need for OOP paradigm, summary of OOP concepts, coping with complexity, abstraction mechanisms. A way of viewing world – Agents, responsibility, messages, methods.
Java Basics-History of Java, Java buzzwords, data types, variables, scope and life time of variables, arrays, operators, expressions, control statements, type conversion and casting, simple java programs, concepts of classes, objects, constructors, methods, access control, this keyword, garbage collection, overloading methods and constructors, parameter passing, recursion, exploring String class.

Unit-II:

Inheritance- Hierarchical abstractions, Base class object, subclass, subtype, substitutability, forms of inheritance- specialization, specification, construction, extension, limitation, combination. Benefits of inheritance, costs of inheritance. Member access rules, super uses, using final with inheritance, the Object class and its methods.
Polymorphism- method overriding, dynamic binding, abstract classes and methods.
Packages- Defining, Creating and Accessing a Package, Understanding CLASSPATH, importing packages. Exploring java.io.
Interfaces- Differences between classes and interfaces, defining an interface, implementing interface, applying interfaces, variables in interface and extending interfaces.

Unit-III

Exception handling- Concepts of exception handling, benefits of exception handling, Termination or presumptive models, exception hierarchy, usage of try, catch, throw, throws and finally, built in exceptions, creating own exception sub classes.
Multithreading- Differences between multi-threading and multitasking, thread life cycle, creating threads, thread priorities, synchronizing threads, daemon threads. Enumerations, auto boxing, annotations, generics. Exploring java.util.

Unit-IV

Event Handling: Events, Event sources, Event classes, Event Listeners, Delegation event model, handling mouse and keyboard events, Adapter classes, nested and inner classes. The AWT class hierarchy, user interface components- labels, buttons, canvas, scrollbars, text components, checkbox, checkbox groups, choices, lists panels – scrollpane, dialogs, menubar, graphics, Layout Managers-Flow Layout, Border Layout, Grid Layout, Card Layout, Grid Bag Layout.

Unit-V

Applets – Concepts of Applets, differences between applets and applications, life cycle of an applet, types of applets, creating applets, passing parameters to applets.
Swings – Introduction, limitations of AWT, MVC architecture, components, containers, exploring swing- JApplet, JFrame and JComponent, ImageIcon, JLabel, JTextfield, JButton, JCheckbox, JList, JRadiobutton, JComboBox, JTabbedPane, JScrollPane, JTree and JTable.

Text Books:

1. Java the complete reference, 8th editon, Herbert Schildt, TMH.
2. Understanding OOP with Java, updated edition, T. Budd, Pearson Eduction.

References:

1. An Introduction to programming and OO design using Java, J.Nino and F.A. Hosch, John Wiley & sons.
2. Java How to Program, H.M.Dietel and P.J.Dietel, Sixth Edition, Pearson Education/PHI.
3. Introduction to Java programming, Y. Daniel Liang, Pearson Education.
4. An introduction to Java programming and object oriented application development, Richard A. Johnson.

LINUX PROGRAMMING LAB

III – B.Tech. – I - Semester
Subject Code: 17CS3106PC

L T P C
0 0 3 2

Course Outcomes (COs) & CO-PO Mapping (3-Strong; 2-Medium; 1-Weak Correlation)

COs	Upon completion of course the students will be able to	PO4	PO5	PO14
CO1	perceive the Linux Shell Environment	3	3	3
CO2	illustrate the File Management and Multiple Task Using Shell Scripts in Linux Environment	3	3	3
CO3	create and manage process	3	3	3
CO4	demonstrate process communication within and between systems	3	3	3
CO5	design network based application	3	3	3

LIST OF EXPERIMENTS

1. Write a Shell Script to wish "Good Morning" and "Good Evening" depending on the system time
2. Write a linux shell program to accept mark details of a student and display total and grade.
3. Write a shell script that accepts a file name, starting and ending line numbers as arguments and displays all the lines between the given line numbers.
4. Write a shell script that deletes all lines containing a specified word in one or more files Supplied as arguments to it.
5. Write a shell script that displays a list of all the files in the current directory to which the User has read, write and execute permissions.
6. Write a shell script that receives any number of file names as arguments checks if every argument supplied is a file or a directory and reports accordingly. Whenever the argument is a file, the number of lines on it is also reported.
7. Write a shell script to find factorial of a given integer.
8. Write an awk script to find the number of characters, words and lines in a file.
9. Implement in C the following Linux commands using System calls
       a. cat   b. cp c. mv
10. Write a C program to emulate the Linux **ls –l** command.
11. Write a C program to create a child process and allow the parent to display "parent" and the child to display "child" on the screen
12. Write a C program to create a Zombie process.
13. Write a C program that illustrates how an orphan is created.
14. Write a C program in which a parent writes a message to a pipe and the child reads the message.
15. Write C program. that illustrates communication between two unrelated processes using Named pipe (FIFO file).
16. Write a C program (sender.c) to create a message queue with read and write permissions to write 3 messages to it with different priority numbers
17. Write a C program (receiver.c) that receives the messages (from the above message queue as specified in (20)) and displays them.
18. Write C programs to perform the following:
    One process creates a shared memory segment and writes a message ("hello") into it another process opens the shared memory segment and reads the message(ie."hello").it will then display the message ("hello") to standard output device.
19. Write client and server programs in C for connection. Oriented communication between server and client processes using Unix Domain sockets to perform the following:
    Client process sends a message, reverses it and sends it back to the client. The client will then Display the message to the standard output device.
20. Write client and server programs in C for Connection oriented communication between server and client processes using Internet Domain sockets to perform the following:
    Client process sends a message to the server process. The server receives the message, reverses it and sends it back to the Client. The Client will then display the message to the standard output device.

DATA MINING & DATA WAREHOUSING LAB

III-B.Tech.-I-Sem
Subject Code: 17CS3107PC

L T P C
0 0 3 2

Prerequisites: Database Management Systems

Course Outcomes (COs) & CO-PO Mapping (3-Strong; 2-Medium; 1-Weak Correlation)

COs	Upon completion of course the students will be able to	PO4	PO5	PO14
CO1	make use of various kinds of tools in data mining	3	3	3
CO2	demonstrate the Classification, Clusters in large Data sets	3	3	3
CO3	classify mining algorithms as a component to the exiting tools	3	3	3
CO4	apply mining techniques for realistic data	3	3	3
CO5	solve real time problems using various data mining functionalities	3	3	3

Unit-I: Explore WEKA Data Mining/Machine Learning Toolkit:

1. Downloading and/or installation of WEKA data mining toolkit,
2. Understand the features of WEKA toolkit such as Explorer, Knowledge Flow interface, Experimenter, Command-line interface.
3. Navigate the options available in the WEKA (ex. Select attributes Panel, Preprocess panel, Classify Panel, cluster panel, Associate Panel and Visualize panel)
4. Study the arff file format
5. Explore the available data sets in WEKA.
6. Load a data set (ex. weather dataset, Iris dataset, etc.)
7. Load each dataset and observe the following
   a. List the attribute names and they types
   b. Number of records in each dataset
   c. Identify the class attribute (if any)
   d. Plot Histogram
   e. Determine the number of records for each class.
   f. Visualize the data in various dimensions

UNIT-II: Perform data preprocessing tasks and Demonstrate perform association rule mining on data sets:

1. Explore various options available in WEKA for preprocessing data and apply (like Discretization Filters, Resample filter, etc.) On each dataset
2. Load each dataset into WEKA and run Aprori algorithm with different support and confidence values. Study the rules generated.
3. Apply different discretization filters on numerical attributes and run the Apriori association rule Algorithm. Study the rules generated. Derive interesting insights and observe the effect of discretization in the rule generation process.

Unit-III: Demonstrate performing classification on data sets:

1. Load each dataset into WEKA and run 1d3, J48 classification algorithm. Study the classifier output. Compute entropy values, Kappa statistic.
2. Extract if-then rules from the decision tree generated by the classifier observe the confusion matrix and Derive Accuracy, F-measure, TPrate, FPrate, Precision and Recall values. Apply cross-validation strategy with various fold levels and compare the accuracy results.

3. Load each dataset into Weka and perform Naive-Bayes classification and k-Nearest Neighbour Classification. Interpret the results obtained.
4. Plot RoC Curves.
5. Compare classification results of ID3, J48, Naive-Bayes and k-NN classifiers for each Dataset, and deduce which classifier is performing best and poor for each dataset and Justify.

Unit-IV: Demonstrate performing clustering on data sets:

1. Load each dataset into WEKA and run simple k-means clustering algorithm with different values of k Number of' desired clusters). Study the clusters formed. Observe the sum of squared errors and centroids, and derive-insights.
2. Explore other clustering techniques available in WEKA:
3. Explore visualization features of WEKA to visualize the clusters. Derive interesting Insights and explain.

Unit-V: Demonstrate performing Regression on data sets

1. Load each dataset into WEKA and build Linear Regression model. Study the clusters formed. Use Training set option. Interpret the regression model and derive patterns and conclusions from the Regression results.
2. Use options cross-validation and percentage split and repeat running the Linear Regression Model. Observe the results and derive meaningful results.
3. Explore Simple linear regression technique that only looks at one variable.

SAMPLE PROBLEM

TASK: Credit Risk Assessment

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

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

The German Credit Data

Actual historical credit data is not always easy to come by because of confidentiality rules. Here is one such data set, consisting of **1000** actual cases collected in Germany. Credit data set (original) Excel Spread sheet version of the German credit data. In spite of the fact that the data is German, you should probably make use of it for this assignment (Unless you really can consult a real loan officer!)

There are 20 attributes used in judging a loan applicant (ie. 7 Numerical attributes and 13 Categorical or Nominal attributes). The goal is the classify the applicant into one of two categories. Good or Bad.

SUBTASKS: (Turn in your answers to the following tasks)

1. List all the categorical (or nominal) attributes and the real valued attributes separately.
2. What attributes do you think might be crucial in making the credit assessment? Come up with some simple rules in plain English using your selected attributes.
3. One type of model that you can create is a Decision tree. Train a Decision tree using the complete data set as the training data. Report the model obtained after training.
4. Suppose you use your above model trained on the complete dataset, and classify credit good/bad for each of the examples in the dataset. What % of examples can you classify correctly? (This is also called testing on the training set) why do you think cannot get 100% training accuracy?
5. Is testing on the training set as you did above a good idea? Why or why not?
6. One approach for solving the problem encountered in the previous question is using cross-validation? Describe what is cross validation briefly. Train a decision tree again using cross validation and report your results. Does accuracy increase/decrease? Why?
7. Check to see if the data shows a bias against "foreign workers" or "personal-status". One way to do this is to remove these attributes from the data set and see if the decision tree created in those cases is significantly different from the full dataset case which you have already done. Did removing these attributes have any significantly effect? Discuss.
8. Another question might be, do you really need to input so many attributes to get good results? May be only a few would do. For example, you could try just having attributes 2, 3,5,7,10,17 and 21. Try out some combinations. (You had removed two attributes in problem 7. Remember to reload the arff data file to get all the attributes initially before you start selecting the ones you want.)
9. Sometimes, the cost of rejecting an applicant who actually has good credit might be higher than accepting an applicant who has bad credit. Instead of counting the misclassification equally in both cases, give a higher cost to the first case (say cost 5) and lower cost to the second case. By using a cost matrix in weak. Train your decision tree and report the Decision Tree and cross validation results. Are they significantly different from results obtained in problem 6.
10. Do you think it is a good idea to prefect simple decision trees instead of having long complex decision Trees? How does the complexity of a Decision Tree relate to the bias of the model?
11. You can make your Decision Trees simpler by pruning the nodes. One approach is to use Reduced Error Pruning. Explain this idea briefly. Try reduced error pruning for training your Decision Trees using cross validation and report the Decision Trees you obtain? Also Report your accuracy using the pruned model does your Accuracy increase?
12. How can you convert a Decision Tree into "if-then-else rules". Make up your own small Decision Tree Consisting 2-3 levels and convert into a set of rules. There also exist different classifiers that output the model in the form of rules. One such classifier in WEKA is rules. PART, train this model and report the set of rules obtained. Sometimes just one attribute can be good enough in making the decision, yes, just one! Can you predict what attribute that might be in this data set? One R classifier uses a single attribute to make decisions (it chooses the attribute based on minimum error).Report the rule obtained by training a one R classifier. Rank the performance of j48, PART, one R.

WEB TECHNOLOGIES LAB

III – B.Tech. – I - Semester
Subject Code: 17CS3108PC

L	T	P	C
0	0	3	2

Course Outcomes (COs) & CO-PO Mapping (3-Strong; 2-Medium; 1-Weak Correlation)

COs	Upon completion of course the students will be able to	PO4	PO5	PO14
CO1	design web pages using HTML, CSS and JavaScript	3	3	3
CO2	build web application using PHP and MySQL	3	3	3
CO3	create web application using PHP and XML	3	3	3
CO4	develop web application using servlets and JDBC	3	3	3
CO5	construct web application using JSP and JDBC	3	3	3

LIST OF EXPERIMENTS

HTML & Java Script

1. Develop static pages (using Only HTML) of an online Book store. The pages should resemble: www.amazon.com the website should consist the following pages. Home page, Registration and user Login User Profile Page, Books catalog Shopping Cart, Payment By credit card Order Conformation
2. Validate the Registration, user login, user profile and payment by credit card pages using JavaScript.
3. Write an HTML page including any required Javascript that takes a number from one text field in the range of 0 to 999 and shows it in another text field in words. If the number is out of range, it should show "out of range" and if it is not a number, it should show "not a number" message in the result box

PHP & XML

4. A web application that takes name and age from an HTML page.If the age is less than 18, it should send a page with "Hello <name>, you are not authorized to visit this site" message ,where <name> should be replaced with the entered name . Otherwise it should send "Welcome <name> to this site" message.
5. A web application that lists all cookies stored in the browser on clicking "List Cookies" button.Add cookies if necessary.
6. A wed application takes a name as input and on submit it shows a hello <name>page where <name>is taken from the request. It shows the start time at the right top corner of the page and provides a logout button. On clicking this button ,it should show a logout page with Thank You<name> Message with the duration of usage (hint: Use session to store name and time).
7. A user validation web application, where the user submits the login name and password to the server. The name and password are checked against the data already available in database and if the data matches, a successful login page is returned .Otherwise a failure message is shown to the user.
8. Modify the above program to use an xml file instead of database

Servlet

9. A web application that takes name and age from an HTML page.If the age is less than 18, it should send a page with "Hello <name>, you are not authorized to visit this site" message ,where <name> should be replaced with the entered name . Otherwise it should send "Welcome <name> to this site" message.
10. A web application that lists all cookies stored in the browser on clicking "List Cookies" button.Add cookies if necessary.
11. A wed application takes a name as input and on submit it shows a hello <name>page where <name>is taken from the request. It shows the start time at the right top corner of the page and provides a logout button. On clicking this button ,it should show a logout page with Thank You<name> Message with the duration of usage (hint: Use session to store name and time).

12. A user validation web application, where the user submits the login name and password to the server. The name and password are checked against the data already available in database and if the data matches, a successful login page is returned .Otherwise a failure message is shown to the user.

JSP

13. A web application that takes name and age from an HTML page.If the age is less than 18, it should send a page with "Hello <name>, you are not authorized to visit this site" message ,where <name> should be replaced with the entered name . Otherwise it should send "Welcome <name> to this site" message.
14. A web application that lists all cookies stored in the browser on clicking "List Cookies" button. Add cookies if necessary.
15. A wed application takes a name as input and on submit it shows a hello <name>page where <name>is taken from the request. It shows the start time at the right top corner of the page and provides a logout button. On clicking this button ,it should show a logout page with Thank You<name> Message with the duration of usage (hint: Use session to store name and time).
16. A user validation web application, where the user submits the login name and password to the server. The name and password are checked against the data already available in database and if the data matches, a successful login page is returned .Otherwise a failure message is shown to the user.

Textbooks:

1. Web Technologies, Uttam k Roy, Oxford University Press
2. The complete Reference PHP – Steven Holzner, Tata McGraw-Hill
3. Web Programming ,building internet applications, Chris Bates 2nd edition, Wiley Dremtech

References:

1. Java Server Pages-Hans Bergsten, SPD O'Reilly
2. Java Script, D. Flanagan O'Reilly SPD.
3. Beginning Web Programming –Jon Duckett WROX.
4. Programming world wide web, R. W. Sebesta,Fourth Edition, Pearson.
5. Internet and World Wide Web- How to program, Dietel and Nieto, Pearson.

HUMAN VALUES & PROFESSIONAL ETHICS
MANDATORY COURSE (NON-CREDIT)

		L	**T**	**P**	**C**
III-B.Tech.-I-Sem.					
Subject Code: 17HS3109MC		**3**	**0**	**0**	**0**

Course Outcomes (COs) & CO-PO Mapping (3-Strong; 2-Medium; 1-Weak Correlation)

COs	Upon completion of course the students will be able to	PO6	PO7	PO8	PO12
CO1	apply the importance of human values for personal and societal development	3	3	3	2
CO2	develop ethics and professional attitude	2	2	3	2
CO3	explain ethical standards in a professional environment	3	3	3	2
CO4	distinguish between professional rights and employee rights	3	3	3	2
CO5	identify their role in professional spheres	3	3	3	3

Unit-I

Human Values: Morals, values, ethics – integrity – work ethics –service learning –civic virtue – respect for others- living peacefully - Caring –sharing –honesty – courage –valuing time – cooperation – commitment –empathy – self-confidence –spirituality – character- Mini-Cases

Unit-II

Professional Ethics: Profession- and professionalism - Two models of professionalism – Professional etiquette -Three types of Ethics or morality Responsibility in Engineering – Engineering standards –Engineering Ethics – Positive and Negative Faces. Professional Codes and Code of conduct of Institute of Engineers . Mini-cases .

Unit-III

Professional Responsibilities: Ethical standards Vs Professional Conduct – Zero Tolerance for Culpable Mistakes – Hazards and Risks - congeniality, collegiality and loyalty. Respect for authority – conflicts of interest –Mini-Cases.

Unit IV

Professional Rights: professional rights and employee rights communicating risk and public policy – Whistle blowing - Professionals /engineers as managers, advisors, experts, witnesses and consultants – moral leadership- Monitoring and control- Mini-Cases

Unit-V

Ethics in global context: Global issues in MNCs- Problems of bribery, extortion, and grease payments – Problem of nepotism, excessive gifts – paternalism – different business practices – negotiating taxes. Mini-Cases.

References:

1. Human Values and Professional Ethics by S B George, Vikas Publishing.
2. Professional Ethics and Human Values by K R Govindan & Saenthil Kumar:, Anuradha Publications.
3. Human Values and Ethics by S K Chakraborthy & D.Chakraborthy, Himalaya.
4. Engineering Ethics(Includes Human Values) by M. Govindarajan, S. Natarajan, & V.S. Senthil Kumar:, HI Learning Pvt. Ltd., New Delhi – 110001

SOFT SKILLS
(MANDATORY COURSE)

		L T P C
III-B.Tech- I Sem.		**0 0 2 0**
Subject Code: 17HS3110MC		

Course Outcomes (COs) & CO-PO Mapping (3-Strong; 2-Medium; 1-Weak Correlation)

COs	Upon completion of course the students will be able to	PO9	PO10
CO1	identify the need for self awareness and exhibit professional attitude	3	3
CO2	interpret and improve in personal and professional communication	3	3
CO3	develop leadership skills and enhance the employability	3	3
CO4	recognize the importance of decision making and change management to improve professional attributes	3	3
CO5	apply interview techniques for overall development	3	3

Unit - I: Awareness & Attitude

Who am I? – Roles we play in life - Introducing oneself – Plans for future – Strengths & Weaknesses – Hobbies
Definition of Discipline – Need for Discipline – Analysis of Discipline
Definition of Integrity – Need for Integrity – Role of Integrity in Success – Personal Integrity & Professional Integrity
Definition – Positive Attitude – Professional Attitude

Unit - II: People Skills

Relationships - Personal & Professional Relationships – Rapport Building – Personal Space
Definition of Motivation –Motivation – Self-motivation

Unit - III: Teamwork & Leadership

Definition of Team and Leadership
Team Dynamics –Specialisation and Teamwork – Rewards of Teamwork - Leading a Team
Leadership Qualities – Leader vs Manager – Leadership Styles

Unit - IV: Decision Making & Change Management

Definitions –Decision Making – Hurdles in Decision Making
Definition – Change and Adaptability –Change Management

Unit - V: Preparation for Interviews

Body Language – Posture - Dressing and Grooming – Researching the Industry and the Organization- Types of Interviews – First Impressions – Dos and Don'ts of an Interview

Activities List:

1. Regular practice tests
2. Quiz, Crossword, Word-search and related activities
3. 5-minute presentations about concepts learnt
4. JAM and Picture Narration.
5. Mock Interviews

Teachers are requested to use Case Study methodology to deliver the course.

References:

1. Soft Skills By Dr K.Alex , Sultan Chand And Co.
2. Practical Personality & Development By Janardana Krishna Pillalamarri, Scitech Publications (India) Pvt Ltd.
3. English Skills For Technical Students By Amaresh Mukherjee, Sankarnath Ghosh And Prabir Ghosh, Orient Longman Pvt Ltd.

III-B.TECH.-II-SEMESTER SYLLABUS

COMPILER DESIGN

III-B.Tech.-II-Sem **L T P C**
Subject Code: 17CS3201PC **4 0 0 4**

Course Outcomes (COs) & CO-PO Mapping (3-Strong; 2-Medium; 1-Weak Correlation)

COs	Upon completion of course the students will be able to	PO2	PO3	PO4	PO12	PO13
CO1	illustrate the various phases of compiler	3	3	3	2	2
CO2	construct top down and bottom up parsers	3	3	3	2	2
CO3	adapt intermediate Code Generation techniques and run-time storage allocation strategies	3	3	3	2	2
CO4	simplify the code using code optimization techniques	3	3	3	2	2
CO5	apply generic code generation algorithm to generate target code	3	3	3	2	2

Unit-I

Overview of Compilation: Phases of Compilation – Lexical Analysis, Regular Grammar and Regular Expression for common programming language features, Pass and Phases of translation, interpretation, bootstrapping, data structures in compilation, LEX-lexical analyzer generator.

Unit-II

Top down Parsing: Context-free grammars, Top down parsing – Backtracking, LL (1), recursive descent parsing, Predictive parsing.
Bottom up parsing: Shift-Reduce parsing, LR parsing, handling ambiguous grammar, YACC – automatic parser generator.

Unit-III

Intermediate Code Generation: Intermediate forms of source Programs - abstract syntax tree, polish notation and three address codes. Attributed grammars, Syntax directed translation.

Symbol Tables: Symbol table format, organization for block structures languages, hashing and tree structures, representation of scope information. Block structures and non-block structure storage allocation: static, Runtime stack and heap storage allocation.

Unit-IV

Code optimization: Consideration for Optimization, Scope of Optimization, local optimization, loop optimization, frequency reduction, constant folding, DAG representation. Data flow analysis: Flow graph, data flow equations, global optimization, redundant sub expression elimination, Induction variable elements, Live variable analysis, Copy propagation.

Unit-V

Object code generation: Object code forms, machine dependent code optimization, register allocation and assignment generic code generation algorithms, DAG for register allocation.

Textbooks:

1. Compilers: Principles, Techniques and Tools, 2nd Edition, Alfred V. Aho, Monica S. Lam, Ravi Sethi, Jeffry D. Ullman, Pearson.
2. Systems programming and operating systems – D.M Dhamdhere, 2nd Edition, TMH.

References:

1. Lex & Yacc – John R. Levine, Tony Mason, Doug Brown, O'reilly.
2. Modern Compiler Design- Dick Grune, Henry E. Bal, Cariel T. H. Jacobs, Wiley dreamtech.
3. Randy Allen, Ken Kennedy, Optimizing Compilers for Modern Architectures, Morgan.

CLOUD COMPUTING

III-B.Tech.-II-Sem   **L T P C**
Subject Code: 17CS3202PC   **4 1 0 4**

Course Outcomes (COs) & CO-PO Mapping (3-Strong; 2-Medium; 1-Weak Correlation)

COs	Upon completion of course the students will be able to	PO1	PO2	PO3	PO12	PO13
CO1	explain various computing paradigms	3	2	3	2	2
CO2	illustrate fundamentals of cloud computing	3	2	3	2	2
CO3	elaborate cloud computing architecture and management	3	3	3	2	2
CO4	perceive various cloud service models	3	3	3	2	2
CO5	select various cloud service providers	3	2	3	2	2

Unit-I

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 Compute: Account creation, Regisons, availability zones, Global infrastructure of AWS, Replication, Elastic Cloud Compute(Ec2), AMI, instance, security groups, keypairs, instance types (nano, micro,small..) tags, volumes, elastic ip, snapshots in volume, snapshots in instance, load balancing, Auto scaling.
IAM: Identity access management introduction, creating users, creating groups, providing permissions, MFA (Multi factor authentication).

Unit-III

VPC (Virtual Private Cloud): Router, switch, LAN, MAN, WAN, VPN, MPLS, Adapters, NAT, Bridged, Hostname, IP (4parts), Branch wise configuring IP, Private IP, Public IP, Security (ACL, Firewall), VPC, Subnet, Routing tables, Internet Gate way, Separate zones per each business in cloud.
Domain Management: Route53 - Domain name, Hostname, DNS Name, FQDN, Sub domains, WWW, A record, CNAME Record, DNS zones, Domain name service providers, Name servers.

Unit–IV

Cloud Database: RDBMS Introduction (Data, Database, DBMS, RDBMS), Oracle/SQL Server database creation, backups, snapshots, retention period, accessibility, Database clients, Client Server architecture, Database connectivity with Application.
S3: Bucket, Storage types, glacier, static website hosting, versioning, Server access logging, Object-level- logging, Encryption, Object Locks, Providing access to files/directories, transfer acceleration, Requester pays

Unit-V

SNS: SNS introduction, configuring mail id, topics.
Lamda: Lamda Functionality, Programming Languages in lambda, Usage of Lambda, Importance of Lambda.
Cloud watch: What is Amazon Cloud watch, Cloud Watch Concepts, Why Cloud watch, Amazon cloud watch workflow, Cloud watch Events, AWS dynamic domain name, Cloud watch logs, Scheduler syntax, Scheduler types.

Textbook:

1. Cloud Computing: Principles and Paradigms by Rajkumar Buyya, James Broberg and Andrzej M. Goscinski, Wiley, 2011.

References:

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

SOFTWARE ENGINEERING

III-B.Tech-II-Sem　　　　　　　　　　　　　　　　　　　　**L T P C**
Subject Code: 17CS3203PC　　　　　　　　　　　　　　　　**4 1 0 4**

Course Outcomes (COs) & CO-PO Mapping (3-Strong; 2-Medium; 1-Weak Correlation)

COs	Upon completion of course the students will be able to	PO2	PO3	PO8	PO11	PO12	PO13
CO1	apply software engineering principles and techniques	3	3	3	3	3	3
CO2	identify requirements, analyze and prepare models	3	3	3	3	3	3
CO3	design a system, component or process to meet the desired needs	3	3	3	3	3	3
CO4	analyze various testing techniques by using various metrics	3	3	3	3	3	3
CO5	adapt risk management strategies to assure software quality	3	2	3	3	3	3

Unit-I

Introduction to Software Engineering: Evolving role of Software, Changing nature of Software, Software Myths.

A Generic View Of Process: Software engineering-A layered technology, The Capability Maturity Model Integration (CMMI), Process Assessment.

Process Models: The water fall model, incremental process models, evolutionary process models, specialized process models, the unified process.

Unit-II

Software Requirements: Functional and Non functional requirements, User requirements, System requirements, the software requirements document.

Requirements Engineering Process: Feasibility studies, requirements elicitation and analysis, requirements validation, requirements management.

System models: context models, behavior 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.

Modeling component-level design & performing user interface design: Designing Class based components, conducting component level design, Golden rules, user interface analysis and design.

Unit-IV

Testing Strategies: A strategic approach to software testing, 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.

Process and products Metrics: Software measurement, Metrics for software quality.

Unit-V

Risk Analysis and Management: Risk Management, Reactive vs Proactive risk strategies, Software risks, Risk identification, Risk projection Risk refinement, RMMM, RMMM plan.

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

Textbooks:

1. Roger S. Pressman, Software engineering- A practitioner's Approach, TMH (I), 7th Edition, 2019.
2. Ian Sommerville, Software Engineering, Pearson education Asia, 10th Edition, 2015.

References:

1. Software Engineering, A Precise Approach, Pankaj Jalote, Wiley India, 2010.
2. Software Engineering: A Primer, Waman S Jawadekar, TMH, 2008.

GLOBAL WARMING & CLIMATE CHANGE
(Open Elective – II)

III-B.Tech.-II-Sem.   **L   T   P   C**
Subject Code: 17CE3204OE   **3   0   0   3**

Course Outcomes (COs) & CO-PO Mapping (3-Strong; 2-Medium; 1-Weak Correlation)

COs	Upon completion of course the students will be able to	PO2	PO6	PO7	PO8	PO12
CO1	describe the various consequences of climate change	3	3	3	3	2
CO2	illustrate the methods of measurement of climate change	3	3	3	3	2
CO3	analyze the causes for climate change and its impacts	3	3	3	3	2
CO4	evaluate the impact of global warming and climate change	3	3	3	3	2
CO5	explain various mitigation techniques	3	3	3	3	2

Unit – I

Global warming and Greenhouse gases – GHGs trend, Global temperature trend, Global distribution of emissions, IPCC Sources of CO_2 in the Land, Ocean and atmosphere. The Climate system – Sun, Atmosphere, Ocean, Ice and energy balance of the earth. History of climate change – glacial cycle , interglacial, interstadial events, year to decadal
Global Warming Potential: Introduction to the calculation of GWP, carbon emissions from fossil fuels and global carbon cycle, carbon intensity of fossil fuels, Effects of energy efficiency on carbon intensity, target CO_2 levels.

Unit – II

The Kyoto Protocol, Climate change –Extreme weather events, The Measurement of Climate Change, Global warming and the hydrological cycle, Climate change impact on ecosystems, Agriculture, Possible remedies of global warming – Reducing Carbon Emissions, Energy use and Emission trading, Future Emissions and Energy Resources, Current and Future sources of Methane, Biological sources of Nitrous oxide, Role of Scientist and Human being.

Unit – III

The history of climate and the human species, human-caused climate change, Impacts Of Climate Change: Impacts of Climate Change on various sectors – Agriculture, Forestry and Ecosystem – Water Resources – Human Health – Industry, Settlement and Society – Methods and Scenarios – Projected Impacts for Different Regions– Uncertainties in the Projected Impacts of Climate Change – Risk of Irreversible Changes.

Unit – IV

Weather and Climate – Climatic zones, continental & maritime climates; Climate change and variability – Natural changes and anthropogenic causes of climate change, Climate feedbacks – Ice-albedo, cloud - albedo and CO_2 feedbacks; Present day Climate variability – El Nino and ENSO events. Climate Change Adaptation And Mitigation Measures: Adaptation Strategy/Options in various sectors – Water – Agriculture –- Infrastructure and Settlement including coastal zones – Human Health – Tourism – Transport – Energy – Key

Unit –V

Mitigation Technologies and Practices – Energy Supply – Transport – Buildings – Industry – Agriculture – Forestry - Carbon sequestration – Carbon capture and storage (CCS)- Waste (MSW & Bio waste, Biomedical, Industrial waste – International and Regional cooperation. Clean Technology And Energy: Clean Development Mechanism –Carbon Trading examples of future Clean Technology- Biodiesel – Natural Compost – Eco- Friendly Plastic – Alternate Energy – Hydrogen – Bio-fuels – Solar Energy – Wind – Hydroelectric Power – Mitigation Efforts in India and Adaptation funding.

Textbooks:

1. Dash Sushil Kumar, "Climate Change – An Indian Perspective", Cambridge University Press India Pvt. Ltd, 2007.
2. Kuhn, T.S., 1962 and updates. The Structure of Scientific Revolutions
3. Contemporary Climatology, by Peter J. Robinson and Ann Henderson-Sellers.
4. Climate Change: A Multidisciplinary Approach, by William James Burroughs
5. Current trends in Global Environment by A.L. Bhatia (2005)

References:

1. Global Warming: A Very Short Introduction by Mark Maslin
2. Global Warming The Complete Briefing by John T Houghton
3. Intergovernmental Panel on Climate Change, (Cambridge University 2007)
4. Ruddiman, William F.2001. Earth's Climate: Past and Future
5. Henderson-Sellers, A., and P.J. Robinson, 1999. Contemporary Climatology (second edition). Prentice-Hall.
6. Houghton, J.T., 2001, (ed). Climate Change 2001, The Scientific Basis. 881pp.

FUNDAMENTALS OF ROBOTICS
(Open Elective – II)

III-B.Tech-II-Sem   **L   T   P   C**
Subject Code: 17ME3204OE   **3   0   0   3**

Course Outcomes (COs) & CO-PO Mapping (3-Strong; 2-Medium; 1-Weak Correlation)

COs	Upon completion of course the students will be able to	PO1	PO2	PO5	PO12
CO1	illustrate principles and functioning of the robot	3	2	2	2
CO2	perform kinematic analysis for end-effector positioning	3	3	3	2
CO3	integrate sensors for robot	3	3	3	2
CO4	design control laws for a robot	3	3	2	2
CO5	develop robot programming for various applications	3	3	3	2

Unit-I

Introduction to Robotics: Types and components of a robot, Classification of robots, classification with respect to geometrical configuration (anatomy), closed-loop and open- loop control systems. Social issues and safety.

Unit-II

Robot Kinematics: Kinematics systems, Definition of mechanisms and manipulators, Kinematic Modelling: Translation and Rotation Representation, Coordinate transformation, Homogeneous Coordinate representation, DH parameters.

Unit-III

Sensors and Vision System: Sensor: Contact and Proximity, Position, Velocity, Force, Tactile etc., Introduction to Cameras, Camera calibration, Geometry of Image formation, Euclidean / Similarity / Affine / Projective transformations Vision applications in robotics.
Robot Actuation Systems: Actuators: Electric, Hydraulic and Pneumatic; Transmission: Gears, Timing Belts and Bearings, Parameters for selection of actuators.

Unit –IV

Robot Control: Basics of control: Transfer functions, Control laws: P, PD, PID, Non-linear and advanced controls.

Unit-V

Control Hardware and Interfacing: Embedded systems: Architecture and integration with sensors, actuators, components, Programming for Robot Applications.

Textbooks:

1. Niku Saeed B., "Introduction to Robotics: Analysis, Systems, Applications", PHI, New Delhi.
2. Mittal R.K. and Nagrath I.J., "Robotics and Control", Tata McGraw Hill.

References:

1. Saha, S.K., "Introduction to Robotics, 2nd Edition, McGraw-Hill Higher Education, 2014.
2. Ghosal, A., "Robotics", Oxford, New Delhi, 2006.

PRINCIPLES OF COMMUNICATION SYSTEMS
(Open Elective – II)

III -B.Tech.-II-Sem   **L T P C**
Subject Code: 17EC3204OE   **3 0 0 3**

Course Outcomes (COs) & CO-PO Mapping (3-Strong; 2-Medium; 1-Weak Correlation)

COs	Upon completion of course the students will be able to	PO1	PO2	PO3	PO12
CO1	outline the fundamentals of communication systems	3	2	2	2
CO2	analyze various analog modulation and demodulation schemes	3	3	3	2
CO3	explain sampling theorem, pulse modulation and multiplexing techniques	3	3	3	2
CO4	illustrate digital modulation schemes	3	3	2	2
CO5	develop source and channel coding techniques	3	3	3	2

Unit-I

Fundamentals of communication systems: Block diagram of communication system; types of communications-analog and digital; Noise–types of noise, sources of noise, calculation of noise in linear systems, and noise figure.

Unit-II

Methods of Modulation: Need for modulation; Types of modulation, generation and detection of AM, DSB-SC, SSB-SC. Angle modulation: frequency & phase modulations, Narrow band and Wide band FM, comparison of AM, FM & PM.

Unit-III

Pulse Modulations: Sampling theorem, Nyquist criteria, introduction to PAM, PWM and PPM.
Multiplexing techniques: TDM, FDM, asynchronous multiplexing.

Unit-IV

Digital Communication: Advantages; Working principle of PCM; comparison of PCM, DM, ADM, ADPCM; introduction to digital modulation techniques-ASK, FSK, PSK, DPSK, QPSK.

Unit-V

Information Theory: Concept of information; rate of information and entropy; Coding efficiency-Shanon-Fano and Huffman coding; introduction to error detection and correction codes.

Textbooks:

1. Communication Systems Analog and Digital – R.P. Singh & SD Sapre, TMH, 20th reprint, 2004.
2. Principles of Communications – H. Taub and D. Schilling, TMH, 2003.

References:

1. Electronic Communication Systems – Kennedy and Davis, TMH, 4th edition, 2004.
2. Communication Systems Engineering – John. G. Proakis and Masoud Salehi, PHI, 2nd Ed. 2004.

DATABASE MANAGEMENT SYSTEMS
(Open Elective – II)

III-B.Tech- II Sem   **L T P C**
Subject Code: 17CS3204OE   **3 0 0 3**

Course Outcomes (COs) & CO-PO Mapping (3-Strong; 2-Medium; 1-Weak Correlation)

COs	Upon completion of course the students will be able to	PO1	PO2	PO3	PO5	PO12
CO1	design databases using E-R model	3	3	3	3	2
CO2	construct database using relational model	3	3	3	3	2
CO3	formulate SQL queries to interact with database	3	3	3	3	2
CO4	make use of transaction control commands	3	3	3	3	2
CO5	apply normalization on database to eliminate redundancy	3	3	3	3	2

Unit-I

Introduction to Database Systems: Introduction and applications of DBMS, Purpose of data base, History of database, Database architecture - Abstraction Levels, Data Independence, Database Languages, Database users and DBA.
Introduction to Database Design: Database Design Process, Data Models, ER Diagrams - Entities, Attributes, Relationships, Constraints, keys, Generalization, Specialization, Aggregation, Conceptual design with the E-R model for large Enterprise.

Unit-II

Relational Model: Introduction to the relational model, Integrity constraints over relations, Enforcing integrity constraints, Querying relational data, Logical database design: E-R to relational, Introduction to views, Destroying/altering tables and views.

Unit-III

Part-A: SQL Basics: DDL, DML, DCL, structure – creation, alteration, defining constraints – Primary key, foreign key, unique, not null, check, in operator.

Part-B: Functions: Aggregate functions, Built-in functions - numeric, date, string functions, set operations.

Unit-IV

Sub-queries: Introduction, correlated sub-queries, use of group by, having, order by, join and its types, Exist, Any, All, view and its types.
Transaction control commands: ACID properties, concurrency control, Commit, Rollback, save point, cursors, stored procedures, Triggers.

Unit-V

Normalization: Introduction, Normal forms - 1NF, 2NF, 3NF, BCNF, 4NF and 5NF, concept of De-normalization and practical problems based on these forms.

Textbooks:

1. Raghurama Krishnan, Johannes Gehrke, Database Management Systems, 3rd Edition, TMH.
2. Abraham Silberschatz, Henry F.Korth, S.Sudarshan, Database System Concepts, 6th Edn, TMH.

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MULTIMEDIA COMPUTING
(Professional Elective - I)

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		L	**T**	**P**	**C**
III-B.Tech-II-Sem		**3**	**0**	**0**	**3**
Subject Code: 17CS3205PE					

Course Outcomes (COs) & CO-PO Mapping (3-Strong; 2-Medium; 1-Weak Correlation)

COs	Upon completion of course the students will be able to	PO2	PO5	PO12	PO13
CO1	perceive the characteristics of different multimedia data	3	3	2	2
CO2	distinguish various data formats and multimedia system designs	3	3	2	2
CO3	apply different compression principles and compression techniques	3	3	2	2
CO4	analyze different multimedia systems and its applications	3	3	2	2
CO5	solve multimedia applications using multimedia data	3	3	2	2

Unit–I

Introduction to Multimedia: Components of multimedia, Multimedia and hypermedia, World Wide Web, overview of multimedia software tools.
Graphics and image data representation: graphics/image data types, file formats.

Unit–II

Fundamental concepts in video: Types of video signals, analog video, digital video,
Basics of Digital Audio: Digitization of sound, MIDI, quantization and transmission of audio.

Unit–III

Multimedia data compression I: Lossless compression algorithm: Run-Length Coding, Variable Length Coding, Dictionary Based Coding, Arithmetic Coding, Lossless Image Compression.
Multimedia data compression II: Lossy compression algorithm: Quantization, Transform Coding, Wavelet-Based Coding, Embedded Zerotree of Wavelet Coefficients, Set Partitioning in Hierarchical Trees (SPIHT).

Unit–IV

Basic Video Compression Techniques: Introduction to video compression, video compression based on motion compensation, search for motion vectors.
Basic Audio Compression Techniques: ADPCM in Speech Coding , G.726 ADPCM, Vocoders.

Unit–V

Multimedia Networks: Computer and Multimedia Networks: Basics of Computer and Multimedia Networks, Multiplexing Technologies, LAN and WAN.
Multimedia Network Communications and Applications: Quality of Multimedia Data Transmission, Multimedia over IP, Multimedia over ATM Networks, Media-on-Demand (MOD).

Textbooks:

1. Fundamentals of Multimedia by Ze-Nian Li and Mark S. Drew, Pearson Prentice Hall, Pearson Education International.

References:

1. Digital Multimedia, Nigel chapman and jenny chapman, Wiley-Dreamtech
2. Macromedia Flash MX Professional 2004 Unleashed, Pearson.
3. Multimedia and communications Technology, Steve Heath, Elsevier (Focal Press).

COMPUTER GRAPHICS
(Professional Elective-I)

III-B.Tech –II-Sem.   **L T P C**
Subject Code: 17CS3206PE   **3 0 0 3**

Course Outcomes (COs) & CO-PO Mapping (3-Strong; 2-Medium; 1-Weak Correlation)

COs	Upon completion of course the students will be able to	PO2	PO3	PO5	PO12	PO13
CO1	analyze the principles, paradigms and techniques of CG	3	3	3	2	2
CO2	illustrate OpenGL, cross-language, cross-platform API	3	3	3	2	2
CO3	make use of computer aided design for content presentation	3	3	3	2	2
CO4	design basic graphics application programs including animation	3	3	3	2	2
CO5	develop a facility with the relevant mathematics of CG	3	3	3	2	2

Unit- I
Introduction: Application areas of Computer Graphics, overview of graphics systems, video-display devices, raster-scan systems, random scan systems, graphics I/O devices.
Output primitives: Points and lines, line drawing algorithms, mid-point circle and ellipse algorithms. Filled area primitives: Scan line polygon fill algorithm, boundary-fill and flood-fill algorithms.

Unit-II
2–D Geometrical transforms :Types of Transformations, matrix representations and homogeneous coordinates, composite transforms, transformations between coordinate systems.
2-D Viewing: The viewing pipeline, viewing coordinate reference frame, window to view-port coordinate transformation, viewing functions, Cohen-Sutherland and Cyrus-beck line clipping algorithm .

Unit- III
3- D Object Representation : Polygon surfaces, quadric surfaces,spline representation, Hermite curve, Bezier curve and B-spline curves, Bezier and B-spline surfaces.
Illumination Models and Rendering Methods: Basic illumination models, polygon rendering methods.

Unit –IV
3-D Geometric transformations: Basic 3-D transformations, composite transformations.
3-D viewing: Viewing pipeline, viewing coordinates, view volume and general projection transforms and Clipping.

Unit- V
Computer animation: Design of animation sequence, general computer animation functions, raster animation, computer animation languages, key frame systems, Motion specifications.

Textbooks:
1. Computer Graphics C version by Donald Hearn and M. Pauline Baker, Pearson education.
2. Computer Graphics by Zhigand xiang, Roy Plastock, Second edition, Schaum's outlines. Tata Mc Graw Hill.

References:
1. Computer Graphics Principles & practice by C, Foley, VanDam, Feiner and Hughes, second edition Pearson Education.
2. Interactive Computer Graphics –A top down approach using OpenGL by Edward Angel, Sixth Edition

MOBILE APPLICATION DEVELOPMENT
(Professional Elective-I)

III – B.Tech II- Sem   **L T P C**
Subject Code: 17CS3207PE   **3 0 0 3**

Course Outcomes (COs) & CO-PO Mapping (3-Strong; 2-Medium; 1-Weak Correlation)

COs	Upon completion of course the students will be able to	PO1	PO2	PO3	PO5	PO12	PO13
CO1	perceive mobile devices and mobile platforms	3	3	3	3	2	2
CO2	design the user interfaces for mobile applications	3	3	3	3	2	2
CO3	develop applications for mobile devices	3	3	3	3	2	2
CO4	simulate mobile applications using Android and Eclipse simulator	3	3	3	3	2	2
CO5	prepare a mobile application for distribution	3	3	3	3	2	2

Unit-I: Introduction:
Mobile communication, limitation of mobile and hand held devices**,** Characteristics and Benefits, Application Model, Infrastructure and Managing Resources, Mobile Software Engineering, Frameworks and Tools, Mobile devices Profiles.
Mobile applications: Native applications, hybrid applications, web applications

Unit-II: Overview in Android Stack:
Linux Kernel, Libraries, Android Runtime, Application Framework, Installing the SDK, Creating Android Emulator, Installing Eclipse, Installing Android Development Tools, Java packages, emulators, services, Android applications structure, Activity lifecycle.

Unit-III: Android components:
Screen Elements and Layouts, Activities, Services, Broadcast Receivers, Content Providers, Views, layouts and Common UI components, Processing of application resources, file system.

Unit-IV: Handling and Persisting Data:
The SQL Language, SQL Data Definition Commands, SQL Data Manipulation Commands, Database Design for Android Applications, Database Queries and Reading Data from the Database, Modifying the Database

Unit-V: Application Development:
Intents and Services, Storing and retrieving data, Communication via the Web, Notification and Alarms, Graphics and Multimedia, Telephony, Location based services, Packaging and Deployment, Security and Hacking.

Textbooks:
1. Programming Android, Zigurd mednieks, Laird Dorning, G. Blake Meike and Masumi Nakamura, O'REILLY 2nd Edition.
2. Jochen Schiller, Mobile Communications, Addison-Wesley, Second Edition, 2009.

References:
1. Zigurd Mednieks, Laird Dornin, G, Blake Meike and Masumi Nakamura, "Programming Android", O"Reilly, 2011.
3. Reto Meier, Wrox Wiley, "Professional Android 2 Application Development", 2010.
4. Alasdair Allan, "iPhone Programming", O"Reilly, 2010.
5. Wei-Meng Lee, "Beginning iPhone SDK Programming with Objective-C", Wrox Wiley, 2010.
6. Stefan Poslad, "Ubiquitous Computing: Smart Devices, Environments and interactions", Wiley, 2009.

PRINCIPLES OF PROGRAMMING LANGUAGES
(Professional Elective-I)

III -B.Tech.-II-Sem   **L T P C**
Subject Code: 17CS3208PE   **3 0 0 3**

Course Outcomes (COs) & CO-PO Mapping (3-Strong; 2-Medium; 1-Weak Correlation)

COs	Upon completion of course the students will be able to	PO2	PO3	PO5	PO8	PO12	PO13
CO1	predict various programming paradigms, express syntax and semantics in formal notation	3	3	3	2	2	2
CO2	build programming paradigms to develop applications	3	3	3	2	2	2
CO3	generate subprograms and blocks	3	3	3	2	2	2
CO4	develop code using logical programming languages	3	3	3	2	2	2
CO5	create complex programs using various programming languages	3	3	3	2	2	2

Unit- I: Preliminary Concepts, Syntax and Semantics

Reasons for studying ,concepts of programming languages, programming domains language evaluation criteria, influences on language design, language categories, programming paradigms - imperative, object oriented, functional programming ,logic programming. Programming language implementation - compilation and virtual machines, programming environments.

General problem of describing syntax and semantic, formal methods of describing syntax-BNF, EBNF for common programming languages features, parse tree, ambiguous grammars, attribute grammars, denotation semantics and axiomatic semantics for common programming language features.

Unit-II: Data types

Introduction, primitives, character, user defined, array, associative, record, union, pointer and reference types, design and implementation uses related to these types. Names, variables, concept of binding, type checking, strong typing, type compatibility, named constants, variable initialization.

Unit – III: Expressions and Statements

Arithmetic relational and boolean expression, short circuit evaluation, mixed mode assignment, assignment statements, control structures-statement level, compound statements, selection, iteration, unconditional statements guarded commands.

Unit- IV: Abstract Data Types

Abstractions and encapsulation: Introductions to data abstraction, design issues, language examples, C++ parameterized ADT, object oriented programming C++, Java.
Exception Handling: Exceptions, exception propagation, exception handler in ADA, C++ and Java.

Unit - V: Functional Programming Languages

Introduction: Fundamentals of FPL LISP, ML, Haskell, application of functional programming languages and comparison of functional and imperative languages
Scripting language: pragmatics, key concepts, introduction to programming with python.

Textbooks:

1. Concepts of Programming Languages Robert. W.Sebesta 8/e , Pearson Education,2008
2. Programming Language Design Concepts, D.A.Watt, Wiley Dreamtech,rp-2007

References:

1. Programming Languages,2nd Edition, A.B. Tucker, R.E. Noonan, TM
2. Programming Languages,K.C.Louden,2nd Edition,Yhomson,2003.

COMPILER DESIGN & MOBILE APPLICATION DEVELOPMENT (ANDROID) LAB

III-B.Tech. II-Sem.   **L T P C**
Subject Code: 17CS3209PC   **0 0 3 2**

Course Outcomes (COs) & CO-PO Mapping (3-Strong; 2-Medium; 1-Weak Correlation)

COs	Upon completion of course the students will be able to	PO4	PO5	PO14
CO1	design lexical analyzer using JLex,flex or lex or other tools	3	3	3
CO2	illustrate predictive parser using recursive decent parser and LL parser	3	3	3
CO3	generate machine code from the abstract syntax tree generated by the parser	3	3	3
CO4	install and configure Android application development tools	3	3	3
CO5	develop user Interfaces for the Android platform	3	3	3

Consider the following mini language, a simple procedural High Level Language, operating on integer data with a syntax looking vaguely like a simple C crossed with Pascal. The syntax of the language is defined by the following BNF grammar:

<program> ::= <block>
<block> ::= { <variable definition> <slist> }
            | { <slist> }
<variable definition> ::= int <vardeflist> ;
<vardeflist> ::= <vardec> | <vardec>, <vardeflist>
<vardec> ::= <identifier> | <identifier> [<constant>]
<slist> ::= <statement> |<statement> ; <slist>
<statement> ::= <assignment> | <ifstatement> | <whilestatement> | <block>
                | <printstatement> | <empty>
<assignment> ::= < identifier> = <expression>
                | <identifier> [<expression>] = [<expression>]
<ifstatement> ::= if <bexpression> then <slist> else <slist> endif
                | if <bexpression> then <slist> endif
<whilestatement> ::= while <bexpression> do <slist> enddo
<printstatement> ::= print{ <expression> }
<expression> ::= <expression> <addingop> <term> | <term> | <addingop> <term>
<bexpression> ::= <expression> <relop> <expression>
<relop> ::= < | <= | = = | >= | > |!=
<addingop> ::= + | -
<term> ::= <term> <multop> <factor> | <factor>
<multop> ::= * | /
<factor> ::= <constant> | <identifier> |<identifier> [<expression> | (<expression>)
<constant> ::= <digit> | <digit> <constant>
<identifier> ::= <identifier> <letterordigit> | <letter>
<letterordigit> ::= a|b|c|....|y|z
<digit> ::= 0|1|2|3|...|8|9
<empty> ::= has the obvious meaning

Comments : zero or more characters enclosed between the standard C/Java style comment brockets /*...*/. The language has the rudimentary support for 1-Dimensional arrays. Ex: int a[3] declares a as an array of 3 elements, referenced as a[0],a[1],a[2].

Sample Program written in this language is :

```
    {
     int a[3],t1,t2;
    t1=2;
    a[0]=1; a[1]=2; a[t1]=3;
    t2= -(a[2]+t1*6) / a[2]-t1);
    if t2>5 then
    print(t2);
```

```
    else
     {
      int t3;
      t3=99;
      t2=25;
      print(-11+t2*t3);  /* this is not a comment on two lines */
    }
    endif
  }
```

COMPILER DESIGN EXPERIMENTS LIST

1. Design a Lexical analyzer for the above language. The lexical analyzer should ignore redundant spaces, tabs and newlines. It should also ignore comments. Although the syntax specification states that identifiers can be arbitrarily long, you may restrict the length to some reasonable value.
2. Implement the lexical analyzer using JLex, flex, flex or lex or other lexical analyzer generating tools.
3. Design Predictive parser for the given language
4. Design LALR bottom up parser for the above language.
5. Convert the BNF rules into Yacc form and write code to generate abstract syntax tree.
6. Write program to generate machine code from the abstract syntax tree generated by the parser.

The following instruction set may be considered as target code for a simple register-based machine, supporting a total of 17 instructions. It has three distinct internal storage areas. The first is the set of 8 registers, used by the individual instructions as detailed below, the second is an area used for the storage of variables and the third is an area used for the storage of program. The instructions can be preceded by a label. This consists of an integer in the range 1 to 9999 and the label is followed by a colon to separate it from the rest of the instruction. The numerical label can be used as the argument to a jump instruction, as detailed below.

In the description of the individual instructions below, instruction argument types are specified as follows:

R specifies a register in the form R0, R1, R2, R3, R4, R5, R6 or R7 (or r0, r1, etc).

L specifies a numerical label (in the range 1 to 9999).

V specifies a "variable location" (a variable number, or a variable location pointed to by a register.

A specifies a constant value, a variable location, a register or a variable location pointed to by a register (an indirect address). Constant values are specified as an integer value, optionally preceded by a minus sign, preceded by a # symbol. An indirect address is specified by an @ followed by a register.

So, for example an A-type argument could have the form 4 (variable number 4), #4 (the constant value 4), r4 (register 4) or @r4 (the contents of register 4 identifies the variable location to be accessed).

The instruction set is defined as follows:

LOAD A, R: loads the integer value specified by A into register R.
STORE R, V: stores the value in register R to variable V.
OUT R: outputs the value in register R.
NEG R: negates the value in register R.
ADD A, R: adds the value specified by A to register R, leaving the result in register R.
SUB A, R: subtracts the value specified by A from register R, leaving the result in register R.
MUL A, R: multiplies the value specified by A by register R, leaving the result in register R.
DIV A, R: divides register R by the value specified by A, leaving the result in register R.
JMP L: causes an unconditional jump to the instruction with the label L.
JEQ R, L: jumps to the instruction with the label L if the value in register R is zero.
JNE R, L: jumps to the instruction with the label L if the value in register R is not zero.
JGE R, L: jumps to the instruction with the label L if the value in register R >=0.
JGT R, L: jumps to the instruction with the label L if the value in register R is greater than zero.
JLE R, L: jumps to the instruction with the label L if the value in register R <=0
JLT R, L: jumps to the instruction with the label L if the value in register R is less than zero.
NOP: is an instruction with no effect. It can be tagged by a label.
STOP: stops execution of the machine.

MOBILE APPLICATION DEVELOPMENT EXPERIMENTS LIST

1. Create an android application for to registration form.
2. Create an android application for to display images in Grid View and List View.
3. Create an android application for capture a photo from camera.
4. Create an application using alert dialog box and display a message.
5. Create an android application for to create simple calculator.
6. Create an android application for login.
7. Create an android application for using services.

Textbooks:

1. Principles of compiler design -A.V. Aho. J.D.Ullman; Pearson Education.
2. Modern Compiler Implementation in C- Andrew N. Appel, Cambridge. University Press
3. Programming Android, Zigurd Mednieks, Laird Dornin, G, Blake Meike and Masumi Nakamura, O"Reilly, 2011.
4. Professional Android 2 Application Development , Reto Meier, Wrox Wiley, 2010.

CLOUD APPLICATION DEVELOPMENT LAB

III-B.Tech.-II-Sem   **L T P C**
Subject Code: 17CS3210PC   **0 0 3 2**

Course Outcomes (COs) & CO-PO Mapping (3-Strong; 2-Medium; 1-Weak Correlation)

COs	Upon completion of course the students will be able to	PO4	PO5	PO14
CO1	analyze the use of Cloud Applications	3	3	3
CO2	create virtual machines from available physical resources	3	3	3
CO3	demonstrate the benefits of various cloud computing platforms	3	3	3
CO4	make use of modern tools to built cloud applications	3	3	3
CO5	design and develop application using AWS	3	3	3

List of Experiments:

1. Register with AWS and create a windows/ Linux instance.
2. Create a S3 storage bucket and store documents in bucket.
3. Create a static website and host website by using S3.
4. Map www.cmritonline.ac.in (any domain name) with WebPages created in experiment 3.
5. Install nginx/apache in EC2 (elastic cloud compute) cloud server and host html WebPages.
6. Create a volume with 10GB hard disk and add to a server.
7. Create an AMI for Multi using purpose.
8. Install and configure any RDBMS database in Cloud.
9. Create a virtual private cloud (VPC) for managing organizational servers.
10. Implement paas (platform as a service) by using elastic beanstalk and deploy a simple web application.
11. Implement load balancing server with minimum 3 nodes.
12. Configure a SNS (Simple Notification Service) and cloud watch.

References:

1. Enterprise Cloud Computing by Gautam Shroff, Cambridge,2010
2. Getting Started with OwnCloud by Aditya Patawar , Packt Publishing Ltd, 2013.
3. Rajkumar Buyya, Christian Vecchiola, S.Tamarai Selvi, 'Mastering Cloud Computing", TMGH,2013.
4. Rodrigo N.Calheiros, Rajiv Ranjan, Anton Beloglazov, César A. F. De Rose, and Rajkumar Buyya, "CloudSim: A Toolkit for Modeling and Simulation of Cloud Computing Environments and Evaluation of Resource Provisioning Algorithms ", Cloud Computing and Distributed Systems (CLOUDS) Laboratory. (http://www.buyya.com/papers/ CloudSim2010.pdf)

ADVANCED ENGLISH COMMUNICATION SKILLS (AECS) LAB

III-B. Tech.-II Sem.   **L T P C**
Subject Code: 17CS3211HS   **0 0 3 2**

Course Outcomes (COs) & CO-PO Mapping (3-Strong; 2-Medium; 1-Weak Correlation)

COs	Upon completion of course the students will be able to	PO5	PO10
CO1	assess and utilize vocabulary in an effective way	3	3
CO2	interpret interpersonal relationships	3	3
CO3	elaborate academic reading and writing skills	3	3
CO4	formulate appropriate communication techniques in various contexts	3	3
CO5	adapt to different work-place and socio-cultural scenarios	3	3

Unit-I: Inter-personal Communication and Building Vocabulary   **3 Weeks**

Starting a Conversation – Responding appropriately and relevantly – Using Appropriate Body Language – Role Play in Different Situations, Synonyms and Antonyms, One-word Substitutes, Prefixes and Suffixes, Collocations and Idioms and Phrases.

Unit-II: Reading Comprehension   **2 Weeks**

General vs Local Comprehension, Reading for Facts, Guessing Meanings from context, Skimming, Scanning, Inferring Meaning.

Unit-III: Writing Skills   **3 Weeks**

 Structure and Presentation of Different Types of Writing - Letter Writing, Resume Writing.

 E-correspondence, Technical Report Writing.

Unit-IV: Presentation Skills   **4 Weeks**

Oral Presentations (individual or group) through JAM Sessions, Seminars, PPTs and Written Presentations through Posters, Projects, Reports, e-mails, Assignments…etc.

Unit-V: Group Discussion and Interview Skills   **4 Weeks**

Dynamics of Group Discussion, Intervention, Summarizing, Modulation of Voice, Body Language, Relevance, Fluency and Organization of Ideas and Rubrics of Evaluation Concept and Process, Pre-interview Planning, Opening Strategies, Answering Strategies, Interview through Tele-conference & Video-conference and Mock Interviews.

References:

1. Effective Technical Conmmunication/ Ashraf Rizvi.M – New Delhi : MGHEdu,c2018.
2. Technical Communication/ Meenakshi Raman – New Delhi: Oxford, 2016
3. English Voculabary in Use Advanced byMicheal McCarthy – Cambridge: Cambridge University Press, 2002
4. Manual, PHI Learning Pvt. Ltd., 2011.
5. Basic Communication Skills for Technology by J.Andrea Ruthurford – New Delhi: Pearson
6. Handbook for Technical Writing/ David Mc Murry.A- New Delhi: Cengage, 2012
7. Kumar, Sanjay and Pushp Lata. English for Effective Communication, Oxford University Press,2015.
8. Konar, Nira. English Language Laboratories – A Comprehensive

QUANTITATIVE APTITUDE
MANDATORY COURSE (NON-CREDIT)

III-B.Tech. I-Sem.		**L**	**T**	**P**	**C**
Subject Code: 17BS3212MC		**0**	**0**	**2**	**0**

Course Outcomes (COs) & CO-PO Mapping (3-Strong; 2-Medium; 1-Weak Correlation)

COs	Upon completion of course the students will be able to	PO9	PO10
CO1	Recall the basics of number systems and apply them accordingly	3	3
CO2	Apply the concepts of percentages, profit and loss, & Interests in real life situations	3	3
CO3	demonstrate various principles related to Distance ,speed ,time and work in solving mathematical problems	3	3
CO4	distinguish between permutations and combinations ,clocks and calendars for solving problems	3	3
CO5	apply principles of geometry and menstruation to achieve qualitative results at workplace	3	3

Unit-I

Number Systems: Basic Concepts, Number Systems: Natural numbers, whole numbers, integers, fractions (proper, Improper, mixed, split), Rational Numbers, Irrational Numbers, Real Numbers.
Divisibility Rules, Logic Equations ,Two digit numbers ,three digit numbers, successive divisions, basic operations(addition, subtraction, multiplication, division)
Averages: Basic Concepts combined mean, average principles, wrong values taken, number added or deleted, average speed.
Progressions & Inequalities: Basic Concepts, Types: arithmetic, geometric, harmonic progression and applications.

Unit-II

Percentages: Basic Concepts, conversions, finding percentages from given numbers, quantity increases or decreases by given percentage, population increase by given percentage, comparisons, consumption when a commodity price increase or decrease and applications
Profit and Loss: Basic Concepts, discounts, marked price and list price, dishonest shopkeeper with manipulated weights, successive discounts etc
Interest (Simple and Compound): Basic Concepts, Yearly, Half-yearly, and quarterly calculations, multiples, differences between simple and compound interest.
Ratio and Proportion: Basic Concepts of ratio and proportion, continued or equal proportions, mean proportions, invest proportion, alternative proportion, division proportion, compound proportion, duplication of ratio, finding values, coins and currencies, etc

Unit-III

Speed, Time and Distance: Basic Concepts, Single train problems, two train problems: some point same side, some point opposite sides, relative speed, different points meeting at common points, different points same side (different timings vs. same timings), ratios, number of stoppages, average speed, etc.
Time and Work: Basic Concepts, comparative work, mixed work, alternative work, middle leave and middle join, ratio efficiency.

Unit-IV

Permutations and combinations: Basic Concepts, differences between permutations and combinations, always together-never together, alternative arrangement, fixed positions, double fixations, items drawing from a single group, items drawing from a multiple group, total ways of arrangement with repetitions and without repetitions, dictionary, handshakes or line joining between two points or number of matches , sides and diagonals, etc.

Clocks and Calendars: Basic Concepts, Angle between minute hand and hour hand, reflex angle, hand angle, time gap between minute hand and hour hand ,relative time : coincide ,opposite sides and right angle ,mirror images, faulty clock(slow/fast),miscellaneous, calendar.

Unit-V

Geometry and Mensuration: Basic concepts, types of angles.
Plane figures: Rectangles, squares, triangles, quadrilateral, areas, perimeters, etc.
Solid figures: Cubes, cuboids, spheres, cylinders-area(total to lateral surface area),volumes, perimeters.
Others: Parallelogram, Rhombus, Trapezium, Circle, Sector, Segment, Cone, Sphere, Hemisphere, Ellipse, Star prism etc.

Text Books:

1. GL Barrons, Mc Graw Hills, Thorpe's verbal reasoning, LSAT Materials
2. R S Agarwal, S.Chand , 'A modern approach to Logical reasoning'
3. R S Agarwal, S Chand, 'Quantitative Aptitude'
4. Quantitative Aptitude - G. L BARRONS
5. Quantitative Aptitude - Abhijit Guha Mc Graw Hills

IV-B.TECH.-I-SEMESTER SYLLABUS

NETWORK SECURITY & CRYPTOGRAPHY

IV-B.Tech I-Sem. **L T P C**
Subject Code: 17CS4101PC **4 0 0 4**

Course Outcomes (COs) & CO-PO Mapping (3-Strong; 2-Medium; 1-Weak Correlation)

COs	Upon completion of course the students will be able to	PO2	PO3	PO6	PO8	PO12	PO13
CO1	perceive basic cryptographic algorithms, message and web authentication and security issues	2	2	2	3	2	3
CO2	identify security system requirements for both of them such as client and server	3	3	3	3	3	3
CO3	design various cryptographic algorithms	3	3	3	3	3	3
CO4	illustrate a network and flow of information	3	3	3	3	3	3
CO5	make use of security key management in network security	3	3	3	3	3	3

Unit – I:
Security Concepts: Introduction, The need for security, Principles of security, Security Attacks (Interruption, Interception, Modification and Fabrication), Security Services (Confidentiality, Authentication, Integrity, Non-repudiation, access Control and Availability) and Mechanisms, A model for Network Security. **Cryptography Concepts and Techniques:** Introduction, symmetric cipher model, substitution techniques, transposition techniques, encryption and decryption, steganography, possible types of attacks.

Unit – II:
Symmetric key Ciphers: Block Cipher principles, DES, AES, Blowfish, Block cipher modes of operation, Stream ciphers, RC4. Placement of encryption function, key distribution.
Asymmetric key Ciphers: Principles of public key cryptosystems, RSA algorithm, key management, Diffie-Hellman Key Exchange, man-in-the-middle attacks, Knapsack Algorithm.

Unit – III:
Message Authentication and Hash Functions: Authentication requirements, Authentication functions, Message authentication codes, hash functions, MD5, Secure Hash Algorithm (SHA-512), HMAC, CMAC, Digital signatures.
Authentication Applications: Kerberos, X.509 Authentication Service.

Unit – IV:
E-Mail Security: Pretty Good Privacy, S/MIME
IP Security: IP Security overview, IP Security architecture, Authentication Header, Encapsulating security payload.

Unit – V:
Web Security: Web security considerations, Secure Socket Layer (SSL) and Transport Layer Security (TLS), Secure Electronic Transaction (SET).
Intruders, Viruses and Firewalls: Intruders, Intrusion Detection, password management, Viruses and related threats, Firewall Design principles, types of firewalls.

Text Books:
1. Cryptography and Network Security – Principles and Practice by William Stallings, Pearson Education, 6th Edition
2. Cryptography and Network Security by Atul Kahate, Mc Graw Hill, 3rd Edition

References:
1. Cryptography and Network Security by C K Shyamala, N Harini, Dr T R Padmanabhan, Wiley India, 1st Edition.
2. Cryptography and Network Security by Forouzan Mukhopadhyay, Mc Graw Hill, 3rd Edition

BIG DATA ANALYTICS

IV B.Tech I-Sem
Subject Code:17CS4102PC

L T P C
4 1 0 4

Course Outcomes (COs) & CO-PO Mapping (3-Strong; 2-Medium; 1-Weak Correlation)

COs	Upon completion of course the students will be able to	PO2	PO3	PO4	PO12	PO13
CO1	identify big data and its business Implications	3	2	2	2	2
CO2	illustrate access and process data on distributed file system	3	3	3	2	3
CO3	demonstrate Hadoop Eco system using Pig	3	3	3	2	3
CO4	develop big data solutions using , Hive and Hbase	3	2	3	2	3
CO5	apply machine learning techniques using R	3	3	3	3	3

Unit-I: Introduction To Big Data
Introduction – distributed file system – Big Data Definition, Four Vs, Characteristic Features – Big Data Life Cycle – Big Data Applications –Big Data vs Traditional Data - Risks of Big Data - Structure of Big Data - Challenges of Conventional Systems - Web Data – Evolution of Analytic Scalability - Evolution of Analytic Processes, Tools and methods - Analysis vs Reporting - Modern Data Analytic Tools.

Unit-II: HDFS (Hadoop Distributed File System)
The Design of HDFS, HDFS Concepts, Command Line Interface, Hadoop file system interfaces, Data flow, Data Ingest with Flume and Scoop and Hadoop archives, Hadoop I/O: Compression, Serialization, Map Reduce Anatomy of a Map Reduce Job Run, Failures, Job Scheduling, Shuffle and Sort, Task Execution, Map Reduce Types and Formats, Map Reduce Features, Matrix-Vector Multiplication and Case Studies.

Unit-III: Hadoop Eco Systems
Pig : Introduction to PIG, Execution Modes of Pig, Comparison of Pig with Databases, Installing and Running PIG, Pig Latin-Structure, Expressions, Types, Functions, Macros, Schemas, User Defined Functions-Filter UDF, Eval UDF, Load UDF, Data Processing operators, parallelism and parameter substitution and Case Studies.

Unit-IV: Hive and Hbase
Hive : Introduction to Hive, Installing and Running Hive, HiveQL -Data Types, Operators and functions, File Formats , Hive Shell, Hive Services, Hive Meta Store, Comparison with Traditional Databases, Tables, Querying Data , User Defined Functions, Case studies.
HBase(Column-oriented) : Introduction to HBase, , Installing and Running HBase, Concepts, Clients, Example-schemas, Loading Data , Web Queries, HBase Versus RDBMS and Case studies.

Unit-V: R Programming
Introduction, Data types, Reading and getting data into R – ordered and unordered factors – arrays and matrices – lists and data frames – reading data from files – probability distributions – statistical models in R - manipulating objects – data distribution- Regression (Linear modeling) **,**Hypothesis testing-graphical analysis-complex Statistics , Data Analytics with R-classification and clustering examples.

Text Books:
1. Tom White " Hadoop: The Definitive Guide" Third Edit on, O'reily Media, 2012.
2. Mark Gardener, "Beginning R - The Statistical Programming Language", John Wiley & Sons, Inc., 2012.

References:
1. Seema Acharya, Subhasini Chellappan, "Big Data Analytics" Wiley 2015.
2. Richard Cotton, "Learning R – A Step-by-step Function Guide to Data Analysis, , O'Reilly Media, 2013.

MACHINE LEARNING

IV-B.Tech.I-Sem.   **L T P C**
Subject Code: 17CS4103PC   **4 1 0 4**

Course Outcomes (COs) & CO-PO Mapping (3-Strong; 2-Medium; 1-Weak Correlation)

COs	Upon completion of course the students will be able to	PO1	PO2	PO3	PO6	PO12	PO13
CO1	outline the functionalities of machine learning	3	3	3	2	3	3
CO2	analyze the decision tree learning and artificial neural networks	3	3	3	3	3	3
CO3	develop Bayesian and computational learning approaches	3	3	3	2	2	3
CO4	demonstrate instance-based learning algorithms	3	3	3	3	3	3
CO5	illustrate the learning set concepts	3	3	3	3	3	3

Unit-I

Introduction: Well-posed learning problems, Designing a learning system, Perspectives and issues in machine learning; Concept learning and the general to specific ordering – Introduction, A concept learning task, Concept learning as search; Find-S: finding a maximally specific hypothesis, Version spaces and the candidate elimination algorithm, Inductive bias.

Unit-II

Decision Tree learning: Introduction, Decision tree representation, Appropriate problems for decision tree learning, The basic decision tree learning algorithm, Hypothesis space search in decision tree learning, Inductive bias in decision tree learning.
Artificial Neural Networks: Introduction, Neural network representation, appropriate problems for neural network learning, Perceptions, Multilayer networks and the Back propagation algorithm.

Unit-III

Bayesian learning: Introduction, Bayes theorem, Concept learning, Maximum likelihood and least squared error hypotheses, Minimum description length principle, Bayes optimal classifier, Gibs algorithm, Naïve Bayes classifier, Bayesian belief networks ,The EM algorithm.

Computational learning theory: Introduction, Probability learning an approximately correct hypothesis, Sample complexity for Finite and infinite Hypothesis Space, The mistake bound model of learning.

Unit-IV

Instance-Based Learning: Introduction, k-Nearest Neighbour Learning, Locally Weighted Regression, Radial Basis Functions, Case-Based Reasoning.

Unit-V

Learning Sets of Rules: Introduction, Sequential Covering Algorithms, Learning Rule Sets: Summary, Learning First Order Rules, Learning Sets of First Order Rules: FOIL, Induction as Inverted Deduction, Inverting Resolution.

Textbooks:

1. Machine Learning – Tom M. Mitchell, TMH.
2. Machine Learning: An Algorithmic Perspective, Stephen Marsland, Taylor & Francis (CRC)

References:

1. Machine Learning Methods in the Environmental Sciences, Neural Networks, William W Hsieh, Cambridge University Press.
2. Chris Bishop, Neural Networks for Pattern Recognition, Oxford University Press, 1995.
3. Machine Learning by Peter Flach, Cambridge.

ENVIRONMENTAL IMPACT ASSESSMENT
(Open Elective – III)

IV-B.Tech.-I-Sem.   **L T P C**
Subject Code: 17CE4104OE   **3 0 0 3**

Course Outcomes (COs) & CO-PO Mapping (3-Strong; 2-Medium; 1-Weak Correlation)

COs	Upon completion of course the students will be able to	PO6	PO7	PO10	PO12
CO1	identify the attributes to be considered for EIA	3	3	3	3
CO2	assess impact of deforestation	3	3	3	3
CO3	interpret impact prediction, significance of soil quality and mitigation	3	3	2	3
CO4	conduct environmental audit and prepare reports	3	3	2	3
CO5	illustrate environmental policies and provisions	3	3	3	3

Unit-I

Basic concept of EIA: Initial environmental Examination, Elements of EIA, factors affecting E-I-A Impact evaluation and analysis, preparation of Environmental Base map, Classification of environmental parameters. E I A Methodologies: introduction, Criteria for the selection of EIA Methodology, E I A methods, Ad-hoc methods, matrix methods, Network method Environmental Media Quality Index method, overlay methods, cost/benefit Analysis.

Unit-II

Assessment of impact of development activities on vegetation and wildlife, environmental Impact of Deforestation – Causes and effects of deforestation.

Unit-III

Procurement of relevant soil quality, impact prediction, assessment of impact significance. Identification and incorporation of mitigation measures for enhancement of soil quality.

Unit-IV

Environmental Audit & Environmental legislation objectives of Environmental Audit, Types of environmental Audit, stages of Environmental Audit, onsite activities, evaluation of Audit data and preparation of Audit report, Post Audit activities.

Unit-V

The Environmental Protection Act, The water Act, The Air (Prevention & Control of pollution Act.), Motor Act, Wild life Act. Case studies and preparation of Environmental Impact assessment statement for various Industries.

Textbooks:

1. Environmental Pollution by R.K. Khitoliya S. Chand.
2. Environmental Impact Assessment, Barthwal, R. R. New Age International Publications.

References:

1. Larry Canter – Environmental Impact Assessment, TMH.
2. Suresh K. Dhaneja - Environmental Science and Engineering, S.K. Kataria & Sons Publication.
3. Bhatia, H. S. - Environmental Pollution and Control, Galgotia Publication, Pvt., Ltd., Delhi.

PRINCIPLES OF ENTREPRENEURSHIP
(Open Elective – III)

IV-B.Tech. I-Sem.   **L T P C**
Subject Code: 17ME4104OE   **3 0 0 3**

Course Outcomes (COs) & CO-PO Mapping (3-Strong; 2-Medium; 1-Weak Correlation)

COs	Upon completion of course the students will be able to	PO7	PO8	PO9	PO11	PO12
CO1	illustrate concept & types of entrepreneurship	3	3	2	3	2
CO2	distinguish individual and corporate entrepreneurship	3	3	3	3	2
CO3	identify the process of launching new ventures	3	3	3	3	3
CO4	assess legal challenges of entrepreneurship	3	3	3	3	3
CO5	build entrepreneurial strategies	3	3	3	3	3

Unit-I: Entrepreneurship

The revolution impact of entrepreneurship- The evolution of entrepreneurship - Approaches to entrepreneurship- Process approach- Twenty first centaury trends in entrepreneurship.
Case: From candle seller to CEO (Arya Kumar P.No. 48).

Unit-II: Individual and corporate entrepreneurship

The entrepreneurial journey - Stress and the entrepreneur- the entrepreneurial ego- Entrepreneurial motivations - Corporate Entrepreneurial Mindset the nature of corporate entrepreneur.
Case: Globalizing Local Talent, (B. Janakiram, M. Rizwana, page 228).

Unit-III: Launching Entrepreneurial Ventures

Opportunities identification - entrepreneurial Imagination and Creativity - the nature of the creativity Process - Innovation and Entrepreneurship - Methods to initiate Ventures. Creating New Ventures - Acquiring an established entrepreneurial venture – Franchising - hybrid disadvantage of Franchising.
Case: creativity in start-ups (Arya Kumar Page 166).

Unit-IV: Legal challenges of Entrepreneurship

Intellectual Property Protection-Patents, Copyrights, Trademarks and Trade Secrets-Avoiding Pitfalls- Formulation of the entrepreneurial Plan- The challenges of new venture start-ups.
Case: Tata Motors – Nano (Arya Kumar P.No. 279).

Unit-V: Strategic perspectives in entrepreneurship

Strategic Planning-Strategic actions-strategic positioning-Business stabilization-Building the adaptive firms-understanding the growth stage-unique managerial concern of growing ventures.
Case: To Lease or Not: A Cash flow Question (David H.Holt, Page 452).

References:

1. Arya Kumar "Entrepreneurship- creating and leading an entrepreneurial org" Pearson 2012.
2. 'Entrepreneurship: New Venture Creation' David H Holt PHI, 2013.
3. Entrepreneurship: Text and Cases P. Narayana Reddy, Cengage, 2010.

PRINCIPLES OF EMBEDDED SYSTEMS
(Open Elective – III)

IV -B.Tech.-I-Sem.   **L T P   C**
Subject Code: 17EC4104OE   **3   -   -   3**

Course Outcomes (COs) & CO-PO Mapping (3-Strong; 2-Medium; 1-Weak Correlation)

COs	Upon completion of course the students will be able to	PO1	PO2	PO3	PO12
CO1	outline the basic concepts of embedded computing	3	3	2	2
CO2	illustrate the architecture of 8051 microcontroller	3	3	3	2
CO3	develop embedded programs using 8051 microcontroller	3	3	3	2
CO4	demonstrate 8051 microcontroller interface with peripherals	3	3	3	2
CO5	explain real time operating system concepts	3	3	3	3

Unit-I

Embedded computing: Introduction, complex systems and microprocessor, the embedded system design process, formalisms for system design, design examples.

Unit-II

The 8051 architecture: Introduction, 8051 micro controller hardware, input / output ports and circuits, external memory, counter and timers, serial data input / output, interrupts.

Unit-III

Basic assembly language programming concepts: The assembly language programming process, programming tools and techniques, programming the 8051.
Instructions set: Data transfer and logical instructions, arithmetic operations, decimal arithmetic. Jump and call instructions.

Unit – IV

Applications: Interfacing with keyboards, displays, D/A and A/D conversions, multiple interrupts, serial data communication.

Unit – V

Introduction to real - time operating systems: Tasks and task states, tasks and data, semaphores, and shared data; message queues, mailboxes and pipes, timer functions, events, memory management, interrupt routines in an RTOS environment.

Textbooks:

1. Computers as Components - Principles of Embedded Computer System Design, Wayne Wolf, Elseveir.
2. The 8051 Microcontroller, Third Edition, Kenneth J.Ayala, Thomson.

References:

1. Microcontrollers, Raj kamal, Pearson Education.
2. An Embedded Software Primer, David E. Simon, Pearson Education.

WEB TECHNOLOGIES
(Open Elective – III)

IV – B.Tech. – I - Semester   **L T P C**
Subject Code: 17CS4104OE   **3 0 0 3**

Course Outcomes (COs) & CO-PO Mapping (3-Strong; 2-Medium; 1-Weak Correlation)

COs	Upon completion of course the students will be able to	PO2	PO3	PO5	PO6	PO12
CO1	design web pages using HTML and JavaScript	3	3	3	3	3
CO2	develop web applications using PHP	3	3	3	2	3
CO3	make use of XML and DTD for web design	3	3	3	2	2
CO4	build web applications using servlets and session tracking	3	3	3	2	2
CO5	establish database connectivity using JSP and JDBC	3	3	3	2	2

Unit-I

Web: Introduction, Internet and web, web browsers, web servers, protocols.
HTML: Basics, elements, attributes, tags- list, tables, images, forms, frames, cascading style sheets.
Java Script: Introduction to scripting, control structures, conditional statements, arrays, functions, objects.

Unit-II

PHP: Declaring variables, data types, arrays, strings, operators, expressions, control structures, functions, Reading data from web form controls, handling file uploads, connecting to database, executing simple queries, handling sessions and cookies, file handling.

Unit-III

XML: Basics of XML, Elements, Attributes, Name space, **Parsing:** DOM and SAX Parsers.
Introduction to DTD: internal and external DTD, Elements of DTD, DTD Limitations, XML Schema, Schema structure, XHTML.

Unit-IV

Servlets: Introduction, Lifecycle, Generic and HTTP servlet, passing parameters to servlet, HTTP servlet Request & Response interfaces, Deploying web Applications,
Session Tracking: Hidden form fields, cookies, URL- Rewriting, session.

Unit-V

JSP: Introduction, Difference Between servlets & JSP, Anatomy of JSP page, JSP elements: Directives, comments, Expressions, scriptlets, Declaration, Implicit JSP objects, using Action elements.
JDBC: Introduction, JDBC Drivers, Loading Driver, establishing connection, Executing SQL statement in JSP pages, MVC architecture

Text Books:

1. Web Technologies, Uttam K Roy, Oxford University Press.
2. The Complete Reference PHP- Steven Hozner, TMH.

References:

1. Java Server Pages-Hans Bergsten, SPD O'Reilly.
2. JavaScript, D. Flanagan O'Reilly, SPD.
3. Beginning Web Programming-Jon Dckett WROX.

ARTIFICIAL INTELLIGENCE
(Professional Elective-II)

IV- B.Tech.- II Semester				**L T P C**
Subject Code: 17CS4105PE				**3 0 0 3**

Course Outcomes (COs) & CO-PO Mapping (3-Strong; 2-Medium; 1-Weak Correlation)

COs	Upon completion of course the students will be able to	PO1	PO2	PO3	PO6	PO12	PO13
CO1	explain the concepts of artificial intelligence	3	3	3	3	2	3
CO2	illustrate various search algorithms	3	3	3	3	2	3
CO3	adapt various probabilistic reasoning approaches	3	3	2	3	3	3
CO4	elaborate Markov decision process	3	3	2	3	2	3
CO5	perceive various reinforcement learning approaches	3	3	2	3	3	3

Unit-I: Introduction

Concept of AI, history, current status, scope, agents, environments, Problem Formulations, Review of tree and graph structures, State space representation, Search graph and Search tree.

Unit-II: Search Algorithms

Random search, Search with closed and open list, Depth first and Breadth first search, Heuristic search, Best first search, A* algorithm, Game Search.

Unit-III: Probabilistic Reasoning

Probability, conditional probability, Bayes Rule, Bayesian Networks- representation, construction and inference.

Temporal Model, Hidden Markov Model.

Unit-IV: Markov Decision Process

MDP formulation, utility theory, utility functions, value iteration, policy iteration and partially observable MDPs.

Unit-V: Reinforcement Learning

Passive reinforcement learning, direct utility estimation, adaptive dynamic programming, temporal difference learning, active reinforcement learning- Q learning.

Textbooks:

1. Elaine Rich & Kevin Knight, 'Artificial Intelligence', 3rd Edition, TMH, 2008.
2. Russel and Norvig, 'Artificial Intelligence', Pearson Education, PHI, 2003.

References:

1. Trivedi, M.C., "A Classical Approach to Artifical Intelligence", Khanna Publishing House, Delhi.
2. Saroj Kaushik, "Artificial Intelligence", Cengage Learning India, 2011.
3. David Poole and Alan Mackworth, "Artificial Intelligence: Foundations for Computational Agents", Cambridge University Press 2010.

HUMAN COMPUTER INTERACTION
(PROFESSIONAL ELECTIVE - II)

IV-B.Tech- I-Sem.   **L T P C**
Subject Code: 17CS4106PE   **3 - - 3**

Course Outcomes (COs) & CO-PO Mapping (3-Strong; 2-Medium; 1-Weak Correlation)

COs	Upon completion of course the students will be able to	PO1	PO2	PO3	PO5	PO8	PO12	PO13
CO1	identify user interfaces and its interactions	3	3	3	2	2	3	2
CO2	illustrate screen design techniques	3	3	3	2	2	2	2
CO3	select components and devices for screen controls	3	3	3	3	3	3	2
CO4	make use of designer tools and techniques for interface	3	3	3	2	3	2	2
CO5	build interface design using software tools and devices	3	3	3	2	3	3	2

Unit-I

Introduction: Importance of the user interface, Characteristics of Graphical and Web user interface
Design process: Know your Client-how human interact with computers, important human characteristics, human considerations, human interaction speeds.

Unit-II

Screen Design: Human considerations in screen design – goals, screen meaning and purpose, organizing screen elements, ordering of screen content, screen navigation and flow, focus and emphasis, presentation information simply and meaningfully, information retrieval on web and statistical graphics. Technological consideration in interface design – graphical systems, and web systems

Unit-III

Characteristics, components, presentation styles, types and operations.
Selection of proper device-based controls, Choose the proper screen-based controls.

Unit-IV
System Menus and Navigation Schemes: structure and functions of menus, content and format of menus, phrasing the menus, navigating menus
Components: Text and messages, icons, multimedia, colors

Unit-V

Software tools: Specification methods, interface–building Tools, evaluation and critiquing tools
Interaction Devices: Keyboard and keypads, pointing devices, speech and auditory interfaces, displays, printers.

Textbooks:
1. The essential guide to user interface design, Wilbert O Galitz, 2nd edition, Wiley Computer publishing.
2. Designing the User Interface: Strategies for Effective, Human-Computer Interaction, Ben Shneiderman , Catherine Plaisant, Addison-Wesley, 4th Edition, 2005

References:
1. Human-Computer Interaction, Alan Dix, Janet Finlay, Gregory D. Abowd, Russell Beale 3rd Edition, Pearson Education, 2004
2. Interaction Design: Beyond Human-Computer Interaction, Preece, Rogers, Sharp, Wiley Publishing, 2002
3. User Interface Design: A Software Engineering Perspective, Soren Lauesen, Pearson Education, 2005

SOCIAL NETWORK ANALYSIS
(PROFESSIONAL ELECTIVE - II)

IV-B.Tech.-I-Sem.   **L T P C**
Subject Code: 17CS4107PE   **3 0 0 3**

Course Outcomes (COs) & CO-PO Mapping (3-Strong; 2-Medium; 1-Weak Correlation)

COs	Upon completion of course the students will be able to	PO2	PO3	PO5	PO6	PO8	PO12	PO13
CO1	develop semantic web related applications	3	3	3	3	3	2	3
CO2	illustrate knowledge using ontology	3	3	3	3	2	2	3
CO3	apply RDF schemas on any data	3	3	2	3	3	3	3
CO4	predict human behavior in social web and related communities	3	3	2	3	3	2	3
CO5	adapt social networks applications	3	3	2	3	3	3	3

Unit-I: Introduction

Limitations of current Web, Development of Semantic Web, Emergence of the Social Web.
Social Network analysis: Development of Social Network Analysis, Key concepts and measures in network analysis.
Electronic sources for network analysis: Electronic discussion networks, Blogs and online communities, Web-based networks. Applications of Social Network Analysis.

Unit-II: Modeling, Aggregating and Knowledge Representation

Ontology-based knowledge Representation: Resource Description Framework (RDF) and RDF Schema, Web Ontology Language.
Modeling and aggregating social network data: State-of-the-art in network data representation, Ontological representation of social individuals, Ontological representation of social relationships, Aggregating and reasoning with social network data, advanced representations.

Unit-III: Extraction and Communities in Web Social Networks

Detecting communities in social networks: Introduction, Definition of Community, Evaluating communities, Methods for community detection, Tools for detecting Communities.
Discovering Communities from Social Networks: Methodologies of Network Community Mining, Applications of Community Mining Algorithms.
Decentralized online social networks. Multi-Relational characterization of dynamic social network communities.

Unit-IV: Predicting Human Behavior and Privacy Issues

Understanding and predicting human behavior for social communities: User data management, Inference and Distribution, Enabling new human experiences, Applications.
Privacy in online social networks: Introduction to Managing Trust in Online Networks, Trust in online environment, Trust models based on subjective logic, Trust network analysis, Trust transitivity analysis, Combining trust and reputation, Trust derivation based on trust comparisons.
Security Objectives: Privacy, Integrity, and Availability. Attack spectrum and countermeasures.

Unit-V: Visualization and Applications of Social Networks

Visualization of Social Networks: Graph theory, Centrality, Clustering, Node-Edge Diagrams, Matrix representation, Visualizing online social networks, Visualizing social networks with Matrix and Node-Link Diagrams, Hybrid representations.
Applications of Social Networks: Cover networks, Web applications, Community welfare, Collaboration networks, Co-Citation networks.

Text Books:

1. Peter Mika, "Social networks and the semantic web", Springer 2007.
2. Borko Furht, "Handbook of Social Network Technologies and Applications", 1st Edition, Springer, 2010.

References:

1. Dion Goh and Schubert Foo, "Social information Retrieval Systems: Emerging Technologies and Applications for Searching the Web Effectively", IGI Global Snippet, 2008.
2. Guandong Xu ,Yanchun Zhang and Lin Li, "Web Mining and Social Networking – Techniques and applications", First Edition Springer, 2011.
3. Max Chevalier, Christine Julien and Chantal Soulé-Dupuy, "Collaborative and Social Information Retrieval and Access: Techniques for Improved user Modelling", IGI Global Snippet, 2009.
4. John G. Breslin, Alexandre Passant and Stefan Decker, "The Social Semantic Web", Springer, 2009.

DISTRIBUTED SYSTEMS

IV-B.Tech I-Sem.
Subject Code: 17CS4108PE

L T P C
3 0 0 3

Course Outcomes (COs) & CO-PO Mapping (3-Strong; 2-Medium; 1-Weak Correlation)

COs	Upon completion of course the students will be able to	PO3	PO4	PO12	PO13
CO1	perceive various architectures used to design distributed systems	3	2	2	2
CO2	build distributed systems using various inter process communication techniques	3	3	2	2
CO3	evaluate distributed algorithms for clock synchronization	3	3	2	2
CO4	analyze the role of middleware using RPC,RMI and design a name server	3	2	2	2
CO5	apply fault tolerant techniques to improve concurrency	3	3	3	2

UNIT I
Characterization of Distributed Systems: Introduction, Examples of Distributed systems, Resource sharing and the web, Challenges.
System models: Introduction, Architectural and Fundamental Models.

UNIT II
Time and Global States: Introduction, Clocks, Events and Process states, Synchronizing Physical Clocks, Logical Time and Logical Clocks, Global States
Coordination and Agreement: Introduction, Distributed Mutual Exclusion, Elections, Multicast Communication, Consensus and Related Problems.

UNIT III
Inter process Communication: Introduction, The API for the Internet Protocols, External Data Representation and Marshalling, Client-Server Communication, Group Communication, Case Study: IPC in UNIX.
Distributed objects and Remote Invocation: Introduction, Communication between Distributed Objects, RPC, Events and Notifications, Case study-Java RMI.

UNIT IV
Distributed File Systems: Introduction, File Service Architecture, and Case Study 1: SUN Network File System, Case Study 2: The Andrew File System.
Name Services: Introduction, Name Services and the Domain Name System,Case study of the Global Name Services.
Distributed Shared Memory: Introduction, Design and Implementation Issues, Sequential Consistency and IVY case study, Release consistency and Munin Case study

UNIT V
Transactions and Concurrency Control: Introduction, Transactions, Nested Transactions, Locks, Optimistic concurrency control, Timestamp ordering,
Distributed Transactions: Introduction, Flat and Nested Distributed Transactions, Atomic commit protocols, Concurrency control in distributed transactions, Distributed deadlocks, Transaction recovery.

Textbooks:

1. Distributed Systems Concepts and Design, G Coulouris, J Dollimore and Tim Kindberg, PearsonEducation.,4th Edition,2009.

References:

1. Distributed Systems: Principles and Paradigms, Andrew S. Tanenbaum and Maarten Van. Steen,2nd Edition,PHI.
2. Distributed Systems, An Algorithm Approach, Sukumar Ghosh, Chapman and Hall/ CRC, Taylor & Francis Group, 2007.

NETWORK SECURITY & CRYPTOGRAPHY LAB

IV-B.Tech I-Sem **L T P C**
Subject Code: 17CS4109PC **4 1 0 4**

Course Outcomes (COs) & CO-PO Mapping (3-Strong; 2-Medium; 1-Weak Correlation)

COs	Upon completion of course the students will be able to	PO4	PO5	PO14
CO1	perceive basic cryptographic algorithms, message and web authentication and security issues	3	3	3
CO2	identify security system requirements for both of them such as client and server	3	3	3
CO3	design various cryptographic algorithms	3	3	3
CO4	illustrate a network and flow of information	3	3	3
CO5	make use of security key management in network security	3	3	3

LIST OF EXPERIMENTS

1. Write a C program that contains a string (char pointer) with a value 'Hello world'. The program should XOR each character in this string with 0 and displays the result.
2. Write a C program that contains a string (char pointer) with a value 'Hello world'. The program should AND or XOR each character in this string with 127 and display the result.
3. Write a Java program to perform encryption and decryption using the following algorithms
     a. Ceaser cipher   b. Substitution cipher   c. Hill Cipher
4. Write a C/JAVA program to implement the DES algorithm logic.
5. Write a C/JAVA program to implement the Blowfish algorithm logic.
6. Write a C/JAVA program to implement the Rijndael algorithm logic.
7. Write the RC4 logic in Java Using Java cryptography; encrypt the text "Hello world" using Blowfish. Create your own key using Java key tool.
8. Write a Java program to implement RSA algorithm.
9. Implement the Diffie-Hellman Key Exchange mechanism using HTML and JavaScript.
10. Calculate the message digest of a text using the SHA-1 algorithm in JAVA.
11. Calculate the message digest of a text using the MD5 algorithm in JAVA.

Textbooks:

1. Cryptography and Network Security – Principles and Practice by William Stallings, Pearson Education, 6th Edition
2. Cryptography and Network Security by Atul Kahate, Mc Graw Hill, 3rd Edition

References:

1. Cryptography and Network Security: C K Shyamala, N Harini, Dr T R Padmanabhan, Wiley India, 1st Edition.
2. Cryptography and Network Security : Forouzan Mukhopadhyay, Mc Graw Hill, 3rd Edition
3. Information Security, Principles, and Practice: Mark Stamp, Wiley India.
4. Principles of Computer Security: WM. Arthur Conklin, Greg White, TMH

BIG DATA ENGINEERING LAB

IV B.Tech I Sem   **L T P C**
Subject Code: 17CS4110PC   **0 0 3 2**

Course Outcomes (COs) & CO-PO Mapping (3-Strong; 2-Medium; 1-Weak Correlation)

COs	Upon completion of course the students will be able to	PO4	PO5	PO14
CO1	identify big data and its business Implications	3	3	3
CO2	illustrate access and process data on distributed file system	3	3	3
CO3	demonstrate Job Execution in Hadoop Environment	3	3	3
CO4	develop big data Solutions using Hadoop Eco System	3	3	3
CO5	apply machine learning techniques using R	3	3	3

LIST OF EXPERIMENTS

I. Hadoop:

1. Install, configure and run Hadoop and HDFS– pig, Hive and Hbase
2. Implement word count / frequency programs using MapReduce
3. To find the Length of the word program using MapReduce
4. Implement an MR program that processes a weather dataset
5. WIKI datamining program to find the page counts using PIG(take 3 fields like language(en,us), Search engine name(yahoo,google), pageclicks)
6. To find the Length of the Voter data with city using Hive
7. Take 6 subjects marks of the students in the xl sheet
    a. find the max and min marks in the each subject
    b. find the count of pass and fail students in each the subject using Hbase
8. Customer ATM transactions with different bank Debit cards data load into either in the notepad/ excel sheet with following fields like (Card no, customer name, date, time ,bank name, withdraw amount, status). Write a program to evaluate the following requirements using Big data frameworks like Pig/Hive/Hbase/MapReduce
    a. Bank wise success transactions list (bank name, times using card, amount with drawn)
    b. One bank , account wise how many times used card   in current month
    c. Bank wise failed transactions list with detail
    d. Maximum and minimum transaction for each bank for last month
    e. Average transaction for each bank for last month
    f. In last month, who used this card more than 2 times.
    g. All the banks all the card members details required except ICICI Bank.

9.   Implement one of the following case study using big data analytics

    a.   Healthcare Data   c. Web Click stream Data
    b. Social Media Data   d. Educational Data

II. R Programming:

1. Implement Linear and logistic Regression
2. Implement Decision tree classification techniques
3. Implement clustering techniques using SVM .
4. Implement Association rule mining.
5. Implement Naïve Bayesian Classification
6. Visualize data using any plotting framework

Text Books:

1. Tom White " Hadoop: The Definitive Guide" Third Edit on, O'reily Media, 2012.
2. Mark Gardener, "Beginning R - The Statistical Programming Language", John Wiley & Sons, Inc., 2012.

References:

1. Seema Acharya, Subhasini Chellappan, "Big Data Analytics" Wiley 2015.
2. Richard Cotton, "Learning R – A Step-by-step Function Guide to Data Analysis, , O'Reilly Media, 2013.

FOREIGN LANGUAGE: FRENCH
MANDATORY COURSE (NON-CREDIT)

IV-B.Tech.-I-Sem.　　　　　　　　　　　　　　　　　　　　　**L　T　P　C**
Subject Code: 17HS4112MC　　　　　　　　　　　　　　　　**3　0　0　0**

Course Outcomes (COs) & CO-PO Mapping (3-Strong; 2-Medium; 1-Weak Correlation)

COs	Upon completion of course the students will be able to	PO9	PO10
CO1	identify the basic structure of French language, spelling and pronunciation	3	3
CO2	reproduce the grammatical structure for basic communication	3	3
CO3	recognize and use the grammatical structures for general comprehension	3	3
CO4	use the grammatical and lexical notions in formal and informal situations	3	3
CO5	apply the language skills in communicating effectively at a global platform	3	3

Unit-I: Introduction

At the airport: Savoir– faire: exchanging greetings, self introduction, introducing another, welcoming someone, identifying someone - Grammar: verbs ‗to be‗, ‗to call oneself‗, subject pronouns, interrogation.

Unit-II: Grammar

At the University: Savoir-faire: enquiring after one‗s welfare, taking leave, expressing appreciation - Grammar: definite & indefinite articles, gender of nouns, adjectives, present tense of regular verbs, to have, to learn, negation, irregular verbs

Unit-III: Conversation

At the café: Savoir –faire: speaking about one‗s likes, giving information, expressing admiration, asking information about someone - Grammar: Interrogative adjectives, irregular verbs, possessive and interrogative adjectives

Unit-IV: Proposal Writing & Formal Letters

At the beach: Savoir faire: proposing an outing, accepting/ refusing the proposal - Grammar: singular & plural, indefinite pronoun, demonstrative adjectives, negation, irregular verbs
A concert: Savoir –faire: inviting, accepting, expressing one‗s inability to accept an invitation

Unit- V: Regular & Irregular Verbs

Grammar: Present tense of more irregular verbs, contracted articles, future tense, interrogative adverbs, At Nalli's Savoir- faire: asking the price of an article, protesting against the price, Grammar: possessive adjectives, Exclamative adjectives, imperative tense

Reference:

1. Course Material: Synchronie I –Méthode de Français, Madanagobalane -Samita Publications, Chennai, 2007

FOREIGN LANGUAGE: GERMAN
MANDATORY COURSE (NON-CREDIT)

IV-B.Tech.-I-Sem.   **L T P C**
Subject Code: 17HS4113MC   **3 0 0 0**

Course Outcomes (COs) & CO-PO Mapping (3-Strong; 2-Medium; 1-Weak Correlation)

COs	Upon completion of course the students will be able to	PO9	PO10
CO1	identify the basic structure of German language, spelling and pronunciation	3	3
CO2	reproduce the grammatical structure for self introduction	3	3
CO3	recognize and use the grammatical article structures for basic conversation	3	3
CO4	use the grammatical and verb structure for formal and informal situations	3	3
CO5	apply the language skills in communicating effectively at a global platform	3	3

Course structure:

A. German Language (speaking, reading, writing, grammar and test)
B. Life in Germany (shopping, restaurant, doctor, government, bank, post)
C. The German Way (introduction, doing business, conversation, meetings, dining)
D. Germany (Culture, Climate)

Unit-I: Pronounciation

Welcome: Introduction to the Language, Spelling and Pronunciation (The alphabets and numbers) Greetings, ordering, requesting, saying thank you - Grammar **– the article "the", conjugation** of verbs

Unit-II: Self Introduction

Shopping - Grammar – adjectives, endings before nouns, practice. Self introduction

Unit-III: Training

Addresses, Occupations, Studies – Grammar - **„to be', the definite/indefinite** articles, individual Training

Unit-IV: Oral

Leisure Time, Sports, Hobbies - Grammar – position of a verb in a main clause , oral practice

Unit-V: Narration

At a Restaurant, Food and Drink - Grammar – the personal pronoun in the Nominative and Accusative, Narrating an event

Resources:

1. Sprachkurs Deutsch 1 (Verlag Diesterweg), New Delhi Learning Centre

IV-B.TECH.-II-SEMESTER SYLLABUS

INTERNET OF THINGS (IOT)

IV B.Tech II Sem **L T P C**
Subject Code: 17CS4201PC **4 1 - 4**

Course Outcomes (COs) & CO-PO Mapping (3-Strong; 2-Medium; 1-Weak Correlation)

COs	Upon completion of course the students will be able to	PO2	PO3	PO6	PO7	PO12	PO13
CO1	explain the concepts of IoT	3	2	3	3	2	2
CO2	illustrate IoT architecture	3	2	3	3	2	3
CO3	design IoT methodology using python	3	3	3	3	2	3
CO4	solve IoT application frame work	3	3	3	3	2	3
CO5	develop IoT for real time applications	3	2	3	3	3	3

Unit-I: Fundamentals of IoT

Introduction – Characteristics - Physical design - Logical design - Enabling technologies - IoT Levels & Deployment Templates - Domain Specific IoTs - IoT vs M2M..

Unit-II: IoT Architecture

M2M high-level ETSI architecture-IETF architecture for IoT-OGC architecture-IoT reference model-Domain model-Information model-functional model-Communication model

Unit-III: Building IoT With Raspberry Pi/ Galileo/Arduino

Physical device – Raspberry Pi Interfaces – Programming – APIs / Packages –Web service Intel Galileo Gen2 with Arduino – Interfaces - Arduino IDE – Programming-APIs and Hacks

Unit- IV: IoT & Cloud Server

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

Unit-V: Case Studies And Advanced Topics

IoT systems management - IoT Design Methodology - Specifications Integration and Application Development. Various Real time applications of IoT-Connecting IoT to cloud–Cloud Storage for IoT – Data Analytics for IoT – Software & Management Tools for IoT

Text Book :

1. Jan Holler, Vlasios Tsiatsis, Catherine Mulligan, Stefan Avesand, Stamatis Karnouskos, David Boyle, "From Machine-to-Machine to the Internet of Things: Introduction to a New Age of Intelligence", 1st Edition, Academic Press, 2014.

References:

1. Arshdeep Bahga, Vijay Madisetti, "Internet of Things -A hands -on approach", niversities Press, 2015, ISBN: 9788173719547
2. Manoel Carlos Ramon, "Intel® Galileo and Intel® Galileo Gen 2: API Features and Arduino Projects for Linux Programmers", Apress, 2014.
3. Marco Schwartz, "Internet of Things with the Arduino Yun", Packt Publishing, 2014
4. Olivier Hersent, David Boswarthick, Omar Elloumi , "The Internet of Things–Key applications and Protocols", Wiley, 2012
5. Getting Started with Raspberry Pi, Matt Richardson & Shawn Wallace, O'Reilly (SPD), 2014, ISBN: 9789350239759

ETHICAL HACKING
(Professional Elective-III)

IV-B.Tech II-Sem.   **L T P C**
Subject Code: 17CS4202PE   **3 0 0 3**

Course Outcomes (COs) & CO-PO Mapping (3-Strong; 2-Medium; 1-Weak Correlation)

COs	Upon completion of course the students will be able to	PO2	PO3	PO5	PO8	PO12	PO13
CO1	outline the framework and security issues related to ethical hacking	3	2	2	3	2	3
CO2	plan and execute controlled attacks to safeguard the business	3	3	3	3	2	3
CO3	identify security lapses and prepare for an ethical hack	3	3	3	3	3	3
CO4	make use of enumeration and exploitation techniques	3	3	3	3	2	3
CO5	adapt best practices for deliverables and integration for security	3	3	3	3	3	3

Unit-I

Introduction: Hacking Impacts, the Hacker; **Framework:** Planning the test, Sound Operations, Reconnaissance, Enumeration, Vulnerability, Analysis, Exploitation, Final Analysis, Deliverable, Integration; **Information Security Models:** Computer Security, Network Security, Service Security, Application security, Security Architecture; **Information Security Program:** The Process of Information Security, Component Parts of Information Security Program, Risk Analysis and Ethical Hacking.

Unit-II

The Business Perspective: Business Objectives, Security Policy, Previous Test Results, Business Challenges.
Planning for a Controlled Attack: Inherent Limitations, Imposed Limitations, Timing is Everything, Attack Type, Source Point, Required Knowledge, Multi-Phased Attacks, Teaming and Attack Structure, Engagement Planner, The Right Security Consultant, The Tester, Logistics, Intermediates, Law Enforcement.

Unit-III

Preparing for a Hack: Technical Preparation, Managing the Engagement.
Reconnaissance: Social Engineering, Physical Security, Internet Reconnaissance.

Unit-IV

Enumeration: Enumeration Techniques, Soft Objective, Looking Around or Attack, Elements of Enumeration, Preparing for the Next Phase.
Exploitation: Intuitive Testing, Evasion, Threads and Groups, Operating Systems, Password. Crackers, Root Kits, applications, Wardialing, Network, Services and Areas of Concern.

Unit-V

Deliverable: The Deliverable, the Document, Overall Structure, Aligning Findings, Presentation.
Integration: Integrating the Results, Integration Summary, Mitigation, Defence Planning, Incident, Management, Security Policy, Conclusion.

Textbook:

1. James S. Tiller, "The Ethical Hack: A Framework for Business Value Penetration Testing", Auerbach Publications, CRC Press.

References:

1. EC-Council, "Ethical Hacking and Countermeasures Attack Phases", Cengage Learning.
2. Michael Simpson, Kent Backman, James Corley, "Hands-On Ethical Hacking and Network Defense", Cengage Learning.

SOFTWARE TESTING METHODOLOGIES
(Professional Elective-III)

IV-B.Tech.-II-Sem.   **L T P C**
Subject Code: 17CS4203PE   **3 0 0 3**

Course Outcomes (COs) & CO-PO Mapping (3-Strong; 2-Medium; 1-Weak Correlation)

COs	Upon completion of course the students will be able to	PO3	PO4	PO5	PO12	PO13
CO1	explain the concepts of STM, flow graphs and path testing	3	2	2	3	3
CO2	illustrate domain testing mechanism	3	3	3	3	3
CO3	distinguish transaction and data flow testing methods	3	3	3	3	3
CO4	make use of paths, products, expressions and logical testing strategies	3	3	3	3	3
CO5	apply transition testing and graph matrices to solve real time problems	3	3	3	3	3

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

Domain Testing: Domains and paths, Nice & ugly domains, domain testing, domains and interfaces testing, domain and interface testing, domains and testability.

Unit-III

Transaction Flow Testing: Transaction flows, Transaction flow testing techniques.

Dataflow Testing: Basics of dataflow testing, strategies in dataflow testing, application of dataflow testing.

Unit-IV

Paths, Path products and Regular expressions: Path products & path expression, reduction procedure, applications, regular expressions & flow anomaly detection**.**
Logic Based Testing: Overview, decision tables, path expressions, KV charts, specifications.

Unit-V

State, State Graphs and Transition testing: State graphs, good & bad state graphs, state testing, Testability tips.

Graph Matrices and Application: Motivational overview, matrix of graph, relations, power of a matrix, node reduction algorithm, building tools. (Student should be given an exposure to a tool like JMeter or Win-runner).

Textbooks:

1. Software Testing Techniques, Baris Beizer, Dreamtech, 2nd edition.
2. Software Testing Tools, Dr.K.V.K.K.Prasad, Dreamtech.

References:

1. The craft of software testing - Brian Marick, Pearson Education.
2. Effective methods of Software Testing, Perry, John Wiley.
3. Software Concepts and Tools P Nageshwarrao, Dream Tech Press.
4. Software Testing S Desikan, J Ramesh, Pearson.

WEB MINING
(Professional Elective-III)

IV-B.Tech.-II-Sem.
Subject Code: 17CS4204PE

L T P C
3 0 0 3

Course Outcomes (COs) & CO-PO Mapping (3-Strong; 2-Medium; 1-Weak Correlation)

COs	Upon completion of course the students will be able to	PO2	PO3	PO5	PO12	PO13
CO1	Outline the concepts of mining	3	2	2	2	2
CO2	apply machine learning concepts to web content mining	3	3	3	3	2
CO3	identify linking and crawling techniques for web mining	3	3	3	3	2
CO4	make use of structured data extraction techniques	3	3	3	2	2
CO5	analyze the algorithms for web usage mining	3	3	3	3	2

Unit-I: Introduction
World Wide Web, History of the Web and the Internet, What is Data Mining? What is Web Mining? Web Mining theoretical background, Algorithms and Techniques, Web Search, Meta-Search, Web Spamming.

Unit-II: Web Content Mining
Web Content Mining, Supervised Learning: Decision tree, Naïve Bayesian Text Classification, Support Vector Machines, Unsupervised Learning: K-means Clustering, Hierarchical Clustering, Partially Supervised Learning: Markov Models Probability-Based Clustering, Vector Space Model, Latent semantic Indexing, Automatic Topic Extraction

Unit-III: Web Link Mining
Web Link Mining – Hyperlink based Ranking – Introduction -Social Networks Analysis, Co-Citation and Bibliographic Coupling, Page Rank, Authorities and Hubs, Link-Based Similarity Search, Enhanced Techniques for Page Ranking, Community Discovery, Web Crawling: A Basic Crawler Algorithm, Implementation Issues, Universal Crawlers, Focused Crawlers, Topical Crawlers Evaluation, Crawler Ethics and Conflicts, New Developments.

Unit-IV: Structured Data Extraction
Structured Data Extraction: Wrapper Generation, Preliminaries- Wrapper Induction, Instance-Based Wrapper Learning ,Automatic Wrapper Generation: Problems ,String Matching and Tree Matching, Multiple Alignment Building DOM Trees, Extraction Based on a Single List Page and Multiple pages.

Unit-V: Web Usage Mining
Web Usage Mining, Click stream Analysis, Web Server Log Files, Data Collection and Preprocessing, Cleaning and Filtering, Data Modeling for Web Usage Mining, The BIRCH Clustering Algorithm, Affinity Analysis and the A Priori Algorithm, Binning, Discovery and Analysis of Web Usage Patterns.

Textbooks:
1. Wilbert Liu, Bing , ” Web Data Mining”, 2nd Edition., Elseiver, 2011.
2. Soumen Chakrabarti, “Mining the Web”, Morgan-Kaufmann Publishers, Elseiver, 2002.

References:
1. Bing Liu, “ Web Data Mining: Exploring Hyperlinks, Contents, and Usage Data (Data-Centric Systems and Applications)”, Springer; 2nd Edition 2009
3. Guandong Xu ,Yanchun Zhang, Lin Li, “Web Mining and Social Networking: Techniques and Applications”, Springer; 1st Edition.2010

NEURAL NETWORKS
(Professional Elective-III)

IV- B. Tech. II-Sem   **L T P C**
Subject Code: 17CS4205PE   **3 0 0 3**

Course Outcomes (COs) & CO-PO Mapping (3-Strong; 2-Medium; 1-Weak Correlation)

COs	Upon completion of course the students will be able to	PO2	PO3	PO5	PO6	PO12	PO13
CO1	illustrate the functionalities of neural networks and learning process	3	3	2	3	3	3
CO2	analyze the single-layer and multi-layer perceptrons	3	3	3	3	3	3
CO3	outline the back propagation algorithms	3	3	3	3	3	3
CO4	choose appropriate Self-Organization Maps	3	3	3	3	3	3
CO5	make use of Neuro Dynamics	3	2	2	3	3	3

Unit –I
Introduction: A Neural Network, Human Brain, Models of a Neuron, Neural Networks viewed as Directed Graphs, Network Architectures, Knowledge Representation, Artificial Intelligence and Neural Networks
Learning Process: Error Correction Learning, Memory Based Learning, Hebbian Learning, Competitive Learning, Boltzmann Learning, Credit Assignment Problem, Memory, Adaption, Statistical Nature of the Learning Process

Unit-II
Single Layer Perceptrons: Adaptive Filtering Problem, Unconstrained Organization Techniques, Linear Least Square Filters, Least Mean Square Algorithm, Learning Curves, Learning Rate Annealing Techniques, Perceptron —Convergence Theorem
Multilayer Perceptron: Back Propagation Algorithm, XOR Problem, Heuristics, Output Representation and Decision Rule, Computer Experiment, Feature Detection

Unit-III
Back Propagation: Back Propagation and Differentiation, Hessian Matrix, Generalization, Cross Validation, Network Pruning Techniques, Virtues and Limitations of Back Propagation Learning, Accelerated Convergence, Supervised Learning

Unit-IV
Self-Organization Maps (SOM): Two Basic Feature Mapping Models, Self Organization Map, SCM Algorithm, Properties of Feature Map, Computer Simulations, Learning Vector Quantization, Adaptive Patter Classification

Unit-V
Neuro Dynamics: Dynamical Systems, Stability of Equilibrium States, Attractors, Neuro Dynamical Models, Manipulation of Attractors as a Recurrent Network Paradigm Hopfield Models - Hopfield Models, Computer Experiment

Text Book:
1. Neural Networks a Comprehensive Foundations, Simon Haykin, PHI edition.

References:
1. Artificial Neural Networks – B. Yegnanarayana, Prentice Hall of India P Ltd 2005
2. Neural Networks in Computer Intelligence, LiMin Fu, TMH 2003
3. Neural Networks -James A Freeman David M S Kapura Pearson Education 2004.
4. Fundamentals of Neural Networks - Laurence Fausett, Pearson Education 2004.

INFORMATION RETRIEVAL SYSTEMS
(Professional Elective-IV)

IV-B.Tech II-Sem   **L T P C**
Subject Code: 17CS4206PE   **3 0 0 3**

Course Outcomes (COs) & CO-PO Mapping (3-Strong; 2-Medium; 1-Weak Correlation)

COs	Upon completion of course the students will be able to	PO2	PO3	PO4	PO12	PO13
CO1	outline information retrieval strategies	3	2	2	3	3
CO2	make use of various retrieval utilities for improving search	3	3	3	3	3
CO3	illustrate CLIR and its efficiency	3	3	3	3	3
CO4	formulate queries for semi-structured data	3	3	3	3	3
CO5	demonstrate distributed Information retrieval data	3	3	3	3	3

Unit-I

Introduction, Retrieval strategies: Vector space model, probabilistic retrieval strategies, simple weight terms, non binary independence model, language model.

Unit-II

Retrieval Utilities: relevance feedback, clustering, N-grams, regression analysis, thesauri, semantic networks, parsing.

Unit-III

Cross-Language Information Retrieval (CLIR): Introduction, crossing the language barrier.

Efficiency: Inverted index, query processing, signature files, duplicate document detection.

Unit-IV

Integrating structured data and text: A historical progression, Information retrieval as a relational application, semi-structured search using relational schema.

Unit-V

Distributed Information retrieval: A theoretical model of information retrieval, web search.

Textbooks:

1. David A. Grossman, Ophir Frieder, Information Retrieval – Algorithms and Heuristics, Springer.
2. Gerald J Kowalski, Mark T Maybury, Information Storage and Retrieval systems,Springer,2000.

References:

1. Soumen Chakrabarti, mining the Web: Discovering knowledge from hyper text data, Morgan Kaufmann publishers, and 2002.
2. Christopher D. manning, Prabhakar Raghavan, Hinrich schutze, An introduction to information Retrieval, Cambridge University Press, Cambridge England, 2009.

COMPUTER FORENSICS
(Professional Elective-IV)

IV-B.Tech.I-Sem   **L T P C**
Subject Code: 17CS4207PE   **3 0 0 3**

Course Outcomes (COs) & CO-PO Mapping (3-Strong; 2-Medium; 1-Weak Correlation)

COs	Upon completion of course the students will be able to	PO2	PO3	PO5	PO8	PO12	PO13
CO1	explain the fundamentals of computer forensics	3	2	2	3	3	3
CO2	illustrate the methods for evidence collection and data seizure	3	3	3	3	3	3
CO3	analyze and validate digital forensic evidences	3	3	3	3	3	3
CO4	solve the computer fraud cases using forensics tools	3	3	3	3	3	3
CO5	make use of various operating systems for computer forensics	3	3	3	3	3	3

Unit-I: **Computer Forensics Fundamentals**

Introduction, reporting cybercrime, law enforcement, Human resources, Services, benefits, applications , types of Law Enforcement, Indian Information Technology Act, Computer Forensics Evidence and Capture: Data Back-up and Recovery.

Unit-II: **Evidence Collection and Data Seizure**

Importance of Evidence, Collection Options, Obstacles, Types of Evidence , The Rules of Evidence, Volatile Evidence, General Procedure, Collection and Archiving, Artifacts, Controlling Contamination: The Chain of Custody, Duplication and Preservation of Digital Evidence: Computer Evidence Processing Steps, Legal Aspects of Collecting and Preserving Evidence, Image Verification and Authentication.

Unit-III: **Computer Forensics analysis and validation**

Determining what data to collect and analyse, validating forensic data, addressing data-hiding techniques, performing remote acquisitions

Processing Crime and Incident Scenes: Identifying digital evidence, collecting evidence in private-sector incident scenes, processing law enforcement crime scenes, preparing for a search, securing a computer incident or crime scene, seizing digital evidence at the scene, storing digital evidence, obtaining a digital hash, reviewing a case.

Unit-IV: **Current Computer Forensic tools**

Evaluating computer forensic tool needs, computer forensics software and hardware tools, validation, E-Mail Investigations.
Cell phone and mobile device forensics: Understanding mobile device forensics, understanding acquisition procedures for cell phones and mobile devices.

Unit-V: **Working with Windows and DOS Systems**

File systems, Microsoft File Structures, NTFS disks, disk encryption, windows registry, virtual machines.

Textbooks:

1. Computer Forensics, Computer Crime Investigation by John R.Vacca, Firewall Media, New Delhi.
2. Computer Forensics and Investigations by Nelson, Phillips Enfinger, Steuart, Cengage Learning.

References:

1. Computer Evidence Collection & Presentation by Christopher L.T. Brown, Firewall Media.
2. Software Forensics Collecting Evidence from the Scene of a Digital Crime by Robert M. Slade, TMH 2005.

NATURAL LANGUAGE PROCESSING
(Professional Elective-IV)

IV-B.Tech.II-Sem   **L T P C**
Subject Code: 17CS4208PE   **3 - - 3**

Course Outcomes (COs) & CO-PO Mapping (3-Strong; 2-Medium; 1-Weak Correlation)

COs	Upon completion of course the students will be able to	PO2	PO3	PO5	PO6	PO12	PO13
CO1	explain fundamentals of NLP and morphology	3	2	3	3	3	3
CO2	demonstrate word level statements and syntactic analysis	3	2	3	3	3	3
CO3	make use of context free grammar and parsing techniques	3	3	3	3	3	3
CO4	apply semantic analysis techniques to solve various problems	3	3	3	3	3	3
CO5	illustrate language generation and discourse analysis	3	2	3	3	3	3

Unit-I: Overview and Morphology

Introduction: Models and Algorithms - Regular Expressions - Basic Regular Expression Patterns - Finite State Automata.
Morphology: Inflectional Morphology - Derivational Morphology - Finite-State Morphological Parsing -Porter Stemmer.

Unit-II: Word Level and Syntactic Analysis

N-grams Models of Syntax - Counting Words - Unsmoothed N- grams, Smoothing- Backoff Deleted Interpolation – Entropy - English Word Classes - Tagsets for English, Part of Speech Tagging-Rule Based Part of Speech Tagging - Stochastic Part of Speech Tagging - Transformation-Based Tagging.

Unit-III: Context Free Grammars and Parsing

Context Free Grammars for English Syntax- Context- Free Rules and Trees – Sentence- Level Constructions– Agreement – Sub Categorization

Parsing – Top-down – Earley Parsing - feature Structures – Probabilistic Context-Free Grammars.

Unit-IV: Semantic Analysis

Representing Meaning - Meaning Structure of Language - First Order Predicate Calculus; Representing Linguistically Relevant Concepts -Syntax- Driven Semantic Analysis - Semantic Attachments -Syntax- Driven Analyzer; Robust Analysis - Lexemes and Their Senses - Internal Structure - Word Sense Disambiguation -Information Retrieval

Unit-V: Language Generation and Discourse Analysis

Discourse -Reference Resolution - Text Coherence - Discourse Structure – Coherence; Dialog and Conversational Agents - Dialog Acts – Interpretation -Conversational Agents – Language Generation – Architecture - Surface Realizations - Discourse Planning; Machine Translation -Transfer Metaphor– Interlingua – Statistical Approaches.

Textbooks:

1. Speech and Language Processing, Daniel Jurafsky and James H. Martin, , Prentice Hall; 2nd Edition, 2008.
2. Foundations of Statistical Natural Language Processing, Christopher D. Manning and Hinrich Schuetze, MIT Press, 1999.

Reference:

1. James Allen, Natural Language Understanding, Addison Wesley; 2nd Edition, 1994.

SOFTWARE PROJECT MANAGEMENT
(Professional Elective-IV)

IV-B.Tech. II-Sem   **L T P C**
Subject Code: 17CS4209PE   **3 0 0 3**

Course Outcomes (COs) & CO-PO Mapping (3-Strong; 2-Medium; 1-Weak Correlation)

COs	Upon completion of course the students will be able to	PO3	PO4	PO5	PO11	PO12	PO13
CO1	outline the concepts of software management and economics	3	2	2	2	3	3
CO2	illustrate artifacts and life cycle phases	3	3	3	2	3	3
CO3	design various workflows and process planning	3	3	3	3	3	3
CO4	adapt automated project planning and control	3	3	3	3	3	3
CO5	apply contemporary software project management practices	3	3	3	3	3	3

Unit-I

Conventional Software Management: Waterfall model, Conventional software, Management performance.
Evolution of Software Economics: Software economics, Pragmatic software cost estimation, the old way and new way.

Unit-II

Life Cycle Phases: Engineering and Production stages, inception phase, elaboration phase, construction phase, transition phase.
Artifacts of the process: Management artifacts, engineering artifacts and pragmatic artifacts, model based architecture.

Unit-III

Workflows and Checkpoints of process: Software process workflows, Iteration workflows, Major milestones, Minor milestones, Periodic status assessment.

Process Planning: Work breakdown structures, Planning guidelines, cost and schedule estimating process, Pragmatic planning.

Unit-IV

Project Organizations: Line-of-business organizations, project organizations, evolution of organizations, Round trip engineering, change management.
Project Control and process instrumentation: The seven core metrics, management indicators, quality indicators, life-cycle expectations, pragmatic software metrics and metrics automation.

Unit-V

Future Software Project Management Practices: Tailoring the process: Process Discriminants, Modern Project Profiles, Next-Generation software Economics, Modern Process Transitions.

Textbooks:

1.   Software Project Management, Walker Royce, Pearson Education.

References:

1.   Software Project Management, Bob Hughes and Mike Cotterell: Tata McGraw Hill Edition.
2.   Software Project Management, Joel Henry, Pearson Education.
3.   Software Project Management in practice, Pankaj Jalote, Pearson Education.2005.