SRI INDU COLLEGE OF ENGINEERING & TECHNOLOGY

(An Autonomous Institution under UGC, New Delhi)

(Permanently Affiliated to JNTUH, Approved by AICTE, New Delhi and Accredited by NBA)
Sheriguda Village, Ibrahimpatnam Mandal, Ranga Reddy Dist. – 501 510

BACHELOR OF TECHNOLOGY
COMPUTER SCIENCE & ENGINEERING

CHOICE BASED CREDIT SYSTEM (CBCS)
ACADEMIC REGULATIONS, COURSE STRUCTURE AND SYLLABI FOR I, II, III AND IV YEARS
UNDER AUTONOMOUS STATUS FOR THE BATCHES ADMITTED FROM THE ACADEMIC YEAR 2016 - 17

B.Tech. Regular Four Year Degree Programme
(For the batches admitted from the academic year 2016–17)
&
B.Tech. (Lateral Entry Scheme)
(For the batches admitted from the academic year 2017 - 18)

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

SRI INDU COLLEGE OF ENGINEERING & TECHNOLOGY

(An Autonomous Institution under UGC, New Delhi)

ACADEMIC REGULATIONS 2016 (R16) FOR CHOICE BASED CREDIT SYSTEM (CBCS) B.TECH. DEGREE COURSES

(Applicable for Students admitted from the academic year 2016-2017)

PRELIMINARY DEFINITIONS AND NOMENCLATURES

- "Autonomous Institute / College" means an institute / college designated as autonomous institute / college by the UGC, New Delhi and JNTUH Statutes, 2014.
- "Academic Autonomy" means freedom to a College in all aspects of conducting its academic programs granted by the University for promoting excellence.
- "Commission" means University Grants Commission (UGC), New Delhi.
- "AICTE" means All India Council for Technical Education.
- "University" means the Jawaharlal Nehru Technological University, Hyderabad.
- "College" means SRI INDU COLLEGE OF ENGINEERING & TECHNOLOGY, Hyderabad unless indicated otherwise by the context.
- "Program" means: Bachelor of Technology (B.Tech) degree program
- "Branch" means specialization in a program like B.Tech degree program in Electronics and Communication Engineering, B.Tech degree program in Computer Science and Engineering etc
- "Course" or "Subject" means a theory or practical subject, identified by its course – number and course-title, which is normally studied in a semester. For example, R14MTH1101: Mathematics - I, R14CSE1102 :Data Structures etc.
- T – Tutorial, P – Practical, D – Drawing, L - Theory, C – Credits

SRI INDU COLLEGE OF ENGINEERING & TECHNOLOGY

(An Autonomous Institution under UGC, New Delhi)

ACADEMIC REGULATIONS 2016 (R16) FOR CHOICE BASED CREDIT SYSTEM (CBCS) B.TECH. DEGREE COURSES

(Applicable for Students admitted from the academic year 2016-2017)

1 Courses of study

The following courses of study (Branches) are offered at present by the college for specialization for the B. Tech. Course:

Sl. No.	Branch Code	Branch
1	1	CIVIL ENGINEERING
2	2	ELECTRICAL & ELECTRONICS ENGINEERING
3	3	MECHANICAL ENGINEERING
4	4	ELECTRONICS & COMMUNICATION ENGINEERING
5	5	COMPUTER SCIENCE & ENGINEERING
6	12	INFORMATION TECHNOLOGY

1.1 Eligibility Criteria for Admission

The eligibility criteria for admission into First year of four year B.Tech. degree programmes shall be as mentioned below:

- The candidate shall be an Indian National.
- The candidate should have completed 16 years of age as on 31st December of the academic year for which the admissions are being conducted
- Passed either Intermediate Public Examination (I.P.E) conducted by the Board of Intermediate Education, Andhra Pradesh, with Mathematics, Physics and Chemistry as optional subjects or any equivalent examination recognized by Board of Intermediate Education, Andhra Pradesh
- Seats in each programme in the Institution are classified into **Category A** and **Category B** as per the Government Orders (G.Os.)

1.1.1 Category – A Seats:

These seats will be filled through counseling as per the rank at the Common Entrance Test (EAMCET) conducted by the State Government and State Government G.Os. as per other admission criteria laid down in the G.Os.

1.1.2 Category - B Seats

These seats will be filled by the institute as per the G.Os. Issued by State Government from time to time.

1.1.3 Category: Lateral Entry

The Candidates shall be admitted into the Third semester, based on the rank secured by the candidate at Engineering Common Entrance Test (ECET (FDH)) by the Convener, ECET

2. Credits

	Semester	
	Periods / week	**Credits**
Theory	03 / 04	03 / 04
Practical	03	02
Drawing	03 / 04	02 / 03
Mini Project	02	02
Comprehensive Viva Voce	--	02
Seminar	06	02
Main Project	15	09

Table : Compulsory subjects

Sl. No.	Subject Particulars
1	All practical subjects
2	Industry oriented mini project
3	Comprehensive Viva-Voce
4	Seminar
5	Project Work

3. Distribution and Weightage of Marks

i. The performance of a student in each semester shall be evaluated subject –wise with **a maximum of 100 marks for theory and 75 marks for practical subjects.** In addition, an Industry oriented mini- project, Technical Seminar, Comprehensive viva-voce, and Main Project Work shall be evaluated for **50, 50, 100 and 200 marks** respectively.

ii. For theory subjects the distribution shall be 30 marks for Internal Evaluation and 70 marks for the End-Examination, Two mid examinations will be conducted in each semester as per the academic calendar. Each mid examination is evaluated for 25 marks. First mid examination should be conducted for 1 – 2 ½ Units of syllabus and the second mid examination shall be conducted for 2 ½ - 5 Units of syllabus. The mid descriptive type

exam paper consists of Section-A and Section-B.

Section-A [compulsory] consists of 5 short answer questions and each carries one mark.

Section-B consists of 6 questions out of which 4 are to be answered and each question carries 5 marks. The time duration of each mid examination is 90 minutes.

Two assignments are to be given to students covering the syllabus of first mid and second Mid examinations and these assignments and Attendance are evaluated for 5 marks each. The first assignment shall be submitted before first mid examinations and second Assignment should be submitted before second mid examination.

At the end of the semester Internal Marks Maximum of 30 for the respective subjects are allotted as follows:

a) 25 marks for the average of the two mid term examinations

b) 5 marks of the average of the two assignment marks & Attendance

- **Award of final sessional marks :** Subject-wise attendance, average marks of two assignments and mid-examination marks will be added and rounded of to the next Integer.

iii. For practical subjects there shall be a continuous evaluation during the semester for **25 sectional marks and 50 marks for end examination**. Out of the 25 marks for internal, **day-to-day work in the laboratory shall be evaluated for 10 marks**, and 10 marks for internal examination (two internal practical examinations will be conducted and the average of the two examinations will be taken into account) and 5 marks for laboratory record.

NOTE: A student who is absent for any assignment/Mid term examination for any reason what so ever shall be deemed to have secured 'zero' marks in the test/examination and no makeup test/examination shall be conducted.

iv. For the subjects having design and / or drawing, (such as Engineering Graphics, Engineering Drawing, Machine Drawing, Production Drawing Practice, and Estimation etc., the distribution shall be **30 marks for internal evaluation (15 marks for day-to-day work and 15 marks for internal tests (**the average of the two examinations will be taken into account**) and 70 marks for end examination.** There shall be **two internal tests** in a semester. The Internal and End Examination pattern for the above subjects may be different from the other theory subjects.

v. There shall be an **industry-oriented mini-Project**, in collaboration with an industry of their specialization, to be taken up during the vacation after III year II Semester examination. The **mini project shall be evaluated during the IV year II Semester.** The industry oriented mini project shall be submitted in report form and should be presented before a

committee, which shall be evaluated for **50 marks.** The committee consists of Head of the Department, the supervisor of mini project and a senior faculty member of the department and External Examiner.

vi. There shall be a **seminar presentation in IV year II Semester**. For the seminar, the student shall collect the information on a specialized topic other than the project topic and prepare a technical report, showing his understanding of the topic, and submit to the department, which shall be evaluated by a Departmental committee consists of the Head of the department, seminar supervisor and a senior faculty member. The seminar report shall be evaluated for **50 marks**. There shall be **no external examination for seminar.**

vii. There shall be a **Comprehensive Viva-Voce in IV year II semester**. The Comprehensive Viva-Voce will be conducted by a Committee consisting of the Head of the Department and three Senior Faculty members of the Department. The Comprehensive Viva-Voce is aimed to assess the student's understanding in various subjects studied during the B.Tech. course of study. The Comprehensive Viva-Voce is evaluated **for 100 marks** by the Committee. There will be **no internal assessment for the Comprehensive viva-voce.**

viii. The Project work shall be started by the student in the beginning of the IV year II Semester. Out of a total of **200 marks** for the project work, **50 marks shall be for Internal Evaluation** and **150 marks for the Semester end Examination**. The Semester end Examination (viva-voce) shall be conducted by a committee comprising of an external examiner, Head of the Department and the project supervisor. The evaluation of project work shall be conducted at the end of the IV year II Semester. **The Internal Evaluation shall be on the basis of three seminars conducted during the IV year II semester for 20 marks by the committee consisting of Head of the Department, project supervisor and senior faculty member of the Department and for 30 marks by the supervisor of the project.**

4. Semester End Examination

(a) **Theory Courses**

Each course is evaluated for 70 marks. Examination is of 3 hours duration.

Question paper contains two sections [Section-A and Section-B]

Section-A : This Section Carries **20 marks** [Five short answer questions of four marks each and only one question to be set from any five units] **which is compulsory.**

Section-B: This Section carries 50 marks with 5 questions consisting of two parts each (a) and (b), out of which the student has to answer either (a) or (b), not both. Each question in Part B carries 10 marks.

(b) **Practical Courses**

Each lab course is evaluated for 50 marks. The examination shall be conducted by the laboratory teacher and another senior teacher

concerned with the subject of the same/other department/Industry. The external examiner may be appointed by the Chief Superintendent in consultation with HOD as and when required.

(c) **Supplementary Examinations**

Supplementary examinations will be conducted along with regular semester end examinations. (during even semester regular examinations, supplementary examinations of odd semester and during odd semester regular examinations, supplementary examinations of even semester will be conducted).

5. Attendance Requirements

i. A student shall be eligible to appear for the Semester end examinations if he / she acquires a **minimum of 75% of attendance in aggregate of all the subjects** for that semester.

ii. Condonation of shortage of attendance in aggregate **up to 10% (65% and above and below 75%)** in a semester may be granted by **Institute Academic Committee,**

iii. A student will not be permitted to write the end examination and hence not promoted to the next semester unless he satisfies the attendance requirement of the present semester, as applicable. They may seek re- admission for that semester when offered next. The student seeking re-admission for a semester will automatically forfeit all/any internal marks that he obtained in all the subjects of the present semester, as applicable.

iv Shortage of Attendance **below 65% in aggregate** shall in **NO case be condoned.**

v. Students whose shortage of attendance is not condoned in any semester are not eligible to take their end examination of that semester.

vi. A stipulated fee shall be payable towards condonation of shortage of attendance.

6. Minimum Academic Requirements:

The following academic requirements have to be satisfied in addition to the attendance requirements mentioned in item No.**5.**

i.. A student shall be deemed to have satisfied the minimum academic requirements and earned the credits allotted to each theory or practical design or drawing subject or project, if he secures **not less than 35% (25 out of 70 marks)** of **marks in the end examination and a minimum of 40% of marks in the sum total of the internal evaluation and end examination taken together.**

ii. **Promotion Rules:**

Credits required for B.Tech. students to get Promotion from I to II year:

- A student will not be promoted from I year to II year unless he fulfills the academic requirement of 24 credits out of 48 credits of I year from all the examinations and secures prescribed minimum attendance.

Credits required for B.Tech. students to get Promotion from II to III year:

- A student will not be promoted from II year to III year unless he fulfills the academic requirement of 43 credits out of 72 credits up to II year I semester from all the relevant regular and supplementary examinations, whether he takes those examinations or not, and secures prescribed minimum attendance.

Credits required for B.Tech. students to get Promotion from III to IV year:

- A student will not be promoted from III year to IV year unless he fulfills the academic requirement of 72 credits out of 120 credits up to III year I semester from all the relevant regular and supplementary examinations, whether he takes those examinations or not, and secures prescribed minimum attendance.
- A student shall register and put up minimum attendance in all 192 credits and earn 192 credits. Grades obtained in the best 184 credits shall be considered for the calculation of CGPA.

7 Detained / Re-admitted Candidate

i. A detained student can seek re-admission into a semester by giving a written application and enclosing the memorandum of marks of all exams he/she has appeared till that date.
ii. Re-admission has to be effected within four weeks of the commencement of the semester. No application for re-admission will be accepted thereafter.
iii. A comprehensive list of all detained candidates is to be maintained in the Examination Branch of the College. The cases of detained candidates have to be examined by a committee of all Heads of Departments to ascertain whether a candidate when readmitted has to undergo any new subject (Substitute Subject) in view of change of course structure. The necessary decisions have to be maintained in the Examination Branch well in advance of the commencement of classes so that the candidate can be informed as and when he or she seeks re-admission.

8. Course pattern

i. The entire course of study is of four academic years. **All the I, II, III & IV years are of semester pattern .**
ii. A student eligible to appear for the end examination in a subject, but absent or has failed in the end examination may reappear for that subject at the supplementary examination whenever conducted.
iii. When a student is detained due to shortage of attendance in any semester, he/she may be re-admitted into that semester when it is offered next, **with the academic regulations of the batch into which he gets readmitted.**
iv. When a student is detained due to lack of credits in any year, he/she may be eligible to be promoted or for promotion into the next year after fulfillment of the academic requirements, **with the academic regulations of the batch into which he gets admitted**

9. Examinations and Assessment - The Grading System

For the award of grades in a course, all evaluation is done in marks as per the scheme of examination. **Marks so obtained are converted to grades at the end of semester as per the guidelines given below using Absolute Grading System.**

Award of Grade Using Absolute GRADING SYSTEM

Grade	GP	Marks
O (Out Standing)	10	≥ 90 - ≤ 100
A+	9	≥ 80 - < 90
A	8	≥ 70 - < 80
B+	7	≥ 60 - < 70
B	6	≥ 50 - < 60
C	5	≥ 45 - < 50
P	4	≥ 40 - < 45
F	0	< 40 - Fail
(Ab)	0	Absent

Semester Grade Point Average (SGPA)

The performance of a student in a semester is indicated by a number called **SGPA.** The **SGPA** is the weighted average of the grade points obtained in all the courses registered by the student during the semester.

$$SGPA = \sum C_i \, P_i \, / \sum C_i$$

where,

C_i = The number of credits for the i^{th} course of a semester for which SGPA is to be calculated.

P_i = Grade points earned in the i^{th} course.

i_i = 1,2,…….., n represent the number of courses in which a student has registered in the concerned semester the SGPA is calculated to two decimal places.

Cumulative Grade Point Average (CGPA)

An up to date assessment of the overall performance of a student from the time of his first registration is obtained by calculating a number called CGPA, which is weighted average of the grade points obtained in all the courses registered by the student since he entered the institution.

$$CGPA = \sum C_j \, P_j \, / \sum C_j$$

where,

C_j = The number of credits for the j^{th} course up to the semester for which CGPA is to be calculated.

P_j = Grade points earned in the j^{th} course.

i_j = 1,2,…….., n represent the number of courses in which a student has registered up to the semester for which the CGPA is to be calculated.

The CGPA is also calculated to two decimal places.

Note:

- As seen from above formula CGPA is **not average** of SGPA

10. Award of B.Tech. Degree and Class

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

i. Pursued **a course of study for not less than four academic years and not more than eight academic years.**
ii. Registered for **192 credits** and secured **192 credits.**

NOTE:

1. Students, who fail to fulfill all the academic requirements for the award of the degree within eight academic years from the year of their admission, shall forfeit their seat in B.Tech. course.

2. After securing the necessary 192 Credits as specified for the successful completion of the entire UGP, an exemption of 8 secured Credits (in terms of two of their corresponding Subjects/Courses) may be permitted for optional drop out from these 192 Credits earned; resulting in 184 Credits for UGP performance evaluation, i.e., the performance of the Student in these 184 Credits shall alone be taken into account for the calculation of 'the final CGPA (at the end of UGP, 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 Student's Performances in the earlier individual Semesters, with the corresponding SGPA and CGPA for which already Grade Cards are given, will not be altered. Further, optional drop out for such 8 secured Credits shall not be allowed for Subjects/ Courses listed as … i) Laboratories/ Practicals, Industrial Training/ Mini-Project, iii) Seminar, iv) Major Project.

3. After a student has satisfied the requirements prescribed for the completion of the program and is eligible for the award of B.Tech degree he / she shall be placed in one of the following four classes:

Class Awarded	CGPA to be secured
First Class with Distinction	≥ 7.75
First Class	6.75 ≤ CGPA < 7.75
Second Class	5.75 ≤ CGPA < 6.75
Pass Class	5.0 ≤ CGPA < 5.75

11. Withholding of Results

If the student has not paid dues to College, or if any case of indiscipline is pending against him, the result of the candidate may be withheld and he will not be allowed to go into the next higher Semester. The award or issue of the Degree may also be withheld in such cases.

12. Transitory Regulations

Students who have discontinued or have been detained for want of attendance or any other academic requirements, may be considered for readmission as and when they become eligible. They have to take up Equivalent subjects, as substitute subject in place of repetition of subjects as decided by the Institute Academic Committee.

13. Minimum Instruction Days

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

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

15. The decision of the Institute Academic Committee will be final in respect of equivalent subjects for those students who are transferred from other colleges. The procedure for permitting students to transfer from other colleges will be decided by the principal / Institute Academic Committee keeping the Government Rules concerned in view.

16. TERMINATION FROM THE PROGRAMME

The admission of a student to the program may be terminated and the student is asked to leave the college in the following circumstances:

i. The student fails to satisfy the requirements of the program within the maximum period stipulated for that program.

ii. The student fails to satisfy the norms of discipline specified by the institute from time to time.

17. CURRICULUM

i. For each program being offered by the Institute, a Board of Studies (BOS) is constituted in accordance with AICTE / UGC / JNTUH statutes.

ii. The BOS for a program is completely responsible for designing the curriculum once in three years for that program.

18. GRIEVANCES REDRESSAL COMMITTEE

"Grievances and Redressal Committee" (General) constituted by the principal shall deal with all grievances pertaining to the academic / administrative / disciplinary matters. The composition of the complaints cum redressal committee shall be:

Headed by Senior Faculty member
Heads of all departments
A senior lady staff member from each department (if available)

The committee constituted shall submit a report to the principal of the college, the penalty to be imposed. The Principal upon receipt of the report from the committee shall, after giving an opportunity of being heard to the person complained against, submit the case with the committee's recommendation to the Governing Body of the college. The Governing Body shall confirm with or without modification the penalty recommended after duly following the prescribed procedure.

19. MALPRACTICE PREVENTION COMMITTEE

A malpractice prevention committee shall be constituted to examine and punish the students who does malpractice / behaves indiscipline in examinations. The committee shall consist of:

Principal.
Subject expert of which the subject belongs to.
Head of the department of which the student belongs to.
The invigilator concerned.
In-charge Examination branch of the college.

The committee constituted shall conduct the meeting on the same day of examination or latest by next working day to the incidence and punish the student as per the guidelines prescribed by the JNTUH/SICET from time to time.

Any action on the part of candidate at the examination like trying to get undue advantage in the performance at examinations or trying to help another, or derive the same through unfair means is punishable according to the provisions contained hereunder. The involvement of the Staff, who are in charge of conducting examinations, valuing examination papers and preparing / keeping records of documents relating to the examinations in such acts (inclusive of providing incorrect or misleading information) that infringe upon the course of natural justice to one and all concerned at the examination shall be viewed seriously and recommended for award of appropriate punishment after thorough enquiry.

20. STUDENT'S FEEDBACK

It is necessary for the Colleges to obtain feedback from students on their course work and various academic activities conducted. For this purpose, suitable feedback forms shall be devised by the College and the feedback obtained from the students regularly in confidence, by administering the feedback form in print or on-line in electronic form.

The feedback received from the students shall be discussed at various levels of decision making at the College and the changes/ improvements, if any, suggested shall be given due consideration for implementation.

21 CONDUCT AND DISCIPLINE

i. Each student shall conduct himself / herself in a manner befitting his / her association with SICET.

ii. He / she is expected not to indulge in any activity, which is likely to bring disrepute to the college.

iii. He / she should show due respect and courtesy to the teachers, administrators, officers and employees of the college and maintain cordial relationships with fellow students.

iv. Lack of courtesy and decorum unbecoming of a student (both inside and outside the college), willful damage or removal of Institute's property or belongings of fellow students, disturbing others in their studies, adoption of unfair means during examinations, breach of rules and regulations of the Institute, noisy and unruly behaviour and similar other undesirable activities shall constitute violation of code of conduct for the student.

v. **Ragging in any form is strictly prohibited and is considered a serious offence. It will lead to the expulsion of the offender from the college.**

vi. Violation of code of conduct shall invite disciplinary action which may include punishment such as reprimand, disciplinary probation, debarring from the examination, withdrawal of placement services, withholding of grades / degrees, cancellation of registration, etc., and even expulsion from the college.

vii. Principal, based on the reports of the warden of Institute hostel, can reprimand, impose fine or take any other suitable measures against an inmate who violates either the code of conduct or rules and regulations pertaining to college hostel.

viii. A student may be denied the award of degree / certificate even though he / she has satisfactorily completed all the academic requirements if the student is found guilty of offences warranting such an action.

ix. Attendance is not given to the student during the suspension period.

22. OTHER ISSUES

The quality and standard of engineering professionals are closely linked with the level of the technical education system. As it is now recognized that these features are essential to develop the intellectual skills and knowledge of these professionals for being able to contribute to the society through productive and satisfying careers as *innovators, decision makers and/or leaders* in the global economy of the 21st century, it becomes necessary that certain improvements are introduced at different stages of their education system. These include:

a) Selective admission of students to a programme, so that merit and aptitude for the chosen technical branch or specialization are given due consideration.

b) Faculty recruitment and orientation, so that qualified teachers trained in good teaching methods, technical leadership and student's motivation are available.

c) Instructional/Laboratory facilities and related physical infrastructure, so that they are adequate and are at the contemporary level.

d) Access to good library resources and Information & Communication Technology **(ICT)** facilities, to develop the student's *mind* effectively.

These requirements make it necessary for the College to introduce improvements like:

a) Teaching-learning process on modern lines, to provide *Add-On* Courses for *audit*/credit in a number of peripheral areas useful for student's self development.

b) Life-long learning opportunities for faculty, students and alumni, to facilitate their dynamic interaction with the society, industries and the world of work.

c) Generous use of ICT and other modern technologies in everyday activities.

23. General

i. Where the words "he", "him", "his", occur in the regulations, they include "she", "her", "hers".

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

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

iv. In the case of any discrepancy/ambiguity/doubt arises in the above rules and regulations, the decision of the Principal shall be final.

v. The College may change or amend any or all of the academic regulations or syllabi at any time and the changes or amendments made shall be applicable to all the students concerned with effect from the dates notified by the College.

24. Academic Regulations for B.Tech. (Lateral Entry Scheme)

(Applicable for students admitted from the academic year 2017-2018)

i. A student shall register for all 144 credits and earn all the 136 credits. Marks obtained in all 136 credits shall be considered for the calculation of the class.

ii. A student who fails to earn 144 credits as indicated in the course structure within **six** academic years from the year of their admission shall forfeit their seat in B.Tech. programme and their admission stands cancelled.

iii. The same attendance regulations are adopted as that of B.Tech. Four year degree course.

iv. **Credits required for B.Tech. students to get Promotion from II to III year:**

- A student will not be promoted from II year to III year unless he fulfills the academic requirement of 24 credits out of 48 credits of II year from all the examinations and secures prescribed minimum attendance.

Credits required for B.Tech. students to get Promotion from III to IV year:

- A student will not be promoted from III year to IV year unless he fulfills the academic requirement of 43 credits out of 72 credits up to III year I semester from all the relevant regular and supplementary examinations, whether he takes those examinations or not, and secures prescribed minimum attendance.

- A student shall register and put up minimum attendance in all 144 credits and earn 144 credits. Grades obtained in the best 136 credits shall be considered for the calculation of CGPA.

v. **Award of B.Tech. Degree and Class:**

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

i. Pursued **a course of study for not less than four academic years and not more than six academic years.**

ii. Registered for **144 credits** and secured **144 credits.**

NOTE:

1. Students, who fail to fulfill all the academic requirements for the award of the degree within six academic years from the year of their admission, shall forfeit their seat in B.Tech. course.

2. After securing the necessary 144 Credits as specified for the successful completion of the entire UGP, an exemption of 8 secured Credits (in terms of two of their corresponding Subjects/Courses) may be permitted for optional drop out from these 144 Credits earned; resulting in 136 Credits for UGP performance evaluation, i.e., the performance of the Student in these 136 Credits shall alone be taken into account for the calculation of 'the final CGPA (at the end of UGP, 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 Student's Performances in the earlier individual Semesters, with the corresponding SGPA and CGPA for which already Grade Cards are given, will not be altered. Further, optional drop out for such 8 secured Credits shall not be allowed for Subjects/ Courses listed as … i) Laboratories/ Practicals, Industrial Training/ Mini-Project, iii) Seminar, iv) Major Project.

3. After a student has satisfied the requirements prescribed for the completion of the program and is eligible for the award of B.Tech degree he / she shall be placed in one of the following four classes:

Class Awarded	CGPA to be secured
First Class with Distinction	≥ 7.75
First Class	6.75 ≤ CGPA < 7.75
Second Class	5.75 ≤ CGPA < 6.75
Pass Class	5.0 ≤ CGPA < 5.75

vi. All other regulations as applicable to B.Tech. four year degree course will hold good for B.Tech. (Lateral Entry Scheme).

MALPRACTICES RULES DISCIPLINARY ACTION FOR / IMPROPER CONDUCT IN EXAMINATIONS		
1. (a)	Possesses or keeps accessible in examination hall, any paper, note book, programmable calculators, Cell phones, pager, palm computers or any other form of material concerned with or related to the subject of the examination (theory or practical) in which he is appearing but has not made use of (material shall include any marks on the body of the candidate which can be used as an aid in the subject of the examination)	Expulsion from the examination hall and cancellation of the performance in that subject only.
(b)	Gives assistance or guidance or receives it from any other candidate orally or by any other body language methods or communicates through cell phones with any candidate or persons in or outside the exam hall in respect of any matter.	Expulsion from the examination hall and cancellation of the performance in that subject only of all the candidates involved. In case of an outsider, he will be handed over to the police and a case is registered against him.
2.	Has copied in the examination hall from any paper, book, programmable calculators, palm computers or any other form of material relevant to the subject of the examination (theory or practical) in which the candidate is appearing.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted to appear for the remaining examinations of the subjects of that Semester/year. The Hall Ticket of the candidate is to be cancelled and sent to the University.
3.	Impersonates any other candidate in connection with the examination.	The candidate who has impersonated shall be expelled from examination hall. The candidate is also debarred and forfeits the seat. The performance of the original candidate, who has been impersonated, shall be cancelled in all the subjects of the examination (including practicals and project work) already appeared and shall not be allowed to appear for examinations of the remaining subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all University examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat. If the imposter is an outsider, he will be handed over to the police and a case is registered against him.
4.	Smuggles in the Answer book or additional sheet or takes out or arranges to send out the question paper during the examination or answer book or additional sheet, during or after the examination.	Expulsion from the examination hall and cancellation of performance in that subject and all the other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all University examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.

5.	Uses objectionable, abusive or offensive language in the answer paper or in letters to the examiners or writes to the examiner requesting him to award pass marks.	Cancellation of the performance in that subject.
6.	Refuses to obey the orders of the Chief Superintendent/Asst. – Superintendent / any officer on duty or misbehaves or creates disturbance of any kind in and around the examination hall or organizes a walk out or instigates others to walk out, or threatens the officer-in charge or any person on duty in or outside the examination hall of any injury to his person or to any of his relations whether by words, either spoken or written or by signs or by visible representation, assaults the officer-in-charge, or any person on duty in or outside the examination hall or any of his relations, or indulges in any other act of misconduct or mischief which result in damage to or destruction of property in the examination hall or any part of the College campus or engages in any other act which in the opinion of the officer on duty amounts to use of unfair means or misconduct or has the tendency to disrupt the orderly conduct of the examination.	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 University examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.
8.	Possess any lethal weapon or firearm in the examination hall.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred and forfeits the seat.
9.	If student of the college, who is not a candidate for the particular examination or any person not connected with the college indulges in any malpractice or improper conduct mentioned in clause 6 to 8.	Student of the colleges expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred and forfeits the seat. Person(s) who do not belong to the College will be handed over to police and, a police case will be registered against them.

10.	Comes in a drunken condition to the examination hall.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year.
11.	Copying detected on the basis of internal evidence, such as, during valuation or during special scrutiny.	Cancellation of the performance in that subject and all other subjects the candidate has appeared including practical examinations and project work of that semester/year examinations.
12.	If any malpractice is detected which is not covered in the above clauses 1 to 11 shall be reported to the University for further action to award suitable punishment.	

Note : Students are advised to read the above regulations thoroughly. Ignorance with regards to the regulations cannot be construed as an excuse.

Frequently asked Questions and Answers about autonomy

1. **Who grants Autonomy? UGC, Govt., AICTE or University**

   In case of Colleges affiliated to a university and where statutes for grant of autonomy are ready, it is the respective University that finally grants autonomy.

2. **Shall SICET award its own Degrees?**

   No. Degree will be awarded by Jawaharlal Nehru Technological University, Hyderabad with a mention of the name SRI INDU COLLEGE OF ENGINEERING & TECHNOLOGY on the Degree Certificate.

3. **What is the difference between a Deemed University and an Autonomy College?**

   A Deemed University is fully autonomous to the extent of awarding its own Degree. A Deemed University is usually a Non-Affiliating version of a University and has similar responsibilities like any University. An Autonomous College enjoys Academic Autonomy alone. The University to which an autonomous college is affiliated will have checks on the performance of the autonomous college.

4. **How will the Foreign Universities or other stake – holders know that we are an Autonomous College?**

   Autonomous status, once declared, shall be accepted by all the stake holders. Foreign Universities and Indian Industries will know our status through our college website.

5. **What is the change of Status for Students and Teachers if we become Autonomous?**

   An autonomous college carries a prestigious image. Autonomy is actually earned out of continued past efforts on academic performances, capability of self-governance and the kind of quality education we offer.

6. **Who will check whether the academic standard is maintained / improved after Autonomy? How will it be checked?**

   There is a built in mechanism in the autonomous working for this purpose. An Internal Committee called Academic Programme Evaluation Committee is a Non – Statutory body, which will keep a watch on the academics and keep its reports and recommendations every year. In addition to Academic Council, the highest academic body also supervises the academic matters. At the end of three years, there is an external inspection by the University for this purpose. The standards of our question papers, the regularity of academic calendar, attendance of students, speed and transparency of result declaration and such other parameters are involved in this process.

7. **Will the students of SICET as an Autonomous College qualify for University Medals and Prizes for academic excellence?**

   No, SICET has instituted its own awards, medals, etc. for the academic performance of the students. However for all other events like sports, cultural and co-curricular organized by the University the students shall qualify.

8. **Can SICET have its own Convocation?**

   No, since the University awards the Degree the Convocation will be that of the University.

9. Can SICET give a provisional degree certificate?

Since the examinations are conducted by SICET and the results are also declared by SICET, the college sends a list of successful candidates with their final percentage of marks to the University. Therefore with the prior permission of the University the college will be entitled to give the provisional certificate.

10. Will Academic Autonomy make a positive impact on the Placements or Employability?

Certainly. The number of students qualifying for placement interviews is expected to improve, due to rigorous and repetitive classroom teaching and continuous assessment, besides the autonomous status is more responsive to the needs of the industry. As a result, there will be a lot of scope for industry oriented skill development built-in into the system. The graduates from an autonomous college will therefore represent better employability.

11. What is the proportion of Internal and External Assessment as an Autonomous College?

Presently, it is 30% for internal assessment and 70% for external assessment. As the autonomy matures the internal assessment component shall be increased at the cost of external assessment.

12. Will there be any Revaluation or Re-Examination System?

No. There will not be any Revaluation system or Re-examination. But, there is a personal verification of the answer scripts.

13. How fast Syllabi can be and should be changed?

Autonomy allows us the freedom to change the syllabi as often as we need.

14. Will the Degree be awarded on the basis of only final year performance?

No. The percentage of marks will reflect the average performance of all the semesters put together.

15. Who takes Decisions on Academic matters?

The Academic Council of College is the top academic body and is responsible for all the academic decisions. Many decisions are also taken at the lower level like the BOS which are like Boards of Studies of the University.

16. What is the role of Examination committee?

The Exam Committee is responsible for the smooth conduct of inter and external examinations. All matters involving the conduct of examinations, spot valuations, tabulations, preparation of Memorandum of Marks etc fall within the duties of the Examination Committee.

17. Is there any mechanism for Grievance Redressal?

Yes, the college has grievance redressal committee, headed by a senior faculty member of the college.

18. How many attempts are permitted for obtaining a Degree?

All such matters are defined in Rules & Regulations.

19. Who declares the result?

The result declaration process is also defined. After tabulation work the entire result is reviewed by the Moderation Committee. Any unusual deviations or gross level discrepancies are deliberated and removed. The entire result is discussed in the College Academic Council for its approval. The result is then declared on the college notice boards as well put on the web site of the college. It is eventually sent to the University.

20. What is our relationship with the Jawaharlal Nehru Technological University, Hyderabad?

We remain an affiliated college of the Jawaharlal Nehru Technological University, Hyderabad. The University has the right to nominate its members on the academic bodies of the college.

21. Shall we require University approval if we want to start any New Courses?

Yes, It is expected that approvals or such other matters from an autonomous college will receive priority.

22. Shall we get autonomy for PG and Doctoral Programmes also?

Yes, presently our PG programmes are also enjoying autonomous status.

23. How many exams will be there as an autonomous college?

This is defined in the Rules & Regulations.

24 Is the College adapting Choice Based Credit System (CBCS) or Not ?
Yes, this College has adapted CBCS system with effect from the Academic Year 2016-17.

25. Note : What is Choice Based Credit System (CBCS)?

Choice Based Credit System (CBCS): The CBCS provides choice for students to select from the prescribed courses (core, elective or minor or soft skill courses).

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SRI INDU COLLEGE OF ENGINEERING & TECHNOLOGY

(an Autonomous Institution under JNTUH)

Choice Based Credit System (CBCS)

REGULATIONS – R16

Common to All Circuit Branches of B.Tech.
(ECE, ETM, CSE, IT, EEE)

I YEAR I SEMESTER **COURSE STRUCTURE**

Subject Code	Subject Name	Lectures	T/P/D	Credits
R16HAS1101	English	4	0	4
R16MTH1101	Mathematics -1	4	0	4
R16EPH1101	Engineering Physics -1	3	1	3
R16CSE1101	Computer Programming	4	0	4
R16MED1144	Engineering Drawing	3	1	3
R16HAS1201	English Language & Communication Skills Lab	0	3	2
R16CSE1201	Computer Programming Lab	0	3	2
R16MED1201	Workshop practice	0	3	2
TOTAL		**18**	**11**	**24**

I YEAR II SEMESTER **COURSE STRUCTURE**

Subject Code	Subject Name	Lectures	T/P/D	Credits
R16MTH1102	Mathematics –II	4	0	4
R16MTH1103	Numerical Methods	4	0	4
R16EPH1102	Engineering Physics -II	3	1	3
R16CSE1102	Data Structures Through ‘C’	3	1	3
R16ECH1101	Engineering Chemistry	3	1	4
R16CSE1202	Data Structures Through ‘C’ Lab	0	3	2
R16ECH1201	Engineering Chemistry Lab	0	3	2
R16EPH1201	Engineering Physics – II Lab	0	3	2
TOTAL		**17**	**12**	**24**

* T/P/D: Tutorial/Practical/Drawing Practice

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Choice Based Credit System (CBCS)

REGULATIONS – R16

B. Tech. COMPUTER SCIENCE & ENGINEERING

II YEAR I SEMESTER **COURSE STRUCTURE**

Subject Code	Subject Name	Lectures	T/P/D	Credits
R16MTH1105	Probability and Statistics	3	1	3
R16CSE1103	Mathematical Foundations of Computer Science	3	1	3
R16CSE1104	Data Structures Through C++	4	0	4
R16ECE1136	Digital Logic Design	3	1	3
R16ECE1102	Electronic Devices and Circuits	4	0	4
R16EEE1130	Basic Electrical Engineering	3	1	3
R16EEE1212	Electrical and Electronics Lab	0	3	2
R16CSE1203	Data Structures through C++ Lab	0	3	2
	TOTAL	**20**	**10**	**24**

II YEAR II SEMESTER **COURSE STRUCTURE**

Subject Code	Subject Name	Lectures	T/P/D	Credits
R16CSE1105	Computer Organization	3	1	3
R16CSE1106	Database Management Systems	4	0	4
R16CSE1107	Java Programming	4	0	4
R16HAS1102	Environmental studies	3	1	3
R16CSE1108	Formal Languages and Automata Theory	3	1	3
R16CSE1109	Design and Analysis of Algorithms	3	1	3
R16CSE1204	Java Programming Lab	0	3	2
R16CSE1205	Database Management Systems Lab	0	3	2
	TOTAL	**20**	**10**	**24**

* T/P/D: Tutorial/Practical/Drawing Practice

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Choice Based Credit System (CBCS)

REGULATIONS – R16

B. Tech. COMPUTER SCIENCE & ENGINEERING

III YEAR I SEMESTER **COURSE STRUCTURE**

Subject Code	Subject Name	Lectures	T/P/D	Credits
R16CSE1110	Principles of Programming Languages	3	1	3
R16HAS1105 R16CIV1123 R16MTH1106	**OPEN ELECTIVE** Human Values and Professional Ethics Intellectual Property Rights Operations Research	3	1	3
R16CSE1113	Software Engineering	4	0	4
R16CSE1118	Compiler Design	3	1	3
R16CSE1114	Operating Systems	4	0	4
R16CSE1139	Computer Networks	3	1	3
R16CSE1206	Operating Systems Lab	0	3	2
R16CSE1207	Compiler Design Lab	0	3	2
	TOTAL	**20**	**10**	**24**

III YEAR II SEMESTER **COURSE STRUCTURE**

Subject Code	Subject Name	Lectures	T/P/D	Credits
R16CSE1143	Distributed Systems	4	0	4
R16CSE1117	Information Security	3	1	3
R16CSE1116	Object Oriented Analysis and Design	4	0	4
R16CSE1121	Software Testing Methodologies	3	1	3
R16HAS1103	Managerial Economics and Financial Analysis	3	1	3
R16CSE1119	Web Technologies	3	1	3
R16CSE1215	Case Tools and Web Technologies Lab	0	3	2
R16HAS1202	Advanced English Language Communication Skills Lab	0	3	2
	TOTAL	**20**	**10**	**24**

* T/P/D: Tutorial/Practical/Drawing Practice

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Choice Based Credit System (CBCS)

REGULATIONS – R16

B. Tech. COMPUTER SCIENCE & ENGINEERING

IV YEAR I SEMESTER **COURSE STRUCTURE**

Subject Code	Subject Name	Lectures	T/P/D	Credits
R16CSE1120	Linux Programming	3	1	3
R16CSE1128	Design Patterns	4	0	4
R16CSE1122	Data Warehousing and Data Mining	3	1	3
R16CSE1125	Cloud Computing	4	0	4
R16CSE1140 R16INF1107 R16CSE1127 R16CSE1123 R16CIV1132	**ELECTIVE – I** Software Project Management Image processing and Pattern Recognition Mobile Computing Computer Graphics Disaster Management	3	1	3
R16CSE1129 R16CSE1130 R16CSE1131 R16CSE1141 R16CSE1112	**ELECTIVE – II** Machine Learning Soft Computing Information Retrieval Systems Artificial Intelligence Computer Forensics	3	1	3
R16CSE1208	Linux Programming Lab	0	3	2
R16CSE1216	Data Warehousing and Mining Lab	0	3	2
	TOTAL	**20**	**10**	**24**

SRI INDU COLLEGE OF ENGINEERING & TECHNOLOGY

(An Autonomous Institution under UGC, New Delhi)

Choice Based Credit System (CBCS)

REGULATIONS – R16

B. Tech. COMPUTER SCIENCE & ENGINEERING

IV YEAR II SEMESTER **COURSE STRUCTURE**

Subject Code	Subject Name	Lectures	T/P/D	Credits
R16HAS1104	Management Science	3	1	3
	ELECTIVE III			
R16CSE1132	Web Services			
R16CSE1133	Semantic Web and Social Networks	3	1	3
R16CSE1134	Scripting Languages			
R16CSE1135	Multimedia & Rich Internet Applications			
	ELECTIVE – IV			
R16CSE1136	Ad hoc and Sensor Networks			
R16CSE1137	Storage Area Networks	3	1	3
R16CSE1138	Database Security			
R16ECE1133	Embedded Systems			
R16CSE1210	Industry Oriented Mini Project	0	0	2
R16CSE1211	Seminar	0	6	2
R16CSE1212	Project Work	0	15	9
R16CSE1213	Comprehensive Viva	0	0	2
TOTAL		**9**	**24**	**24**

*** T/P/D: Tutorial/Practical/Drawing Practice**

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(COMMON TO ALL BRANCHES)

B.Tech. - I Year – I Semester	**for Circuit Branches**	**L**	**T/P/D**	**C**
B.Tech. - I Year – II Semester	**for Non-Circuit Branches**	**4**	**0**	**4**

(R16HAS1101) - ENGLISH

INTRODUCTION

In view of the growing importance of English as a tool for global communication and the consequent emphasis on training students to acquire communicative competence, the syllabus has been designed to develop linguistic and communicative competencies of Engineering students. The prescribed books and the exercises are meant to serve broadly as students' handbooks.

In the English classes, the focus should be on the skills of reading, writing, listening and speaking and for this the teachers should use the text prescribed for detailed study. For example, the students should be encouraged to read the texts/selected paragraphs silently. The teachers can ask comprehension questions to stimulate discussion and based on the discussions students can be made to write short paragraphs/essays etc.

The text for non-detailed study is for extensive reading/reading for pleasure. Hence, it is suggested that they read it on their own the topics selected for discussion in the class. The time should be utilized for working out the exercises given after each section, as also for supplementing the exercises with authentic materials of a similar kind for example, from newspaper articles, advertisements, promotional material etc. However, the stress in this syllabus is on skill development, fostering ideas and practice of language skills.

OBJECTIVES

To improve the language proficiency of the students in English with emphasis on LSRW skills.

To equip the students to study academic subjects more effectively using the theoretical and practical components of the English syllabus.

To develop the study skills and communication skills in formal and informal situations.

LEARNING OUTCOMES

1. Usage of English Language, written and spoken
2. Enrichment of comprehension and fluency
3. Gaining confidence in using language in verbal situations

SYLLABUS

I. Listening Skills

Objectives

1. To enable students to develop their listening skill so that they may appreciate its role in the skills based approach to language learning
2. To train students in listening so that they can comprehend the speech of people of different backgrounds and regions

Students should be given practice in listening to the sounds of the language to be able to recognize them, to distinguish between them to mark stress and recognize and use the right intonation in sentences.

- Listening for general content
- Listening to fill up information
- Intensive listening
- Listening for specific information

II. Speaking Skills

Objectives

1. To make students aware of the role of speaking in English and its contribution to their success.
2. To enable students to express themselves fluently and appropriately in social and professional contexts

- Oral practice
- Describing objects/situations/people
- Role play – Individual/Group activities (Using exercises from the five units of the prescribed text: ***Skills Annexe - Functional English for Success)***
- Just A Minute(JAM) Sessions

III. Reading Skills

Objectives

1. To raise awareness in the students about the significance of silent reading and comprehension
2. To develop the ability of students to guess the meanings of words from context and grasp the overall message of the text, draw inferences etc

- Skimming the text
- Understanding the gist of an argument
- Identifying the topic sentence
- Inferring lexical and contextual meaning
- Understanding discourse features
- Scanning
- Recognizing coherence/sequencing of sentences

NOTE : *The students will be trained in reading skills using the prescribed text for detailed study*

They will be examined in reading and answering questions using 'unseen' passages which may be taken from authentic texts, such as magazines/newspaper articles

IV. Writing Skills

Objectives

1. To raise awareness in the students about writing as an exact and formal skill
2. To equip them with the components of different forms of writing, beginning with the lower order ones

- Writing 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

TEXTBOOKS PRESCRIBED

In order to improve the proficiency of the student in the acquisition of the four skills mentioned above, the following texts and course content, divided into **Five Units**, are prescribed:

For Detailed study: **First Textbook:** ***"Skills Annexe -Functional English for Success***", Published by Orient Black Swan, Hyderabad

For Non-detailed study

1. **Second text book** ***"Epitome of Wisdom",*** Published by Maruthi Publications, Guntur

The course content and study material is divided into **Five Units.**

Unit –I

1. Chapter entitled '***Wit and Humour****'* from '**Skills Annexe' -Functional English for Success**, Published by Orient Black Swan, Hyderabad
2. Chapter entitled **'*Mokshagundam Visvesvaraya'*** from ***"Epitome of Wisdom",*** Published by Maruthi Publications, Hyderabad

L-Listening For Sounds, Stress and Intonation
S-Greeting and Taking Leave, Introducing Oneself and Others (Formal and Informal Situations)
R- Reading for Subject/ Theme
W- Writing Paragraphs
G-Types of Nouns and Pronouns
V- Homonyms, homophones, synonyms and antonyms

Unit –II

1. Chapter entitled "***Cyber Age"*** from "***Skills Annexe -Functional English for Success***" Published by Orient Black Swan, Hyderabad
2. Chapter entitled **'*Three Days To See'*** from ***"Epitome of Wisdom",*** Published by Maruthi Publications, Hyderabad

L – Listening for themes and facts
S – Apologizing, interrupting, requesting and making polite conversation
R- for theme and gist
W- Describing people, places, objects and events
G- Verb forms
V- noun, verb, adjective and adverb

Unit –III

1. Chapter entitled **'*Risk Management'*** from **"*Skills Annexe -Functional English for Success*"** Published by Orient Black Swan, Hyderabad
2. Chapter entitled **'*Leela's Friend'*** by R.K. Narayan from ***"Epitome of Wisdom",*** Published by Maruthi Publications, Hyderabad

L – for main points and sub-points for note taking
S – giving instructions and directions; Speaking of hypothetical situations
R – reading for details
W – note-making, information transfer, punctuation
G – present tense
V – synonyms and antonyms

Unit –IV

1. Chapter entitled '***Human Values and Professional Ethics'*** from "***Skills Annexe -Functional English for Success"*** Published by Orient Black Swan, Hyderabad
2. Chapter entitled ***'The Last Leaf'*** from ***"Epitome of Wisdom",*** Published by Maruthi Publications, Hyderabad

L -Listening for specific details and information

S- narrating, expressing opinions and telephone interactions

R -Reading for specific details and information

W- Writing formal letters and CVs

G- Past and future tenses

V- Vocabulary - idioms and Phrasal verbs

Unit –V

1. Chapter entitled '***Sports and Health'*** from ***"Skills Annexe -Functional English for Success***" Published by Orient Black Swan, Hyderabad

2. Chapter entitled ***'The Convocation Speech'*** by N.R. Narayanmurthy' from ***"Epitome of Wisdom",*** Published by Maruthi Publications, Hyderabad

L- Critical Listening and Listening for speaker's tone/ attitude

S- Group discussion and Making presentations

R- Critical reading, reading for reference

W-Project proposals; Technical reports, Project Reports and Research Papers

G- Adjectives, prepositions and concord

V- Collocations and Technical vocabulary Using words appropriately

* Exercises from the texts not prescribed shall also be used for classroom tasks.

REFERENCES

1. Contemporary English Grammar Structures and Composition by David Green, MacMillan Publishers, New Delhi. 2010.
2. Innovate with English: A Course in English for Engineering Students, edited by T Samson, Foundation Books.
3. English Grammar Practice, Raj N Bakshi, Orient Longman.
4. Technical Communication by Daniel Riordan. 2011. Cengage Publications. New Delhi.
5. Effective English, edited by E Suresh Kumar, A RamaKrishna Rao**,** P Sreehari, Published by Pearson
6. Handbook of English Grammar& Usage, Mark Lester and Larry Beason, Tata Mc Graw –Hill.
7. Spoken English, R.K. Bansal & JB Harrison, Orient Longman.
8. Technical Communication, Meenakshi Raman, Oxford University Press
9. Objective English Edgar Thorpe & Showick Thorpe, Pearson Education
10. Grammar Games, Renuvolcuri Mario, Cambridge University Press.
11. Murphy's English Grammar with CD, Murphy, Cambridge University Press.
12. Everyday Dialogues in English, Robert J. Dixson, Prentice Hall India Pvt Ltd.,
13. ABC of Common Errors Nigel D Turton, Mac Millan Publishers.
14. Basic Vocabulary Edgar Thorpe & Showick Thorpe, Pearson Education
15. Effective Technical Communication, M Ashraf Rizvi, Tata Mc Graw –Hill.
16. An Interactive Grammar of Modern English, Shivendra K. Verma and Hemlatha Nagarajan , Frank Bros & CO
17. A Communicative Grammar of English, Geoffrey Leech, Jan Svartvik, Pearson Education
18. Enrich your English, Thakur K B P Sinha, Vijay Nicole Imprints Pvt Ltd.,
19. A Grammar Book for You And I, C. Edward Good, MacMillan Publishers

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B.Tech. - I Year – I Semester

L	T/P/D	C
4	0	4

(R16MTH1101) Mathematics - I

UNIT - I **Solution for linear systems**

Matrices and Linear systems of equations: Elementary row transformations-Rank-Echelon form, Normal form – Solution of Linear Systems – Direct Methods- LU Decomposition-LU Decomposition from Gauss Elimination –Solution of Tridiagonal Systems-Solution of Linear Systems Eigen values, Eigen vectors – properties – Condition number of rank, Cayley-Hamilton Theorem (without
Proof) - Inverse and powers of a matrix by Cayley-Hamilton theorem – Diagonalization of matrix. Calculation of powers of matrix – Modal and spectral matrices.

UNIT – II **Linear Transformations**

Real matrices – Symmetric, skew - symmetric, orthogonal matrices, Linear Transformation – Orthogonal Transformation. Complex matrices: Hermitian, Skew-Hermitian and Unitary Matrices – Eigen values and Eigen vectors of complex matrices and their properties.
Quadratic forms- Reduction of quadratic form to canonical form – Rank - Positive, negative definite - semi definite - Index - signature - Sylvester law, Singular value decomposition.

UNIT – III Basic definitions of Sequences and series – Convergences and divergence – Ratio test – Comparison test– Integral test – Cauchy's root test – Raabe's test – Absolute and conditional convergence - Functions of Single Variable- Rolle's Theorem – Lagrange's Mean Value Theorem – Cauchy's Mean value Theorem – Generalized Mean Value theorem (all theorems without proof)

UNIT – IV **Application of Single variables:** Radius, Centre and Circle of Curvature – Evolutes and Envelopes. Tracing of curves in Cartesian and polar coordinates

Functions of several variables

Limits and continuity of functions of two variables- partial differentiation - total differential coefficient and chain rule - Jacobian- Functional dependence - Maxima and Minima of functions of two variables with constraints and without constraints-Lagrange's method of multipliers.

UNIT – V Multiple integrals - double and triple integrals-scalar and vector fields- Gradient-Divergence- Curl and their related properties, Potential function - Laplacian and second order operators. Line integral – work done – Surface integrals - Flux of a vector valued function. Vector integrals theorems: Green's -Stoke's and Gauss's Divergence Theorems (Statement & their Verification).

Text Books:

1. Engineering Mathematics – I by T.K. V. Iyengar, B. Krishna Gandhi & Others, S. Chand.
2. Mathematical Methods by T.K. V. Iyengar, B. Krishna Gandhi & Others, S. Chand.

References:

1. Engineering Mathematics-I , Shahnaz Bathul, PHI learning.
2. Mathematical Methods by Shahnaz Bathul, PHI learning.

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B.Tech. - I Year – I Semester

L	T/P/D	C
3	1	3

(R16EPH1101) Engineering Physics – I

UNIT – I

1. **Interference:** Superposition of waves, Young's double slit experiment, coherence, Newton's rings.
2. **Diffraction:** Fresnel and Fraunhofer diffractions, Fraunhofer diffraction at single slit and double slit, diffraction grating, Double refraction and Nicol prism.

UNIT - II

1. Ionic Bond, Covalent Bond, Metallic Bond, Hydrogen Bond, Vander Waals Bond, Calculation of Cohesive Energy of Diatonic Molecule

2.**Crystallography and Crystal Structures:** Space Lattice, Unit Cell, Lattice Parameters, Crystal Systems, Bravais Lattices, Miller Indices, Crystal Planes and Directions, Inter Planar Spacing of Orthogonal Crystal Systems, Atomic Radius, Co-ordination Number and Packing Factor of SC, BCC, FCC, Diamond Structures, Structures of NaCl, ZnS, CsCl.

Unit III

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

2.**Defects in Crystals:** Point Defects: Vacancies, Substitutional, Interstitial, Frenkel and Schottky Defects; Estimation of Vacancies in Frenkel and Schottky Defects Qualitative treatment of line (Edge and Screw Dislocations) Defects, Burger s Vector, Surface Defects and Volume Defects.

Unit IV

1.**Principles of Quantum Mechanics:** Waves and Particles, de Broglie Hypothesis , Matter Waves, Davisson and Germers Experiment, G. P. Thomson Experiment, Heisenbergs Uncertainty Principle - Physical Significance of the Wave Function - Schrodinger s Time Independent Wave Equation - -Particle in One Dimensional Potential Box extension to Three Dimensions.

2.Elements of Statistical Mechanics: Maxwell-Boltzman, Bose-Einstein and Fermi-Dirac Statistics (Qualitative Treatment), Photon Gas, Black Body Radiation, Plank's Law.

Unit V

1.Free Electron Theory of Metals: Classical free electron theory(Drude and Lorentz), Quantum Theory, Concept of Electron Gas, Fermi Energy, Density of Electrons state, Electrical conductivity of metals, relaxation time, collision time, mean free path

2. Band Theory of Solids: Electron in a periodic Potential, Bloch Theorem, Kronig-Penny Model (Quantitative Treatment), Origin of Energy Band Formation in Solids, Classification of Materials into Conductors, Semi Conductors & Insulators, Concept of Effective Mass of an Electron and Hole.

TEXT BOOKS

1. Applied Physics P.K.Palanisamy (SciTech Publications (India) Pvt. Ltd.
2. Applied Physics T. Bhima Shankaram & G. Prasad (B.S. Publications)
3. Engineering Physics P.K.Palanisamy (SciTech Publications (India) Pvt. Ltd.

REFERENCES

1. Applied Physics Mani Naidu Pearson Education
2. Modern Physics by K. Vijaya Kumar, S. Chandralingam: S. Chand & Co. Ltd
3. Introduction to Solid State Physics C. Kittel (Wiley Eastern).
4. Engineering Physics by T. Srikanth, K. Vijaya Kumar, S. Chandra Lingam, S. Chand & Co.Ltd.

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B.Tech. - I Year – I Semester

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4	0	4

(R16CSE1101) Computer Programming

UNIT - I ***Introduction to Computers*** – Computer Systems - Computing Environments - Computer Languages –DOS/Linux Commands - System Development – SDLC - Creating and Running Programs;

Problem Solving Techniques – Flow Charts – Algorithms – Pseudo Code – Simple Illustrations - Domain Problems;

UNIT – II ***C Fundamentals*** – History of C Languages- Features of C- Structure of C- Reserved Words- Types - Identifiers – Constants - and Character set.;

Data Types – Basic Data Types- Derived Data Types- User Defined Data Types;

Basic Input Output- printf and scanf Functions- Format and Control Characters- Escape Sequences;

Expressions: Infix - Prefix – Postfix - Unary - Binary - Ternary;

Operators – Unary - Arithmetic- Relational- Logical – Bitwise - Assignment and Special Operators- Precedence and Associativity of Operators;

Statements – Syntax- Types of Statements- Evaluating Expressions- Type Conversions;

Branching – Conditional Branching - If - If-else – Nested If and Nested if else - Switch-Case - Control Structures (Loops) – While - Do-while - For - Dangling in Programming - Unconditional Branching - Break- Continue - Goto;

UNIT – III ***Arrays*** – Using Arrays in C – Two Dimensional Arrays- Multi-dimensional Arrays;

Pointers – Pointer Variable – Declaration – Definition – Initialization - Pointer to Pointers - Memory Mapping- Pointer Arithmetic- Arrays of Pointers – Dynamic Memory Allocation;

Strings – Basic Concepts on Strings - String Input/Output - Arrays of Strings - String Manipulation Functions;

UNIT – IV ***Functions*** – Function Definition- Function Declaration –Function Call – Parameters - Formal & Actual Parameters - Return Value - Scope of Parameters. Parameter Passing: Call by Value and Call by Reference - Passing Arrays as Function Arguments;

Recursion: Definition- Design – Limitations - Advantages and Disadvantages;

Macros – Pre-Processor Directives- Macro Creation- Conditional Compilation;

UNIT – V ***Enumerated, Structure and Union Types*** – Declaration – Initialization – Operations – Programming Applications - Nested Structures- Self Referential Structures- Structures as Function Arguments and Return Value - Differences Between Structures and Unions;

Files-Types of Files **-** File Pointer - File Opening Modes- Creating Files - Writing- Reading- Appending- Editing- Copying & Merge – Standard Library Functions - Random Accessing - Command Line Arguments - Error Handling;

Text Books:

1. "Computer Science- A Structured Programming Approach Using C" by B.A. Forouzan and R.F.Gilberg- Third Edition- Thomson.
2. "The C programming Language" by B.W.Kernighan- Dennis M.Ritchie- PHI Pearson Education.

References:

1. "Working with C" by Yashavant. P Kanetkar
2. "C how to program" by Paul Deitel and Havey Deitel- PHI
3. "Absolute beginner's guide to C"- Greg M. Perry- Second Edition- Sams Pub

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B.Tech. - I Year – I Semester

L	T/P/D	C
3	1	3

(R16MED1144) Engineering Drawing

UNIT - I INTRODUCTION TO ENGINEERING DRAWING:

Week 1- Principles of Engineering Graphics and their Significance, Lettering and BIS Conventions

Week 2 : Conic Sections including the Rectangular Hyperbola – General method only.

Week 3 : Cycloid, Epicycloids and Hypocycloid, Involute.

Week 4 : Scales-Plain, Diagonal and Vernier Scales.

UNIT – II ORTHOGRAPHIC PROJECTION:

Week 5 : Principles of orthographic projections–conventions – projections of points and Projections of lines inclined to one planes and Inclined to both the planes – True length of the line and True angle of the line and traces of a line.

Week 6: Projections of planes : Regular geometric figures parallel, Perpendicular and inclined to one reference plane – Plane inclined to the both the reference planes.

UNIT – III Projections of Solids

Week 7 : Projections of regular solids, Cube, Prisms, Pyramids, Tetrahedron, Cylinder and cone and axis inclined to both the reference planes.

UNIT – IV Sectional Views of Simple Solids

Week 8 : Sections or sectional views of right regular solids-Prism, cylinder, Pyramid, Cone.

Week 9 : Development of surfaces of right regular solids – Prism, Cylinder, Pyramid and Cone.

UNIT – V ISOMETRIC PROJECTIONS:

Week 10 : Principles of Isometric Projection – Isometric Scale – Isometric Views - Conventions – Isometric views of Lines, Plane Figures, Simple solids

Week 11 : Conversion of Isometric views to Orthographic views and vice – versa Conversions.

Week 12 : Basics of the perspective views including one point, two point, three point, zero point, infinite perspective and aerial perspective method. Drawings by visual ray method and vanishing point method. Introduction of AUTOCAD and Basic commands of AUTOCAD.

Text Books:

1. Engineering Drawing N.D. Bhatt / Charotar
2. Engineering Drawing and Graphics Rane and Shah/Peason Edu.

References:

1. A text book of Engineering Drawing / Dhwan R K / S. Chand
2. Engineering Graphics with Auto CAD / James D Bethune / Pearson Edu.
3. Engineering Graphics / K R Mohan / Dhanpat Rai
4. Text book of Engineering Drawing / K L Narayana / P Kannaih / Scitech

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(COMMON TO ALL BRANCHES)

B.Tech. - I Year – I Semester	**for Circuit Branches**	**L**	**T/P/D**	**C**
B.Tech. - I Year – II Semester	**for Non-Circuit Branches**	**0**	**3**	**2**

(R16HAS1201) ENGLISH LANGUAGE & COMMUNICATION SKILLS LAB

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

Objectives

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

Syllabus: English Language Communication Skills Lab shall have two parts:

a. **Computer Assisted Language Learning (CALL) Lab**
b. **Interactive Communication Skills (ICS) Lab**

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

Exercise – I

CALL Lab: Introduction to Phonetics – Speech Sounds – Vowels and Consonants
ICS Lab: Ice-Breaking activity and JAM session
Articles, Prepositions, Word formation- Prefixes & Suffixes, Synonyms & Antonyms

Exercise – II

CALL Lab: Structure of Syllables - Past Tense Marker and Plural Marker – Weak Forms and Strong Forms - Consonant Clusters.
ICS Lab: Situational Dialogues – Role-Play- Expressions in Various Situations – Self-introduction and Introducing Others – Greetings – Apologies – Requests – Social and Professional Etiquette - Telephone Etiquette.
Concord (Subject in agreement with verb) and Words often misspelt- confused/misused

Exercise - III

CALL Lab: Minimal Pairs- Word accent and Stress Shifts- Listening Comprehension.
ICS Lab: Descriptions- Narrations- Giving Directions and guidelines.
Sequence of Tenses, Question Tags and One word substitutes.

Exercise – IV

CALL Lab: Intonation and Common errors in Pronunciation.
ICS Lab: Extempore- Public Speaking
Active and Passive Voice, –Common Errors in English, Idioms and Phrases

Exercise – V

CALL Lab: Neutralization of Mother Tongue Influence and Conversation Practice
ICS Lab: Information Transfer- Oral Presentation Skills
Reading Comprehension and Job Application with Resume preparation.

Minimum Requirement of infra structural 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 with minimum 60 multimedia systems with the following specifications:

i) P – IV Processor
   a) Speed – 2.8 GHZ
   b) RAM – 512 MB Minimum
   c) Hard Disk – 80 GB
ii) Headphones of High quality

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

Books Suggested for English Language Lab Library (to be located within the lab in addition to the CDs of the text book which are loaded on the systems):

1. Suresh Kumar, E. & Sreehari, P. 2009. *A Handbook for English Language Laboratories.* New Delhi: Foundation
2. *Speaking English Effectively* 2nd Edition by Krishna Mohan and N. P. Singh, 2011. Macmillan Publishers India Ltd. Delhi.
3. Sasi Kumar, V & Dhamija, P.V. *How to Prepare for Group Discussion and Interviews.* Tata McGraw Hill
4. Hancock, M. 2009. *English Pronunciation in Use. Intermediate.* Cambridge: CUP
5. Spoken English: A Manual of Speech and Phonetics by R. K. Bansal & J. B. Harrison. 2013. Orient Blackswan. Hyderabad.
6. Hewings, M. 2009. *English Pronunciation in Use. Advanced.* Cambridge: CUP
7. Marks, J. 2009. *English Pronunciation in Use. Elementary.* Cambridge: CUP
8. Nambiar, K.C. 2011. *Speaking Accurately. A Course in International Communication.* New Delhi : Foundation
9. Soundararaj, Francis. 2012. *Basics of Communication in English. New Delhi: Macmillan*
10. **Spoken English** (CIEFL) in 3 volumes with 6 cassettes, OUP.
11. **English Pronouncing Dictionary** Daniel Jones Current Edition with CD.
12. **A textbook of English Phonetics for Indian Students** by T. Balasubramanian (Macmillan)

DISTRIBUTION AND WEIGHTAGE OF MARKS

English Language Laboratory Practical Examination:

1. The practical examinations for the English Language Laboratory shall be conducted as per the University norms prescribed for the core engineering practical sessions.
2. For the Language lab sessions, there shall be a continuous evaluation during the year for 25 sessional marks and 50 year-end Examination marks. Of the 25 marks, 15 marks shall be awarded for day-to-day work and 10 marks to be awarded by conducting Internal Lab Test(s). The year- end Examination shall be conducted by the teacher concerned with the help of another member of the staff of the same department of the same institution.

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(R16CSE1201) Computer Programming Lab

Objectives:

- To learn/strengthen a programming language like C- To learn problem solving techniques Recommended Systems/Software Requirements:
- Intel based desktop PC- ANSI C Compiler with Supporting Editors- IDE's such as Turbo C- Bloodshed C-
- Linux with gcc compiler(GNU Compiler collection)

Week – 1 (basic programming- if- if-else- switch)

a) Solving problems such as temperature conversion- student grading- income tax calculation- etc.- which expose students to use basic C operators.
b) Write a C program to find the roots of a quadratic equation.
c) Write a C program- which takes two integer operands and one operator form the user- performs the operation and then prints the result. (Consider the operators +, - ,*, /, % and use Switch Statement)

Week – 2 (while- do looping)

a) Write a C program to find the sum of individual digits of a positive integer.
b) Write a C program to generate all the prime numbers between 1 and n- where n is a value supplied by the user.
c) Write a program which checks a given integer is Fibonacci number or not.

Week – 3 (while- do looping)

a) 2's complement of a number is obtained by scanning it from right to left and complementing all the bits after the first appearance of a 1. Thus 2's complement of 11100 is 00100. Write a C program to find the 2's complement of a binary number.
b) A Fibonacci sequence is defined as follows: the first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence. Write a C program to generate the first n terms of the sequence.
c) Write a C function to read in two numbers- x and n- and then compute the sum of this geometric progression: $1+x+x^2+x^3+\ldots\ldots\ldots\ldots+x^n$
d) Write a C function to read in two numbers- x and n(no. of terms)- and then compute sin(x) and cos(x).

Week - 4 (For looping)

a) Write a C program to generate Pascal's triangle.
b) Write a C program to construct a pyramid of numbers.
c) Write a C program to calculate the following Sum:
Sum=$1-x^2/2! +x^4/4!-x^6/6!+x^8/8!-x^{10}/10!$
d) The total distance travelled by vehicle in 't' seconds is given by distance = $ut+1/2at^2$ where 'u' and 'a' are the initial velocity (m/sec.) and acceleration (m/sec^2). Write C program to find the distance travelled at regular intervals of time given the values of 'u' and 'a'. The program should provide the flexibility to the user to select his own time intervals and repeat the calculations for different values of 'u' and 'a'.

Week – 5 (Arrays)

a) Write a C program to find both the largest and smallest number of an array of integers.
b) Write a C program to find Addition of Two Matrices
c) Write a C program for Calculating transpose of a matrix in-place manner.
d) Write a C program to find Matrix multiplication by checking compatibility

Week – 6 (Strings)

a) Simple programming examples to manipulate strings.
b) Verifying a string for its palindrome property
c) Write a C program that uses functions to perform the following operations:
   i. To insert a sub-string in to given main string from a given position.
   ii. To delete n Characters from a given position in a given string.
   iii. To replace a character of string either from beginning or ending or at a specified location

Week – 7 (Pointers)

a. Simple program to understand pointer concept
b. Program which explains the use of dynamic arrays.
c. Program to enlighten dangling memory problem (Creating a 2-D array dynamically using pointer to pointers approach.

Week – 8 (Structures)

a) Examples which explores the use of structures- union and other user defined variables
b) Write a C program that uses functions to perform the following operations using Structure:

i) Reading a complex number ii) Writing a complex number
iii) Addition of two complex numbers iv) Multiplication of two complex numbers

Week – 9 (Functions)

a) Write a C function to generate Pascal's triangle.
b) Write a C function to construct a pyramid of numbers.
c) Write a C functions to find both the largest and smallest number of an array of integers.
d) Write a Pointer based function to exchange value of two integers using passing by address.

Week - 10 (Recursive Functions)

Write C programs that use both recursive and non-recursive functions for the following

i) To find the factorial of a given integer.
ii) To find the GCD (Greatest Common Divisor) of two given integers.
iii) To solve Towers of Hanoi problem.

Week – 11 (Files)

a) Write a C program which copies one file to another.
b) Write a C program to reverse the first n characters in a file. (Note: The file name and n are specified on the command line)

Week – 12 (Command Line arguments and macros)

a) Copy source file contents into destination file by command line arguments
b) Write a program to implement conditional compilation

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(R16MED1201) WORKSHOP PRACTICE

Part – A (IT Workshop)

Week - 1 ***Introduction to Computers***: Identify the Peripherals of Computer - Components in CPU Assembling and Disassembling - Hardware trouble shooting;

Week - 2 ***Software Installation***: Introduction to Operating System- Installation of DOS- Windows and Unix/Linux Installation - Configuring and Trouble Shooting;

Week - 3 ***Drivers and Utilities***: Threats- Virus- Worms - anti, Virus- Firewall and Device Driver's Configuration;
Office Automation: Introduction- Need of Automation- Windowing- Toolbars- Menu Application;

Week - 4 ***Word Processing***: Formatting Styles - Applying Text Effects - Paragraphs- Borders- Backgrounds - Header and Footer - Tables – Images - Hyper linking – Mail Merge;

Week - 5 ***Spreadsheets:*** Creating Tabulated Information - Overview of Toolbars - Formatting Cells - Creation of Graphs and Charts - Learning Functions and Formulas;

Week - 6 ***Presentations:*** Orientation and Layouts of Presentation - Types of Views - Inserting Styles - Design and Custom Animation - Setup and Slide Show;

Week - 7 ***Browsing***: Introduction to Internet- LAN- Connecting Computers through LAN- Accessing Computers through LAN - Access to Websites and Emails - Search Engines like Google and MSN.

REFERENCES:

1) "Building a Dream PC" by Will Smith- Que Publications.
2) "Upgrading and Repairing PCs" 12th Edition- Scott Mueller- Que Publications
3) "Repairing and Upgrading your PC" by Robert Bruce Thompson; Barbara Fritchman Thompson- O'Rei
4) "Microsoft Office for the Older and Wiser: Get Up and Running with Office 2010 and Off 2007" by Sean McManus.
5) "The Essential Guide to Computing: The Story of Information Technology (Essential Gu Series)" by E. Garrison Walters-

Part – B (Engineering Workshop)

Trades for Exercises : At least two exercises from each trade

Week - 1 Carpentry
Week - 2 Fitting
Week - 3 Tin-smithy and Black-Smithy
Week - 4 House Wiring
Week - 5 Foundry
Week - 6 Welding
Week - 7 Plumbing & Machine Shop

Text Books :

1. Work shop Manual – P. Kannaiah / K.L. Narayana, Scitech Publishers
2. Work shop Manual by Venkatreddy
3. Work shop practice by Hazra Chowdary

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(R16MTH1102) Mathematics - II

UNIT - I **Differential equations of first order and their applications**

Overview of differential equations- exact, linear and Bernoulli. Applications to Newton's Law of cooling, Law of natural growth and decay, orthogonal trajectories and geometrical applications

UNIT – II **Higher Order Linear differential equations and their applications**

Linear differential equations of second and higher order with constant coefficients, RHS term of the type $f(X)= e^{ax}$, Sin ax, Cos ax, and x^n, e^{ax} V(x), x^n V(x), method of variation of parameters. Applications to bending of beams, Electrical circuits, simple harmonic motion

UNIT – III **Partial differential equations**

Introduction and Formation of partial differential equation by elimination of arbitrary constants and arbitrary functions, Solutions of first order linear (Lagrange) equation and nonlinear (Standard type) equations, Method of separation of variables for second order equations -Two dimensional wave equation. Applications of linear partial differential equations-method of separation of variables - Solutions of one dimensional heat equation, wave equation and two dimensional Laplace equation under initial and boundary conditions

UNIT – IV **Fourier Series**

Fourier Series: Determination of Fourier coefficients – Fourier series – even and odd functions – Fourier series in an arbitrary interval – even and odd periodic continuation – Half-range Fourier sine and cosine expansions. Fourier transforms-Fourier sine and cosine transforms- inverse transforms.

UNIT – V **Laplace transform and its applications to Ordinary differential equations**

Laplace transform of standard functions – Inverse transform – first shifting Theorem, Transforms of derivatives and integrals – Unit step function – second shifting theorem – Dirac's delta function – Convolution theorem – Periodic function - Differentiation and integration of transforms-Application of Laplace transforms to ordinary differential equations.

Text Books:

1. Engineering Mathematics – I by T.K. V. Iyengar, B. Krishna Gandhi & Others, S. Chand.
2. Mathematical Methods by T.K. V. Iyengar, B. Krishna Gandhi & Others, S. Chand.

References:

1. Engineering Mathematics-I , Shahnaz Bathul, PHI learning.
2. Mathematical Methods by Shahnaz Bathul, PHI learning.

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(R16MTH1103) Numerical Methods

UNIT - I **Solution of non- linear Systems**

Solution of Algebraic and Transcendental Equations: The Bisection Method – The Method of False Position – The Iteration Method – Newton-Raphson Method. Existence of solution-Gauss elimination method(with pivoting) - Gauss Jordan method-Ill conditioned systems –Jacobi iterative method -Gauss siedel method-convergence of iterative methods.

UNIT – II **Interpolation:**

Introduction- Errors in Polynomial Interpolation – Finite differences- Forward Differences-Backward differences –Central differences – Symbolic relations and separation of symbols- Difference Equations - Differences of a polynomial-Newton's formulae for interpolation – Central difference interpolation Formulae – Gauss Central Difference Formulae –Interpolation with unevenly spaced points-Lagrange's Interpolation formula. B. Spline interpolation - Cubic spline.

UNIT – III **Curve fitting & Numerical Integration**

Curve fitting: Fitting a straight line –Second degree curve-exponential curve-power curve by the method of least squares. Numerical Differentiation and Integration – General Quadrature formula – Trapezoidal, Simpson's 1/3 and Simpson's 3/8 Rule , Gaussian Integration.

UNIT – IV **Numerical solution of IVP's in ODE**

Numerical solution of Ordinary Differential equations: Solution by Taylor's series-Picard's Method of successive Approximations-Euler's Method-Modified Euler's Method - Runge-Kutta Methods –Predictor-Corrector Method- Adams-Bashforth Method.

UNIT – V **Boundary value, Eigen value problems and solution of partial differential equations**

Finite difference method and solving Eigen value problems, power method-classification of partial differential equations- Laplace equation by Gauss Seidal & Jacobi Methods, parabolic equations. Solution of heat equation (One dimensional) by Schmith Method.

Text Books:

1. Introductory Methods by Numerical Analysis by S.S. Sastry, PHI Learning Pvt. Ltd.
2. Advanced Engineering Mathematics by Jain & S.R.K. Iyengar, Narosa Publications.

References:

1. Numerical Methods by Dr. Shahnaz Bathul, PHI Learning Pvt. Ltd.
2. Numerical Methods by T.K.V. Iyengar, B. Krishna Gandhi and others, S Chand

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(R16EPH1102) Engineering Physics - II

UNIT– I Semiconductor Physics: Fermi Level in Intrinsic and Extrinsic Semiconductors, Intrinsic Semiconductors and Carrier Concentration, Extrinsic Semiconductors and Carrier Concentration, Equation of Continuity, Direct & Indirect Band Gap Semiconductors, Hall Effect, Formation of PN Junction, PN Diode as a Rectifier (Forward and Reverse Bias).

Unit II Dielectric Properties: Electric Dipole, Dipole Moment, Dielectric Constant, Polarizability, Electric Susceptibility, Displacement Vector, Electronic, Ionic and Orientation Polarizations and Calculation of Polarizabilities -Internal Fields in Solids, Clausius -Mossotti Equation, Piezo-electricity, Pyro-electricity and Ferro- electricity.

Unit III Magnetic Properties: Permeability, Field Intensity, Magnetic Field Induction, Magnetization, Magnetic Susceptibility, Origin of Magnetic Moment, Bohr Magneton, Classification of Dia, Para and Ferro Magnetic Materials on the basis of Magnetic Moment, Domain Theory of Ferro Magnetism on the basis of Hysteresis Curve, Soft and Hard Magnetic Materials, Properties of Anti-Ferro and Ferri Magnetic Materials, Ferrites and their Applications Superconductivity, Meissner Effect, effect of Magnetic field, Type-1 and Type-II superconductors, Applications of Superconductors.

Unit IV 1. Lasers: Characteristics of Lasers, Spontaneous and Stimulated Emission of Radiation, Meta-stable State, Population Inversion, Lasing Action, Einstein s Coefficients and Relation between them, Ruby Laser, Helium-Neon Laser, Carbon Dioxide Laser, Semiconductor Diode Laser, Applications of Lasers.
2.Fiber Optics: Principle of Optical Fiber, Construction of Optical Fiber, Acceptance Angle and Acceptance Cone, Numerical Aperture, Types of Optical Fibers and Refractive Index Profiles, Attenuation in Optical Fibers, Optical Fibers in Communication System, Application of Optical Fibers.

Unit V 1.Acoustics of Buildings & Acoustic Quieting: Basic Requirement of Acoustically Good Hall, Reverberation and Time of Reverberation, Sabine s Formula for Reverberation Time(Quantitative Treatment), Measurement of Absorption Coefficient of a Material, Factors Affecting The Architectural Acoustics and their Remedies. Acoustic Quieting.
2.Nanotechnology: Origin of Nanotechnology, Nano Scale, Surface to Volume Ratio, Quantum Confinement, Bottom-up Fabrication: Sol-gel, Precipitation, Combustion Methods; Top-down Fabrication: Chemical Vapour Deposition, Physical Vapour

TEXT BOOKS

1. Engineering Physics V. Rajaendra, TATA Mc. Graw Hill Publishers.
2. Applied Physics P.K.Palanisamy (SciTech Publications (India) Pvt. Ltd.
3. Applied Physics T. Bhima Shankaram & G. Prasad (B.S. Publications)
4. Engineering Physics P.K.Palanisamy (SciTech Publications (India) Pvt. Ltd.

REFERENCES

1. Applied Physics Mani Naidu Pearson Education
2. Engineering Physics by P. Appalanaidu and Chandrasekhar VGS Booklinks.
3. Nanotechnology : A Gentle Introduction to the next Big Idea by M.Ratner, D. Ratner

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B.Tech. - I Year – II Semester	L	T/P/D	C
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(R16CSE1102) Data Structures Through 'C'

UNIT - I

Data Structures – Introduction to Data Structures- Classification of Data Structures - Abstract Data Types

Stacks - Operations of Stack- Push - Pop- Display - Necessary Conditions on Stack - Array Representation - Stack Implementations – Stack implementation of Recursion - Stack Applications – Stack Application of Expression Conversion and Expression Evaluation;

UNIT - II

Queues-Operations of Queue- Insert- Remove - Display - Necessary Conditions on Queues - Array Representation - Types of Queues: Circular Queue- D-Queues- Operations- Implementation and Applications – Queue Application of Scheduling Algorithms – First-In-First-Out Scheduling Algorithm - Round-Robin Scheduling Algorithm

UNIT – III

Linked list – Disadvantages of Linear List and Advantages of Linked List- Singly Linked List -Operations of Linked List - Insertion- Deletion - Display – Searching - Types of Lists - Circular Linked List - Double Linked List – Operations- Implementation and Applications - Linked Representation of Stacks – Linked Representation of Queues;

UNIT – IV

Trees – Definition- Terminology- Tree Types. Binary Tree- Definition- Representation- Binary Search Tree - Binary Tree Traversals - In Order - Pre Order – Post Order Tree Traversal Techniques;

Graphs – Definitions- Graph Representations- Graph Traversals - BFS and DFS;

UNIT - V

Searching - Linear and Binary Search Methods;

Sorting - Bubble Sort - Selection Sort - Insertion Sort - Radix Sort - Quick Sort - Merge sort;

Complexity – Complexity of Searching and Sorting Techniques - Big O Notation- Comparison of Sorting Techniques;

Text Books

1. "Data Structures through C" by Yashavant. P Kanetkar, BPB
2. "Data Structures Using C" by Aaron M. Tenenbaum, Pearson Education

REFERENCES:

1. "C& Data structures" by P. Padmanabham- Third Edition- B.S. Publications.
2. "Data Structures using C" by A.M.Tanenbaum- Y.Langsam- and M.J. Augenstein- Pearson-Education / PHI
3. "C Programming & Data Structures" by E. Balagurusamy, TMH.
4. "C Programming & Data Structures" by P. Dey- M Ghosh R Thereja, Oxford University Press
5. "C& Data structures"by E V Prasad and N B Venkateswarlu, S. Chand&Co.

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Common to All Branches
(ECE, EEE, CSE, IT, MECH., CIVIL)

(R16ECH1101) Engineering Chemistry

UNIT I Electrochemistry and Batteries

Concept of Electro Chemistry, Conductors (electronic & electrolytic), Conductance-Specific, Equivalent and molar conductance, Ionic conductance, ionic mobilities and their interrelation, EMF: Electrode, Electrode potential, standard electrode potential, Nernst equation and its applications, types of electrodes- Reference Electrodes (SCE, Quinhydrone electrode), Ion Selective Electrode (Glass Electrode), Galvanic Cells & Concentration Cells, Numerical problems. Batteries: Primary Cells (dry cell and Lithium cells), secondary cells (lead-Acid cell, Ni-Cd cell). Applications of batteries. Fuel cells – Hydrogen – Oxygen fuel cells, methanol – oxygen fuel cell, Advantages and applications of fuel cells.

Unit II Corrosion and its control

Definition, causes and effects of corrosion, types of corrosion. Chemical and Electrochemical corrosion (mechanism), Factors affecting rate of corrosion - Purity of metal, position of metal in Galvanic series, nature of corrosion product, temperature, pH, and humidity. Corrosion control methods – Cathodic protection, sacrificial anode, impressed current cathode. Surface coatings – metallic coatings (anodic and cathodic), methods of application of metallic coatings- hot dipping, (galvanizing, tinning) cementation, cladding, electroplating (Copper Plating), Electroless Plating (Ni plating) - Organic surface coatings – paints its constituents and their functions.

Unit III Polymers

Polymers Definition, Classification, Types of Polymerization (Addition, Condensation & Coordination). Plastics: Thermoplastic resins & Thermo set resins, Compounding & fabrication of plastics (Compression and injection moulding), Preparation, properties, engineering applications of: PVC, PS, Teflon, & Bakelite, Fibres-Nylon - 6, 6 and terylene, Fiber Reinforced plastics (FRP) - Applications Rubbers – Natural rubber, vulcanization. Elastomers – Buna-S, Butyl rubber and Thiokol rubber. Conducting Polymers: Preparation, Mechanism of conduction and applications of Poly acetylene and poly aniline.

Unit IV Water and Energy Sources

Water: Hardness of water, types of hardness, Causes of hardness, units. Numerical problems. Boiler feed water-internal treatment (Phosphate, Colloidal and Calgon conditioning), external treatment-Lime soda, Zeolite process & Ion exchange process and Numerical problems. Boiler troubles- scales & sludges, Priming and foaming, caustic embrittlement and boiler corrosion, Desalination of water-Reverse osmosis, potable water – treatment of water for domestic supply, disinfection by chlorination.

Energy sources: Fuels, Classification – Solid fuels – coal – analysis – proximate and ultimate analysis of coal, Liquid fuels – petroleum – refining of petroleum-cracking (thermal & catalytic), fixed bed catalytic cracking. Knocking (Octane and Cetane numbers) synthetic petrol –synthesis by Fischer Tropsech's process, Bergius Process; Gaseous fuels – Natural gas, CNG and LPG, Combustion – definition – HCV, LCV.

Unit V Surface and Materials Chemistry

Surface chemistry : Solid surfaces, types of adsorption, Langmuir adsorption isotherm, Calculation of surface area of solid & applications of adsorption, Colloids-classification of colloids, properties- Electrical (zeta potential) & optical (Tyndal effect) , applications of colloids.

Materials chemistry: Cement: composition of Portland cement, manufacture of port land Cement, setting & hardening of cement (reactions). Lubricants: classification, mechanism and properties of lubricant: Viscocity , Cloud point, pour point,flash & fire point,. Refractories: Classification, Characteristics of a good refractory.

TEXT BOOKS

1. Engineering Chemistry by P.C Jain & Monica Jain, Dhanpatrai Publishing Company (2008).
2. Text Book of Engineering Chemistry by Jyostna Cherukuri, Bharathi Kumari. VGS Publishers.
3. Text of Engineering Chemistry by S.S. Dara & Mukkanti S. Chand & Co,New Delhi(2006).

REFERENCES

1. Text Book of Engineering Chemistry by C.P. Murthy, C.V. Agarwal, A. Naidu B.S. Publications, Hyderabad (2006).
2. Chemistry of Engineering Materials by R.P Mani and K.N.Mishra, CENGAGE learning.
3. Applied Chemistry – A text for Engineering & Technology – Springar (2005).
4. Text Book of Engineering Chemistry – Shasi Chawla, Dhantpat Rai publishing Company, NewDelhi (2008).

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(R16CSE1202) Data Structures Through 'C' Lab

Objectives:

- To learn/strengthen a programming language like C- To learn problem solving techniques Recommended Systems/Software Requirements:
- Intel based desktop PC- ANSI C Compiler with Supporting Editors- IDE's such as Turbo C- Bloodshed C-
- Linux with gcc (GNU Compiler Collection) compiler

Week – 1

Write a C program to implement a list using array with insert, delete, display, sort, search operations

Week – 2

Write a C program to implement Stack operations (push, pop, display) using an array

Week – 3

Write a C program to implement Queue operations (insert, remove, display) using an array

Week – 4 & 5

Write a C program on Stack applications.

a) to convert infix expression into postfix expression
b) Evaluate postfix expression.
c) Implement recursion

Week – 6

Write a C program to implement scheduling algorithms using Queue

a) First – In – First – Out Algorithm b) Round Robin Algorithm

Week – 7

Write a C program to perform Linked List operations (create, insert, delete, display & find)

Week – 8

Write a C program on implementations on Linked List

a) Stack operations using Linked List (pointers)
b) Queue operations using Linked List (pointers)

Week – 9

Write a C program on Searching techniques.

a) Linear Search b) Binary Search

Week - 10

Write a C program on Sorting techniques

a) Bubble Sort b) Selection Sort

Week – 11

Write a C program on Sorting techniques

a) Insertion Sort b) Radix Sort

Week – 12

Write a C program on Sorting techniques

a) Quick Sort b) Merge Sort

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Common to All Branches
(ECE, EEE, CSE, IT, MECH., CIVIL)

(R16ECH1201) Engineering Chemistry Lab

1 Titrimetry:

a. Estimation of hardness of water by EDTA method. (or)
b. Estimation of calcium in limestone by Permanganometry.
c. Estimation of Ferrous Ion by Permanganate
d. Estimation of Ferrous Ion by $K_2Cr_2O_7$

Instrumental methods:

2 Colorimetry:

a. Determination of ferrous iron in cement by colorimetric method. (or)
b. Estimation of Copper by Colorimetric method.

3 Conductometry:

a. Conductometric titration of strong acid Vs strong base. (or)
b. Conductometric titration of mixture of acids Vs strong base.

4. Potentiometry:

a. Titration of strong acid Vs strong base by potentiometry. (or)
b. Titration of weak acid Vs strong base by potentiometry.

5. Physical Properties:

a. Determination of viscosity of sample oil by redwood/oswald's viscometer
b. Determination Surface Tension of lubricants

6. Identification and Preparations:

a. Preparation of organic compounds Asprin
b. Benzimidazole

7. Mineral Analysis

a. Determination of percentage of copper in brass. (or)
b. Estimation of manganese dioxide in pyrolusite.

TEXT BOOKS

1. Practical Engineering Chemistry by K.Mukkanti, etal, B.S.Publishers, Hyd.

REFERENCES

1. Text Book of Engineering chemistry by R.N.Goyal and Harmendra Goel.
2. Instrumental Methods of Chemical Analysis, Chatwal Anand, Himalaya Publications.

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(R16EPH1201) Engineering Physics – II Lab
(Common for ECE, CSE, IT, EEE)

1. Determination of wavelength of a given source of light by using diffraction grating.
2. To find the frequency of a tuning fork – Melde's Experiment.
3. To find the frequency of ac signal generator – A.C Sonometer.
4. Time constant of an RC – Circuit
5. LCR – Circuit
6. Newton Rings
7. Dispersive power of the material of a Prism – Spectrometer.
8. Stewart and Gee's Experiment
9. Torsional pendulum
10. Energy gap of a semi conductor.
11. Characteristics of a laser diode.
12. Numerical aperture of optical fiber
13. Bending loss of optical fiber

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(R16MTH1105) PROBABILITY AND STATISTICS

Objectives: To learn

- Understand a random variable that describes randomness or an uncertainty in certain realistic situation. It can be of either discrete or continuous type.
- In the discrete case, study of the binomial and the Poisson random variables and the Normal random variable for the continuous case predominantly describe important probability distributions. Important statistical properties for these random variables provide very good insight and are essential for industrial applications.
- Most of the random situations are described as functions of many single random variables. In this unit, the objective is to learn functions of many random variables through joint distributions.
- The types of sampling, Sampling distribution of means ,Sampling distribution of variance, Estimations of statistical parameters, Testing of hypothesis of few unknown statistical parameters.
- The mechanism of queuing system ,The characteristics of queue, The mean arrival and service rates
- The expected queue length, The waiting line
- The random processes, The classification of random processes, Markov chain, Classification of states
- Stochastic matrix (transition probability matrix),Limiting probabilities, Applications of Markov chains

UNIT-I

Single Random variables and probability distributions: Random variables – Discrete and continuous. Probability distributions, mass function/ density function of a probability distribution . Mathematical Expectation, Moment about origin, Central moments Moment generating function of probability distribution.

Binomial, Poisson & normal distributions and their properties. Moment generating functions of the above three distributions, and hence finding the mean and variance.

UNIT-II

Multiple Random variables, Correlation & Regression: Joint probability distributions- Joint probability mass / density function, Marginal probability mass / density functions, Covariance of two random variables, Correlation - Coefficient of correlation, The rank correlation.

Regression- Regression Coefficient, The lines of regression and multiple correlation & regression.

UNIT-III

Sampling Distributions and Testing of Hypothesis

Sampling: Definitions of population, sampling, statistic, parameter. Types of sampling, Expected values of Sample mean and varience, sampling distribution, Standard error, Sampling distribution of means and sampling distribution of varience.

Parameter estimations – likelihood estimate, interval estimations.

Testing of hypothesis: Null hypothesis, Alternate hypothesis, type I, & type II errors – critical region, confidence interval, Level of significance. One sided test, two sided test,

Large sample tests:

i. Test of Equality of means of two samples equality of sample mean and population mean (cases of known varience & unknown varience, equal and unequal variances)
ii. Tests of significance of difference between sample S.D and population S.D.
iii. Tests of significance difference between sample proportion and population proportion & difference between two sample proportions.

Small sample tests:

Student t-distribution, its properties; Test of significance difference between sample mean and population mean; difference between means of two small samples

Snedecor's F- distribution and it's properties. Test of equality of two population variences

Chi-square distribution , it's properties, Chi-square test of goodness of fit

UNIT-IV

Queuing Theory: Structure of a queuing system, Operating Characteristics of queuing system, Transient and steady states, Terminology of Queuing systems, Arrival and service processes- Pure Birth-Death process Deterministic queuing models- M/M/1 Model of infinite queue, M/M/1 model of finite queue .

UNIT-V

Stochastic processes: Introduction to Stochastic Processes –Classification of Random processes, Methods of description of random processes, Stationary and non-stationary random process, Average values of single random process and two or more random processes. Markov process, Markov chain, classification of states – Examples of Markov Chains, Stochastic Matrix.

TEXT BOOKS:

1) Higher Engineering Mathematics by Dr. B.S. Grewal, Khanna Publishers
2) Probability and Statistics for Engineers and Scientists by Sheldon M.Ross, Academic Press 3) Operations Research by S.D. Sarma,

REFERENCE BOOKS:

1. Mathematics for Engineers by K.B.Datta and M.A S.Srinivas,Cengage Publications
2. Probability and Statistics by T.K.V.Iyengar & B.Krishna Gandhi Et
3. Fundamentals of Mathematical Statistics by S C Gupta and V.K.Kapoor
4. Probability and Statistics for Engineers and Scientists by Jay l.Devore.

Outcomes:

- Students would be able to identify distribution in certain realistic situation. It is mainly useful for circuit as well as non-circuit branches of engineering. Also able to differentiate among many random variable involved in the probability models. It is quite useful for all branches of engineering.
- The student would be able to calculate mean and proportions (small and large sample) and to make important decisions from few samples which are taken out of unmanageably huge populations .It is Mainly useful for non-circuit branches of engineering.
- The students would be able to find the expected queue length, the ideal time, the traffic intensity and the waiting time. These are very useful tools in many engineering and data management problems in the industry. It is useful for all branches of engineering.
- The student would able to understand about the random process, Markov process and Markov chains which are essentially models of many time dependent processes such as signals in communications, time series analysis, queuing systems. The student would be able to find the limiting probabilities and the probabilities in nth state. It is quite useful for all branches of engineering

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(R16CSE1103) MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE

Objectives:

- To explain with examples the basic terminology of functions, relations, and sets.
- To perform the operations associated with sets, functions, and relations.
- To relate practical examples to the appropriate set, function, or relation model, and interpret the associated operations and terminology in context.
- To describe the importance and limitations of predicate logic.
- To relate the ideas of mathematical induction to recursion and recursively defined structures.
- To use Graph Theory for solving problems.

UNIT-I

Mathematical Logic : Statements and notations, Connectives, Well formed formulas, Truth Tables, tautology, equivalence implication, Normal forms, Quantifiers, universal quantifiers. **Predicates** : Predicative logic, Free & Bound variables, Rules of inference, Consistency, proof of contradiction, Automatic Theorem Proving.

UNIT-II

Relations: Properties of Binary Relations, equivalence, transitive closure, compatibility and partial ordering relations, Lattices, Hasse diagram. Functions: Inverse Function Composition of functions, recursive Functions, Lattice and its Properties, **Algebraic structures :** Algebraic systems Examples and general properties, Semi groups and monads, groups sub groups' homomorphism, Isomorphism.

UNIT-III

Elementary Combinatorics: Basis of counting, Combinations & Permutations, with repetitions, Constrained repetitions, Binomial Coefficients, Binomial Multinomial theorems, the principles of Inclusion – Exclusion. Pigeon hole principles and its application.

UNIT-IV

Recurrence Relation : Generating Functions, Function of Sequences Calculating Coefficient of generating function, Recurrence relations, Solving recurrence relation by substitution and Generating funds. Characteristics roots solution of In homogeneous Recurrence Relation.

UNIT-V

Graph Theory : Representation of Graph, DFS, BFS, Spanning Trees, planar Graphs. Graph Theory and Applications, Basic Concepts Isomorphism and Sub graphs, Multi graphs and Euler circuits, Hamiltonian graphs, Chromatic Numbers.

TEXT BOOKS :

1. Elements of DISCRETE MATHEMATICS- A computer Oriented Approach-C L Liu, D P Mohapatra. Third Edition, Tata McGraw Hill.
2. Discrete Mathematics for Computer Scientists & Mathematicians, J.L. Mott, A. Kandel, T.P. Baker, PHI.

REFERENCE BOOKS :

1. Discrete Mathematics and its Applications, Kenneth H. Rosen, Fifth Edition.TMH.
2. Discrete Mathematical structures Theory and application-Malik & Sen, Cengage.
3. Discrete Mathematics with Applications, Thomas Koshy, Elsevier.
4. Logic and Discrete Mathematics, Grass Man & Trembley, Pearson Education.

Outcomes:

- Ability to Illustrate by examples the basic terminology of functions, relations, and sets and demonstrate knowledge of their associated operations.
- Ability to Demonstrate in practical applications the use of basic counting principles of permutations, combinations, inclusion/exclusion principle and the pigeonhole methodology.
- Ability to represent and Apply Graph theory in solving computer science problems.

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(R16CSE1104) DATA STRUCTURES THROUGH C++

Objectives:

- To understand the basic concepts such as Abstract Data Types, Linear and Non Linear Data structures.
- To understand the notations used to analyze the Performance of algorithms.
- To understand the behavior of data structures such as stacks, queues, trees, hash tables, search trees, Graphs and their representations.
- To choose the appropriate data structure for a specified application.
- To understand and analyze various searching and sorting algorithms.
- To write programs in C++ to solve problems using data structures such as arrays, linked lists, stacks queues, trees, graphs, hash tables, search trees.

UNIT – I

C++ Class Overview-Basic OOP concepts, Class Definition, Objects, Class Members, Access Control, Class Scope, Constructors and Destructors, parameter passing methods, Inline functions, static class members, this pointer, Friend functions, Dynamic memory allocation and de-allocation (new and delete), Exception handling.

Function Overloading, Operator Overloading, Generic Programming-Function and class templates, Inheritance basics, base and derived classes, inheritance types, base class access control, runtime polymorphism using virtual functions, abstract classes, streams I/O.

UNIT – II

Algorithms, performance analysis, Time complexity and Space complexity, Review of basic data structures-The list ADT, Stack ADT, Queue ADT, array and linked list Implementations using template classes in C++. Tree-Basic Terminology, Binary tree ADT, array and linked representations, traversals, Threaded binary trees.

UNIT – III

Dictionaries, linear list representation, skip list representation, operations insertion, deletion and searching, Hashing-hash table representation, hash functions, collision resolution-separate chaining, open addressing-linear probing, quadratic probing, double hashing, rehashing extensible hashing comparison of hashing and skip lists.

Priority Queues-Definition, ADT, Realizing a Priority Queue using Heap-Definition, Insertion, Deletion, Heap Sort, External Sorting-Model for external sorting, Multiway merge, Polyphase merge.

UNIT - IV

Search Tress (Part- 1): Binary Search Trees, Definition, ADT, Implementation, Operations-Searching, Insertion and Deletion, AVL Tree-Definition, Operations-Insertion and Searching.

Search trees (Part-II): B-Tree Definition, B-Tree of order m, insertion, deletion and searching, Comparison of Search Trees. Graphs-Basic terminology, representations of Graphs, Graph search methods –DFS,BFS.

UNIT – V

Text Processing: Pattern matching algorithms-Brute Force, the Knuth-Morris-Pratt algorithm, Tries, Standard Tries, Compressed Tries, Suffix Tries.

Text Books:

1. Data structures, Algorithms and Applications in C++, S. Sahni, University Press (India) Pvt. Ltd, 2nd edition, Universities Press.
2. Data Structures and Algorithms in C++, Michael T. Goodrich, R. Tamassia and D. Mount, Wiley student edition, seventh edition, John Willey and Sons.

References:

1. Data structures and Algorithm Analysis in C++, Mark Allen Weiss, Pearson Education. Ltd., Second Edition
2. Data structures and algorithms in C++, 3rd Edition, Adam Drozdek, Cengage Learning.
3. Data structures using C and C++, Langsam, Augenstein and Tanenbaum, PHI.
4. Problem solving with C++, The OOP, Fourth edition, W.Savitch, Pearson eduction.
5. Data structures using C++, D.S. Malik, Cengage Learning, India Edition.
6. Data Structures with C++ Using STL, 2nd edition, W.H. Ford and W.R. Topp, Pearson/PHI.
7. Mastering Algorithms with C,K. Loudon, O'Reilly, SPD pvt, Ltd.
8. An Introduction to Data structures and Algorithms, J.A. Storer, Springer.
9. Advanced Data structures & Algorithms in C++, V.V.Muniswamy, Jaico Publishing House.

Outcomes:

- Learn how to use data structure concepts for realistic problems.
- Ability to identify appropriate data structure for solving computing problems in respective.
- Ability to solve problems independently and think critically.

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(R16ECE1136) DIGITAL LOGIC DESIGN

Objectives:

- To understand basic number systems codes and logical gates.
- To understand the Boolean algebra and minimization logic.
- To understand the design of combinational sequential circuits.
- To understand the basic s of various memory.

UNIT-I

Digital Systems: Binary Numbers, Octal, Hexa Decimal and other base numbers, Number base conversions, complements, signed binary numbers, Floating point number representation, binary codes, error detecting and correcting codes, digital logic gates(AND, NAND,OR,NOR, Ex-OR, Ex-NOR), Boolean algebra , basic theorems and properties, Boolean functions, canonical and standard forms.

UNIT-II

Gate –Level Minimization and combination circuits , The K-Maps Methods, Three Variable, Four Variable, Five Variable , sum of products , product of sums Simplification, Don't care conditions , NAND and NOR implementation and other two level implantation.

UNIT-III

Combinational Circuits (CC): Design Procedure, Combinational circuit for different code converters and other problems, Binary Adder, subtractor, Multiplier, Magnitude Comparator, Decoders, Encoders, Multiplexers, De-multiplexers.

UNIT-IV

Synchronous Sequential Circuits: Latches, Flip -flops, analysis of clocked sequential circuits, design of counters, Up-down counters, Ripple counters , Registers, Shift registers, Synchronous Counters.
Asynchronous Sequential Circuits: Reduction of state and follow tables, Role free Conditions.

UNIT-V:

Memory: Random Access memory, types of ROM, Memory decoding, address and data bus, Sequential Memory, Cache Memory, Programmable Logic Arrays, memory Hierarchy in terms of capacity and access time.

TEXT BOOKS:

1) Digital Design- M. Morris Mano.

REFERENCE BOOKS:

1) 1. Switching and Finite Automata Theory by Zvi. Kohavi, Tata McGraw Hill.
2) 2. Switching and Logic Design, C.V.S. Rao, Pearson Education. 3) 3. Digital Principles and Design – Donald D.Givone, Tata McGraw Hill, Edition. 4) 4. Fundamentals of Digital Logic & Micro Computer Design , 5TH Edition, M. Rafiquzzaman John Wiley.

Outcomes:

After this course student could able to design, understand the number systems, combinational sequential circuits. And they should be in a position to continue with computer organization.

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(R16ECE1102) ELECTRONIC DEVICES AND CIRCUITS

Objectives:

This is a fundamental course, basic knowledge of which is required by all the circuit branch engineers. This course focuses:

- To familiarize the student with the principle of operation, analysis and design of Junction diode, BJT and FET amplifier circuits, transistors and field effect transistors.
- To understand diode as rectifier.
- To study basic principle of filter circuits and various types.

UNIT -I

P-N Junction Diode: Qualitative Theory of P-N Junction, P-N Junction as a Diode, Diode Equation, Volt-Ampere Characteristics, Temperature dependence of VI characteristic, Ideal versus Practical – Resistance levels (Static and Dynamic), Transition and Diffusion Capacitances, Diode Equivalent Circuits, Load Line Analysis,

Breakdown Mechanisms in Semiconductor Diodes, Zener Diode Characteristics.

Special Purpose Electronic Devices: Principle of Operation and Characteristics of Tunnel Diode (with the help of Energy Band Diagram), Varactor Diode, SCR and Semiconductor Photo Diode.

UNIT -II

Rectifiers and Filters : The P-N junction as a Rectifier, Half wave Rectifier, Full wave Rectifier, Bridge Rectifier, Harmonic components in a Rectifier Circuit, Inductor Filters, Capacitor Filters, L- Section Filters, p- Section Filters, Comparison of Filters, Voltage Regulation using Zener Diode**.**

UNIT -III

Bipolar Junction Transistor and UJT: The Junction Transistor, Transistor Current Components, Transistor as an Amplifier, Transistor Construction, BJT Operation, BJT Symbol, Common Base, Common Emitter and Common Collector Configurations, Limits of Operation , BJT Specifications, BJT Hybrid Model, Determination of h-parameters from Transistor Characteristics, Comparison of CB, CE, and CC Amplifier Configurations, UJT and Characteristics.

UNIT -IV

Transistor Biasing and Stabilization: Operating Point, The DC and AC Load lines, Need for Biasing, Fixed Bias, Collector Feedback Bias, Emitter Feedback Bias, Collector - Emitter Feedback Bias, Voltage Divider Bias, Bias Stability, Stabilization Factors, Stabilization against variations in VBE and ß, Bias Compensation using Diodes and Transistors, Thermal Runaway, Thermal Stability, Analysis of a Transistor Amplifier Circuit using h-Parameters.

UNIT -V

Field Effect Transistor and FET Amplifiers

Field Effect Transistor: The Junction Field Effect Transistor (Construction, principle of operation, symbol) – Pinch-off Voltage - Volt-Ampere characteristics, The JFET Small Signal Model, MOSFET (Construction, principle of operation, symbol), MOSFET Characteristics in Enhancement and Depletion modes.

FET Amplifiers: FET Common Source Amplifier, Common Drain Amplifier, Generalized FET

Amplifier, Biasing FET, FET as Voltage Variable Resistor, Comparison of BJT and FET.

TEXT BOOKS:

1. Millman's Electronic Devices and Circuits – J. Millman, C.C.Halkias, and Satyabrata Jit, 2 Ed.,1998, TMH.
2. Electronic Devices and Circuits – Mohammad Rashid, Cengage Learing, 2013
3. Electronic Devices and Circuits – David A. Bell, 5 Ed, Oxford.

REFERENCE BOOKS:

1. Integrated Electronics – J. Millman and Christos C. Halkias, 1991 Ed., 2008, TMH.
2. Electronic Devices and Circuits – R.L. Boylestad and Louis Nashelsky, 9 Ed., 2006, PEI/PHI.
3. Electronic Devices and Circuits – B. P. Singh, Rekha Singh, Pearson, 2 Ed, 2013.
4. Electronic Devices and Circuits - K. Lal Kishore, 2 Ed., 2005, BSP.
5. Electronic Devices and Circuits – Anil K. Maini, Varsha Agarwal, 1 Ed., 2009, Wiley India Pvt. Ltd.
6. Electronic Devices and Circuits – S.Salivahanan, N.Suresh Kumar, A.Vallavaraj, 2 Ed., 2008, TMH.

Outcomes:

- Understand and Analyse the different types of diodes, operation and its characteristics.
- Design and analyse the DC bias circuitry of BJT and FET.
- Design biasing circuits using diodes and transistors.
- To analyze and design diode application circuits, amplifier circuits and oscillators employing BJT, FET devices.

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(R16EEE1130) BASIC ELECTRICAL ENGINEERING

Objectives:
This course introduces the concepts of basic electrical engineering parameters, quantities, analysis of AC and DC circuits, the construction operation and analysis of transformers, DC and AC machines. It also gives knowledge about measuring instruments operation in detail.

UNIT – I
Introduction to Electrical Engineering: Ohm's law, basic circuit components, Kirchhoff's laws. Simple problems.
Network Analysis: Basic definitions, types of elements, types of sources, resistive networks, inductive networks, capacitive networks, and series parallel circuits, star delta and delta star transformation. , Network theorems-Superposition, Thevenins's, Maximum power transfer theorems and simple problems.

UNIT-II
Alternating Quantities: Principle of ac voltages, waveforms and basic definitions, root mean square and average values of alternating currents and voltage, form factor and peak factor, phasor representation of alternating quantities, the J operator and phasor algebra, analysis of ac circuits with single basic network element, single phase series circuits.

UNIT-III
Transformers : Principles of operation, Constructional Details, Ideal Transformer and Practical Transformer, Losses, Transformer Test, Efficiency and Regulation Calculations (All the above topics are only elementary treatment and simple problems).

UNIT-IV
D.C. and A.C. Machines:
D.C generators: Principle of operation of dc machines, types of D.C generators, EMF equation in D.C generator. **D.C motors**: Principle of operation of dc motors, types of D.C motors, losses and torque equation, losses and efficiency calculation in D.C generator. **A.C Machines:** Three phase induction motor, principle of operation, slip and rotor frequency, torque (simple problems).

UNIT V
Basic Instruments: Introduction, classification of instruments, operating principles, essential features of measuring instruments, Moving coil permanent magnet (PMMC) instruments, Moving Iron of Ammeters and Voltmeters (elementary Treatment only).

TEXT BOOKS:
1. Basic concepts of Electrical Engineering, PS Subramanyam, BS Publications.
2. Basic Electrical Engineering, S.N. Singh, PHI.

REFERENCE BOOKS:
1. Basic Electrical Engineering, Abhijit Chakrabarthi, Sudipta nath, Chandrakumar Chanda, Tata-McGrawHill.
2. Principles of Electrical Engineering, V.K Mehta, Rohit Mehta, S.Chand Publications.

3. Basic Electrical Engineering, T.K.Nagasarkar and M.S. Sukhija, Oxford University Press.
4. Fundamentals of Electrical Engineering, RajendraPrasad, PHI. 5. Basic Electrical Engineering by D.P.Kothari , I.J. Nagrath, McGraw-Hill.

Outcomes:

After going through this course the student gets a thorough knowledge on basic electrical circuits, parameters, and operation of the transformers in the energy conversion process, electromechanical energy conversion, construction operation characteristics of DC and AC machines and the constructional features and operation of operation measuring instruments like voltmeter, ammeter, wattmeter etc...With which he/she can able to apply the above conceptual things to real-world electrical and electronics problems and applications.

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(R16EEE1212) ELECTRICAL AND ELECTRONICS LAB

PART - A

1. Verification of Superposition and Reciprocity theorems.
2. Verification of Maximum power transfer theorem.
3. Verification of Thevenin's and Norton's theorems.
4. Magnetization characteristics of D.C. Shunt generator.
5. Swinburne's Test on DC shunt machine.
6. Brake test on DC shunt motor.
7. OC and SC tests on Single-phase transformer. 8. Brake test on 3-phase Induction motor.

PART – B

1. PN Junction Diode Characteristics (Forward bias, Reverse bias).
2. Zener Diode Characteristics.
3. Transistor CE Characteristics (Input and Output).
4. Rectifier without Filters (Full wave & Half wave).
5. Rectifier with Filters (Full wave & Half wave).

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(R16CSE1203) DATA STRUCTURES THROUGH C++ LAB

Objectives:
To make the student learn an object oriented way of solving problems.
To make the student write ADTs for all data structures.

Recommended Systems/Software Requirements:
Intel based desktop PC with minimum of 166 MHZ or faster processor with at least 64 MB RAM and 100 MB free disk space
C++ compiler and STL Recommended

Week 1:
Write C++ programs to implement the following using an array.
a) Stack ADT b) Queue ADT

Week 2:
Write C++ programs to implement the following using as singly linked list.
a) Stack ADT b) Queue ADT

Week 3:
Write C++ programs to implement the deque (double ended queue) ADT using a doubly linked list and an array.

Week 4:
Write a C++ program to perform the following operations:
a) Insert an element into a binary search tree.
b) Delete an element from a binary search tree.
c) Search for a key element in a binary search tree.

Week 5:
Write C++ programs that use recursive functions to traverse the given binary tree in
a) Preorder b) Inorder and c) Postorder.

Week 6:
Write C++ programs that use non-recursive functions to traverse the given binary tree in
a) Preorder b) Inorder and c) Postorder.

Week 7:
Write C++ programs for the implementation of BFS and DFS for a given graph.

Week 8:
Write C++ programs for implementing the following sorting methods.
a) Merge Sort b) Heap Sort

Week 9:
Write a C++ program to perform the following operations
a) Insertion into a B- tree b) Deletion from a B-tree

Week 10:
Write a C++ program to perform the following operation
a) Insertion into an AVL Tree b) Deletion from AVL Tree.

Week 11:
Write a C++ program to implement all the functions of a dictionary (ADT) using hashing.

Week 12:
Write a C++ program for implementing Knuth-Morris- Pratt pattern matching algorithm.
(Note : Use Class Templates in the above Programs)

Text Books:

1. Data Structures A Pseudocode Approach with C++, India Edition, R.F. Gilberg and B.A. Forouzan, Cengage Learning.
2. 2.Programming Principles and Practice using C++, B. Stroustrup, Addison-Wesley (Pearson education).
3. 3.Data Structures and STL, W.J. Collins, McGraw Hill, International edition.
4. 4.Data Structures and Algorithms with OODesign patterns in C++, B.R. Priess, John Wiley & sons.
5. 5.The Art, Philosophy, and Science of OOP with C++, Rick Miller, SPD.
6. 6.C++ for programmers, P.J. Deitel and H.M. Deitel, PHI / Pearson.

Outcomes

1. The skills to apply OOP in C++ programming in problem solving.
2. Basics of C++ programming, Inheritance programs and Exception Handling.
3. Learn how to use data structures concepts for realistic problem.
4. ability to apply solving and logical skills to programming in C++ language and also in other languages.

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(R16CSE1105) COMPUTER ORGANIZATION

Objectives:

- To understand basic components of computers.
- To explore the I/O organizations in depth.
- To explore the memory organization.
- To understand the basic chip design and organization of 8086 with assembly language programming.

UNIT-I Basic Computer Organization — Functions of CPU, I/O Units, Memory: Instruction: Instruction Formats - One address, two addresses, zero Addresses and three addresses and comparison; addressing modes with numeric examples: Program Control- Status bit conditions, conditional branch instructions, Program Interrupts: Types of Interrupts.

UNIT-II Input-Output Organizations- I/O Interface, I/O Bus and Interface modules: I/O Vs memory Bus, Isolated Vs Memory-Mapped I/O, Asynchronous data Transfer- Strobe Control, Hand Shaking: Asynchronous Serial transfer- Asynchronous Communication interface, Modes of transfer programmed - I/O, Interrupt Initiated I/O,DMA: DMA Controller, DMA Transfer, IOP-CPU-IOP Communication, Intel 8089 IOP.

UNIT – III

Memory Organizations

Momory hierarchy, Main Memory, RAM, ROM Chips, Memory Address Map, memory Connection to CPU, associate memory , Cache Memory, Data Cache, Instruction cache, Miss and Hit ratio, Access time, associative, set associative, mapping , waiting into cache, Introduction to virtual memory.

UNIT – IV

8086 CPU Pin Diagram- Special functions of general purpose registers, Segment register, concept of pipelining, 8086 Flag register, Addressing modes of 8086.

UNIT-V

8086-Instruction formats: assembly Language Programs involving branch & Call instructions, sorting, evaluation of arithmetic expressions.

Text books:

1) Computer system Architecture: Morris Mano (UNIT-1,2,3).
2) Advanced Micro Processor and Peripherals- Hall/ A K Ray(UNIT-4,5).

Reference books:

1) Computer Organization and Architecture — William Stallings Sixth Edition, Pearson/PHI.
2) Structured Computer Organization — Andrew S. Tanenbaum. 4th Edition PHI/Pearson.
3) Fundamentals or Computer Organization and Design, - Sivaraama Dandamudi Springer Int. Edition.
4) Computer Architecture a quantitative approach, John L. Hennessy and David A. Patterson, Fourth Edition Elsevier.
5) Computer Architecture: Fundamentals and principles of Computer Design, Joseph D. Dumas II, BS Publication.

Outcomes: After this course students understand in a better way the I/O and memory organization in depth. They should be in a position to write assembly language programs for various applications.

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(R16CSE1106) DATABASE MANAGEMENT SYSTEMS

Objectives:

- To understand the basic concepts and the applications of database systems.
- To master the basics of SOL and construct queries using SOL.
- To understand the relational database design Principles.
- To become familiar with the basic issues of transaction processing and concurrency control.
- To become familiar with database storage structures and access techniques.

UNIT - I

Introduction-Database System Applications: Purpose of Database Systems, View of Data - Data Abstraction, Instances and Schemas, Data Models ,Database Languages - DDL, DML. Database Access from Application Programs, Transaction Management, Data Storage and Querying, Database – Architecture, Database users and Administrators, History of Database systems.

Introduction to Data base design, ER diagrams, Beyond ER Design, Entities. Attributes and Entity sets, Relationships and Relationship sets, Additional features of ER Model, Conceptual Design with the ER Model, Conceptual design for Large enterprises. Relational Model: Introduction to the Relational Model - Integrity Constraints over Relations, Enforcing Integrity constraints, Querying relational data, Logical data base Design, Introduction to views - destroying /altering Tables and views.

UNIT- II

Relational Algebra and Calculus: Relational Algebra - Selection and projection, Set operations, Renaming, Joins, Division, Examples of Algebra Queries, Relational Calculus – Tuple Relational Calculus - Domain relational calculus - Expressive Power of Algebra and calculus.

Form of Basic SQL Query - Examples of Basic SQL Queries, Introduction to nested Queries, Correlated Nested Queries, Set - Comparison Operators, Aggregate Operators, NULL values-Comparison using Null values -Logical connectives -AND, OR and NOT - Impact on SQL Constructs, outer Joins, Disallowing NULL values, Complex Integrity Constraints in SQL Triggers and active data bases.

UNIT – III

Introduction to scheme refinement: problems caused by redundancy, Decompositions – Problem related to decomposition, Functional Dependencies – Reasoning about FDS, Normal Forms – FIRST, SECOND, THIRD Normal forms – BCNF – Properties of Decompositions – Loss less join Decomposition, Dependency preserving Decomposition, Schema Refinement in Data base Design – Multi valued Dependencies – FOURTH Normal Form, Join Dependencies, FIFTH Normal Form, Inclusion Dependencies.

UNIT – IV

Transaction Management: Transaction Concept – Transaction State – Implementation of Atomicity and Durability - Concurrent – Executions – Serializability – Recoverability – Implementation of Isolation – Testing for serializability.

Concurrency Control: Lock – Based Protocols – Timestamp Based Protocols – Validation – Based protocols – Multiple Granularity.

Recovery Syhstem – Failure Classification – Storage Structure – Recovery and atomicity – Log – Based Recovery – Recovery with Concurrent Transactions – Buffer Management – Failure with loss of nonvolatile storage – Advance Recovery systems – Remote Backup systems.

UNIT – V

Overview of Storage and Indexing : Data on External Storage, File Organization and Indexing – Clustered Indexes, Primary and Secondary Indexes, Index data Structures – Hash Based indexing, Tree based Indexing Comparison of File Organizations.

Tree Structured Indexing: Intuitions for tree indexes, Indexed Sequential Access Methods (ISAM) B+ Trees: A Dynamic Index Structure, Search Insert, Delete.

Hash Based Indexing: Static Hashing, Extendable hashing, Liner Hashing, Extendable hashing vs Liner Hashing.

TEXT BOOKS:

1. Data base Management systems, Raghu Ramakrishan, Johannes Gehrke, TMH, 3rd Edition, 2003.
2. Data base System Concepts, A. Silberschatz, H.F. Korth, S.Sudharshan, McGraw hill, VI edition, 2006.

REFERENCE BOOKS

1. Database Systems, 6th edition, Ramez Elmastri, Shamkant B. Navathe, Pearson Education, 2013.
2. Database Principles, Programming, and Performance, P.O. Neil, E.O'Neil, 2nd ed., ELSEVIER.
3. Database Systems, A Practical approach to Design implementation and Management Fourth edition, Thomas Connolly, Carolyn Begg, Pearson education.
4. Database System Concepts, Peter Rob & Carlos Coronel, Cengage learning, 2008
5. Fundamentals of Relational Database Management systems, S.Sumathi, S. Esakkirajan, Springer.
6. Database Management System Oracle SQL and PL/SQL, P.K.Das Gupta, PHI.
7. Introduction to Database Management, M.L. Gillenson and others, Wiley Student Edition.
8. Database Development and Management, Lee Chao, Auerbach publications, Taylor & Francis Group.
9. Introduction to Database Systems, C.J.Date, Pearson Education.
10. Database Management Systems, G.K.Gupta, TMH.

Outcomes:

- Demonstrate the basic elements of a relational database management system.
- Ability to identify the data models for relevant problems.
- Ability to design entity relationship and convert entity relationship diagrams into RDBMS and formulate SQL queries on the respect data.
- Apply normalization for the development of application software's

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(R16CSE1107) JAVA PROGRAMMING

Objectives:

- To understand object oriented programming concepts, and apply them in problem solving.
- To learn the basics of java Console and GUI based programming.

UNIT – I

OOP concepts – Data abstraction, encapsulation, inheritance, benefits of inheritance, polymorphism, classes and objects, Procedural and object oriented programming paradigms.

Java programming – History of Java, comments, data types variables constants, scope and life time of variables, operators, operator hierarchy, expressions, type conversion and casting, enumerated types, control flow – block scope, conditional statements, loops, break and continue statements, simple java stand along programs, arrays, console input and output, formatting output, constructors, methods, parameter passing, static fields and methods, access control, this reference, overloading methods and constructors, recursion, garbage collection, building strings, exploring string class.

UNIT- II

Inheritance – inheritance hierarchies, super and sub classes, Member access rules, super keyword, preventing inheritance: final classes and methods, the Object class and its methods.

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

Interfaces – interfaces vs. Abstract classes, defining an interface implementing interfaces, accessing implementations through interface references, extending interface.

Inner classes – Uses of inner classes, local inner classes, anonymous inner classes, static inner classes, examples.

Packages – Defining, Creating and Accessing a Package, Understanding CLASSPATH, importing packages.

UNIT – III

Exception handling - Dealing with errors, benefits of exception handling, the classification of exceptions – exception hierarchy, checked exceptions and unchecked exceptions, usage of try, catch, throw, throws and finally, re-throwing exceptions, exception specification, built in exceptions, creating own exception sub classes.

Multithreading - Differences between multiple processes and multiple threads, thread states, creating threads, interrupting threads, thread priorities, synchronizing threads, inter-thread communication, producer consumer pattern.

UNIT – IV

Collection Framework in Java - Introduction to Java Collections, Overview of Java Collection Frame work, Generics, Commonly used Collection classes – Array List, Vector, Hash table, Stack, Enumeration, Iterator, String Tokenizer, Random, Scanner, calendar and Properties.

Files – Streams – byte streams, character streams, text input/output, binary input/output, random access file operations, File management using File class.

Connecting to Database – JDBC Type 1 to 4 drivers, connecting to a database, querying a database and processing the results, updating data with JDBC.

UNIT – V

GUI Programming with Java – The AWT class hierarchy, introduction to Swing, Swing vs AWT, Hierarchy for Swing components, Containers – JFrame, JApplet, JDialog, JPanel, Overview of some swing components – Jbutton, JLabel, JTextField, JTestArea, Simple swing applications, Layout management – Layout manger types – border, grid and flow

Event handling – Events, Event Sources, Event classes, Event Listeners, Relationship between Event sources and Listeners, Delegation event model, Examples: handling a button click, handling mouse events, Adapter classes.

Applets – Inheritance hierarchy for applets, differences between applets and applications, life cycle of an applet, passing parameters to applets, applet security issues.

TEXT BOOK:

1. Java Fundamentals – A comprehensive introduction, Herbert Schildt and Dale Skrien, TMH

REFERENCE BOOKS :

1. Java for Programmers, P.J.Deitel and H.M.Deitel, Pearson education (OR) Java: How to program P.J.Deitel and H.M.Deitel, PHI.
2. Object Oriented Programming through Java, P. Radha Krishna Universities Press.
3. Thinking in Java, Bruce Eckel, Pearson Education.
4. Programming in Java, S.Malhotra and S. Choudhary, Oxford Univ. Press.

Outcomes:

- Understanding of OOP concepts and basics of java programming (Console and GUI based)
- The skills to apply OOP and Java programming in problem solving.
- Should have the ability to extend his/her knowledge of Java programming further on his/her own.

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(R16HAS1102) ENVIRONMENTAL STUDIES

Objectives:

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

UNIT – I

Ecosystems: Definition, Scope and importance of ecosystem. Classification, structure and function of an ecosystem, Food chains , food webs and ecological pyramids, Flow of energy, Biogeochemical cycles, bioaccumulation, Biomagnification, ecosystem value, services and carrying capacity, Field visits.

UNITS - II

Natural Resources: Classification of Resources: Living and Non-Living resources, water resources: use and over utilization of surface and ground water, floods and droughts, Dams: benefits and problems. **Mineral resources:** use and exploitation, environmental effects of extracting and using mineral resources, **Land resources:** Forest resources, **Energy resources:** growing energy needs, renewable and non renewable energy sources, use of alternate energy source, case studies.

UNIT – III

Biodiversity and Biotic Resources: Introduction, Definition, genetic, species and ecosystem diversity. Value of biodiversity; consumptive use, productive use, social, ethical, aesthetic and optional values. India as a mega diversity nation, Hot spots of biodiversity. Field visit. Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts; conservation of biodiversity: in-Situ and Ex-situ conservation. National Biodiversity act.

UNIT – IV

Environmental Pollution and Control Technologies: Environmental Pollution: Classification of pollution, **Air Pollution:** Primary and secondary pollutants, Automobile and industrial pollution, Ambient air quality standards. **Water Pollution:** Sources and types of pollution, drinking water quality standards. **Soil Pollution :** Sources and types, impacts of modern agriculture, degradation of soil. **Noise Pollution:** Sources and Health hazards, standards, **Solid waste:** Municipal Solid Waste management composition and characteristics of e-Waste and its management. **Pollution control technologies:** Wastewater Treatment methods: Primary secondary and Tertiary, Overview of air pollution control technologies, Concepts of bioremediation. **Global Environmental Problems and Global Efforts:** Climate change and impacts on human environment. Ozone depletion and Ozone depleting substances (ODS). Deforestation and desertification International conventions / Protocols: Earth summit, Kyoto protocol and Montreal Protocol

UNIT – V

Environmental Policy, Legislation & EIA: Environmental Protection act. Legal aspects Air Act-1981, Water Act, Forest Act, Wild life Act, Municipal Solid waste management and handling rules, biomedical waste management and handling rules, hazardous waste management and handling rules. **EIA:** EIA structure, methods of baseline data acquisition. Overview on impacts of air, water, biological and Socia-economical aspects. Strategies for risk assessment, Concepts of Environmental

Management Plan (EMP). **Towards Sustainable Future:** Concept of Sustainable Development, Population and its explosion, Crazy Consumerism, Environmental Education, Urban Sprawl, Human Health, Environmental Ethics, Concept of Green Building, Ecological Foot Print, Life Cycle assessment (LCA), Low carbon life style.

SUGGESTED TEXT BOOKS:

1. Textbook of Environmental Studies for Undergraduate courses by Erach Bharucha for University Grants Commission
2. Environmental Studies by R. Rajagopalan, Oxford University, Press.

REFERENCE BOOKS:

1. Environmental Science: towards a sustainable future by Richard T.Wright, 2008 PHL Learning Private Ltd. New Delhi.
2. Environmental Engineering and Science by Gilbert M.Masters and Wendell P.Ela, 2008 PHI Learning PVt. Ltd.
3. Environmental Science by Daniel B.Botkin & Edward A.Keller, Wiley INDIA edition.
4. Environmental Studies bny Anubha Kaushik, 4th Edition, New age International Publishers.
5. Text book of Environmental Science and Technology – Dr. M. Anji Reddy 2007, BS Publications.

Outcomes:

Based on this course, the Engineering graduate will understand / evaluate / develop technologies on the basis of ecological principles and environmental regulations which intern helps in sustainable development.

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(R16CSE1108) FORMAL LANGUAGES AND AUTOMATA THEORY

Objectives:

The purpose of this course is to acquaint the student with an overview of the theoretical foundations of computer science from the perspective of formal languages.

- Classify machines by their power to recognize languages.
- Employ finite state machines to solve problems in computing.
- Explain deterministic and non-deterministic machines.
- Comprehend the hierarchy of problems arising in the computer sciences.

UNIT I :

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

Finite Automata : NFA with Î transitions - Significance, acceptance of languages. Conversions and Equivalence : Equivalence between NFA with and without Î transitions, NFA to DFA conversion, minimisation of FSM, equivalence between two FSM's, Finite Automata with output- Moore and Melay machines.

UNIT II :

Regular Languages : Regular sets, regular expressions, identity rules, Constructing finite Automata for a given regular expressions, Conversion of Finite Automata to Regular expressions. Pumping lemma of regular sets, closure properties of regular sets (proofs not required).

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

UNIT III :

Context Free Grammars : Ambiguity in context free grammars. Minimisation of Context Free Grammars. Chomsky normal form, Greiback normal form, Pumping Lemma for Context Free Languages. Enumeration of properties of CFL (proofs omitted).

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. (Proofs not required). Introduction to DCFL and DPDA.

UNIT IV :

Turing Machine : Turing Machine, definition, model, design of TM, Computable functions, recursively enumerable languages. Church's hypothesis, counter machine, types of Turing machines (proofs not required). linear bounded automata and context sensitive language.

UNIT V :

Computability Theory : Chomsky hierarchy of languages, linear bounded automata and context sensitive language, LR(0) grammar, decidability of problems, Universal Turing Machine, undecidability of posts. Correspondence problem, Turing reducibility, Definition of P and NP problems, NP complete and NP hard problems.

TEXT BOOKS :

1. "Introduction to Automata Theory Languages and Computation". Hopcroft H.E. and Ullman J. D. Pearson Education
2. Introduction to Theory of Computation – Sipser 2nd edition Thomson

REFERENCES BOOKS:

1. Introduction to Forml languages Automata Theory and Computation Kamala Krithivasan Rama R.
2. Introduction to Computer Theory, Daniel I.A. Cohen, John Wiley.
3. Theory Of Computation: A Problem - Solving Approach, Kavi Mahesh, Wiley India Pvt. Ltd.
4. "Elements of Theory of Computation", Lewis H.P. & Papadimition C.H. Pearson /PHI.
5. Theory of Computer Science – Automata languages and computation -Mishra and Chandrashekaran, 2nd edition, PHI.

Outcomes:

- Graduate should be able to understand the concept of abstract machines and their power to recognize the languages.
- Attains the knowledge of language classes & grammars relationship among them with the help of Chomsky hierarchy.
- Graduate will be able to understanding the pre-requisites to the course compiler or advanced compiler design.

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(R16CSE1109) DESIGN AND ANALYSIS OF ALGORITHMS

Objectives:

- To analyze performance of algorithms.
- To choose the appropriate data structure and algorithm design method for a specified application.
- To understand how the choice of data structures and algorithm design methods impacts the performance of programs.
- To solve problems using algorithm design methods such as the greedy method, divide and conquer, dynamic programming, backtracking and branch and bound.
- Prerequisites (Subjects) Data structures, Mathematical foundations of computer science.

UNIT I:

Introduction: Algorithm, Psuedo code for expressing algorithms, Performance Analysis-Space complexity, Time complexity, Asymptotic Notation- Big oh notation, Omega notation, Theta notation and Little oh notation, Probabilistic analysis, Amortized analysis.

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

UNIT II:

Searching and Traversal Techniques: Efficient non - recursive binary tree traversal algorithm, Disjoint set operations, union and find algorithms, Spanning trees, Graph traversals - Breadth first search and Depth first search, AND / OR graphs, game trees, Connected Components, Bi - connected components. Disjoint Sets- disjoint set operations, union and find algorithms, spanning trees, connected components and biconnected components.

UNIT III:

Greedy Method: General method, applications - Job sequencing with dead lines, 0/1 knapsack problem, Minimum cost spanning trees, Single source shortest path problem.

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

UNIT IV:

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

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

UNIT V:

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

TEXT BOOKS :

1. Fundamentals of Computer Algorithms, Ellis Horowitz,Satraj Sahni and Rajasekharam, Galgotia publications pvt. Ltd.
2. Foundations of Algorithm, 4th edition, R. Neapolitan and K. Naimipour, Jones and Bartlett Learning.
3. Design and Analysis of Algorithms, P. H. Dave, H. B. Dave, Pearson Education, 2008.

REFERENCES :

1. Computer Algorithms, Introduction to Design and Analysis, 3rd Edition, Sara Baase, Allen, Van, Gelder, Pearson Education.
2. Algorithm Design: Foundations, Analysis and Internet examples, M. T. Goodrich and R. Tomassia, John Wiley and sons.
3. Fundamentals of Sequential and Parallel Algorithm, K. A. Berman and J. L. Paul, Cengage Learning.
4. Introducation to the Design and Analysis of Algorithms, A. Levitin, Pearson Education.
5. Introducation to Algorithms, 3rd Edition, T. H. Cormen, C. E. Leiserson, R. L. Rivest, and C. Stein, PHI Pvt. Ltd.
6. Design and Analysis of algorithm, Aho, Ullman and Hopcroft, Pearson Education, 2004.

Outcomes:

- Be able to analyze algorithms and improve the efficiency of algorithms.
- Apply different designing methods for development of algorithms to realistic problems, such as divide and conquer, greedy and etc.
- Ability to understand and estimate the performance of algorithm.

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(R16CSE1204) JAVA PROGRAMMING LAB

Objectives:

- To introduce java compiler and eclipse platform.
- To impart hand on experience with java programming.

Note:

i. Use Linux and MySQL for the Lab Experiments. Though not mandatory, encourage the use of Eclipse platform.
ii. The list suggests the minimum program set. Hence, the concerned staff is requested to add more problems to the list as needed.

1. Use Eclipse or Netbean platform and acquaint with the various menus. Create a test project, add a test class and run it. See how you can use auto suggestions, auto fill. Try code formatter and code refactoring like renaming variables, methods and classes. Try debug step by step with a small program of about 10 to 15 lines which contains at least one if else condition and a for loop.
2. Write a Java program that works as a simple calculator. Use a grid layout to arrange buttons for the digits and for the +, -, *, % operations. Add a text field to display the result. Handle any possible exceptions like divided by zero.
3.
    a. Develop an applet in Java that displays a simple message.
    b. Develop an applet in Java that receives an integer in one text field, and computes its factorial Value and returns it in another text field, when the button named "Compute" is clicked.
4. Write a Java program that creates a user interface to perform integer divisions. The user enters two numbers in the text fields, Num1 andNum2. 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 the exception in a message dialog box.
5. Write a Java program that implements a multi-thread application that has three threads. First thread generates random integer every 1 second and if the value is even, second thread computes the square of the number and prints. If the value is odd, the third thread will print the value of cube of the number.
6. Write a Java program that connects to a database using JDBC and does add, delete, modify and retrieve operations.
7. Write a Java program that simulates a traffic light. The program lets the user select one of three lights: red, yellow, or green with radio buttons. On selecting a button, an appropriate message with "Stop" or "Ready" or "Go" should appear above the buttons in selected colr. Initially there is no message shown.
8. Write a Java program to create an abstract class named Shape that contains two integers and an empty method named 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.

9. Suppose that a table named Table.txt is stored in a text file. The first line in the file is the header, and the remaining lines correspond to rows in the table. The elements are seperated by commas. Write a java program to display the table using Labels in Grid Layout.
10. Write a Java program that handles all mouse events and shows the event name at the center of the window when a mouse event is fired (Use Adapter classes).
11. Write a Java program that loads names and phone numbers from a text file where the data is organized as one line per record and each field in a record are seperated by a tab ( ). It takes a name or phone number as input and prints the corresponding other value from the hash table (hint: use hash tables).
12. Implement the above program with database instead of a text file.
13. Write a Java program that takes tab seperated data (one record per line) from a text file and inserts them into a database.
14. Write a java program that prints the meta-data of a given table.

TEXT BOOK:

1. Java Fundamentals - A comprehensive Introduction, Herbert Schildt and dale skrien, TMH.

REFERENCE BOOKS:

1. Java for Programmers, P.J. Deitel and H.M. Deitel, Pearson education (OR) Java: How to Program P.J. Deitel and H.M. Deitel, PHI.
2. Object Orients Programming through Java, P. Radha Krishna, Universities Press.
3. Thinking in Java, Bruce Eckel, Pearson Education.
4. Programming in Java, S. Malhotra and S. Choudhary, Oxford Univ. Press.

Outcomes:

- Basics of java programming, multi-threaded programs and Exception handling.
- The skills to apply OOP in Java programming in problem solving.
- Ability to access data from a DB with Java programs.
- Use of GUI components (Console and GUI based).

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(R16CSE1205) DATABASE MANAGEMENT SYSTEMS LAB

Objectives:

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

Roadway Travels

"Roadway Travels" is in business since 1997 with several buses connecting different places in india. Its main office is located in Hydearabd.

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

- Reservation and Ticketing
- Cancellations

Reservation & Cancellation:

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

Cancellations are also directly handed at the bokking office.

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

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

Experiment 1: E-R Model

Analyze the carefully and come up with the entities in it. Identitfy what data has to be persisted in the database. This contains the entities, attributes etc.

Identify the primary keys for all the entities. Identify the others keys like candidate keys, partial keys, if any.

Example: Entities:

1. BUS
2. Ticket
3. Passenger

Relationships:

1. Reservation
2. Cancellation

PRIMARY KEY ATTRIBUTES:

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

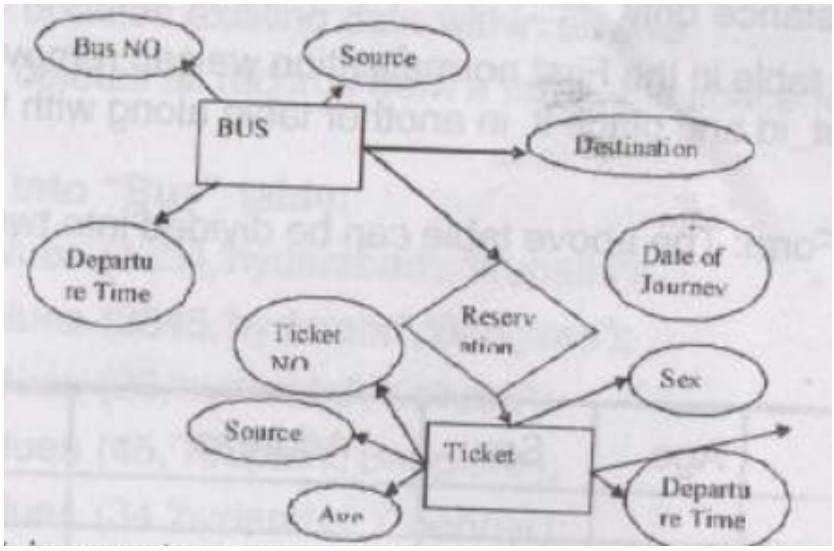
Apart from the above mentioned entities you can identify more. The above mentioned are few.

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

Experiment 2: Concept design with E-R Model

Relate the entities appropriately. Apply cardnalities for each relationship. Identify strong entities and weak entities (if any). Indicate the type of relationships (total / partial). Try to incorporate generalization, aggregation, specialization etc wherever required.

Example: E-R diagram for bus



Note: The student is required to submit a document by drawing the E-R Diagram to the lab teacher.

Experiment 3: Relational Model

Represent all the entities (Strong, Weak) in tabular fashion. Represent realtionships in a tabular fashion. There are different ways of representing relationships as tables based on the requirement. Different types of attributes (Composite, Multi-valued, and Derived) have different way of representation.

Example: The passenger tables look as below. This is an example. You can add more attributes based on E-R model. This is not a normalized table.

Passenger

Name	Age	Sex	Address	Ticket_id	Passport ID

Note: The student is required to submit a document by Represent relationships in a tabular fashion to the lab teacher.

Experiment 4: Normalization

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

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

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

Passenger

Name	Age	Sex	Address	Passport ID

Passport ID	Ticket_id

You can do the second and third normal forms if required. Any how Normalized tables are given at the end.

Experiment 5: Installation of MySQL and practice DDL commands

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

Example for creation of a normalized "Passenger" table.

```
CREATE TABLE Passenger(
   Passport_id INTEGER PRIMARY KEY,
   Name VARCHAR(50) NOT NULL,
   Age INTEGER NOT NULL,
   Sex CHAR,
   Address VARCHAR(50) NOT NULL
);
```

Similarly create all other tables.
Note: Detailed creation of tables is given at the end.
Experiment 6: Practicing DML commands
DML commandsare used for managing data within schema objects. Some examples:

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

insert values into "Bus" table:

```
insert into Bus values (1234, 'hyderabad', 'tirupathi');

insert into Bus values(2345, 'hyderabad', 'banglore');

insert into Bus values(23, 'hyderabad', 'kolkata');

insert into Bus values(45, 'tirupathi', 'bangalore');

insert into Bus values(34, 'hyderabad', 'chennai');
```

insert values into "Passenger" table:

```
insert into Passenger values(1, 45, 'ramesh', 45, 'M', 'abc123');

insert into Passenger values(2, 78, 'geetha', 36, 'F', 'abc124');

insert into Passenger values(45, 90, 'ram', 30, 'M', 'abc12');

insert into Passenger values(67, 89, 'ravi', 50, 'M', 'abc14');

insert into Passenger values(56, 22, 'seetha', 32, 'F', 'abc55');
```

Few more Examples of DML commands:

```
SELECT * FROM Bus; (selects all the attributes and displays)
```

```
UPDATE Bus SET Bus_No = 1 WHERE Bus_No = 2;
```

Experiment 7: Querying

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

Practice the following Queries:

1. Dispaly unique PNR_No of all passengers.
2. Display all the names of male passengers.
3. Display the ticket numbers and names of all the passengers.
4. Find the ticket numbers of the passengers whose name start with 'r' and ends with 'h'.
5. Find the names of passengers whose age is between 30 and 45.
6. Display all the passengers names beginning with 'A'
7. Display the sorted list of passengers names.

Experiment 8 and Experiment 9: Querying (continued...)

You are going to practice queries using Aggregate functions (COUNT, SUM, AVG, MAX,and MIN), GROUP BY, HAVING and Creation and droping of VIEWS.

1. Write a Query to display the information present in the Passenger and cancellation tables. Hint: Use UNION Operator.
2. Display the number of days in a week on which the 9W01 bus is available.
3. Find number of tickets booked for each PNR_No using GROUP BY CLAUSE. Hint: Use GROUP BY on PNR_No.
4. Find the distinct PNR numbers that are present.
5. Find the number of tickets booked by a passenger where the number of seats is greater than 1. Hint: Use GROUP BY, WHERE and HAVING CLAUSES.
6. Find the total number of cancelled setas.

Experiment 10: Triggers

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

E.g:

```
CREATE TRIGGER updatecheck BEFORE UPDATE ON passenger FOR EACH ROW
BEGIN
   IF NEW.TickentNO > 60 THEN
      SET New.TickentNO = TicketNo;
   ELSE
      SET New.TicketNo = 0;
   END IF;
END
```

Experiment 11: Procedures

In this session you are going to learn Creation of stored procedure, Execution of procedure and modification of procedure. Practice procedures using the database.

E.g:

```
CREATE PROCEDURE myproc()
BEGIN
   SELECT     COUNT(Tickets)
   FROM     Ticket
   WHERE    age >= 40;
END;
```

Experiment 12: Cursors

In this week you need to do the following: Declare a cursor that defines a result set.

Open the cursor to establish the result set. Fetch the data into local variables as needed from the cursor, one row at a time. Close the cursor when done

```
CREATE PROCEDURE myproc(in_customer_id INT)
BEGIN
   DECLARE v_id INT;
   DECLARE v_name VARCHAR(30);

   DECLARE c1 CURSOR FOR
   SELECT stdid, stdFirstname FROM students WHERE stdid - in_customer_id;

   OPEN c1;
   FETCH c1 INTO v_id, v_name;
   CLOSE c1;
END;
```

Tables:

BUS

Bus No: VARCAHR : PK(primary key)
Source: VARCHAR
Destination: VARCHAR

Passenger

PPNO: VARCHAR(15) : PK
Name: VARCHAR(15)
Age: INT(4)
Sex: CHAR(10) : Male/Female
Address: VARCHAR(20)

Passenger_Tickets

PPNO: VARCHAR(15) : PK
Ticket_No: NUMERIC(9)

Reservation

PNR_No: NUMERIC(9) : FK
Journey_date: DATETIME(8)

No_of_seats: INT(8)
Address: VARCHRA(50)
Contact_No: NUMERIC(9) --> Should not less than 9 and Should not accept any other character other than interger
STATUS: CHAR(2) : Yes/No

Cancellation

PNR_No: NUMERIC(9) : FK
Journey_date: DATETIME(8)
No_of_seats: INT(8)
Address: VARCHRA(50)
Contact_No: NUMERIC(9) --> Should not less than 9 and Should not accept any other character other than interger
STATUS: CHAR(2) : Yes/No

Ticket

Ticket_No: NUMERIC(9) : FK
Journey_date: DATETIME(8)
Age: INT(4)
Sex: CHAR(10) : Male/Female
Source: VARCHAR
Destination: VARCHAR
Dep_time: VARCHAR

RFERENCE BOOKS:

1. Introduction to SQL, Rick F.vander Lans, Pearson education.
2. Oracle PL/SQL, B.Rosenzweig and E.Silvestrova, Pearson education.
3. Oracle PL/SQL Programming, Steven Feuerstein, SPD.
4. SQL & PL/SQL for Oracle 10g, Black Book, Dr. P.S. Deshpande, Dream Tech.
5. Oracle Database 11g PL/SQL Programming, M.Mc Laughlin, TMH.
6. SQL Fundamentals, J.J. Patrick, Pearson Education.

Outcomes:

- Ability to design and implement a database schema for given problem.
- Be capable to Design and build a GUI application.
- Apply the normalization techniques for development of application software to realistic problems.
- Ability to formulate queries using SQL DML/DDL/DCL commands.

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(R16CSE1110) PRINCIPLES OF PROGRAMMING LANGUAGES

Objectives:

- To briefly describe various programming paradigms.
- To provide conceptual understanding of High level language design and implementation.
- To introduce the power of scripting languages.

UNIT I :

Preliminary Concepts: 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. **Syntax and Semantics:** general Problem of describing Syntax and Semantics, formal methods of describing syntax - BNF, EBNF for common programming languages features, parse trees, ambiguous grammars, attribute grammars, denotational semantics and axiomatic semantics for common programming language features.

UNIT II :

Data types: Introduction, primitive, character, user defined, array, associative, record, union, pointer and reference types, design and implementation uses related to these types. Names, Variable, concept of binding, type checking, strong typing, type compatibility, named constants, variable initialization. **Expressions and Statements:** Arithmetic relational and Boolean expressions, Short circuit evaluation mixed mode assignment, Assignment Statements, Control Structures – Statement Level, Compound Statements, Selection, Iteration, Unconditional Statements, guarded commands.

UNIT III :

Subprograms and Blocks: Fundamentals of sub-programs, Scope of life time of variables, static and dynamic scope, design issues of subprograms and operations, local referencing environments, parameter passing methods, overloaded sub-programs, generic sub-programs, parameters that are sub-program names, design issues for functions user defined overloaded operators, co routines.

UNIT IV :

Abstract Data types: Abstractions and encapsulation, introductions to data abstraction, design issues, language examples, C++ parameterized ADT, object oriented programming in small talk, C++, Java, C#, Ada 95

Concurrency: Subprogram level concurrency, semaphores, monitors, massage passing, Java threads, C# threads.

Exception handling: Exceptions, exception Propagation, Exception handler in Ada, C++ and Java.

Logic Programming Language: Introduction and overview of logic programming, basic elements of prolog, application of logic programming.

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, Case Study: Python- Values and Types, Variables, Storage and Control, Bindings and Scope, Procedural Abstraction, Separate Compilation, Module Library.

TEXT BOOKS:

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.

REFERENCE BOOKS:

1. Programming Languages, 2nd Edition, A. B. Tucker, R. E. Noonan, TMH.
2. Programming Languages, K. C. Louden, 2nd Edition, Thomson, 2003.
3. LISP Patric Henry Winston and Paul Horn Pearson Education.
4. Programming in Prolog, W. F. Clocksin & C. S. Mellish, 5th Edition, Springer.
5. Programming Python, M. Lutz, 3rd Edition, O'reilly, SPD, rp-2007.
6. Core Python Programming, Chun, II Edition, Pearson Education, 2007.
7. Guide to Programming with Python, Michel Dawson, Thomson, 2008

Outcomes:

- Ability to express syntax and semantics in formal notation.
- Ability to apply suitable programming paradigm for the application.
- Gain knowledge and comparison of the features programming languages.

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(R16HAS1105) HUMAN VALUES AND PROFESSIONAL ETHICS (OPEN ELECTIVE)

Objectives: This introductory course input is intended.

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

UNIT - I:

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

UNIT - II:

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

UNIT - III:

Understanding Harmony in the Family and Society - Harmony in Human - Human Relationship: Understanding harmony in the Family the basic unit of human interaction. Understanding values in human - human relationship; meaning of Nyaya and program for its fulfillment to ensure Ubhay-tripti; **Trust (Vishwas) and Respect (Samman) as the foundational values of relationship.** Understanding the meaning of Vishwas; Difference between intention and competence. Understanding the meaning of Samman, Difference between respect and differentiation; the other salient values in relationship. Understanding the harmony in the society (society being an extension of family): Samadhan, Samridhi, Abhay, Sah-astiva as comprehensive Human Goals. Visualizing a universal harmonious order in society - Undivided Society (Akhand Samaj), Universal Order (Sarvabhaum Vyawastha) - from family to world family!

UNIT - IV:

Understanding Harmony in the nature and Existence - Whole existence as Co-existence: Understanding the harmony in the Nature. Interconnectedness and mutual fulfillment among the four orders of nature - recyclability and self-regulation in nature. Understanding Existence as Co-

existence (Sah-astiva) of mutually interacting units in all-pervasive space. Holistic perception of harmony at all levels of existence.

UNIT - V:

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

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

Case studies of typical holistic technologies, management models and production systems. Strategy for transition from the present state to Universal Human Order.

a. At the level of individual: as socially and ecologically responsible engineers, technologists and managers
b. At the level of society: as mutually enriching institutions and organizations.

TEXT BOOKS:

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

REFERENCE BOOKS:

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

Relevant CDs, Movies, Documentaries & Other Literature:

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

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(R16CIV1123) INTELLECTUAL PROPERTY RIGHTS (OPEN ELECTIVE)

UNIT - I:

Introduction to Intellectual property: Introduction, types of intellectual property, international organizations, agencies and treaties, importance of intellectual property rights.

UNIT - II:

Trade Marks: Purpose and function of trademarks, acquisition of trade mark rights, protectable matter, selecting and evaluating trade mark, trade mark registration processes.

UNIT - III:

Law of copy rights: Fundamental of copy right law, originality of material, rights of reproduction, rights to perform the work publicly, copy right ownership issues, copy right registration, notice of copy right, international copy right law.

Law of patents: Foundation of patent law, patent searching process, ownership rights and transfer

UNIT - IV:

Trade Secrets: Trade secrete law, determination of trade secrete status, liability for misappropriations of trade secrets, protection for submission, trade secrete litigation.

Unfair competition: Misappropriation right of publicity, False advertising.

UNIT - V:

New development of intellectual property: new developments in trade mark law; copy right law, patent law, intellectual property audits.

International overview on intellectual property, international - trade mark law, copy right law, international patent law, international development in trade secrets law.

TEXT BOOKS & REFERENCES:

1. Intellectual property right, Deborah, E. Bouchoux, cengage learning.
2. Intellectual property right - Unleashing the knowledge economy, prabuddha ganguli, Tata Mc Graw Hill Publishing Company Ltd.

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(R16MTH1106) OPERATIONS RESEARCH (OPEN ELECTIVE)

Objectives:

This subject will provide students with

- Ability to understand and analyze managerial problems in industry so that they are able to use resources (capitals, materials, staffing, and machines) more effectively;
- Knowledge of formulating mathematical models for quantitative analysis of managerial problems in industry;
- Skills in the use of Operations Research approaches and computer tools in solving real problems in industry;
- Mathematical models for analysis of real problems in Operations Research.

UNIT – I

Development – Definition– Characteristics and Phases – Types of models – Operations Research models – applications.

Allocation: Linear Programming Problem Formulation – Graphical solution – Simplex method – Artificial variables techniques: Two–phase method, Big-M method.

UNIT – II

Transportation Problem – Formulation – Optimal solution, unbalanced transportation problem – Degeneracy.

Assignment problem – Formulation – Optimal solution - Variants of Assignment Problem- Traveling Salesman 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

Replacement: Introduction – Replacement of items that deteriorate with time – when money value is not counted and When money value is counted – Replacement of items that fail completely- Group Replacement.

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.

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 – V

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.

DYNAMIC Programming: Introduction – Terminology- Bellman's Principle of Optimality – Applications of dynamic programming- shortest path problem
– linear programming problem.

Simulation: Introduction, Definition, types of simulation models, Steps involved in the simulation process- Advantages and disadvantages-applications of simulation to queuing and inventory.

TEXT BOOK :

1. Operations Research /J.K.Sharma 4e. /MacMilan
2. Introduction to O.R/Hillier & Libermann/TMH

REFERENCE BOOKS :

1. Introduction to O.R /Taha/PHI
2. Operations Research/ NVS Raju/ SMS Education/3rd Revised Edition
3. Operations Research /A.M.Natarajan, P.Balasubramaniam, A. Tamilarasi/Pearson Education.
4. Operations Research / Wagner/ PHI Publications.
5. Operations Research/M.V. Durga Prasad, K, Vijaya Kumar Reddy, J. Suresh Kumar/ Cengage Learning.

Course Outcomes

1. Upon completion of the subject, students will be able to
2. recognize the importance and value of Operations Research and mathematical modeling in solving practical problems in industry;
3. formulate a managerial decision problem into a mathematical model;
4. understand Operations Research models and apply them to real-life problems;
5. use computer tools to solve a mathematical model for a practical problem.

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(R16CSE1113) SOFTWARE ENGINEERING

Objectives:

- To understanding of software process models such as waterfall and evolutionary models.
- To understanding of software requirements and SRS document.
- To understanding of different software architectural styles.
- To understanding of software testing approaches such as unit testing and integration testing.
- To understanding on quality control and how to ensure good quality software.

UNIT - I:

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

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

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

UNIT - II:

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

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

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

UNIT - III:

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

Creating an architectural design: software architecture, Data design, Architectural styles and patterns, Architectural Design, assessing alternative architectural designs, mapping data flow into a software architecture.

Modeling component-level design : Designing class-based components, conducting component-level design, Object constraint language, designing conventional components.

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

UNIT - IV:

Testing Strategies: A strategic approach to software testing, test strategies for conventional software, Black-Box and White-Box testing, Validation testing, System testing, the art of Debugging.

Product metrics: Software Quality, Frame work for Product metrics, Metrics for Analysis Model, Metrics for Design Model, Metrics for source code, Metrics for testing, Metrics for maintenance.

Metrics for Process and Products: Software Measurement, Metrics for software quality.

UNIT - V:

Risk Management: Reactive vs Proactive Risk strategies, software risks, Risk identification, Risk projection, Risk refinement, RMMM, RMMM Plan.

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

TEXT BOOKS :

1. Software Engineering A practitioner's Approach, Roger S Pressman, 6th edition. McGrawHill International Edition.
2. Software Engineering, Ian Sommerville, 7th edition, Pearson education.

REFERENCE BOOKS :

1. Software Engineering, A Precise Approach, Pankaj Jalote, Wiley India, 2010.
2. Software Engineering: A Primer, Waman S Jawadekar, Tata McGraw-Hill, 2008
3. Fundamentals of Software Engineering, Rajib Mall, PHI, 2005
4. Software Engineering, Principles and Practices, Deepak Jain, Oxford University Press.
5. Software Engineering1: Abstraction and modelling, Diner Bjorner, Springer International edition, 2006.
6. Software Engineering2: Specification of systems and languages, Diner Bjorner, Springer International edition 2006.
7. Software Engineering Foundations, Yingux Wang, Auerbach Publications, 2008.
8. Software Engineering Principles and Practice, Hans Van Vliet, 3rd edition, John Wiley & Sons Ltd.
9. Software Engineering3: Domains, Requirements, and Software Design, D. Bjorner, Springer International Edition.
10. Introduction to Software Engineering, R. J. Leach, CRC Press.

Outcomes:

- Ability to identity the minimum requirements for the development of application.
- Ability to develop, maintain, efficient, reliable and cost effective software solutions.
- Ability to critically thinking and evaluate assumptions and arguments.

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(R16CSE1118) COMPILER DESIGN

Objectives:

- To describe the steps and algorithms used by language translators.
- To discuss the effectiveness of optimization.
- To explain the machine dependent aspects of Compilation

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.

Top down Parsing: Context free grammars, Top down parsing – Backtracking, LL (1), recursive descent parsing, Predictive parsing, Preprocessing steps required for predictive parsing.

UNIT – II

Bottom up parsing : Shift Reduce parsing, LR and LALR parsing, Error recovery in parsing , handling ambiguous grammar, YACC – automatic parser generator.

UNIT – III

Semantic analysis : Intermediate forms of source Programs – abstract syntax tree, polish notation and three address codes. Attributed grammars, Syntax directed translation, Conversion of popular Programming languages language Constructs into Intermediate code forms, Type checker.

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

UNIT – IV

Code optimization : Consideration for Optimization, Scope of Optimization, local optimization, loop optimization, frequency reduction, folding, DAG representation.

Data flow analysis : Flow graph, data flow equation, 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.

TEXT BOOKS :

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.

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. Engineering a Compiler-Cooper & Linda, Elsevier.
4. Compiler Construction, Louden, Thomson.

Outcomes:

- Ability to undestand the the design of a compiler given features of the languages.
- Ability to implement practical aspects of automata theory.
- Gain Knowledge of powerful compiler generation tools.

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(R16CSE1114) OPERATING SYSTEMS

Objectives:

- To understand main components of OS and their working
- To study the operations performed by OS as a resource manager
- To understand the different scheduling policies of OS
- To understand the different memory management techniques
- To understand process concurrency and synchronization
- To understand the concepts of input/ output, storage and file management
- To study different OS and compare their features.

UNIT - I:

Operating System Introduction: Operating Systems Objectives and functions, Computer System Architecture, OS Structure, OS Operations, Evolution of Operating Systems - Simple Batch, Multi programmed, time shared, Personal Computer, Parallel, Distributed Systems, Real-Time Systems, Special - Purpose Systems, Operating System services, user OS Interface, System Calls, Types of System Calls, System Programs, Opening System Design and Implementation, OS Structure, Virtual machines.

UNIT - II:

Process and CPU Scheduling - Process concepts - The Process, Process State, Process Control Block, Threads, Process Scheduling - Scheduling Queues, Schedulers, Context Switch, Preemptive Scheduling, Dispatcher, Scheduling Criteria, Scheduling algorithms, Multiple-Processor Scheduling, Real-Time Scheduling, Thread scheduling, Case studies: Linux, Windows.

Process Coordination - Process Synchronization, The Critical section Problem, Peterson's solution, Synchronization Hardware, Semaphores, and Classic Problems of Synchronization, Monitors, Case Studies: Linux, Windows.

UNIT - III:

Memory Management and Virtual Memory - Logical & physical Address Space, Swapping, Contiguous Allocation, Paging, Structure of Page Table. Segmentation, Segmentation with Paging, Virtual Memory, Demand Paging, Performance of Demanding Paging, Page Replacement, Page Replacement Algorithms, Allocation of Frames, Thrashing.

UNIT - IV:

File System Interface - The Concept of a File, Access methods, Directory Structure, File System Mounting, File Sharing, Protection, File System Implementation - File System Structure, File System Implementation, Allocation methods, Free-space Management, Directory Implementation, Efficiency and Performance.

Mass Storage Structure - Overview of Mass Storage Structure, Disk Structure, Disk Attachment, Disk Scheduling, Disk Management, Swap space Management.

UNIT - V:

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

Protection - System Protection, Goals of Protection, Principles of Protection, Domain of Protection, Access Matrix, Implementation of Access Matrix, Access Control, Revocation of Access Rights, Capability-Based Systems, Language-Based Protection.

TEXT BOOKS:

1. Operating System Principles, Abraham Silberchatz, Peter B. Galvin, Greg Gagne 8th Edition, Wiley Student Edition.
2. Operating systems - Internals and Design Principles, W. Stallings, 6th Edition, Pearson.

REFERENCES BOOKS:

1. Modern Operating Systems, Andrew S Tanenbaum 3rd Edition PHI.
2. Operating Systems A concept - based Approach, 2nd Edition, D. M. Dhamdhere, TMH.
3. Principles of Operating Systems, B. L. Stuart, Cengage learning, India Edition.
4. Operating Systems, A. S. Godbole, 2nd Edition, TMH
5. An Introduction to Operating Systems, P.C.P. Bhatt, PHI.
6. Operating Systems, S, Haldar and A. A. Arvind, Pearson Education.
7. Operating Systems, R. Elmasri, A. G. Carrick and D. Levine, Mc Graw Hill.
8. Operating Systems in depth, T. W. Doeppner, Wiley.

Outcome:

- Apply optimization techniques for the improvement of system performance.
- Ability to understand the synchronous and asynchronous communication mechanisms in their respective OS.
- Learn about minimization of turnaround time, waiting time and response time and also maximization of throughput with keeping CPU as busy as possible.
- Ability to compare the different OS

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(R16CSE1139) COMPUTER NETWORKS

Objectives:

- To introduce the fundamental various types of computer networks.
- To demonstrate the TCP/IP and OSI models with merits and demerits.
- To explore the various layers of OSI Model.
- To introduce UDP and TCP Models.

UNIT - I:

Overview of the Internet: Protocol, Layering Scenario, TCP/IP Protocol Suite: The OSI Model, Internet history standards and administration; Comparison of the OSI and TCP/IP reference model.
Physical Layer: Guided transmission media, wireless transmission media.
Data Link Layer - design issues, CRC codes, Elementary Data Link Layer Protocols, sliding window protocol

UNIT - II:

Multi Access Protocols - ALOHA, CSMA, Collision free protocols, Ethernet- Physical Layer, Ethernet Mac Sub layer, data link layer switching & use of bridges, learning bridges, spanning tree bridges, repeaters, hubs, bridges, switches, routers and gateways.

UNIT - III:

Network Layer: Network Layer Design issues, store and forward packet switching connection less and connection oriented networks-routing algorithms-optimality principle, shortest path, flooding, Distance Vector Routing, Control to Infinity Problem, Hierarchical Routing, Congestion control algorithms, admission control.

UNIT - IV:

Internetworking: Tunneling, Internetwork Routing, Packet fragmentation, IPv4, IPv6 Protocol, IP addresses, CIDR, IMCP, ARP, RARP, DHCP.
Transport Layer: Services provided to the upper layers elements of transport protocol-addressing connection establishment, Connection Release, Crash Recovery.

UNIT - V:

The Internet Transport Protocols: UDP-RPC, Real Time Transport Protocols, The Internet Transport Protocols- Introduction to TCP, The TCP Service Model, The TCP Segment Header, The Connection Establishment, The TCP Connection Release, The TCP Connection Management Modeling, The TCP Sliding Window, The TCP Congestion Control, The future of TCP.
Application Layer- Introduction, providing services, Applications layer paradigms, Client server model, Standard client-server application-HTTP, FTP, electronic mail, TELNET, DNS, SSH

TEXT BOOKS:

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

REFERENCES BOOKS:

1. An Engineering Approach to Computer Networks - S. Keshav, 2nd Edition, Pearson Edication.
2. Understanding communications and Networks, 3rd Edition, W. A. Shay, Cengage Learning.
3. Introduction to Computer Networks and Cyber Security, Chwan-Hwa (John) Wu, J. David Irwin, CRC Press.
4. Computer Networks, L. L. Peterson and B. S. Davie, 4th edition, ELSEVIER.
5. Computer Networking: A Top-Down Approach Featuring the Internet, James F. Kurose, K. W. Ross, 3rd Edition, Pearson Eduction.

Outcomes:

- Students should be understand and explore the basics of Computer Networks and Various Protocols. He/She will be in a position to understand the World Wide Web concepts.
- Students will be in a position to administrate a network and flow of information further he/she can understand easily the concepts of network security, Mobile, and ad hoc networks.

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(R16CSE1206) OPERATING SYSTEMS LAB

Objectives:

- To use Linux Operating system for study of operating system concepts.
- To write the code to implemented modify various concepts in operating systems using Linux.

List of Programs:

1. Simulate the following CPU scheduling algorithms

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

2. Simulate all page replacement algorithms

   a) FIFO b) LRU c) LFU d) OPT

3. Simulate Paging Technique of memory management.

4. Simulate all file allocation strategies

   a) Sequential b) Indexed c) Linked

5. Simulate all File Organization Techniques

   a) Single level directory b) Two level c) Hierarchical d) DAG

6. Simulate Bankers Algorithm for Dead Lock Avoidance

7. Simulate Bankers Algorithm for Dead Lock Detection

Outcomes:

The course objectives ensure the development of students applied skills in operating systems related areas.

Students Williams knowledge in writing Software routines Modules or implementing various concepts of Operating systems

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(R16CSE1207) COMPILER DESIGN LAB

Objectives:

- To provide an understanding of the language translation peculiarities by designing a complete translator for a mini language.

Recommended System / Software Requirements:

- Intel based desktop PC with minimum of 166 MHZ or faster processor with at least 64 MB RAM and 100 MB free disk space
- C++ compiler and JDK kit

Consider the following mini Language, a simple procedural high-level language, only 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> ::= { <variabledefinition> <slist> } | { <slist> }
<variabledefinition> ::= 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> ::= <bexpression> then <slist> else <slist> endif | if <bexpression> then <slist> endif
<whilestatement> ::= while <bexpression> do <slist> enddo
<printstatement> ::= print (<expression>)
<expression> ::= <expression> <additionop> <term> | <term> | addingop> <term>
<bexpression> ::= <expression> <relop> <expression>
<relop> ::= < | <= | == | >= | > | !=
<addingop> ::= + | -
<term> ::= <term> <mulitop> <factor> | <factor>
<multop> ::= * | /
<factor> ::= <constant> | <identifier> | <identifier> [<expression>] | (<expression>)
<constant> ::= <digit> | <digit> <constant>
<identifier> ::= <identifier> <letterordigit> | <letter>
<letterordigit> ::= <letter> | <digit>
<letter> ::= a|b|c|d|e|f|g|h|i|j|k|l|m|n|o|p|q|r|s|t|u|v|w|x|y|z
<digit> ::= 0|1|2|3|4|5|6|7|8|9
<empty> has the obvious meaning

Comments (zero or more characters enclosed between the standard C / Java style comment brackets /*...*/) can be inserted. The language has rudimentary support for 1-dimensional arrays. The declaration
int a[3] declares an array of three elements, referenced as a[0], a[1] and a[2] Note also that you should worry about the scoping of names.
A simple 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(-t1 + t2 * t3); /* this is a comment on 2 lines */
 }
 endif
}
```

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 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 from 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.

The following is a simple register-based machine, supporting a total of 17 instructions. It has three distinct internal storage areas. The first is the set of 8 registers, used by the individual instructions as detailed below, the second is an area used for the storage of variables and the third is an area used for the storage of program. The instructions can be precede 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 rabge 1 tp 9999).
V specifies a "variable location" (a variable number, or a variable location pointed to by a register - see below).
A specifies a constant value, a variable location, a register or a variable location pointed to by a register (an indirect address). Constant values are specified as an integer value, optionally preceded by a minus sign, preceded by a # symbol. An indirect address is specified by an @ followed by a register.
So, for example an A-type argument could have the form 4 (variable number 4), #4 (the constant value 4), r4 (register 4) or @r4 (the contents of register 4 identifies the variable location to be accessed).
The instruction set is defined as follows:
LOAD A, R
loads the integer value specified by A into register R.
STORE R, V
stores the value in register R to variable V.

OUT R
outputs the value in register R.
NEG R
negates the value in register R.
ADD A, R
adds the value specified by A to register R, leaving the result in register R.
SUB A, R
subtracts the value specified by A from register R, leaving the result in register R.
MUL A, R
multiplies the value specified by A by register R, leaving the result in register R.
DIV A, R
divides register R by the value specified by A, leaving the result in register R.
JMP L
causes an unconditional jump to the instruction with the label L.
JEQ R, L
jumps to the instruction with the label L if the value in register R is zero.
JNE R, L
jumps to the instruction with the label L if the value in register R is not zero.
JGE R, L
jumps to the instruction with the label L if the value in register R is greater than or equal to zero.
JGT R, L
jumps to the instruction with the label L if the value in register R is greater than zero.
JLE R, L
jumps to the instruction with the label L if the value in register R is less than or equal to zero.
JLT R, L
jumos to the instruction with the label L if the value in register R is less than zero.
NOP
is an instruction with no effect. It can be tagged by a label.
STOP
stops execution of the machine. All programs should terminate by executing a STOP instruction.

Outcomes:

- By this laboratory, students will understand the practical approach of now a compiler works. This will enable him to work in the development phase of new computer languages in industry.

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(R16CSE1143) DISTRIBUTED SYSTEMS

Objectives

- To understand what and why a distributed system is
- To understand theoretical concepts, namely, virtual time, agreement and consensus protocols
- To understand IPC, Group communication & RPC concepts.
- To understand the DFS and DSM Concepts.
- To understand the concepts of transaction in distributed environment and associated concepts, namely, concurrency control, deadlocks and error recovery.

UNIT – I

Characterization of Distributed Systems : Introduction, Examples of distributed Systems, Resource Sharing and the Web, Challenges.

System Models : Introduction, Architectural models 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, distributed debugging.

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, Remote Procedure Call, Events and notifications, Case study: JAVA RMI.

UNIT – IV

Distributed File Systems: Introduction, File Service architecture, Case Study1: SUN network file systems, Case Study 2: .The Andrew File System.

Name Services: Introduction, Name Services and the Domain Name System, Directory Services, Case study of the Global Name Service

Distributed Shared Memory: Introduction, Design and Implementation issues, Sequential consistency and IVY case study, Release consistency and Munin case study, Other consistency models

UNIT V

Transactions and Concurrency control: Introduction, Transactions, Nested Transactions, Locks, Optimistic concurrency control, Timestamp ordering, Comparison of methods for concurrency control.

Distributed Transactions: Introduction, Flat and Nested Distributed Transactions, Atomic commit protocols, Concurrency control in distributed transactions, Distributed deadlocks, Transaction recovery

TEXT BOOKS:

1. Distributed Systems, Concepts and Design, G Coulouris, J Dollimore and T Kindberg, Pearson Education, 4TH Edition, 2009.

REFERENCES:

1. Distributed Systems: Principles and Paradigms, S. Tanenbaum and Maarten Van Steen, 2nd Edition, PHI.
2. Distributed Systems, An Algorithm Approach, Sukumar Ghosh, Chapman & Hali/CRC, Taylor & Fransis Group, 2007.

Outcomes

- Able to comprehend and design a new distributed system with the desired features.
- Able to start literature survey leading to further research in any subarea.
- Able to develop new distributed applications.

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(R16CSE1117) INFORMATION SECURITY

Objectives

- Explain the objectives of information security
- Explain the importance and application of each of confidentiality integrity, authentication and availability
- Understand various cryptographic algorithms
- Understand the basic categories of threats to computers and networks
- Describe public key cryptosystem
- Understand intrusions and intrusion detection
- Discuss the fundamental ideas of public-key cryptography
- Generate and distribute a PGP key pair and use the PGP package to send an encrypted e-mail message.
- Discuss Web security and Firewalls.

UNIT – I

Attacks on Computers and Computer Security : Introduction, The need for security, Security approaches, Principles of security, Types of Security attacks, Security services, Security Mechanisms, A model for Network Security

Cryptography: Concepts and Techniques: Introduction, plain text are cipher text, substitution techniques, transposition techniques, encryption and decryption, symmetric and asymmetric key cryptography, steganography, key range and key size, possible types of attacks.

UNIT – II

Symmetric key Ciphers: Block cipher principles & Algorithms (DES, AES Blowfish), Differential and Linear Cryptanalysis, Block cipher modes of operation, Stream ciphers, RC4, Location and placement of encryption function, Key distribution **Asymmetric key Ciphers:** Principles of public key cryptosystems, Algorithms (RSA, Diffie-Hellman, ECC), Key Distribution.

UNIT – III

Message Authentication Algorithms and Hash Functions : Authentication requirements, Functions, Message authentication codes, Hash Functions, Secure hash algorithm, Whirlpool, HMAC, CMAC, Digital signatures, knapsack algorithm **Authentication Applications:** Kerberos, X.509 Authentication Service, Public – Key infrastructure, Biometric Authentication

UNIT – IV

E-Mail Security : Pretty Good Privacy, S/MIME **IP Security:** IP Security overview, IP Security architecture, Authentication Header, Encapsulating security payload, Combining security associations, key management.

UNIT – V

Web Security: Web security considerations, Secure Socket Layer and Transport Layer Security, Secure Electronic transaction **Intruders, Virus and Firewalls:** Intruders, Intrusion detection, password management, Virus and related threats, Countermeasures, Firewall design principles, Types of firewalls **Case Studies on Cryptography and security:** Secure inter-branch Payment Transactions, Cross site Scripting Vulnerability, Virtual Elections.

TEXT BOOKS

1. Cryptography and Network Security: William Stallings, Pearson Education, 4th Edition
2. Cryptography and Network Security : AtulKathate, Mc Graw Hill, 2nd Edition

REFERENCE BOOKS:

1. Cryptography and Network Security: C.K. Shyamala, N. Harini, Dr. T.R. Padmanabhan, Wiley India, 1st Edition
2. Cryptography and Network Security: Forouzan Mulkhopadhyay, Mc. Graw Hill, 2nd Edition
3. Information Security, Principles and Practice: Mark Stamp, Wiley India.
4. Principles of Computer Security : WM Arthur Conkin, Greg White, TMH
5. Introduction to Network Security: Neal Krawetz, CENGAGE Learning.
6. Network Security and Cryptography: Bemand Menezes, CENGAGE Learning.

Outcomes:

- Student will be able to understand basic cryptographic algorithms, message and web authentication and security issues.
- Ability to identify information system requirements for both of them such as client and server.
- Ability to understand the current legal issues towards information security.

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(R16CSE1116) OBJECT ORIENTED ANALYSIS AND DESIGN

Objectives :

- Concisely define the following key terms: class, object, state behavior, object class, class diagram, object diagram, operation, encapsulation, constructor operation, query operation, update operation, scope operation, association, association role, multiplicity association class, abstract class, concrete class class-scope attribute abstract operation, method polymorphism, overriding, multiple classification, aggregation, and composition.
- Describe the activities in the different phases of the object oriented development life cycle.
- State the advantages of object-oriented modeling vis-à-vis structure approaches.
- Compare and contrast the object-oriented model with the E-R and EER models.
- Model a real-world application by using a UML class diagram.
- Provide a snapshot of the detailed state of a system at a point in time using a UML (Unified Modeling Language) object diagram.
- Recognize when to use generalization, aggregation, and composition relationships.
- Specify different types of business rules in a class diagram.

UNIT - I

Introduction to UML : Importance of modeling, principles of modeling, object oriented modeling, conceptual model of the UML, Architecture, Software Development Life Cycle.

UNIT - II

Basic Structural Modeling : Classes, Relationships, Common Mechanisms, and Diagrams. Advanced Structural Modeling : Advanced classes, advanced relationships, Interfaces, Types and Roles, Packages.

Class & Object Diagrams : Terms, concepts, modeling techniques for Class & Object Diagrams

UNIT- III

Basic Behavioral Modeling-I : Interactions, Interaction diagrams.

Basic Behavioral Modeling-II : Use cases, Use case Diagrams, Activity Diagrams.

UNIT - IV

Advanced Behavioral Modeling : Events and signals, state machines, processes and Threads, time and space, state chart diagrams.

Architectural Modeling : Component, Deployment, Component diagrams and Deployment diagrams.

UNIT - V

Patterns and Frameworks, Artifact Diagrams Case Study : The Unified Library application.

TEXT BOOKS :

1. Grady Booch, James Rumbaugh, Ivar Jacobson : The Unified Modeling Language User Guide, Pearson Education, 2nd Edition.
2. Hans-Erik Eriksson, Magnus Penker, Brian Lyons, David Fado: UML 2 Toolkit, WILEY-Dreamtech India Pvt. Ltd.

REFERENCE BOOKS:

1. Meilir Page-Jones: Fundamentals of Object Oriented Design in UML, Pearson Education.
2. Pascal Roques: Modeling Software Systems Using UML2, WILEY- Dreamtech India Pvt. Ltd.
3. Atul Kahate: Object Oriented Analysis & Design, The McGraw-Hill Companies.
4. Mark Priestley: Practical Object-Oriented Design with UML,TATA McGrawHill
5. Appling UML and Patterns: An introduction to Object – Oriented Analysis and Design and Unified Process, Craig Larman, Pearson Education.
6. Object-Oriented Analysis and Design with the Unified Process by Jhon W. Satzinger, Robert B Jackson and Stephen D Burd, Cengage Learning.
7. UML and C++, R.C. Lee, and W.M.Tepfenhart, PHI
8. Object Oriented Analysis, Design and implementation, B. Dathan, S. Ramnath, Universities Press.
9. OODesign with UML and Java, K. Barclay, J. Savage, Elsevier
10. Learning UML 2.0 Russ Miles and Kim Hamilton, O'Reilly, SPD

Outcomes: Graduate can able to take up the case studies and model it in different views with respect user requirement such as use case. Logical component and deployment and etc: and preparation of document of the project for the unified Library application.

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(R16CSE1121) SOFTWARE TESTING METHODOLOGIES

Objectives:
To understand the software testing methodologies such as flow graphs and path testing, transaction flows testing, data flow testing domain testing and logic based testing.

UNIT I :
Introduction : Purpose of testing, Dichotomies, model for testing, consequences of bugs, taxonomy of bugs
Flow graphs and Path testing : Basics concepts of path testing, predicates, path predicates and achievable paths, path sensitizing, path instrumentation, application of path testing.

UNIT II :
Transaction Flow Testing : Transaction flows, transaction flow testing techniques.
Dataflow testing: Basics of dataflow testing, strategies in dataflow testing, application of dataflow testing.

UNIT III:
Domain Testing: Domains and paths, Nice & ugly domains, domain testing, domains and interfaces testing, domain and interface testing, domains and testability.

UNIT IV :
Paths, Path products and Regular expressions : Path products & path expression, reduction procedure, applications, regular expressions & flow anomaly detection.
Logic Based Testing : Overview, decision tables, path expressions, kv charts, specifications.

UNIT V :
State, State Graphs and Transition testing : State graphs, good & bad state graphs, state testing, Testability tips.
Graph Matrices and Application : Motivational overview, matrix of graph, relations, power of a matrix, node reduction algorithm, building tools (student should be given an exposure to a tool like JMeter or Win-runner).

TEXT BOOKS :

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

REFERENCES :

1. The craft of software testing - Brian Marick, Pearson Education.
2. Software Testing, 3rd Edition, P.C. Jorgensen, Aurbach Publication (Dist by SPO)
3. Software Testing, n. Chauhan, Oxford University Press.
4. Introduction to Software Testing, P. Ammann & J. Offutt, Cambridge Univ. Press.
5. Effective methods of Software Testing, Perry, John Wiley 3rd Edition, 1999.
6. Software Testing Concepts and Tools, P. Nageswara Rao, dreamtech Press
7. Software Testing, M.G. Limye, TMH.
8. Software Testing, S. Desikan, G. Reamesh, Pearson
9. Foundations of Software Testing, D. Graham & Others, Cengage Learning.
10. Foundations of Software Testing, A.P. Madhur, Pearson.

Outcomes:

- Ability to apply the process of testing and various methodologies in testing for developed software.
- Ability to write test cases for given softw3are to test it before delivery to the customer.

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B.Tech. - III Year – II Semester

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(R16HAS1103) MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS

Objectives:

To enable the student to understand and appreciate, with a practical insight, the importance of certain basic issues governing the business operations namely; demand and supply, production function, cost analysis, markets, forms of business organizations, capital budgeting and financial accounting and financial analysis.

Unit I

Introduction & Demand Analysis: Definition, Nature and Scope of Managerial Economics. Demand Analysis: Demand Determinants, Law of Demand and its exceptions. Elasticity of Demand: Definition, Types, Measurement and Significance of Elasticity of Demand. Demand Forecasting, Factors governing demand forecasting, methods of demand forecasting.

Unit II

Production & Cost Analysis: Production Function - Isoquants and Isocosts, MRTS, Least Cost Combination of Inputs, Cobb-Douglas Production function, Laws of Returns, Internal and External Economies of Scale. Cost Analysis: Cost concepts. Break-even Analysis (BEA)-Determination of Break-Even Point (simple problems) - Managerial Significance.

Unit III

Markets & New Economic Environment: Types of competition and Markets, Features of Perfect competition, Monopoly and Monopolistic Competition. Price-Output Determination in case of Perfect Competition and Monopoly. Pricing: Objectives and Policies of Pricing. Methods of Pricing. Business: Features and evaluation of different forms of Business Organisation: Sole Proprietorship, Partnership, Joint Stock Company, Public Enterprises and their types, New Economic Environment: Changing Business Environment in Post-liberalization scenario.

Unit IV

Capital Budgeting: Capital and its significance, Types of Capital, Estimation of Fixed and Working capital requirements, Methods and sources of raising capital - Trading Forecast, Capital Budget, Cash Budget. Capital Budgeting: features of capital budgeting proposals, Methods of Capital Budgeting: Payback Method, Accounting Rate of return (ARR) and Net Present Value Method (simple problems).

Unit V

Introduction to Financial Accounting & Financial Analysis: Accounting concepts and Conventions - Introduction IFRS - Double - Entry Book Keeping, Journal, Ledger, Trial Balance - Final Accounts (Trasing Account, Profit and Loss Account and Balance Sheet with simple adjustments). Financial Analysis: Analysis and Interpretation of Liquidity Ratios, Activity Ratios, and Capital structure Ratios and Profitability ratios. Du Pont Chart.

TEXT BOOKS:

1. Varshney & Maheswari: Managerial Economics, Sultan Chand, 2009.
2. S.A. Siddiqui & A.S. Siddiqui, Managerial Economics and Financial Analysis, New Age international Publishers, Hyderabad 2013.
3. M. Kasi Reddy & Saraswathi, Managerial Economics and Financial Analysis, PHI New Delhi, 2012.

REFERENCES:

1. Ambrish Gupta, Financial Accounting for Management, Pearson Education, New Delhi, 2012.
2. H. Craig Peterson & W. Cris Lewis, Managerial Economics, Pearson, 2012.
3. Lipsey & Chrystel, Economics, Oxford University Press, 2012.
4. Domnick Salvatore: Managerial Economics In a Global Economy, Thomson, 2012.
5. Narayanaswamy: Financial Accounting - A Managerial Perspective, Pearson, 2012.
6. S.N. Maheswari & S.K. Maheswari, Financial Accounting, Vikas, 2012.
7. Truet and Truet: Managerial Economics: Analysis, Problems and Cases, Wiley, 2012.
8. Dwivedi: Managerial Economics, Vikas, 2012.
9. Shailaja & Usha: MEFA, University Press, 2012.
10. Aryasri: Managerial Economics and Financial Analysis, TMH, 2012.
11. Vijay Kumar & Appa Rao, Managerial Economics & Financial Analysis, Cengage 2011.
12. J.V. Prabhakar Rao & P.V. Rao, Managerial Economics & Financial Analysis, Maruthi Publishers, 2011.

Outcomes:

At the end of the course, the student will

- Understand the market dynamics namely, demand and supply, demand forecasting, elasticity of demand and supply, pricing methods and pricing in different market structures.
- Gain an insight into how production function is carried out to achieve least cost combination of inputs and cost analysis.
- Develop an understanding of
- Analyze how capital budgeting decisions are carried out.
- Understanding the framework for both manual and computerized accounting process
- Know how to analyze and interpret the financial statements through ratio analysis.

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(R16CSE1119) WEB TECHNOLOGIES

Objectives:

- To introduce PHP language for server side scripting
- To introduce XML and processing of XML Data with Java
- To Introduce Server Side Programming with Java Servlets and JSP
- To Introduce Client side scripting with Javascript and AJAX

UNIT – I

Introduction to PHP : Declaring Variables, data types, arrays, string operators, expressions, control structures, functions, Reading data from web from controls like text boxes, radio buttons, ,lists etc., Handling File Uploads, Connecting to database (MySQL as reference), executing simple queries, handling results, Handling sessions and cookies.

File Handling in PHP: File operations like opening, closing, reading, writing, appending, deleting etc. on text and binary files, listing directories.

UNIT - II

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

UNIT – III

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

UNIT – IV

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

UNIT – V

Client side Scripting : Introduction to Javascript: Javascript Language – declaring variables, scope of variables, functions, evnt handlers (onclick, onsubmit etc.), Document Object Model, Form Validation. Simple AJAX application.

TEXT BOOKS:

1. Web Technologies, Uttam K Roy, Oxford University Press
2. The Complete Reference PHP – Steven Holzner, Tata McGraw-Hill

REFERENCE BOOKS:

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

Outcomes:

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

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(R16CSE1215) CASE TOOLS AND WEB TECHNOLOGIES LAB

CASE TOOLS LAB

Objectives:

- Understand how UML supports the entire OOAD process.
- Become familiar with all phases or OOAD.
- Understand different software testing tools and their features.

I. Students are divided into batches of 5 each and each batch has to draw the following diagrams using UML for an ATM system whose description is given below.

UML diagrams to be developed are:

1. Use Case Diagram
2. Class Diagram
3. Sequence Diagram
4. Collaboration Diagram
5. State Diagram
6. Activity Diagram
7. Component Diagram
8. Deployment Diagram
9. Test Design

Description for an ATM System

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

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

The ATM must be able to provide the following services to the customer.

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

2. A customer must be able to make a deposit to any account linked to the card, consisting of cash and/or checks in an envelope. The customer will enter the amount of the deposit into the ATM, subject to manual verification when the envelope is removed from the machine by an operator. Approval must be obtained from the bank before physically accepting the envelope.
3. A Customer must be able to make a transfer of money between any two accounts linked to the card.
4. A customer must be able to make a balance inquiry of any account linked to the card.
5. A customer must be able to abort a transaction in progress by pressing the Cancel key instead of responding to a request from the machine.

The ATM will communicate each transaction to the bank and obtain verification that it was allowed by the bank. Ordinarily, a transaction will be considered complete by the bank once it has been approved. In the case of a deposit, a deposited the envelope. (if the customer fails to deposit the envelope within the timeout period, or presses cancel instead, no second message will be sent to the bank and the deposit will not be credited to the customer.)

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

The ATM will provide the customer with a printed receipt for each successful transaction.

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

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

II. Study of any testing tool (e.g. Win runner)
III. Study of any web testing tool (e.g. Selenium)
IV. Study of any bug tracking tool (e.g. Bugzilla, Bugbit)
V. Study of any test management tool (e.g. Test Director)
VI. Study of any open source-testing tool (e.g. Test Link)

Outcomes :

- **Ability to understand the history, cost of using and building CASE tools.**
- **Ability to construct and evaluate hybrid CASE tools by integrating existing tools.**

WEB TECHNOLOGIES LAB

Objectives:

- To enable the student to program web applications using the following technologies HTML, Javascript, AJAX, PHP, Tomcat Server, Servlets, JSP

Note:

1. **Use LAMP Stack (Linux, Apache, MySQL and PHP) for the Lab Experiments. Through not mandatory, encourage the use of Eclipse platform wherever applicable.**
2. **The list suggests the minimum program set. Hence, the concerned staff is requested to add more problems to the list as needed.**

1. Install the following on the local machine
   - Apache Web Server (if not installed)
   - Tomcat Application Server locally
   - Install MySQL (if not installed)
   - Install PHP and configure it to work with Apache web server and MySQL (if not already configured)
2. 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.
3. Write an HTML page that has one input, which can take multi-line test and a submit button. Once the user clicks the submit button, ti should show the number of characters, words and lines in the test entered using an alert message. Words are separated with white space and lines are separated with new line character.
4. Write an HTML page that contains a selection box with a list of 5 countries. When the user selects a country, its capital should be printed next to the list. Add CSS to customize the properties of the font of the capital (color, bold and font size).
5. Create an XML document that contains 10 users information. Write a Java Program, which takes User Id as input and returns the user details by taking the user information from the XML document using (a) DOM Parser and (b) SAX Parser
6. Implement the following web applications using (a) PHP, (b) Servlets and (c) JSP;

   i. 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.
   ii. Modify the above program to use an xml file instead of database.
   iii. Modify the above program to use AJAX to show the result on the same page below the submit button.
   iv. A simple calculator web application that takes two numbers and an operator (+. -, * and %) from an HTML page and returns the result page with the operation performed on the operands.
   v. Modify the above program such that it stores each query in a database and checks the database frist for the result. If the query is already available in the DB, it returns the value that was previously computed (from DB) or it computes the result and returns it after storing the new query and result in DB.
   vi. A web 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 arid

provides a logout page with Thank You <name> message with the duration of usage (hint: Use session to store name and time).

vii. 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.

viii. A web application for implementation:
The user is first served a login page which takes user's name and password, After submitted the details the server checks these values against the data from a database and takes the following decisions.
If name and password matches, serves a welcome page with user's full name.
If name matches and password doesn't match, than serves " password mismatch" page
If name is not found in the database, serves a registration page, where user's full name is asked and on submitted the full name, it stores, the login name, password and full name in the data (hint: use session for storing the submitted login name and password)

ix. A web application that lists all cookies stored in the browser on clicking "List Cookies " button. Add cookies if necessary.

TEXT BOOKS

1. Web Technologies, Uttam K Roy, Oxford University Press
2. The Complete Reference PHP – Steven Hoizner, Tata McGraw- Hill

REFERENCE BOOKS:

1. Web Programming, building internet applications, Chris Bates 2nd edition, Wiley Dreamtech
2. Java Server Pages – Hans Bergsten, SPD O'Reilly
3. Java Script, D.Flanagan, O'Reilly, SPD
4. Beginning Web Programming – Jon Duckett WROX
5. Programming world wide web, R.W.l Sebesta, Fourth Edition, Pearson.
6. Internet and World Wide Web – How to program, Dietel and Nieto, Pearson.

Outcomes:

- Use LAMP Stack for web applications
- Use Tomcat Server for Servlets and JSPs
- Write simple applications with Technologies like HTML, Javascript, AJAX, PHP, Servlets and JSPs
- Connect to Database and get results
- Parse XML files using Java (DOM and SAX parsers)

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(R16HAS1202) ADVANCED ENGLISH LANGUAGE COMMUNICATION SKILLS LAB

Introduction

The introduction of the Advanced Communication Skills Lab is considered essential at 3rd year level. At this stage, the students need to prepare themselves for their careers which may require them to listen to, read, speak and write in English both for their professional and interpersonal communication in the globalised context.

The proposed course should be a laboratory course to enable students to use 'good' English and perform the following:

- Gathering ideas and information to organise ideas relevantly and coherently.
- Engaging in debates.
- Participating in group discussions.
- Facing interviews.
- Writing project/research reports/technical reports.
- Making oral presentations.
- Writing formal letters.
- Transferring information from non-verbal to verbal texts and vice-versa.
- Taking part in social and professional communication.

Objectives:

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

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

Syllabus:

The following course content to conduct the activities is prescribed for the Advanced Communication Skills (ACS) Lab:

1. **Activities on Fundamentals of Inter-personal Communication and Building Vocabulary** - Starting a conversation – responding appropriately and relevantly – using the right body language – Role Play in different situations & Discourse Skills- using visuals - Synonyms and antonyms, word roots, one-word substitutes, prefixes and suffixes, study of word origin, business vocabulary, analogy, idioms and phrases, collocations & usage of vocabulary.
2. **Activities on Reading Comprehension** –General Vs Local comprehension, reading for facts, guessing meanings from context, scanning, skimming, inferring meaning, critical reading & effective googling.
3. **Activities on Writing Skills** – Structure and presentation of different types of writing – *letter writing/Resume writing/ e-correspondence/ Technical report writing/ Portfolio writing* – planning for writing – improving one's writing.
4. **Activities on Presentation Skills** – Oral presentations (individual and group) through JAM sessions/seminars/**PPTs** and written presentations through posters/projects/reports/ e-

mails/assignments etc.

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

Minimum Requirement:
The Advanced Communication Skills (ACS) Laboratory shall have the following infra-structural facilities to accommodate at least 35 students in the lab:

- **Spacious room with appropriate acoustics.**
- **Round Tables with movable chairs**
- **Audio-visual aids**
- **LCD Projector**
- **Public Address system**
- **P – IV Processor, Hard Disk – 80 GB, RAM–512 MB Minimum, Speed – 2.8 GHZ**
- **T. V, a digital stereo & Camcorder**
- **Headphones of High quality**

Prescribed Lab Manual: A book titled ***A Course Book of Advanced Communication Skills (ACS) Lab*** published by Universities Press, Hyderabad.

Suggested Software:
The software consisting of the prescribed topics elaborated above should be procured and used.

- **Oxford Advanced Learner's Compass**, 7th Edition
- **DELTA's key to the Next Generation TOEFL Test: Advanced Skill Practice.**
- **Lingua TOEFL CBT Insider**, by Dreamtech
- **TOEFL & GRE**(KAPLAN, AARCO & BARRONS, USA, Cracking GRE by CLIFFS)
- **The following software from 'train2success.com'**
  - **Preparing for being Interviewed**
  - **Positive Thinking**
  - **Interviewing Skills**
  - **Telephone Skills**
  - **Time Management**

Books Recommended:

1. Technical Communication by Meenakshi Raman & Sangeeta Sharma, Oxford University Press 2009.
2. Advanced Communication Skills Laboratory Manual by Sudha Rani, D, Pearson Education 2011.
3. Technical Communication by Paul V. Anderson. 2007. Cengage Learning pvt. Ltd. New Delhi.
4. Business and Professional Communication: Keys for Workplace Excellence. Kelly M. Quintanilla & Shawn T. Wahl. Sage South Asia Edition. Sage Publications. 2011.
5. The Basics of Communication: A Relational Perspective. Steve Duck & David T. McMahan. Sage South Asia Edition. Sage Publications. 2012.
6. English Vocabulary in Use series, Cambridge University Press 2008.
7. Management Shapers Series by Universities Press(India)Pvt Ltd., Himayatnagar, Hyderabad 2008.

8. Handbook for Technical Communication by David A. McMurrey & Joanne Buckley. 2012. Cengage Learning.
9. Communication Skills by Leena Sen, PHI Learning Pvt Ltd., New Delhi, 2009.
10. Handbook for Technical Writing by David A McMurrey & Joanne Buckely CENGAGE Learning 2008.
11. Job Hunting by Colm Downes, Cambridge University Press 2008.
12. Master Public Speaking by Anne Nicholls, JAICO Publishing House, 2006.
13. English for Technical Communication for Engineering Students, Aysha Vishwamohan, Tata Mc Graw-Hil 2009.
14. Books on TOEFL/GRE/GMAT/CAT/ IELTS by Barron's/DELTA/ Cambridge University Press.
15. International English for Call Centres by Barry Tomalin and Suhashini Thomas, Macmillan Publishers, 2009.

DISTRIBUTION AND WEIGHTAGE OF MARKS:

Advanced Communication Skills Lab Practicals*:*

1. The practical examinations for the ACS Laboratory practice shall be conducted as per the University norms prescribed for the core engineering practical sessions.
2. For the English Language lab sessions, there shall be continuous evaluation during the year for 25 sessional marks and 50 End Examination marks. Of the 25 marks, 15 marks shall be awarded for day-to-day work and 10 marks to be awarded by conducting Internal Lab Test(s). The End Examination shall be conducted by the teacher concerned, by inviting the External Examiner from outside. In case of the non-availability of the External Examiner, other teacher of the same department can act as the External Examiner.

Mini Project: As a part of Internal Evaluation

1. Seminar/ Professional Presentation

2. A Report on the same has to be prepared and presented.

**** Teachers may use their discretion to choose topics relevant and suitable to the needs of students.***

**** Not more than two students to work on each mini project.***

**** Students may be assessed by their performance both in oral presentation and written report.***

Outcomes

- Accomplishment of sound vocabulary and its proper use contextually.
- Flair in Writing and felicity in written expression.
- Enhanced job prospects.
- Effective Speaking Abilities

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(R16CSE1120) LINUX PROGRAMMING

Objectives:

- To understand and make effective use of Linux utilities and Shell scripting language (bash) to solve Problems.
- To implement in C some standard Linux utilities such as ls, mv,cp etc. using system calls.
- To develop the skills necessary for systems programming including file system programming. Process and signal management, and interprocess communication.
- To develop the basic skills required to write network programs using Sockets.

UNIT-I

Linux Utilities- File handling utilities, Security by file permissions, Process utilities, Disk utilities, Networking commands, Filters, Text processing utilities and Backup utilities,

Shell-Scripts, Operation, Addresses, Commands, Applications, awk–Execution, Fields and Records, Scripts, Operation, Patterns, Actions, Associative Arrays, String and Mathematical functions, system commands in awk applications.

Shell Programming with Bourne again shell (bash): Introduction, shell responsibilities, pipes and Redirection, here documents, running a shell script, the shell as a programming language, shell meta characters, file name substitution, shell variables, command substitution, shell commands, the environment, quoting, test command, control structures, arithmetic in shell, shell script examples, interrupt processing, functions, debugging shell scripts.

UNIT-II

Files and Directories: File Concept, File types, File System Structure, File metadata-Inodes, kernel support for files, System calls for file I/O operations. Open, create, read, write, close, iseek, dup2, file status information-stat family file and record locking – fonti function, file permissions – chmod, fchmod, file ownership-chown, khown, fchown, links-soft links and hard links – symlink, link, unlink. Directories – creating, removing and changing directories mkdir, rmdir, chdir, obtaining current working directory-getcwd, Directory contents, Scanning Directories-opendir, readdir, closedir, rewinddir functions.

UNIT- III

Process- Process concept, Layout of a C program image in main memory, Process environment – environment list, environment variables, getenv, setenv, Kernel support for process, process identification, process control - process creation, replacing a process image, waiting for a process, process termination, zombie process, orphan process, system call interface for Process management-fork, vfork, exit, wait, waitpid, exec family, Program Groups, Sessions and Controlling Terminal, Differences between threads and Processes.

Signals-Introduction to signals, Signal generation and handling, Kernel support for signals, Signal function, unreliable signals, reliable signals, kill, raise, alarm, pause, abort, sleep functions.

UNIT-IV

Inter process Communication: Introduction to IPC, IPC between processes on a single computer system, IPC between processes on different systems, Pipes-creation, IPC between related processes using unnamed pipes, FIFOs creation, IPC between unrelated processes using FIFOs (named pipes), difference between unnamed and named pipes, popen and pclose library functions.

Message Queues, Kernel support for messages, APIs for message queues, client/ server example. Semaphores-Kernel support for semaphores, APIs for semaphores, file locking with semaphores.

UNIT – V

Shared Memory- Kernel support for shared memory, APIs for shared memory, shared memory example.

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, Socket options- setsockopt and fcntl system calls, Comparison of IPC mechanisms.

Text Books:

1. Unix System Programming using C++ T. Chan, PHI.
2. Unix Concepts and Applications, 4th Edition, Sumitabha Das, TMH.
3. Unix Network Programming, W.R. Stevens, PHI.

Reference Books:

1. Beginning Linux Programming, 4th Edition, N. Matthew, R. Stones, Wrox, Wiley India Edition.
2. Unix for programmers and users, 3rd Editions, Graham Glass, King Ables,Pearson Education.
3. System Programming with C and Unix, A. Hoover, Pearson.
4. Unix System Programming, Communication, Concurrency and Threads, K.A. Robbins and S. 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
10. C programming Language, Kernighan and Ritchie, PHI

Outcomes:

- Work confidently in Linux environment.
- Work with shell script to automate different tasks as Linux administration.

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(R16CSE1128) DESIGN PATTERNS

Objectives:

- Understand the design patterns that are common in software applications.
- Understand how these patterns are related to Object Oriented design.

UNIT – I

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

UNIT – II

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

Creational Patterns : Abstract Factory, Builder, Factory Method, Prototype, Singleton, Discussion of Creational Patterns.

UNIT – III

Structural Pattern Part-I: Adapter, Bridge, Composite.

Structural Pattern Part-II: Decorator, acade, Flyweight, Proxy.

UNIT – IV

Behavioral Patterns Part-I: Chain of Responsibility, Command, Interpreter, Iterator.

Behavioral Patterns Part-II: Mediator, Memento, Observer,

UNIT - V

Behavioral Patterns Part-II (cont'd): State, Strategy, Template Method ,Visitor, Discussion of Behavioral Patterns.

What to Expect from Design Patterns, A Brief History, The Pattern Community An Invitation, A Parting Thought.

TEXT BOOKS

1. Design Patterns By Erich Gamma, Pearson Education

REFERENCE BOOKS:

1. Pattern's in JAVA Vol-I By Mark Grand ,Wiley DreamTech.
2. Pattern's in JAVA Vol-II By Mark Grand ,Wiley DreamTech
3. JAVA Enterprise Design Patterns Vol-III By Mark Grand ,Wiley DreamTech.
4. Head First Design Pattern by Eric Freeman-Oreilly-spd
5. Peeling Design Patterns, Prof. Meda Srinivasa Rao, Narsimha Karumanchi, CareerMonk Publications.
6. Design Patterns Explained By Alan Shalloway,Pearson Education.
7. Pattern Oriented Software Architecture,F.Buschmann & others, John Wiley& Sons.

Outcomes:

- Ability to understand and apply common design patterns to incremental / iterative development
- Ability to identify appropriate patterns for design of given problem

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B.Tech. - IV Year – I Semester

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(R16CSE1122) DATA WAREHOUSING AND DATA MINING

Objectives:
Study data warehouse principles and its working learn data mining concepts understand association rules mining. Discuss classification algorithms learn how data is grouped using clustering techniques.

UNIT – I
Data Warehouse: Introduction to Data Warehouse, difference between operational database systems and data warehouses, Data warehouse Architecture and its Components, Extraction-Transformation-Loading, Logica (Multidimensional), Data Modeling, Sehema Design, Star and Snow-Flake Scheme, Fact Consultation, Fact Table, Fully Addictive, Semi-Addictive, Non Addictive Measures; Fact-Less-Facts, Dimention Table Characteristics; OLAP Cube, OLAP Operations, OLAP Server Architecture – ROLAP, MOLAP and HOLAP.

UNIT – II
Introduction to Data Mining: Introduction, What is Data Mining, Definition, KDD, Challenges, Data Mining Tasks, Data Preprocessing, Data Cleaning, Missing data, Dimensionality Reduction, Feature Subset Selection Discretization and Binaryzation, Data Transformation; Measures of Similarity and Dissimilarity – Basics

UNIT – III
Association Rules: Problem Definition, Frequent Item Set Generation, The APRIORI Principle, Support and Confidence Measures, Association Rule Generation; APRIOIRI Algorithm, The Partition Algorithms, FP-Growth Algorithms, Compact Representation of Frequent Item Set-Maximal Frequent Item Set, Closed Frequent Item Set.

UNIT – IV
Classification: Problem Definition, General Approaches to solving a classification problem, Evaluation of Classifiers, Classification techniques, Decision Trees-Decision tree Construction, Methods for Expressing attribute test conditions, Measures for Selecting the Best Split, Algorithm for Decision tree Induction; Naïve-Bayes Classifier, Bayesian Belief Networks; K-Nearest neighbor Classification-Algorithm and Characteristics.

UNIT – V
Clustering: Problem Definition, Clustering Overview, Evaluation of Clustering Algorithms, Partitioning Clustering-K-Means Algorithm, K-Means Additional issues, PAM algorithm, Hierarchical Clustering-Agglomerative methods and divisive methods, Basic Agglomerative Hierarchical Clustering Algorithm Specific techniques, Key Issues in Hierarchical Clustering, Strength and Weakness; Outlier Detection.

TEXT BOOKS :

1. Data Mining — Concepts and Techniques - Jiawei Han & Micheline Kamber, Morgan Kaufmann Publighers, Elsevier.2nd Edition, 2006.
2. Introduction to Data Mining — Pang-Ning Tan, Michael Steinbach and Vipin Kumar, Pearson education.

REFERENCE BOOKS:

1) Data Mining Techniques, Arun K Pujai, 3rd Edition, University Press
2) Data Warehousing Fundamentals, Pualraj Ponnaiah, Wiley Student Edition
3) The Data Warehouse Life Cycle Toolkit – Ralph Kimball, Wiley student Edition
4) Data Mining, Vikaram Pudi, P Radha Krishna, Oxford University Press.

Outcomes:

- Student should be able to understand why the data warehouse in addition to database systems
- Ability to perform the preprocessing of data and apply mining techniques on it.
- Ability to identify the association rules, classification and clusters in large data sets.
- Ability to solve real world problems in business and scientific information using data mining.

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(R16CSE1125) CLOUD COMPUTING

Objectives

- To explain the evolving computer model called cloud computing.
- To introduce the various levels of services that can be achieved by cloud.
- To describe the security aspects in cloud.

UNIT – I

Systems Modeling, Clustering and Virtualization: Distributed System Models and Enabling Technologies, Computer Clusters for Scalable Parallel Computing, Virtual Machines and Virtualization of Clusters and Data centers.

UNIT – II

Foundations: Introduction to Cloud Computing, Migrating into a Cloud, Enriching the 'Integration as a Service' Paradigm for the Cloud Era, The Enterprise Cloud Computing Paradigm.

UNIT – III

Infrastructure as a Service (IAAS) & Platform and Software as a Service (PAAS / SAAS): Virtual machines provisioning and Migration services, On the Management of Virtual machines for Cloud Infrastructures, Enhancing Cloud Computing Environments using a cluster as a Service, Secure Distributed Data Storage in Cloud Computing.

Aneka, Comet Cloud, T-Systems', Workflow Engine for Clouds, Understanding Scientific Applications for Cloud Environments.

UNIT – IV

Monitoring, Management and Applications: An Architecture for Federated Cloud Computing, SLA Management in Cloud Computing, Performance Prediction for HPC on Clouds, Best Practices in Architecting Cloud Applications in the AWS cloud, Building Content Delivery networks using Clouds, Resource Cloud Mashups.

UNIT – V

Governance and Case Studies: Organizational Readiness and Change management in the Cloud age, Data Security in the Cloud, Legal Issues in Cloud computing, Achieving Production Readiness for Cloud Services.

TEXT BOOKS

1) Cloud Computing: Principles and Paradigms by Rajkumar Buyya, James Broberg and Andrzej M. Goscinski, Wiley, 2011.
2) Distributed and Cloud Computing, Kai Hwang, Geoffery C.Fox, Jack J.Dongarra, Elsevier, 2012.

REFERENCE BOOKS

1) Cloud Computing : A Practical Approach, Anthony T.Velte, Toby J.Velte, Robert Elsenpeter, Tata McGraw Hill, rp2011.
2) Enterprise Cloud Computing, Gautam Shroff, Cambridge University Press, 2010.

3) Cloud Computing: Implementation, Management and Security, John W. Rittinghouse, James F.Ransome, CRC Press, rp2012.
4) Cloud Application Architectures: Building Applications and Infrastructure in the Cloud, George Reese, O'Reilly, SPD, rp2011.
5) Cloud Security and Privacy: An Enterprise Perspective on Risks and Compliance, Tim Mather, Subra Kumaraswamy, Shahed Latif, O'Reilly, SPD, rp2011.

Outcomes

- Ability to understand the virtualization and cloud computing concepts.

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3	-/1/-	3

(R16CSE1140) SOFTWARE PROJECT MANAGEMENT
(ELECTIVE – I)

Objectives:

The main goal of software development projects is to create a software system with a predetermined functionality and quality in a given time frame and with given costs. For achieving this goal, models are required for determining target values and for continuously controlling these values. This course focuses on principles, techniques, methods & tools for model - based management of software projects, assurance of product quality and process adherence (quality assurance), as well as experience - based creation & improvement of models (process management). The goals of the course can be characterized as follows.

1. Understanding the specific roles within a software organization as related to project and process management.
2. Understanding the basic infrastructure competences (e.g., process modeling and measurement)
3. Understanding the basic steps of project planning, project management, quality assurance, and process management and their relationships.

UNIT - I

Conventional Software Management : The waterfall model, conventional software Management performance.

Evolution of Software Economics : Software Economics, pragmatic software cost estimation.

UNIT - II

Improving Software Economics : Reducing Software product size, improving software processes, improving team effectiveness, improving automation, Achieving required quality, peer inspections.

The old way and the new : The principles of conventional software Engineering, principles of modern software management, transitioning to an iterative process.

UNIT - III

Life cycle phases : Engineering and production stages, inception, Elaboration, construction, transition phases.

Artifacts of the process : The artifact sets, Management artifacts, Engineering artifacts, programmatic artifacts.

Model based software architectures : A Management perspective and technical perspective.

UNIT - IV

Work Flows of the process : Software process workflows, Iteration workflows. Checkpoints of the process : Major mile stones, Minor Milestones, Periodic status assessments. Iterative Process Planning : Work breakdown structures, planning guidelines, cost and schedule estimating, Iteration planning process, Pragmatic planning.

Project Organizations and Responsibilities : Line-of-Business Organizations, Project Organizations, evolution of Organizations.

Process Automation : Automation Building blocks, The Project Environment.

UNIT - V

Project Control and Process instrumentation : The seven core Metrics, Management indicators, quality indicators, life cycle expectations pragmatic Software Metrics, Metrics automation. Tailoring the Process : Process discriminates, Example.

Future Software Project Management : Modern Project Profiles, Next generation Software economics, modern process transitions.

Case Study: The command Center Processing and Display system- Replacement (CCPDS-R)

TEXT BOOKS :

1. Software Project Management, Walker Royce: Pearson Education, 2005.
2. Software Project Management, Bob Hughes and Mike Cotterell, 4th Edition, Tata McGraw-Hill

REFERENCES :

1. Applied Software Project Management, Joel Henry, Pearson Education.
2. Software Project Management in practice, Pankaj Jalote, Pearson Education.2005.

Outcomes

- Describe and determine the purpose and importance of project management from the perspectives of planning, tracking and completion of project.
- Compare and differentiate organization structures and project structures.
- Implement a project to manage project schedule, expenses and resources with application of suitable project management tools.

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(R16INF1107) IMAGE PROCESSING AND PATTERN RECOGNITION
(ELECTIVE – I)

Objectives:

Adequate background knowledge about image processing and pattern recognition

Practical knowledge and skills about image processing and pattern recognition tools

Necessary knowledge to design and implement a prototype of an image processing and pattern recognition application.

UNIT I:

Fundamental steps of image processing: components of an image processing of system. The image model and image acquisition, sampling and quantization, relationship between pixels, distance functions, scanner

Statistical and spatial operations, intensity functions transformations, histogram processing, smoothing & sharpening – Spatial filters Frequency domain filters, homomorphic filtering , image filtering & restoration. Inverse and wiener filtering, FIR wiener filter, Filtering using image transforms, smoothing spines and interpolation.

UNIT – II

Morphological and other area operations: basic morphological operations, opening and closing operations, dilation erosion, Hit or Miss transform, morphological algorithms, extension to grey scale images.

Segmentation and Edge detection region operations, basic edge detection, second order detection, crack edge detection, gradient operators, compass and Laplace operators, edge linking and boundary detection, thresholding, region based segmentation, segmentation by morphological watersheds.

UNIT – III

Image compression: Types and requirements, statistical compression, spatial compression, contour coding, quantizing compression, image data compression - predictive technique, pixel coding, transfer coding theory, loss and lossless predictive type coding, Digital image Water marking.

UNIT – IV

Representation and Description: Chain codes, Polygonal approximation, Signature Boundary Segments, Skeletons, Boundary Descriptors, Regional Descriptors, Relational Descriptors, Principal components for Description.

UNIT – V

Pattern Recognition Fundamentals: Basic concepts of pattern recognition, Fundamental problems in pattern recognition system, design concepts and methodologies example of automatic pattern recognition systems, a simple automatic pattern recognition model.

Pattern classification: Pattern classification by distance function: Measures of similarity, Clustering criteria, K-means algorithm, Pattern Classification by likelihood function: Pattern classification as a Statistical decision problem, Bayes classifier for normal patterns.

TEXT BOOKS:

1) Digital image processing Third edition, Pearson Education, Rafael C. Gonzalez, Richard E. Woods.
2) Pattern recognition Principles: Julus T. Tou, and Rafel C. Gonzalez, Addision-Wesly Publishing Company.
3) Digital Image Processing, M. Anji Reddy, Y.Hari Shankar, BS Publications.

REFERENCE BOOKS:

1) Image processing, Analysis and Machine Vision, Second Edition Milan Sonka, Vaclav Hlavac and Roger Boyle. Thomson learning.
2) Digital image processing – William k. Prati – John Wiley edition.
3) Fundamentals of digital image processing – by A.K. Jain, PHI
4) Pattern classification, Richard Duda, Hart and David Strok John Wile publishers.
5) Digital Image Processing, S.Jayaraman, S. Esakkirajar T.Veerakumar, TMH
6) Pattern Recognition, R. Shinghal, Oxrord University Press.

Outcomes:

- Ability to apply computer algorithms to practical problems.
- Ability to image segmentation, reconstruction and restoration.
- Ability to perform the classification of patterns.

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(R16CSE1127) MOBILE COMPUTING
(ELECTIVE – I)

Objectives :

- To make the student understand the concept of mobile computing paradigm, its novel applications and limitations.
- To Understand the typical mobile networking infrastructure through a popular GSM protocol.
- To Understand the issues and solutions of various layers of mobile networks, namely MAC layer, Network Layer & Transport Layer
- To Understand the database issues in mobile environments & data delivery models. To understand the ad hoc networks and related concepts.
- To Understand the platforms and protocols used in mobile environment.

UNIT - I

Introduction: Mobile Communications, Mobile Computing – Paradigm Promises/Novel Applications and Impediments and Architecture; Mobile and Handheld Devices, Limitations of Mobile and Handheld Devices.

GSM : Services, System architecture, Radio interface, Protocols, Localization and calling, Handover, Security, and New data services GPRS, CSHSD, DECT.

UNIT - II

(Wireless) Medium Access Control (MAC) : Motivation for a specialized MAC (Hidden and exposed terminals, Near and far terminals), SDMA, FDMA, TDMA, CDMA, Wireless LAN/(IEEE 802.11).

Mobile Network Layer : IP and Mobile IP Network Layer, packet delivery, and Handover Management, Location Management, Registration, Tunneling and Encapsulation, Route Optimization, DHCP.

UNIT - III

Mobile Transport Layer : Conventional TCP/IP Protocols, Indirect TCP, Snooping TCP, Mobile TCP, Other Transport Layer Protocols for Mobile Networks.

Database Issues : Database Hoarding & Caching Techniques, Client-Server Computing & Adaptation, Transactional Models, Query Processing, Data Recovery Process & QoS issues.

UNIT - IV

Data Dissemination and Synchronization: Communications Asymmetry, classification of data Delivery Mechanisms, Data Dissemination, Broadcast Models, Selective Tuning and indexing Methods, Data Synchronization Introduction, Software, and Protocols.

UNIT - V

Mobile Ad hoc Networks (MANETs): Introduction, Applications & Challenges of a MANET, Classification of Routing Algorithms, Algorithms such as DSR, AODV, DSDV, ETC., Mobile Agents, Service Discovery.

Protocols and Platforms for Mobile Computing: WAP, Bluetooth, XML, J2ME, JavaCard, PlamOS, Windows CE, SymbaanOS, Linux for Mobile Devices, Android.

TEXT BOOKS :

1. Jochen Schiller,"Mobile Communications",Addison-Wesley.,Second Edition, 2009.
2. Raj Kamal, " Mobile Compuring", Oxford University Press, 2007, ISBN 0195686772

REFERENCES :

1. Jochen Schiller,"Mobile Communications", Addison-Wesley.,Second Edition, 2004.
2. Stojmenovic and Cacute "Handbook of Wireless Networks and Mobile Computing", Wiley, 2002, ISBN 0471419028
3. Reza Behravanfar, "Mobile Computing Principles: Designing and Developing Mobile Applications with UML and XML", ISBN: 0521817331, Cambridge University Press, October 2004,

Outcomes:

- Able to think and develop new mobile application.
- Able to take any new technical issue related to this new paradigm and come up with a solution(s).
- Able to develop new ad hoc network applications and/or algorithms/ protocols.
- Able to understand & develop any existing or new protocol related to mobile environment.

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(R16CSE1123) COMPUTER GRAPHICS
(ELECTIVE – I)

Objectives:

To make students understand about fundamentals of Graphs enable them to design animated scenes for virtual object creations.

To make the student present the content graphically.

UNIT I :

Introduction: Application areas of Computer Graphics, overview of graphics systems, video-display devices, raster-scan systems, random scan systems, graphics monitors and work stations and input devices

Output primitives : Points and lines, line drawing algorithms, 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 : Translation, scaling, rotation, reflection and shear transformations, matrix representations and homogeneous coordinates, composite transforms, transformations between coordinate systems.

2-D viewing : The viewing pipeline, viewing coordinate reference frame, window to view-port coordinate transformation, viewing functions, Cohen-Sutherland and Cyrus-beck line clipping algorithms, Sutherland –Hodgeman polygon 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. Sweep representations, Octrees BSP Trees,

3-D Geometric transformations : Translation, rotation, scaling, reflection and shear transformations, composite transformations. 3-D viewing : Viewing pipeline, viewing coordinates, view volume and general projection transforms and clipping.

UNIT IV :

Visible surface detection methods : Classification, back-face detection, depth-buffer, scan-line, depth sorting, BSP-tree methods, area sub-division and octree methods.

Illumination Model and Surface rendering Methods: Basic illumination models, polygon rendering methods.

UNIT V:

Computer animation : Design of animation sequence, general computer animation functions, raster animation, computer animation languages, key frame systems, motion specifications.

TEXT BOOKS :

1. “Computer Graphics C version”, Donald Hearn and M.Pauline Baker, Pearson Education.
“Computer Graphics Second edition”, Zhigand xiang, Roy Plastock, Schaum’s outlines, Tata Mc-Graw hill edition.

REFERENCES :

1. Computer Graphics Principles & practice", second edition in C, Foley, VanDam, Feiner and Hughes, Pearson Education.
2. "Procedural elements for Computer Graphics", David F Rogers, Tata Mc Graw hill, 2nd edition.
3. "Principles of Interactive Computer Graphics", Neuman and Sproul, TMH.
4. "Principles of Computer Graphics", Shalini Govil, Pai, 2005, Springer.
5. "Computer Graphics", Steven Harrington, TMH
6. Computer Graphics, F.S.Hill, S.M.Kelley, PHI
7. Computer Graphics, P.Shirley, Steve Marschner & Other, Cengage Learning.
8. Computer Graphics & Animation, M.C. Trivedi, Jaico Publishing House.
9. An integrated Introduction to Computer Graphics and Geometric Modeling, R. Goldman, CRC Press, Taylor & Francis Group.
10. Computer Graphics, Rajesh K.Maurya, Wiley India.

Outcomes:

- Students can animate scenes entertainment.
- Will be able work in computer aided design for content presentation. Better analogy data with pictorial representation

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(R16CIV1132) DISASTER MANAGEMENT
(ELECTIVE – I)

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 induced 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 storms - Destruction by tropical cyclones & local storms (causes , distribution human adjustment, perception & mitigation) Cumulative atmospheric hazards/ disasters : - Floods- Droughts- Cold waves- Heat 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 Palnetary Hazards/ Disasters- Man induced Hazards /Disasters- Physical hazards/ Disasters-Soil Erosion
Soil Erosion:-- Mechanics & forms of Soil Erosion- Factors & 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 Pardeep 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 Bhawan, 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, Universiters Press, India, 2003
6. R.B. Singh, Space Technology for Disaster Mitigation in India (INCED), University of Tokyo, 1994
7. Dr. Satender , Disaster Management t in Hills, Concept Publishing Co., New Delhi, 2003
8. A.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

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3	-/1/-	3

(R16CSE1129) MACHINE LEARNING
(ELECTIVE – II)

Objectives:

- To be able to formulate machine learning problems corresponding to different applications.
- To understand a range of machine learning algorithms along with their strengths and weaknesses.
- To understand the basic theory underlying machine learning.

UNIT – I

Introduction: An illustrative learning task, and a few approaches to it. What is known from algorithms? Theory, Experiment, Biology Psychology.

Concept Learning : Version spaces, Inductive Bias, Active queries, Mistake bound/PAC model, basic results, Overview of issues regarding data sources, success criteria.

UNIT – II

Decision Tree Learning – Minimum Description Length Principle, Occam's razor, Learning with active queries.

Neural Network Learning: Perceptions and gradient descent back propagation.

UNIT – III

Sample complexity and Over fitting: Errors in estimating means, Cross Validation and jackknifing VC dimension, Irrelevant features: Multiplicative rules for weight turning.

Bayesian Approaches: The basics Expectation Maximization, Hidden Markov Models.

UNIT – IV

Instance – based Techniques: Lazy vs. eager generalization, K nearest neighbor, case – based reasoning.

UNIT – V

Genetic Algorithms : Different search methods for induction – Explanation – based learning using prior knowledge to reduce sample complexity.

TEXT BOOKS:

1) Tom Michel, Machine Learning, McGraw Hill, 1997.
2) Trevor Has tie, Robert Tibshirani & Jerome Friedman. The elements of Statically Larning, Springer Verlag, 2001.

REFERENCE BOOKS:

1) Machine learning Methods in the Environmental Sciences, Neural Networks, William W Hsieh, Cambridge Univ. Press.
2) Richard o, Duda Peter E. Hart and David G. Stork, pattern classification, John Wiley & Sons inc. 2001.
3) Chris Bishop, Neural Networks for Pattern Recognition, Oxford University Press, 1995.

Outcomes:

- Student should be able to understand the basic concepts such as decision trees and neural networks
- Ability to formulate machine learning techniques to respective problems.
- Apply machine learning algorithms to solve problems of moderate complexity.

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(R16CSE1130) SOFT COMPUTING
(ELECTIVE – II)

Objectives:

To give students knowledge of soft computing theories fundamentals, i.e. Fundamentals of artificial and neural networks, fuzzy sets and fuzzy logic and genetic algorithms.

UNIT – I:

All problems and Search: All problems, Techniques, Problem Spaces and Search, Heuristic Search Techniques – Generate and Test, Hill Climbing, Best First Search Problem reduction, ?Constraint Satisfaction and Means End Analysis. Approaches to Knowledge Representation – Using Predicate Logic and Rules.

UNIT II:

Artificial Neural Networks: Introduction, Basic models of ANN, important terminologies, Supervised Learning Networks, Perception Networks, Adaptive Linear Neuron, Backpropagation Network, Associative memory Networks. Traing Algorithms for pattern association, BAM and Hopefiled Networks.

UNIT – III:

Unsupervised Learning Network: Introduction, Fixed weight Competitive Nets, Maxnet, Hamming Network, Kohonen Self-Organizing Feature Maps, Learning Vector Quantization, Counter Propagation Network, Adaptive Resonance Theory Networks, Special Networks – Introduction to various networks.

UNIT – IV:

Introduction to Classical Sets (crisp Sets) and Fuzzy Sets: Operations and Fuzzy sets, Classical Relations – and Fuzzy Relations – Cardinality, Operations, Properties and composition, Tolerance and equivalence relations.
Membership functions – Features, Fuzzification, membership value assignments, Defuzzification.

UNIT – V:

Fuzzy arithmetic and Fuzzy Measures, Fuzzy Rule Base and Approximate Reasoning Fuzzy Decision making.
Fuzzy Logic: Control Systems, Genetic Algorithm – Introduction and basic operators and Terminology Applications Optimization of TSP, Internet Search Technique.

TEXT BOOKS:

1) Principles of Soft Computing, S.N. Sivanandam, S.N. Deepa, Wiley India, 2007.
2) Soft Computing and intelligent System Design – Fakhreddine O Karray, Clarence D Sliva, Pearson Edition, 2004.

REFERENCE BOOKS:

1) Artificial Intelligence and Soft computing- Behavioural and Cognitive Modeling of the Human Brain-Amit Konar, CRC Press, Taylor and Francis Group.
2) Artificial Intelligence – Elaine Rich and Kevin Knight, TMH, 1991, rp2008
3) Artificial Intelligence – Patric Henry Winston – Third Edition, Pearson Education.
4) A First Course in Fuzzy Logic-Hung T Nguyen and Elbert A Walker, CRC, Press Taylor and Francis Group.
5) Artificial Intelligence and Intelligent Systems, N.P. Pandhy, Oxford Univ. Press.

Outcomes:

- Student can bale to building intelligent systems through soft computing techniques.
- Student should be able to understand the concept of artificial neural networks, fuzzy arithmetic and fuzzy logic with their day to day applications.

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(R16CSE1131) INFORMATION RETRIEVAL SYSTEMS (ELECTIVE – II)

Objectives :

- To learn the different models for information storage and retrieval To learn about the various retrieval utilities.
- To understand indexing and querying in information retrieval systems.
- To expose the students to the notions of structured and semi structured data. To learn about web search.

UNIT-I

Introduction:

Retrieval Strategies : Vector space model, Probabilistic retrieval strategies simple term weights, Non binary independence model Language Models.

UNIT-II

Retrieval Utilities : Relevance feedback, Clustering, N-grams, Regression analysis, Thesauri.

UNIT-III

Retrieval Utilities : Semantic networks, Parsing Cross-language Information Retrieval: Introduction, Crossing the language barrier.

UNIT-IV

Efficiency: Inverted index, Query processing, Signature files, Duplicate document detection.

UNIT-V

Integrating Structured Data and Text: A Historical progression, Information retrieval as a relational application, Semi-structured search using a relational schema.

Distributed information Retrieval: A Theoretical model of distributed retrieval Web search.

TEXTBOOK:

1. David A. Grossman, Ophir Frieder, Information Retrieval – Algorithm and Heuristics, Springer, 2nd Edition (Distributed by Univerisities Press)

REFERENCES BOOKS :

1) Gerald J. Kowalski, Mark T Maybury. Information Storage and Retrieval Systems, Springer, 2000
2) Soumen Chakrabarti, Mining the Web: Discovering Knowledge from Hypertext Data, Morgan - Kaufmann Publications, 2002
3) Christopher D. manning, Prabhakar Raghavan, Hinrich Schotze, an Introduction to Information Retrieval, Cambridge University Press, Cambridge, England, 2009.

Outcomes:

- Possess the ability to store and retrieve textual documents using appropriate models.
  Possess the ability to use the various retrieval utilities for improving search
- Possess an understanding of indexing and compressing documents to improve space and time efficiency.
- Possess the skill to formulate SQL like queries for unstructured data Understand issues in web search.

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(R16CSE1141) ARTIFICIAL INTELLIGENCE (ELECTIVE – II)

Objectives:

- To learn the difference between optimal reasoning vs human like reasoning
- To understand the notions of state space representation, exhaustive search, heuristic search along with the time and space complexities.
- To learn different knowledge representation techniques.
- To understand the applications of AI: namely Game Playing, Theorem proving, Expert Systems, Machine Learning and Natural Language Processing

UNIT – I

Introduction: History, Intelligent Systems, Foundations of AI, Sub areas of AI, Applications
Problem Solving – State – Space Search and Control Strategies: Introduction General Problem Solving, Characteristics of Problem, Exhaustive Searches, Heuristic Search Techniques, Iterative-Deepening A*, Constraint Satisfaction.
Game Playing, Bounded Look-ahead Strategy and use of Evaluation Functions, Alpha-Beta Pruning.

UNIT – II

Login Concepts and Logic Programming: Introduction, Propositional Calculus Propositional Logic, Natural Deduction System, Axiomatic System, Semantic Tableau System in Propositional Logic, Resolution Refutation in Propositions Logic, Predicate Logic, Login Programming.
Knowledge Representation: Introduction, Approaches to Knowledge Representation, Knowledge Representation using Semantic Network Extended Semantic Networks for KR, Knowledge Representation using frames.

UNIT – III

Expert System and Applications: Introduction, Phases in Building Expert Systems, Expert, Application of Expert Systems, List of Sheets and Tools.
Uncertainty Measure – Probability Theory: Introduction, Probability Theory Bayesian Belief Networks, Certainty Factor Theory, Dempster-Shafer Theory

UNIT – IV

Machine-Learning Paradigms: Introduction, Machine Learning Systems, Supervised and Unsupervised Learning Inductive Learning, Learning Decision Trees (Text Book 2) Deductive Learning Clustering, Support Vector Machines.
Artificial Neural Networks: Introduction, Artificial Neural Networks, Single-Layer Feed – Forward Networks, Multi-Layer Feed – Forward Networks Radial-Basis Function Networks, Design Issues of Artificial Neural Networks, Recurrent Networks.

UNIT – V

Advanced knowledge Representation Techniques: Case Grammars Semantic Web.
Natural Language Processing: Introduction, Sentence Analysis Phases, Grammars and Parsers, Types of Parsers, Semantic Analysis, Universal Networking knowledge.

TEXT BOOKS:

1. Saroj Koushik, Artificial Intelligence, Cengage Learning, 2011.
2. Russell, Novig, Artificial Intelligence, A Modern Approach, Pearson Education, Second Edition, 2004.

REFERENCE BOOK:

1) Rich Knight, Nair, Artificial Intelligence, Tata McGraw Hill, Third Edition, 2009

Outcomes:

- Possess the ability to formulate an efficient problem space for a problem expressed in English.
- Possess the ability to select a search algorithm for a problem and characterize its time and space complexities.
- Possess the skill for representing knowledge using the appropriate technique.
- Possess the ability to apply A1 techniques to solve problems of Game Paying, Expert Systems, Machine Learning and Natural Language Processing.

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(R16CSE1112) COMPUTER FORENSICS
(ELECTIVE – II)

Objectives:

- A brief explanation of the objective is to provide digital evidence which are obtained from digital media.
- In order to understand the objectives of computer forensics, first r) all, people have to recognize the different roles computer plays in certain crime.
- According to a snippet from the United States Security Service, the functions computer has in different kinds of crimes.

UNIT - I

Computer Forensics Fundamentals: What is Computer Forensics?, Use of Computer Forensics in Law Enforcement, Computer Forensics Assistance to Human Resources/Employment Proceedings, Computer Forensics Services, Benefits of Professional Forensics Methodology, Steps taken by Computer Forensics Specialists.

Types of Computer Forensics Technology: Types of Military Computer Forensic Technology, Types of Law Enforcement - Computer Forensics Technology - Types of Business Computer Forensic Technology

Computer Forensics Evidence and Capture: Data Recovery Defined Data Back-up and Recovery - The Role of Back-up in Data Recovery - The Data-Recovery Solution

UNIT - II

Evidence Collection and Data Seizure: Why Collect Evidence? Collection Options - Obstacles - Types of Evidence - The Rules of Evidence - Volatile Evidence - General Procedure - Collection and Archiving - Methods o Collection - Artifacts - Collection Steps - Controlling Contamination: The Chain of Custody

Duplication and Preservation of Digital Evidence: Preserving the Digital Crime Scene - Computer Evidence Processing Steps - Legal Aspects Collecting and Preserving Computer Forensic Evidence

Computer Image Verification and Authentication: Special Needs Evidential Authentication - Practical Consideration - Practical Implementation.

UNIT - III

Computer Forensics analysis and validation: Determining what data 11 collect and analyze, validating forensic data, addressing data-hiding techniques, performing remote acquisitions

Network Forensics: Network forensics overview, performing live acquisitions, developing standard procedures for network forensics using network tools, examining the honeynet project. .

Processing Crime and Incident Scenes: Identifying digital evidence, allocating 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 tools, computer forensics hardware tools, validating and testing forensics software

e-mail Investigations: Exploring the role of e-mail in investigation, exploring ho roles of the client and server in e-mail, investigating e-mail crimes and 4olations, understanding e-mail servers, using specialized e-mail forensic Tools.

Cell phone and mobile device forensics: Understanding mobile device forensics, understanding acquisition procedures for cell phones and mobile devices.

UNIT – V:

Working with Windows and DOS Systems: understanding file systems, 4Noloring Microsoft File Structures, Examining NTFS disks, Understanding whole disk encryption, windows registry, Microsoft startup tasks, MS-DOS startup tasks, virtual machines.

TEXT BOOKS:

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

REFERENCE BOOKS:

1) Real Digital Forensics by Keith J. Jones, Richard Bejtlich, Curtis W. Rose, Addison- Wesley Pearson Education
2) Forensic Compiling, A Practitioners Guide by Tony Sammes and Brian Jenkinson, Springer International edition.
3) Computer Evidence - Collection & Presentation by Christopher L.T. Brown, Firewall Media.
4) Homeland Security, Techniques & Technologies by Jesus Mena, SI Firewall Media.
5) Software Forensics Collecting Evidence from the Scene of a Digital Crime by Robert M.Slade, TMH 2005
6) Windows Forensics by Chad Steel, Wiley India Edition.

Outcomes:

- Students will understand the usage of computers in forensic, and el how to use various forensic tools for a wide variety of investigations.
- It gives an opportunity to students to continue their zeal in research in computer forensics

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(R16CSE1208) LINUX PROGRAMMING LAB

Objectives:

- To write shell scripts to solve problems.
- To implement some standard Linux utilities such as ls, cp etc system calls.
- To develop network-based applications using C.

List of sample problems:

Note: Use Bash for Shell scripts.

1. 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.
2. Write a shell script that deletes all lines containing a specified word in one or more files supplied as arguments to it.
3. 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.
4. 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.
5. Write a shell script that accepts a list of file names as its arguments, counts and reports the occurrence of each word that is present in the first argument file on other argument files.
6. Write a shell script to list all of the directory files in a directory.
7. Write a shell script to find factorial of a given integer.
8. Write an awk script to count the number of lines in a file that do not contain vowels.
9. Write an awk script to find the number of characters, words and lines in a file.
10. Write a C program that makes a copy of a file using standard I/O and system calls.
11. Implement in C the following Linux commands using System calls a) cat b) mv
12. Write a C program to list files in a directory.
13. Write a C program to emulate the Unix ls -l command.
14. Write a C program to list for every file in a directory, its inode number and file name.
15. Write a C program that redirects standard output to a file. Ex: ls > f1.
16. 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.
17. Write a C program to create a Zombie process.
18. Write a C program that illustrates how an orphan is created.
19. Write a C program that illustrates how to execute two commands concurrently with a command pipe. Ex:- ls –l l sort
20. Write C programs that illustrate communication between two unrelated process using named pipe (FIFO File)
21. Write a C program in which a parent writes a message to a pipe and the child reads the message.
22. 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.
23. Write a C program (receiver. c) that receives the messages (from the 0 above message queue as specified in (22)) and displays them.
24. Write a C program that illustrates suspending and resuming processes using signals.

25. 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 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.
26. 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.
27. 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.

TEXT BOOKS:

1) Beginning Linux Programming, 4th Edition, N.Matthew, R.Stones,Wrox, Wiley India Edition.
2) Advanced Unix Programming, N.B.Venkateswarulu, BS Publications.
3) Unix and Shell Programming, M.G. Venkatesh Murthy, Pearson Education.
4) Unix Shells by Example, 4th Edition, Elllie Quigley, Pearson Education.
5) Sed and Awk, O. Dougherty & A.Robbins,2nd edition, SPD.

Outcomes:

- Ability to understand the Linux environment
- Ability to perform the file management and multiple tasks using shell scripts in Linux environment

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(R16CSE1216) DATA WAREHOUSING AND MINING LAB

Objectives:

Learn how to build a data warehouse and query it (using open source tools like Pentaho Data Integration and Pentaho Business Analytics), Learn to perform data mining tasks using a data mining toolkit (such as open source WEKA), Understand the data sets and data preprocessing, Demonstrate the working of algorithms for data mining tasks such association rule mining, classification, clustering and regression, Exercise the data mining techniques with varied input values for different parameters.

UNIT-I: Build Data Warehouse and Explore WEKA

A. Build a Data Warehouse/Data Mart (using open source tools like Pentaho Data Integration tool, Pentoaho Business Analytics; or other data warehouse tools like Microsoft-SSIS, Informatica, Business Objects, etc.).

I. Identify source tables and populate sample data

II. Design multi-dimensional data models namely Star, snowflake and Fact constellation schemas for any one enterprise (ex. Banking Insurance, Finance, Healthcare, Manufacturing, Automobile, etc.)

III. Write ETL scripts and implement using data warehouse tools

IV. Perform various OLAP operations such slice, dice, roll up, drill rand pivot

V. Explore visualization features of the tool for analysis like identifying trends etc.

B. Explore WEKA Data Mining/Machine Learning Toolkit

I. Downloading and/or installation of WEKA data mining toolkit,

II. Understand the features of WEKA toolkit such as Explorer, Knowledge. Flow interface, Experimenter, command-line interface.

III. Navigate the options available in the WEKA (ex. Select attributes panel, Preprocess panel, Classify panel, Cluster panel, Associate panel and Visualize panel)

IV. Study the arff file format

V.Explore the available data sets in WEKA.

VI. Load a data set (ex. Weather dataset, Iris dataset, etc.)

VII. Load each dataset and observe the following:

i. List the attribute names and they types

ii. Number of records in each dataset iii.Identify the class attribute (if any)

iv. Plot Histogram

v. Determine the number of records for each class.

vi. Visualize the rata in various dimensions

Unit 2 Perform data preprocessing tasks and Demonstrate performing association rule mining on data sets

A. Explore various options available in Weka for preprocessing data and apply (like Discretization Filters, Resample filter, etc.) on each dataset

B. Load each dataset into Weka and run Aprori algorithm with different support and confidence values. Study the rules generated.

C. 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 3 Demonstrate performing classification on data sets

A. Load each dataset into Weka and run Id3, J48 classification algorithm. Study the classifier output. Compute entropy values, Kappa statistic.
B. Extract if-then rules from the decision tree generated by the classifier, Observe the confusion matrix and derive Accuracy, F-measure, TPrate, -EPrate, Precision and Recall values. Apply cross-validation strategy with various fold levels and compare the accuracy results.
C. Load each dataset into Weka and perform Naive-bayes classification and k-Nearest Neighbour classification. Interpret the results obtained.
D. Plot RoC Curves
E. 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 4 Demonstrate performing clustering on data sets

A. 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.
B. Explore other clustering techniques available in Weka.
C. Explore visualization features of Weka to visualize the clusters. Derive interesting insights and explain.

Unit 5 Demonstrate performing Regression on data sets

A. Load each dataset into Weka and build Linear Regression m Study the clusters formed. Use Training set option. interpret regression model and derive patterns and conclusions from regression results.
B. Use options cross-validation and percentage split and repeat running the Linear Regression Model. Observe the results and d meaningful results.
C. Explore Simple linear regression technique that only looks variable.

Resource Sites:

1. http://www.pentaho.com/
2. http://www.cs.waikato.ac.nz/ml/weka/

Outcomes:

Ability to understand the various kinds of tools.

Demonstrate the classification, clusters and etc. in large data sets

DATAMINING LAB

Objectives:

- To obtain practical experience using data mining techniques on real world data sets.
- Emphasize hands-on experience working with all real data sets.

List of Sample Problems:

Task 1: 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 the form production rules.
2) Books. Find some training manuals for loan officers or perhaps a suitable textbook on finance. Translate this knowledge from text form 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 when 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 dataset, consisting of 1000 actual cases collected in Germany. credit dataset (original) Excel spreadsheet 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 !)
A few notes on the German dataset

- DM stands for Deutsche Mark, the unit of currency, worth about 90 cents Canadian (but looks and acts like a quarter).
- owns_telephone. German phone rates are much higher than in Canada so fewer people own telephones.
- foreign_worker. There are millions of these in Germany (many from Turnkey). It is very hard to get German citizenship if you were not born of German parents.
- There are 20 attributes used in judging a loan applicant. 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., (5 marks)
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. (5 marks)
3. One type of model that you can create is a Decision Tree - train a Decision Tree using the complete dataset as the training data. Report the model obtained after training. (10 marks)
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 you cannot get 100% training accuracy? (10 marks)
5. Is testing on the training set as you did above a good idea? Why or Why not ? (10 marks)
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 your accuracy increase/decrease? Why? (10 marks)
7. Check to see if the data shows a bias against "foreign workers" (attribute 20), or "personal-status" (attribute 9). One way to do this (perhaps rather simple minded) is to remove these attributes from the dataset and see if the decision tree created in those cases is significantly different from the full dataset case which you have already done. To remove an attribute you can use the preprocess tab in Weka's GUI Explorer. Did removing these attributes have any significant effect? Discuss. (10 marks)

8. Another question might be, do you really need to input so many attributes to get good results? Maybe only a few would do. For example, you could try just having attributes 2, 3, 5, 7, 10, 17 (and 21, the class attribute (naturally)). 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.) (10 marks)
9. Sometimes, the cost of rejecting an applicant who actually has • good credit (case 1) might be higher than accepting an applicant who has bad credit (case 2). Instead of counting the misclassifications equally in both cases, give a higher cost to the first case (say cost 5) and lower cost to the second case. You can do this by using a cold matrix in Weka. Train your Decision Tree again and report the Decision Tree and cross-validation results. Are they significantly different from results obtained in problem 6 (using equal cost)? (10 marks)
10. Do you think it is a good idea to prefer 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? (10 marks)
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 (you can do this in Weka) and report the Decision Tree you obtain? Also, report your accuracy using the pruned model. Does your accuracy increase? (10 marks)
12. (Extra Credit): How can you convert a Decision Trees into "if-then. else rules". Make up your own small Decision Tree consisting of 2,3 levels and convert it 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 dataset ? 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 and oneR. (10 marks)

Task Resources:

Mentor lecture on Decision Trees

Andrew Moore's Data Mining Tutorials (See tutorials on Decision Trees and Cross Validation)

Decision Trees (Source: Tan, MSU)

Tom Mitchell's book slides (See slides on Concept Learning and Decision Trees)

Weka resources:

- o Introduction to Weka (html version) (download ppt version)
- o Download Weka
- o Weka Tutorial
- o ARFF format
- o Using_Weka from command line

Task 2: Hospital Management System

Data Warehouse consists Dimension Table and Fact Table.

REMEMBER The following

Dimension

The dimension object (Dimension):

_ Name

_ Attributes (Levels) , with one primary key

_ Hierarchies

One time dimension is must.

About Levels and Hierarchies

Dimension objects (dimension) consist of a set of levels and a set of hierarchies defined over those levels. The levels represent levels of aggregation. Hierarchies describe parent-child relationships among a set of levels.

For example, a typical calendar dimension could contain five levels. Two hierarchies can be defined on these levels:
H1: YearL > QuarterL > MonthL > WeekL > DayL
H2: YearL > WeekL > DayL

The hierarchies are described from parent to child, so that Year is the parent of Quarter, Quarter the parent of Month, and so forth.

About Unique Key Constraints

When you create a definition for a hierarchy, Warehouse Builder creates an identifier key for each level of the hierarchy and a unique key constraint the lowest level (Base Level)

Design a Hospital Management system data warehouse (TARGET) consists of Dimensions Patient, Medicine, Supplier, Time. Where measures are ' NO UNITS', UNIT PRICE.

Assume the Relational database (SOURCE) table schemas as follows
TIME (day, month, year),
PATIENT (patient__ name, Age, Address, etc.,)
MEDICINE (Medicine_Brand_name, Drug_name, Supplier, no_units, Uinit_Price, etc.,)
SUPPLIER :(Supplier_name, Medicine_Brand_name, Address, etc.,)
If each Dimension has 6 levels, decide the levels and hierarchies, Assume the level names suitably.
Design the Hospital Management system data warehouse using all schemas. Give the example 4-D cube with assumption names.

Outcomes:

- Ability to add mining algorithms as a component to the exiting tool
- Ability to apply mining techniques for realistic data.

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(R16HAS1104) MANAGEMENT SCIENCE

Objectives:

This course is intended to familiarise the students with the framework for the managers and leaders available for understanding and making decisions relating to issues related organizational structure, production operations, marketing, Human resource Management, product management and strategy.

UNIT -I:

Introduction to Management and Organization: Concepts of Management and organization- nature, importance and Functions of Management, Systems Approach to Management - Taylor's Scientific Management Theory - Fayal's Principles of Management- Maslow's theory of Hierarchy of Human Needs - Douglas McGregor's Theory X and Theory Y- Hertzberg Two Factor Theory of Motivation - Leadership Styles, Social responsibilities of Management. Desiring Organisational Structures: Basic concepts related to Organisation - Departmentation and Decentralisation, Types and Evaluation of mechanistic and organic structures of organisation and suitability.

UNIT -II:

Operations and Marketing Management: Principles and Types of Plant Layout-Methods of production (Job, batch and Mass Production), Work Study -Basic procedure involved in Method Study and Work Measurement -Business Process Reengineering (BPR) - Statistical Quality Control: control charts for Variables and Attributes (simple Problems) and Acceptance Sampling, TQM, Six Sigma, Deming's contribution to quality. Objectives of Inventory control, EOQ, ABC Analysis, Purchase Procedure, Stores Management and Stores Records -JIT System, Supply Chain Management, Functions of Marketing, Marketing Mix, and Marketing Strategies based on Product Life Cycle, Channels of distribution.

UNIT -III:

Human Resources Management (HRM): Concepts of HRM, HRD and Personnel Management and Industrial Relations (PMIR), HRM vs PMIR, Basic functions of HR Manager: Manpower planning, Recruitment, Selection, Training and Development, Placement, Wage and Salary Administration, Promotion, Transfer, Separation, Performance Appraisal, Grievance Handling and Welfare Administration, Job Evaluation and Merit Rating - Capability Maturity Model (CMM) Levels - Performance Management System.

UNIT -IV:

Project Management (PERT/CPM): Network Analysis, Programme Evaluation and Review Technique (PERT), Critical Path Method (CPM), Identifying critical path, Probability of Completing the project within given time, Project Cost Analysis, Project Crashing (simple problems).

UNIT -V:

Strategic Management and Contemporary Strategic Issues: Mission, Goals, Objectives, Policy, Strategy, Programmes, Elements of Corporate Planning Process, Environmental Scanning, Value Chain Analysis, SWOT Analysis, Steps in Strategy Formulation and Implementation, Generic Strategy alternatives. Bench Marking and Balanced Score Card as Contemporary Business Strategies.

TEXT BOOKS:

1. Stoner, Freeman, Gilbert, ***Management,*** 6th Ed, Pearson Education, New Delhi, 2004
2. P. Vijaya Kumar, N. Appa Rao and Ashima B. Chhalill, Cengags Learning India Pvt Ltd, 2012.

REFERENCE BOOKS:

1. Kotler Philip and Keller Kevin Lane: Marketing Management, Pearson, 2012.
2. Koontz and Weihrich: Essentials of Management, McGraw Hill, 2012,
3. Thomas N. Duening and John M.Ivancevich Management—Principles and Guidelines, Biztantra, 2012.
4. Kanishka Bedi, Production and Operations Management, Oxford University Press, 2012.
5. Samuel C.Certo: Modern Management, 2012.
6. Schermerhorn, Capling, Poole and Wiesner: Management, Wiley, 2012.
7. Parnell: Strategic Management, Cengage,2012.
8. Lawrence R Jauch, R.Gupta and William F.Glueck: Business Policy and Strategic Management, Frank Bros.2012.
9. Aryasri: Management Science, McGraw Hill, 2012

Outcomes:

- By the end of the course, the student will be in a position to
- Plan an organisational structure for a given context in the organisation
- carry out production operations through Work study
- understand the markets, customers and competition better and price the given products appropriately.
- ensure quality for a given product or service
- plan and control the HR function better
- plan, schedule and control projects through PERT and CPM
- evolve a strategy for a business or service organisation

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(R16CSE1132) WEB SERVICES
(ELECTIVE – III)

Objectives

- To understand the details of web services technologies like WSDL, UDDI, SOAP
- To learn how to implement and deploy web service client and server
- To explore interoperability between different frameworks

UNIT- I

Evolution and Emergence of Web Services - Evolution of distributed computing, Core distributed computing technologies — client/server, CORBA, JAVA RMI, Microsoft DCOM, MOM, Challenges in Distributed Computing, role of J2EE and XML in distributed computing, emergence of Web Services and Service Oriented Architecture (SOA).

Introduction to Web Services — The definition of web services, basic operational model of web services, tools and technologies enabling web services, benefits and challenges of using web services.

Web Services Architecture — Web services Architecture and its characteristics, core building blocks of web services, standards and technologies available for implementing web services, web services communication models, basic steps of implementing web services.

UNIT- II

Fundamentals of SOAP — SOAP Message Structure, SOAP encoding, Encoding of different data types, SOAP message exchange models, SOAP communication and messaging, Java and Axis, limitations of SOAP.

UNIT- III

Describing Web Service - WSDL - WSDL in the world of Web Services, Web Services life cycle, anatomy of WSDL definition document, WSDL bindings, WSDL Tools, limitations of WSDL.

UNIT- IV

Discovering Web Services - Service discovery, role of service discovery in a SOA, service discovery mechanisms, UDDI - UDDI registries, uses of UDDI Registry, Programming with UDDI, UDDI data structures, Publishing API, Publishing, searching and deleting information in a UDDI Registry, limitations of UDDI.

UNIT - V

Web Services Interoperability - Means of ensuring Interoperability, Overview of .NET, Creating a .NET client for an Axis Web Service, creating Java client for a Web service, Challenges in Web Services Interoperability,

Web Services Security- XML security frame work, Goals of Cryptography, Digital signature, Digital Certificate, XML Encryption.

TEXT BOOK:

1. Developing Java Web Services, R. Nagappan, R. Skoczylas, R.P. Sriganesh, Wiley India.

REFERENCE BOOKS:

1. Java Web Service Architecture, James McGovern, Sameer Tyagi et. al. Elsevier
2. Building Web Services with Java, 2"d Edition, S. Graham and others Pearson Edn.
3. Java Web Services, D.A. Chappell & T. Jewell, O'Reilly,SPD.
4. Web Services, G. Alonso, F. Casati and others, Springer.

Outcomes:

- Basic details of WSDL, UDDI, SOAP
- Implement WS client and server with interoperable systems

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(R16CSE1133) SEMANTIC WEB AND SOCIAL NETWORKS
(ELECTIVE – III)

Objectives:

- To learn web intelligence
- To learn Knowledge Representation for the Semantic Web
- To learn Ontology Engineering
- To learn Semantic Web Applications, Services and Technology
- To learn Social Network Analysis and semantic web

UNIT- I

Thinking and Intelligent Web Applications, The Information Age, The World Wide Web, Limitations of Today's Web, The Next Generation Web.

Machine Intelligence, Artificial Intelligence, Ontology, Inference engines, Software Agents, Berners-Lee www, Semantic Road Map, Logic on the semantic Web.

UNIT- II

Ontologies and their role in the semantic web, Ontologies Languages for the Semantic Web — Resource Description Framework(RDF) / RDF Schema, Ontology Web Language(OWL), UML, XML/XML Schema. Ontology Engineering, Constructing Ontology, Ontology Development Tools, Ontology Methods, Ontology Sharing and Merging, Ontology Libraries and Ontology Mapping.

UNIT- III

Logic, Rule and Inference Engines. Semantic Web applications and services, Semantic Search, e-learning, Semantic Bioinformatics, Knowledge Base.

UNIT- IV

XML Based Web Services, Creating an OWL-S Ontology for Web Services, Semantic Search Technology, Web Search Agents and Semantic Methods, What is social Networks analysis, development of the social networks analysis, Electronic Sources for Network Analysis — Electronic Discussion networks.

UNIT- V

Blogs and Online Communities, Web Based Networks. Building Semantic Web Applications with social network features.

TEXT BOOKS:

1. Thinking on the Web Berners Lee, Godel and Turing, Wiley interscience, 2008.
2. Social Networks and the Semantic Web, Peter Mika, Springer, 2007.

REFERENCE BOOKS:

1. Semantic Web Technologies, Trends and Research in Ontology Based Systems, J.Davies, Rudi Studer, Paul Warren, John Wiley & Sons.
2. Semantic Web and Semantic Web Services -Liyang Lu Chapman and Hall/CRC Publishers, (Taylor & Francis Group)
3. Information Sharing on the semantic Web - Heiner Stuckenschmidt; Frank Van Harmelen, Springer Publications.
4. Programming the Semantic Web, T.Segaran, C.Evans, J.Taylor, O'Reilly, SPD.

Outcomes:

- Ability to understand and knowledge representation for the semantic web.
- Ability to create ontology.
- Ability to build a blogs and social networks.

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L	T/P/D	C
3	-/1/-	3

(R16CSE1134) SCRIPTING LANGUAGES
(ELECTIVE - III)

Objectives:

This course demonstrates an in depth understanding of the tools and the scripting languages necessary for design and development of applications dealing with Bio-information/ Bio-data. The instructor is advised to discuss examples in the context of Bio-data/ Bio-information application development.

UNIT - I

Introduction to PERL and Scripting: Scripts and Programs, Origin of Scripting , Scripting Today, Characteristics of Scripting Languages, Uses for Scripting Languages, Web Scripting, and the universe of Scripting Languages. PERL- Names and Values, Variables, Scalar Expressions, Control Structures, arrays, list, hashes, strings, pattern and regular expressions, subroutines.

UNIT - II

Advanced perl: Finer points of looping, pack and unpack, file system, eval, data structures, packages, modules, objects, interfacing to the operating system, Creating Internet ware applications, Dirty Hands Internet Programming, security Issues.

PHP Basics : PHP Basics- Features, Embedding PHP Code in your Web pages, Outputting the data to the browser, Data types, Variables, Constants, expressions, string interpolation, control structures, Function, Creating a Function, Function Libraries, Arrays, strings and Regular Expressions.

UNIT - III

Advanced PHP Programming: PHP and Web Forms, Files, PHP Authentication and Methodologies -Hard Coded, File Based, Database Based, IP Based, Login Administration, Uploading Files with PHP, Sending Email using PHP, PHP Encryption Functions, the Mcrypt package, Building Web sites for the World.

UNIT - IV

TCL : TCL Structure, syntax, Variables and Data in TCL, Control Flow, Data Structures, input/output, procedures, strings, patterns, files, Advance TCL-eval, source, exec and uplevel commands, Name spaces, trapping errors, event driven programs, making applications internet aware, Nuts and Bolts Internet Programming, Security Issues, C Interface.

Tk-Visual Tool Kits, Fundamental Concepts of Tk, Tk by example, Events and Binding , Perl-Tk.

UNIT - V

Python: Introduction to Python language, python-syntax, statements functions, Built-in-functions and Methods, Modules in python, Exception Handling.

Integrated Web Applications in Python — Building Small, Efficient Python Web Systems, Web Application Framework.

TEXT BOOKS:

1. The World of Scripting Languages , David Barron, Wiley Publication
2. Python Web Programming, Steve Holden and David Beazley, New Riders Publications.
3. Beginning PHP and MySQL, 3rd Edition, Jason Gilmore, Apress Publications (Dream tech.).

REFERENCE BOOKS:

1. Open Source Web Development with LAMP using Linux, Apache, MySQL, Perl and PHP, J.Lee and B.Ware (Addison Wesley) Pearson Education.
2. Programming Python, M.Lutz, SPD.
3. PHP 6 Fast and Easy Web Development, Julie Meloni and Matt Telles, Cengage Learning Publications.
4. PHP 5.1, I.Bayross and S.Shah, The X Team, SPD.
5. Core Python Programming, Chun, Pearson Education.
6. Guide to Programming with Python, M.Dawson, Cengage Learning
7. Perl by Example, E. Quigley, Pearson Education.
8. Programming Perl, Larry Wall, T. Christiansen and J. Orwant, O'Reilly, SPD.
9. Tcl and the Tk Tool kit, Ousterhout, Pearson Education.
10. PHP and MySQL by Example, E. Quigley, Prentice Hall(Pearson).
11. Perl Power, J.P.Flynt, Cengage Learning.
12. PHP Programming solutions, V.Vaswani, TMH.

Outcomes:

- Ability to understand the differences between scripting languages,
- Ability to apply your knowledge of the weaknesses of scripting languages to select implementation.
- Master an understanding of python especially the object oriented concepts.

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(R16CSE1135) MULTIMEDIA & RICH INTERNET APPLICATIONS (ELECTIVE - III)

Objectives:

This course aims to further develop students' competency in producing dynamic and creative graphic solutions for multimedia productions. It provides students with the basic concepts and techniques of interactive authoring. It also introduces students with the advanced scripting skills necessary for implementing highly interactive, rich internet applications using multimedia technologies and authoring tools. Students will develop aesthetic value and competencies in multimedia authoring. Artistic visual style and layout design are stressed, as well as the editing and integration of graphic images, animation, video and audio files. The course allows students to master Industry-wide software and technologies to create highly interactive, rich Internet applications.

UNIT - I

Fundamental concepts in Text and Image: Multimedia and hypermedia, World Wide Web, overview of multimedia software tools. Graphics and image data representation graphics/image data types, file formats, Color in image and video: color science, color models in images, color models in video.

UNIT - II

Fundamental concepts in video and digital audio: Types of video signals, analog video, digital video, digitization of sound, MIDI, quantization and transmission of audio.

Multimedia Data Compression: Lossless compression algorithms, Lossy compression algorithms, Image compression standards.

UNIT III

Basic Video compression techniques, Case study: MPEG Video Coding I, Basic Audio compression techniques, Case study: MPEG Audio compression.

Web 2.0 : What is web 2.0, Search, Content Networks, User Generated Content, Blogging, Social Networking, Social Media, Tagging, Social Marking, Rich Internet Applications, Web Services, Mashups, Location Based Services, XML, RSS, Atom, JSON, and VoIP, Web 2.0 Monetization and Business Models, Future of the Web.

UNIT - IV

Rich Internet Applications(RIAs) with Adobe Flash : Adobe Flash-Introduction, Flash Movie Development, Learning Flash with Hands-on Examples, Publish your flash movie, Creating special effects with Flash, Creating a website splash screen, action script, web sources.

Rich Internet Applications(RIAs) with Flex 3 - Introduction, Developing with Flex 3, Working with Components, Advanced Component Development, Visual Effects and Multimedia,

UNIT - V

Ajax- Enabled Rich Internet Application : Introduction, Traditional Web Applications vs Ajax Applications, Rich Internet Application with Ajax, History of Ajax, Raw Ajax example using xmlhttprequest object, Using XML, Creating a full scale Ajax Enabled application, Dojo ToolKit.

TEXT BOOKS:

1. Fundamentals of Multimedia by Ze-Nian Li and Mark S. Drew PHI Learning, 2004
2. Professional Adobe Flex 3, Joseph Balderson, Peter Ent, et al, Wrox Publications, Wiley India, 2009.
3. AJAX, Rich Internet Applications, and Web Development for Programmers, Paul J Deitel and Harvey M Deitel, Deitel Developer Series, Pearson Education.

REFERENCE BOOKS:

1. Multimedia Communications: Applications, Networks, Protocols and Standards, Fred Halsall, Pearson Education, 2001, rp 2005.
2. Multimedia Making it work, Tay Vaughan, 7th edition, TMH, 2008.
3. Introduction to multimedia communications and Applications, Middleware, Networks, K.R.Rao, Zoran, Dragored, Wiley India, 2006, rp. 2009.
4. Multimedia Computing, Communications & Applications, Ralf Steinmetz and Klara Nahrstedt, Pearson Education, 2004
5. Principles of Multimedia, Ranjan Parekh, TMH, 2006.
6. Multimedia in Action, James E.Shuman, Cengage Learning, 198, rp 2008.
7. Multimedia Systems design, Prabhat K. Andleigh, Kiran Thakrar, PHI**,** 1986.
8. Multimedia and Communications Technology, Steve Heath, Elsevier, 1999, rp 2003.
9. Adobe Flash CS3 Professional, Adobe press, Pearson Education, 2007.
10. Flash CS3 Professional Advanced, Russel Chun, Pearson Education, 2007.
11. Flash CS5, Chris Grover, O'Reilly, SPD, 2010.
12. SAMS Teach yourself Adobe flash CS3, Pearson Education, 2007.
13. Flex 4 Cookbook, Joshua Noble, et.al, O'Reilly,SPD 2010.
14. Flex3 — A beginner's guide, Michele E.Davis, Jon A.Phillips, TMH, 2008.
15. Mastering Dojo, R.Gill, C.Riecke and A.Russell,SPD.

Outcomes:

- Ability to create and design rich internet applications.
- Ability to develop different multimedia tools to produce web based and independent user interfaces.

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(R16CSE1136) AD HOC AND SENSOR NETWORKS
(ELECTIVE – IV)

Objectives:

- To understand the concepts of sensor networks
- To understand the MAC and transport protocols for adhoc networks
- To understand the security of sensor networks
- To understand the applications of adhoc and sensor networks

UNIT- I

Introduction to Ad Hoc Wireless Networks: Characteristics of MANETs, Applications of MANETs, Challenges.

Routing in MANETs: Topology-based versus Position-based approaches, Topology based routing protocols, Position based routing, Other Routing Protocols.

UNIT- II

Data Transmission in MANETs: The Broadcast Storm, Multicasting, Geocasting

TCP over Ad Hoc Networks: TCP Protocol overview, TCP and MANETs Solutions for TCP over Ad Hoc

UNIT- Ill

Basics of Wireless Sensors and Applications: The Mica Mote, Sensing and Communication Range, Design Issues, Energy consumption, Clustering of Sensors; Applications

Data Retrieval in Sensor Networks: Classification of WSNs, MAC layer, Routing layer, High-level application layer support, Adapting to the inherent dynamic nature of WSNs.

UNIT- IV

Security : Security in Ad hoc Wireless Networks, Key Management, Secure Routing, Cooperation in MANETs, Intrusion Detection Systems.

Sensor Network Platforms and Tools: Sensor Network Hardware, Sensor Network Programming Challenges, Node-Level Software Platforms

UNIT- V

Operating System - TinyOS

Imperative Language: nesC, Dataflow style language: TinyGALS, Node Level Simulators, ns-2 and its sensor network extension, TOSSIM

TEXT BOOKS:

1. Ad Hoc and Sensor Networks - Theory and Applications, ***Carlos Corderio Dharma P.Aggarwal,*** World Scientific Publications / Cambridge University Press, March 2006
2. Wireless Sensor Networks: An Information Processing Approach, ***Feng Zhao, Leonidas Guibas,*** Elsevier Science imprint, Morgan Kauffman Publishers, 2005, rp2009.

REFERENCE BOOKS:

1. Adhoc Wireless Networks - Architectures and Protocols, C.Siva Ram Murthy, B.S. Murthy, Pearson Education, 2004
2. Wireless Sensor Networks — Principles and Practice, Fei Hu, Xiaojun Cao, An Auerbach book, CRC Press, Taylor & Francis Group, 2010
3. Wireless Ad hoc Mobile Wireless Networks — Principles, Protocols and Applications, Subir Kumar Sarkar, et al., Auerbach Publications, Taylor & Francis Group, 2008.
4. Ad hoc Networking, ***Charles EPerkins,*** Pearson Education, 2001.

5. Wireless Ad hoc Networking, ***Shih-Lin Wu, Yu-Chee Tseng,*** Auerbach Publications, Taylor & Francis Group, 2007
6. Wireless Ad hoc and Sensor Networks — Protocols, Performance and Control, Jagannathan Sarangapani, CRC Press, Taylor & Francis Group, 2007, rp 2010.
7. Security in Ad hoc and Sensor Networks, Raheem Beyah, et al., World Scientific Publications / Cambridge University Press, 2010
8. Ad hoc Wireless Networks — A communication - theoretic perspective, Ozan K.Tonguz, Gialuigi Ferrari, Wiley India, 2006, rp2009.
9. Wireless Sensor Networks — Signal processing and communications perspectives, Ananthram Swami, et al., Wiley India, 2007, rp2009.

Outcomes:

- Ability to understand the concept of ad-hoc and sensor networks.
- Ability to design and implement sensor network protocols.
- Ability to set up and evaluate measurements of protocol performance in sensor networks

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(R16CSE1137) STORAGE AREA NETWORKS
(ELECTIVE – IV)

Objectives:

- Understand Storage Area Networks characteristics and components. Become familiar with the SAN vendors and their products
- Learn Fibre Channel protocols and how SAN components use them to communicate with each other Become familiar with Cisco MDS 9000 Multilayer Directors and Fabric Switches Thoroughly learn Cisco SAN-OS features.
- Understand the use of all SAN-OS commands. Practice variations of SANOS features

UNIT- I

Review data creation and the amount of data being created and understand the value of data to a business, challenges in data storage and data management, Solutions available for data storage, Core elements of a data center infrastructure, role of each element in supporting business activities Hardware and software components of the host environment, Key protocols and concepts used by each component, Physical and logical components of a connectivity environment, Major physical components of a disk drive and their function, logical constructs of a physical disk, access characteristics, and performance Implications.

UNIT- II

Concept of RAID and its components, Different RAID levels and their suitability for different application environments: RAID 0, RAID 1, RAID 3, RAID 4, RAID 5, RAID 0+1, RAID 1+0, RAID 6, Compare and contrast integrated and modular storage systems, High-level architecture and working of an intelligent storage system

Evolution of networked storage, Architecture, components, and topologies of FC-SAN, NAS, and IP-SAN, Benefits of the different networked storage options, Understand the need for long-term archiving solutions and describe how CAS fulfills the need, Understand the appropriateness of the different networked storage options for different application environments

UNIT- III

List reasons for planned/unplanned outages and the impact of downtime, Differentiate between business continuity (BC) and disaster recovery (DR), RTO and RPO, Identify single points of failure in a storage infrastructure and list solutions to mitigate these failures.

UNIT- IV

Architecture of backup/recovery and the different backup/recovery topologies, replication technologies and their role in ensuring information availability and business continuity, Remote replication technologies and their role in providing disaster recovery and business continuity capabilities

UNIT- V

Identify key areas to monitor in a data center, Industry standards for data center monitoring and management, Key metrics to monitor for different components in a storage infrastructure, Key management tasks in a data center. Information security, Critical security attributes for information systems, Storage security domains, List and analyzes the common threats in each domain

Virtualization technologies, block-level and file-level virtualization technologies and processes.

Case Studies:
The technologies described in the course are reinforced with EMC examples of actual solutions. Realistic case studies enable the participant to design the most appropriate solution for given sets of criteria.

TEXT BOOK:

1. EMC Corporation, Information Storage and Management, Wiley.

REFERENCE BOOKS:

1. Robert Spalding, "Storage Networks: The Complete Reference", Tata McGraw Hill, Osborne, 2003.
2. Marc Farley, "Building Storage Networks", Tata McGraw Hill, Osborne, 2001.
3. Meeta Gupta, Storage Area Network Fundamentals, Pearson Education Limited, 2002.

Outcomes:

- Ability to demonstrate the storage area networks and their products
- Ability to provide the mechanisms for the backup/recovery.

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(R16CSE1138) DATABASE SECURITY
(ELECTIVE - IV)

Objectives:

- To learn the security of databases
- To learn the design techniques of database security
- To learn the secure software design

UNIT- I

Introduction: Introduction to Databases Security Problems in Databases Security Controls Conclusions

Security Models -1: Introduction Access Matrix Model Take-Grant Model Acten Model PN Model Hartson and Hsiao's Model Fernandez's Model Bussolati and Martella's Model for Distributed databases

UNIT- II

Security Models -2: Bell and LaPadula's Model Biba's Model Dion's Model Sea View Model Jajodia and Sandhu's Model The Lattice Model for the Flow Control conclusion

Security Mechanisms : Introduction User Identification/Authentication Memory Protection Resource Protection Control Flow Mechanisms Isolation Security Functionalities in Some Operating Systems Trusted Computer System Evaluation Criteria

UNIT- III

Security Software Design : Introduction A Methodological Approach to Security Software Design Secure Operating System Design Secure DBMS Design Security Packages Database Security Design

Statistical Database Protection & Intrusion Detection Systems: Introduction Statistics Concepts and Definitions Types of Attacks Inference Controls evaluation Criteria for Control Comparison. Introduction IDES System RETISS System ASES System Discovery

UNIT- IV

Models For The Protection Of New Generation Database Systems -1: Introduction A Model for the Protection of Frame Based Systems A Model for the Protection of Object-Oriented Systems SORION Model for the Protection of Object-Oriented Databases

UNIT- V

Models For The Protection Of New Generation Database Systems -2: A Model for the Protection of New Generation Database Systems: the Orion Model Jajodia and Kogan's Model A Model for the Protection of Active Databases Conclusions

TEXT BOOKS:

1. Database Security by Castano Pearson Edition (1/e)
2. Database Security and Auditing: Protecting Data Integrity and Accessibility, 1st Edition, Hassan Afyouni, THOMSON Edition.

REFERENCE BOOK:

1. Database security by alfred basta, melissa zgola, CENGAGE learning.

Outcomes:

- Ability to carry out a risk analysis for large database.
- Ability to set up, and maintain the accounts with privileges and roles

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(R16ECE1133) EMBEDDED SYSTEMS
(ELECTIVE - IV)

Objectives:

- Design embedded computer system hardware
- Design, implement, and debug multi-threaded application software that operates under real-time constraints on embedded computer systems
- Use and describe the implementation of a real-time operating system on an embedded computer system
- Formulate an embedded computer system design problem including multiple constraints, create a design that satisfies the constraints, *implement the design in hardware and software, and measure performance against the design constraints
- Create computer software and hardware implementations that operate according to well-known standards Organize and write design documents and project reports
- Organize and make technical presentations that describe a design.

UNIT - I

Embedded Computing : Introduction, Complex Systems and Microprocessor, The Embedded System Design Process, Formalisms for System Design, Design Examples. **(Chapter I from Text Book 1, Wolf).**

The 8051 Architecture : Introduction, 8051 Micro controller Hardware, Input/Output Ports and Circuits, External Memory, Counter and Timers, Serial data Input/Output, Interrupts. **(Chapter 3 from Text Book 2, Ayala).**

UNIT-II

Basic Assembly Language Programming Concepts : The Assembly Language Programming Process, Programming Tools and Techniques, Programming the 8051. Data Transfer and Logical Instructions. **(Chapters 4,5 and 6 from Text Book 2, Ayala).**

Arithmetic Operations, Decimal Arithmetic. Jump and Call Instructions, Further Details on Interrupts. **(Chapter 7 and 8 from Text Book 2, Ayala)**

UNIT - III

Applications : Interfacing with Keyboards, Displays, D/A and A/D Conversions, Multiple Interrupts, Serial Data Communication. **(Chapter 10 and 11 from Text Book 2, Ayala). 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. **(Chapter 6 and 7 from Text Book 3, Simon).**

UNIT - IV

Basic Design Using a Real-Time Operating System : Principles, Semaphores and Queues, HardReal-Time Scheduling Considerations, Saving Memory and Power, An example RTOS like uC-OS (Open Source); Embedded Software Development Tools: Host and Target machines, Linker/ Locators for Embedded

Software, Getting Embedded Software into the Target System; Debugging Techniques: Testing on

Host Machine, Using Laboratory Tools, An Example System. (Chapter 8,9,10 & 11 from Text Book 3, Simon).

UNIT - V

Introduction to advanced architectures : ARM and SHARC, Processor and memory organization and Instruction level parallelism; Networked embedded systems: Bus protocols, I2C bus and CAN bus; Internet-Enabled Systems, Design Example-Elevator Controller. **(Chapter 8 from Text Book 1, Wolf).**

TEXT BOOKS :

1. Computers and Components, Wayne Wolf, Elseveir.
2. The 8051 Microcontroller, Kenneth J. Ayala, Thomson.

REFERENCE BOOKS :

1. Embedding system building blocks, Labrosse, via CMP publishers.
2. Embedded Systems, Raj Kamal, TMH.
3. Micro Controllers, Ajay V Deshmukhi, TMH.
4. Embedded System Design, Frank Vahid, Tony Givargis, John Wiley.
5. Microcontrollers, Raj kamal, Pearson Education.
6. An Embedded Software Primer, David E. Simon, Pearson Education.

Outcomes:

- Ability to understanding of general system theory and how this applies to embedded system.
- Ability to build a prototype circuit on breadboard using 8051 microcontroller.

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	-	**-/-/-**	**2**

(R16CSE1210) INDUSTRY ORIENTED MINI PROJECT

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	-	**-/6/-**	**2**

(R16CSE1211) SEMINAR

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B.Tech. - IV Year – II Semester	**L**	**T/P/D**	**C**
	-	**-/15/-**	**9**

(R16CSE1212) PROJECT WORK

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B.Tech. - IV Year – II Semester	**L**	**T/P/D**	**C**
	-	**-/-/-**	**2**

(R16ICSE1213) COMPREHENSIVE VIVA