ACADEMIC REGULATIONS

COURSE STRUCTURE AND

DETAILED SYLLABUS

Computer Science and Engineering

B.TECH. FOUR YEAR DEGREE COURSE

(Applicable for the batches admitted from 2015-2016)

TAMASOMA JYOTIRGAMAYA

Estd. 1995

VALLURUPALLI NAGESWARA RAO VIGNANA JYOTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY

An Autonomous Institute, Accredited by NAAC with 'A' Grade
NBA Accreditation for CE, EEE, ME, ECE, CSE, EIE, IT B.Tech. Programmes
Approved by AICTE, New Delhi, Affiliated to JNTUH
Recognized as "College with Potential for Excellence" by UGC
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Vision and Mission of the Institute

VISION

To be a World Class University providing value-based education, conducting interdisciplinary research in cutting edge technologies leading to sustainable socio-economic development of the nation.

MISSION

➢ To produce technically competent and socially responsible engineers, managers and entrepreneurs, who will be future ready.

➢ To involve students and faculty in innovative research projects linked with industry, academic and research institutions in India and abroad.

➢ To use modern pedagogy for improving the teaching-learning process.

Vision and Mission of the Department

VISION

To achieve academic and research excellence in essential technologies of Computer Science and Engineering by promoting a creative environment for learning and innovation.

MISSION

➢ To provide dynamic, innovative and flexible curriculum which equip the students with the necessary problem driven skills to strengthen their career prospects and potential to pursue higher studies.

➢ To foster inquisitive-driven research among students and staff so as to reinforce the domain knowledge and address contemporary societal issues.

➢ To inculcate ethical values, leadership qualities and professional behavior skills for improving the living standards of people.

ACADEMIC REGULATIONS FOR B.TECH. PROGRAMME

(Applicable for Students admitted from the academic year 2015-2016)

1. Programmes of study

- The following four year B.Tech. degree programmes of study are offered at VNR VJIET from the academic year 2017-2018.

Branch Code	Branch
01	Civil Engineering
02	Electrical and Electronics Engineering
03	Mechanical Engineering
04	Electronics and Communication Engineering
05	Computer Science and Engineering
10	Electronics and Instrumentation Engineering
12	Information Technology
24	Automobile Engineering

- **'ENGLISH'** language is used as the medium of instruction in all the above programmes.

1.1 Eligibility Criteria for Admission
The eligibility criteria for admission into engineering programmes shall be as mentioned below:
- The candidate shall be an Indian National / NRI
- The candidate should have completed 16 years of age as on 31st December of the academic year for which the admissions are being conducted
- The candidate should have passed the qualifying examination (10+2) or equivalent as on the date of admission recognized by BIE, Telangana State

1.1.1 Seats in each programme in the Institution are classified into **Category A** and

Category B as per the G.Os.

Category – A Seats:

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

Category - B Seats:

These seats shall be filled by the Institute as per the G.Os issued by the State Government from time to time.

1.1.2   Category: Lateral Entry
The candidate shall be admitted into the Third Semester, (2nd year, 1st semester) based on the rank secured by the candidate in Engineering Common Entrance Test (ECET (FDH)) by the Convener, ECET.

2. Distribution and Weights 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 100 marks for practical subjects.** In addition, an Industry oriented mini-project, seminar, comprehensive viva-voce and project work shall be evaluated for **100, 100, 100 and 200 marks** respectively.

ii.   For theory subjects, the distribution shall be **40 marks for Mid-term Evaluation** and **60 marks for the Semester End Examination**.

Mid-Term Evaluation (40 M):

Mid-term evaluation consists of mid-term examination (30 M) and assignment/test (10 M).

- ➢ **Mid-term examination (30 M):**
- • For theory subjects, two mid examinations shall be conducted in each semester as per the   academic calendar. Each mid examination shall be evaluated for 30 marks.
  PART-A   3 X 2M = 6 M (one question from each UNIT)
  PART-B   3 X 8 M = 24 M (three internal choice questions one from each UNIT shall be given, the student has to answer one question from each UNIT)
- • 80 % weightage for better mid-term examination and 20% weightage for the other mid examination shall be used and calculated as the final mid-term examination marks for each subject.

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> **Assignment/objective exam/ case study/course project (10 M):**
- Two assignment/objective exam/ case study/course project shall be given to the students covering the syllabus of First Mid and Second Mid Examinations respectively and evaluated for 10 marks each.
- The first assignment shall be submitted before first mid examination and second assignment shall be submitted before second mid examination.
- The average of 2 assignments shall be taken as final assignment marks.

iii.   For practical subjects, there shall be a **continuous evaluation during the semester for 40 marks and 60 marks for semester end examination**. Out of the 40 marks, **day-to-day work in the laboratory shall be evaluated for 10 marks**, and **15 marks for practical examination** and **15 marks for laboratory record.**

NOTE: **1. Any student who shall remain 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.**

   2. Evaluation guidelines available with respective HOD's.

iv.   For the subjects having design and / or drawing, (such as Engineering Graphics, Geometrical Drawing, Machine Drawing, Production Drawing Practice, and Estimation etc.,) the distribution shall be **40 marks for internal evaluation (20 marks for day-to-day work and 20 marks for Mid examination (**the average of the two examinations shall be taken into account**) and 60 marks for semester end examination.**

NOTE: Evaluation guidelines available with respective HOD's.

v.   There shall be an **industry-oriented mini-project**, in collaboration with an industry of their specialization, to be taken up during the summer vacation after III year II semester examination. The **industry oriented mini project shall be evaluated during the IV year I semester.** The industry oriented mini project shall be submitted in report form and presented before a committee, which shall evaluate it for **100 marks.** The committee shall consist of Head of the Department, the supervisor of mini project and a senior faculty member of the department. There shall be **no mid-term assessment for industry oriented mini project. However, attending the shadow engineering program or any such other programme, in lieu thereof, is a pre-requisite for evaluating industry-oriented mini project.**

NOTE: Evaluation guidelines available with respective HOD's.

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 consisting of the Head of the department, seminar supervisor and a senior faculty member. **The seminar shall be evaluated for 100 marks based on the report and presentation made.**

NOTE: Evaluation guidelines available with respective HOD's.

vii. There shall be a **comprehensive viva-voce in IV year II semester**. The comprehensive viva-voce shall be conducted by a committee consisting of the Head of the Department and three senior faculty members of the Department **after submitting the filled and duly signed M.T.P record**. The comprehensive viva-voce is aimed to assess the student's understanding in various subjects studied during the B.Tech. programme of study. The comprehensive viva-voce shall be evaluated **for 100 marks** by the committee. There shall be **no Mid-term assessment for the comprehensive viva-voce.**

Evaluation:-

a. Objective type examination – 50 marks. (Two hours test)
b. Committee evaluation – 50 marks.

NOTE: Evaluation guidelines available with respective HOD's

viii. The **project work** shall be started by the student in the beginning of the IV year I semester. Out of a total of **200 marks** for the project work, **80 marks shall be for mid-term evaluation** and **120 marks for the semester end examination**. The viva-voce shall be conducted by a committee comprising an external examiner, Head of the Department, the project supervisor and one senior faculty. The evaluation of project work shall be conducted at the end of the   IV year II Semester. **The mid-term evaluation shall be on the basis of three seminars conducted during the IV year II semester for 80 marks by the committee consisting of Head of the Department, project supervisor and senior faculty member of the Department.**

NOTE: Evaluation guidelines available with respective HOD's

3. Semester End Examination (60 M):

(a) Theory Courses

Question paper pattern for semester end examination (60 Marks) consists of two sections i.e., Part-A and Part-B.

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PART-A:

- Shall consist of 10 questions of 02 marks each. (10X2M = 20M)
- There shall be 02 questions from each unit.
- All the questions are compulsory.

PART-B:

- Shall consist of 05 questions of 08 marks each. (05X8M = 40M)
- There shall be 01 question from each unit with internal choice.

(b)   Practical Courses

Each laboratory course shall be evaluated for 60 marks. The semester end examination shall be conducted by two examiners, one Internal and other external concerned with the subject of the same / other department / Industry. The evaluation shall be as per the standard format.

(c)   Supplementary Examinations

Supplementary examinations shall 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 shall be conducted).

4.   Attendance Requirements

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

ii.   Shortage of attendance in aggregate **up to 10% (attendance of 65% and above and below 75%)** in a semester may be condoned by the **Institute Academic Committee based on the rules prescribed by the Academic Council of the Institute from time to time.**

iii. A student shall not be permitted to write the semester end examination and not promoted to the next semester unless he/she satisfies the attendance requirement of the present semester, as applicable.   He/She may seek re-admission for that semester when offered next, if not promoted to the next semester.

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

v.   Students whose shortage of attendance is not condoned or who have not paid the stipulated fee or who have not cleared any other due to the Institute in any semester are not eligible to writer semester end examination of that semester.

5. **Minimum Academic Requirements**

The following academic requirements have to be satisfied in addition to the attendance requirements mentioned in Regulation No.4**.**

i. A student shall be deemed to have satisfied the minimum academic requirements and earned the credits allotted to each theory or practical or design or drawing subject or project, if he/she secures **not less than 35% (21 out of 60 marks) of marks in the semester end examination and a minimum of 40% of marks in the sum total of the mid-term evaluation and semester end examination taken together.**

ii. For promotion from II year II semester to III year I semester, the student needs to have 50% of credits up to II year II semester which includes
   ➢ Two regular and two supplementary examinations of I B Tech. I semester.
   ➢ Two regular and one supplementary examinations of I B Tech. II semester
   ➢ One regular and one supplementary examinations of II year I semester.
   ➢ One regular examinations of II year II semester.

iii. For promotion from III year II semester to IV year I semester, the student needs to have 50% of credits up to III year II semester which includes
   ➢ Three regular and three supplementary examinations of I B Tech. I semester.
   ➢ Three regular and two supplementary examinations of I B Tech. II semester
   ➢ Two regular and two supplementary examinations of II year I semester.
   ➢ Two regular and one supplementary examinations of II year II semester.
   ➢ One regular and one supplementary examination of III year I semester.
   ➢ One regular examination of III year II semester.

iv. A student shall register and put up minimum academic requirement in all **188 credits and earn atleast 180 credits for the award of B.Tech. degree.** The grade obtained for the minimum credits shall be considered for the calculation of CGPA.

v. The students shall take one open elective subject each from the lists given in open elective-1 and open elective-2. The selected subjects shall not belong to their own branch.

vi. The student shall be qualified in **two certificate courses** during his/her course of study.

vii. "Gender Sensitization" is compulsory value added course as per the JNTUH procds. No. A1/2557/XXII SCAS/2015(2), dated 19.11.2015.

viii. Students who fail to earn atleast 180 credits as indicated in the course structure **within eight academic years counting** from the year of their admission shall **forfeit their seat** in B.Tech. programme and their **admission stands cancelled.**

6. Course pattern

i. The entire programme of study is of four academic years. **All I, II, III and IV years are of semester pattern.**

ii. A student eligible to appear for the semester end examination in a subject, but absent or has failed in the semester end examination may reappear for that subject in the supplementary examination whenever conducted.

iii. When a student is detained due to shortage of attendance in any semester, he/she shall seek readmission into that semester when it is offered next, **with the academic regulations of the batch into which he/she gets readmitted and has to obtain the degree within 8 academic years from the year of his/her original admission.**

iv. When a student is detained due to lack of credits in any year, he/she may be eligible for promotion to the next year after obtaining the required number of credits and fulfillment of the academic requirements.

7. Award of B.Tech. Degree and Class

A student shall be declared eligible for the award of the B. Tech. degree if he/she fulfils the following academic regulations:

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

ii. Registered for **188 credits** and secured a minimum of **180 credits with compulsory subjects as listed in the following Table.**

Table: Compulsory Courses

S. No.	Courses Particulars
1.	All Practical Courses
2.	Industry oriented mini project
3.	Comprehensive Viva-Voce
4.	Seminar
5.	Project work
6.	Engineering Graphics / Engineering Drawing / Machine Drawing

NOTE: 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. programme.

8. CGPA System:

Method of awarding absolute grades and grade points in four year B.Tech. degree programme is as follows:

- Absolute Grading Method is followed, based on the total marks obtained in mid-term and semester end examinations.

- Grades and Grade points are assigned as given below.

Marks Obtained	Grade	Description of Grade	Grade Points(GP) Value Per Credit
>=90	O	Outstanding	10.00
>=80 and <89.99	A+	Excellent	9.00
>=70 and <79.99	A	Very Good	8.00
>=60 and <69.99	B	Good	7.00
>=50 and <59.99	C	Fair	6.00
>=40 and <49.99	D	Pass	5.00
<40	F	Fail	--
Not Appeared the Exam(s)	N	Absent	

- **The student is eligible for the award of the B.Tech. degree with the class as mentioned in the following table.**

CGPA	Class
>= 7.5	First Class with Distinction
>= 6.5 and <7.5	First Class
>= 5.5 and < 6.5	Second Class
>=5.0 and < 5.5	Pass Class

➢ **Calculation of Semester Grade Points Average (SGPA):**

The performance of each student at the end of the each semester shall be indicated in terms of SGPA. The SGPA shall be calculated as below:

$$SGPA = \frac{\text{Total earned weighted grade points in a semester}}{\text{Total credits in a semester}}$$

$$SGPA = \frac{\sum_{i=1}^{P} C_i * G_i}{\sum_{i=1}^{P} C_i}$$

Where C_i = Number of credits allotted to a particular subject 'i'

G_i = Grade point corresponding to the letter grade awarded to the subject 'i'

i = 1,2,…..p represent the number of subjects in a particular semester

Note: SGPA is calculated and awarded for the candidates who pass all the courses in a semester.

➢ **Calculation of Cumulative Grade Point Average (CGPA):**

The CGPA of a student for the entire programme shall be calculated as given below:

- Assessment of the overall performance of a student shall be obtained by calculating Cumulative Grade Point Average (CGPA), which is weighted average of the grade points obtained in all subjects during the course of study.

$$CGPA = \frac{\text{Total earned weighted grade points for the entire programme}}{\text{Total credits for the entire programme}}$$

$$CGPA = \frac{\sum_{j=1}^{m} C_j * G_j}{\sum_{j=1}^{m} C_j}$$

Where C_j = Number of credits allotted to a particular subject 'j'

G_j = Grade Point corresponding to the letter grade awarded to that subject 'j'

j = 1,2,….m represent the number of subjects of the entire program.

- Grade lower than D in any subject shall not be considered for CGPA calculation. The CGPA shall be awarded only when the student acquires the required number of credits prescribed for the program.

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> **Grade Card**

The grade card issued shall contain the following:

a) The credits for each subject offered in that semester

b) The letter grade and grade point awarded in each subject

c) The **SGPA/CGPA**

d) Total number of credits earned by the student up to the end of that semester.

9. **Withholding of Results**

If the student has not paid dues to the Institute, or if any case of indiscipline is pending against him, the result of the candidate may be withheld. The award or issue of the Provisional Certificate and the Degree may also be withheld in such cases.

10. **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 subjects in place of repeated subjects as decided by the Chairman of the BoS of the respective departments. He/She shall be admitted under the regulation of the batch in which he/she is readmitted.

11. **Minimum Instruction Days**

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

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

13. **The decision of the Institute Academic Committee shall be final in respect of equivalent subjects for those students who are transferred from other colleges. The transfer of students from other college or from this institute is to be approved by the Governing Council of the Institute.**

14. **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 discrepancy/ambiguity/doubt arising in the above rules and regulations, the decision of the Principal shall be final.

   iv. The Chairman Academic Council 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.

15. **Academic Regulations for B.Tech. (Lateral Entry Scheme)**

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

A student shall be declared eligible for the award of the B. Tech. degree if he/she fulfils the following academic regulations:

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

ii. Registered for **138 credits** and secured a minimum of **130 credits with compulsory subjects as listed in the following Table.**

Table: Compulsory Courses

S. No.	Courses Particulars
1.	All Practical Courses
2.	Industry oriented mini project
3.	Comprehensive Viva-Voce
4.	Seminar
5.	Project work
6.	Engineering Graphics / Engineering Drawing / Machine Drawing

iii. A student who **fails to earn a minimum of 130 credits** as indicated in the course structure **within six academic years** from the year of their admission shall **forfeit his/her seat in B.Tech. programme and his admission stands cancelled.**

iv. The same attendance regulations are adopted as that of B.Tech. four year degree course.

v. For promotion from III year II semester to IV year I semester, the student needs to have 50% of credits up to III year II semester which includes

   ➢ Two regular and two supplementary examinations of II B Tech. I semester

   ➢ Two regular and one supplementary examinations of II B Tech. II semester

   ➢ One regular and one supplementary examinations of III B.Tech. I semester

   ➢ One regular of examinations of III year II semester

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

16. **Malpractice Rules**

Disciplinary Action for Malpractices/Improper Conduct in Examinations

S. No.	Nature of Malpractices/Improper conduct If the candidate:	Punishment
1.	(a) Possesses or keeps accessible in	Expulsion from the examination hall

	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)	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 shall 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.
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 end semester 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 shall be handed over to the police and a case is registered against him.
4.	Smuggles 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 end semester and supplementary 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	Cancellation of the performance in that subject.

	marks.	
6.	Refuses to obey the orders of the Chief Superintendent/Assistant–Superintendent / any officer on duty or misbehaves or creates disturbance of any kind in and around the examination hall or organizes a walk out or instigates others to walk out, or threatens the officer-in charge or any person on duty in or outside the examination hall of any injury to his person or to any of his relations whether by words, either spoken or written or by signs or 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 are also debarred and they shall forfeit their seats. In case of outsiders, they shall 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 end semester examinations including

		supplementary Examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.
8.	Possesses any lethal weapon or firearm in the examination hall.	Expulsion from the examination hall and cancellation 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 any of clauses 6 to 8.	If the student belongs to the college, 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 shall be handed over to police and, a police case shall 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 series of the 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.
12.	If any malpractice is detected which is not covered in the above clauses 1 to 11 shall be reported to the academic council of the Institute for further action to award suitable punishment.	

Malpractices identified by squad or special invigilators

Punishments shall be given to the candidates as per the above guidelines.

Malpractice identified at Spot center during valuation

The following procedure is to be followed in the case of malpractice cases detected during valuation, scrutiny etc. at spot center.

1) Malpractice is detected at the spot valuation. The case is to be referred to the malpractice committee. Malpractice committee shall meet and discuss/question the candidate and based on the evidences, the committee shall recommend suitable action on the candidate.

2) A notice is to be served to the candidate(s) involved, through the Principal, to his address and to the candidate(s) permanent address regarding the malpractice and seek explanations.

3) The involvement of staff who are in charge of conducting examinations, invigilators, examiners valuing examination papers and preparing / keeping records of documents related 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 examinations shall be viewed seriously and recommend for award of appropriate punishment after thorough enquiry.

4) Based on the explanation by the party involved and recommendations of the committee action may be initiated.

5) Malpractice committee:

i.	Dean, Academics	Chairman
ii.	Controller of Examinations	Convener
iii.	Invigilator	Member
iv.	Chief Examiner of the subject/subject expert	Member
v.	Concerned Head of the Department	Member

Program Educational Objectives (PEO's)

Program Educational Objectives of B.Tech in Computer Science Engineering are to:

PEO - I The graduates of the program will become proficient in the principles and practices of computer science, mathematics and science, enabling them to solve a wide range of computing related problems.

PEO - II To enable the students with innovative applications of engineering knowledge and programming skills to spearhead the progress of society in the information age.

PEO - III To mould the students into competent, successful, and practicing engineers in their career and/or in pursuing their higher studies through the spirit of innovation and entrepreneurship

PEO - IV To provide exposure to cutting edge technologies, adequate training and opportunities to work individually and as teams on multidisciplinary projects with effective analytical skills

PEO - V To acquire and practice the profession with ethics, integrity and leadership qualities with due consideration to environmental issues in conformance with societal needs.

Program Outcomes (PO's)

Upon completion of the programme, the student will be able

a. To apply and integrate knowledge of computing to the engineering discipline

b. To identify, analyze, formulate and solve complex problems related to computer science and engineering.

c. To design, construct and evaluate a computer based system, process or component, to meet the evolving needs.

d. To demonstrate application of engineering skills and techniques for efficient development of projects and products.

e. To use modern techniques and tools necessary for computing practice that drives towards entrepreneurship

f. To develop innovative ideas that can be translated into commercial products benefiting the society and the economic growth.

g. To understand the impact of engineering solutions in a social, global, environmental and economic context.

h. To posses leadership and management skills with best professional, ethical practices and social concern

i. To interact professionally with others in the workplace and to function effectively as an individual and in a group.

j. To demonstrate quality skills so as to speak, listen and present effectively the acquired technical knowledge to a range of audience.

k. To utilize project management skills and principles of finance and economics in the construction of hardware and software systems with business objective.

l. To substantiate contemporary knowledge and technological developments by being a continuous learner.

VNR Vignana Jyothi Institute of Engineering & Technology
B. TECH Computer Science and Engineering

I YEAR I SEMESTER   **COURSE STRUCTURE**

Subject Code	Course Name	Lectures	T/P/D	Credits
5BS11	Advanced Calculus	3	0	3
5BS21	Engineering Physics	3	0	3
5BS32	Engineering Chemistry	3	0	3
5BS01	English	3	0	3
5CS01	Computer Programming	3	1	4
5CE03	Environmental Studies	3	0	3
5ME53	IT and Engineering Workshop	0	3	2
5CS51	Computer Programming Laboratory	0	3	2
5BS25	Engineering Physics and Engineering Chemistry Laboratory	0	3	2
Total		**18**	**10**	**25**

I YEAR II SEMESTER   **COURSE STRUCTURE**

Course Code	Course Name	Lectures	T/P/D	Credits
5BS12	Ordinary Differential Equations and Laplace Transforms	3	0	3
5BS13	Computational Methods	3	0	3
5BS24	Applied Physics	3	1	4
5CS11	Code of Ethics	3	0	3
5IT02	Data Structures	3	1	4
5ME19	Engineering Drawing	2	4	4
5IT52	Data Structures Laboratory	0	3	2
5BS02	English Language Communications Skills Laboratory	0	3	2
Total		**17**	**12**	**25**

VNR Vignana Jyothi Institute of Engineering & Technology
B. TECH Computer Science and Engineering

II YEAR I SEMESTER   **COURSE STRUCTURE**

Course Code	Course Name	Lectures	T/P/D	Credits
5BS17	Probability, Statistics and Queuing Theory	3	0	3
5EE22	Elements of Electrical and Electronics Engineering	3	0	3
5IT03	Advanced Data Structures through C++	3	0	3
5CS02	Mathematical Foundations for Computer Science	3	1	4
5BS41	Business Economics and Financial Analysis	3	0	3
5CS03	Digital Logic Design	3	0	3
5EE62	Elements of Electrical and Electronics Engineering Laboratory	0	3	2
5IT53	Advanced Data Structures through C++ Laboratory	0	3	2
Total		**18**	**7**	**23**

VNR Vignana Jyothi Institute of Engineering & Technology
B. TECH Computer Science and EngineeringII YEAR II SEMESTER
COURSE STRUCTURE

Course Code	Course Name	Lectures	T/P/D	Credits
5CS04	Formal Languages and Automata Theory	3	1	4
5CS05	Data Base Management Systems	3	0	3
5IT04	Computer Organization	3	0	3
5CS06	Design and Analysis of Algorithms	3	0	3
5CS07	Software Engineering	3	0	3
5CS15	JAVA Programming	3	0	3
5CS52	Data Base Management Systems Laboratory	0	3	2
5CS53	JAVA Programming and Design Analysis of Algorithms Laboratory	0	3	2
Total		**18**	**7**	**23**
#5BS04	Gender Sensitization	-	3	2

Value added Course

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

VNR Vignana Jyothi Institute of Engineering & Technology

B. TECH Computer Science Engineering

III YEAR I SEMESTER   **COURSE STRUCTURE**

Course Code	Course Name	Lectures	T/P/D	Credits
5IT08	Operating Systems	3	0	3
5CS08	Object Oriented Analysis and Design	3	0	3
5IT06	Computer Networks	3	0	3
5CS09	Compiler Design	3	1	4
	Open Elective – I	3	0	3
5BS03	Advanced English Language Communications Skills Laboratory	0	3	2
5IT59	Operating Systems and Computer Networks Laboratory	0	3	2
5CS54	Compiler Design and OOAD Laboratory	0	3	2
Total		**15**	**10**	**22**

OPEN ELECTIVE – I

Course Code	Course Name	Course Offered By the Department
5CE71	Disaster Management	CE
5EE71	Renewable Energy Technologies	EEE
5ME71	Digital Fabrication	ME
5EC71	Principles of Electronic Communications	ECE
5CS71	Object Oriented Programming through Java	CSE
5EI71	Principles of Measurements and Instrumentation	EIE
5IT71	Cyber Security	IT
5AE71	Principles of Automobile Engineering	AE
5BS71	Professional Ethics and Human Values	H&S

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

VNR Vignana Jyothi Institute of Engineering & Technology
B. TECH Computer Science Engineering

III YEAR II SEMESTER   COURSE STRUCTURE

Course Code	Course Name	Lectures	T/P/D	Credits
5IT12	Web Technologies	3	1	4
5CS12	Introduction to Analytics	3	0	3
5IT10	Linux Internals	3	0	3
5CS13	Data Mining	3	1	4
	Open Elective – II	3	0	3
5CS55	Data Mining and Analytics Laboratory	0	3	2
5IT58	Web Technologies Laboratory	0	3	2
5CS56	Linux Internals Laboratory	0	3	2
	Total	**15**	**11**	**23**

Open Electives-II

Course Code	Course Name	Course Offered By the Department
5CE72	Introduction to Geographical Information System	CE
5EE72	Energy Auditing Conservation and Management	EEE
5ME72	Optimization Techniques	ME
5EC72	Introduction to Micro Processors and Controllers	ECE
5EC95	Wireless Communications and Networks	ECE
5CS72	Open Source Technologies	CSE
5EI72	LabVIEW Programming	EIE
5EI79	Fundamentals of Robotics	EIE
5IT72	Relational Database Management Systems	IT
5AE72	Modern Automotive Technologies	AE
5BS72	Entrepreneurship	H&S

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

VNR Vignana Jyothi Institute of Engineering & Technology
B. TECH Computer Science Engineering

IV YEAR I SEMESTER **COURSE STRUCTURE**

Course Code	Course Name	Lectures	T/P/D	Credits
5CS17	Big Data Analytics	3	0	3
5BS42	Management Science	3	0	3
5CS16	Network Security	3	0	3
5CS10	Artificial Intelligence & Neural Network	3	0	3
Elective – I				
5IT75	Mobile Computing	3	0	3
5IT81	Information Security Management			
5CS74	Gaming Engineering			
5CS75	Computer Graphics and Animation			
Elective – II				
5CS76	Introduction to Internet of Things	3	0	3
5CS77	Building Enterprise Applications			
5CS78	Advanced Databases			
5IT77	Cloud Computing			
5CS57	Network Security laboratory	0	3	2
5CS58	Big Data Analytics Laboratory	0	3	2
5CS91	Industry Oriented Mini Project	0	4	2
Total		**18**	**10**	**24**

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

VNR Vignana Jyothi Institute of Engineering & Technology
B. TECH Computer Science Engineering

IV YEAR II SEMESTER		COURSE STRUCTURE		
Course Code	Course Name	Lectures	T/P/D	Credits
5CS18	Predictive Analytics	3	0	3
Elective –III				
5CS79	Semantic Web and Social Networks	3	0	3
5IT82	Information Security Assessments and Audits			
5CS80	Bio – Informatics			
5CS82	Software Project Management			
Elective – IV				
5CS81	Cognitive Science	3	0	3
5IT76	Information Retrieval Systems			
5CS83	Software Defined Networks			
5CS84	Multi Core Technologies			
5CS92	Technical Seminar	0	3	2
5CS93	Comprehensive Viva-voce	0	0	2
5CS94	Project Work	0	20	10
Total		**9**	**23**	**23**

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

I Year B.Tech CSE – I Sem	**L**	**T/P/D**	**C**
	3	**0**	**3**

(5BS11) ADVANCED CALCULUS

Course prerequisites: Differentiation, Integration

Course Objectives:

- **Understand** the Taylor's theorem and its application to maxima and minima of f(x,y)
- **Understand** the process of curve Tracing.
- **Understand** multiple integrals and its applications
- **Apply** integral theorems of vector calculus.

Course Outcomes:

After completion of the course the student is able to

- **Solve** problems involving the maxima and minima of f(x,y).
- **Trace** curves using basic characteristics.
- **Evaluate** integrals using special functions and change of variables.
- **Evaluate** vector integrals.

UNIT I

CALCULUS OF ONE AND SEVERAL REAL VARIABLES   Mean value theorems **–** Role's Theorem, Lagrange's Mean value theorem Cauchy's Mean value theorem **,** Taylor's expansion and McLaurin's expansion of functions   (without proofs).

Partial differentiation, partial derivatives of first and second order in terms of partial derivatives, change of variables , Jacobian, Taylor's theorem of two variables(without proof). Maxima and Minima of two variables, Langrange's method of undetermined multipliers.

UNIT II

CURVE TRACING AND RELATED APPLICATIONS

Radius of Curvature of curves in Cartesian, parametric and polar coordinates. Tracing of curves in Cartesian, parametric and polar coordinates (like conics, astroid, hypocycloid, Folium of Descartes, Cycloid, Circle, Cardiode, Lemniscate).

UNIT III

MULTIPLE INTEGRALS

Beta, Gamma and Error functions, Introduction of Multiple integrals ,   evaluation of double and triple integrals, change of order of integration change of variables , Cylindrical and Spherical polar coordinates.

UNIT IV

VECTOR DIFFERENTIAL CALCULUS

Scalar and Vector point functions, Gradient, Divergence, Curl with geometrical & physical interpretation, Directional derivatives, vector identities (without proofs).

UNIT V
VECTOR INTEGRAL CALCULUS
Line integrals and application to Work done and Circulation, Scalar potential function, Surface integrals and Volume integrals, Gauss divergence theorem, Green's theorem, Stokes' theorem (theorems without proof).

TEXT BOOKS:
1. Higher Engineering Mathematics – by B. S. Grewal,*Khanna publishers*
2. Calculus and Analytic Geometry *by* Thomas and Finney, 9th edition; *Publisher: Pearson Education.*

REFERENCES:
1. Advanced Engineering Mathematics *by* Erwin Kreyszig, 8th edition; *Publisher: John Wiley.*
2. Advanced Engineering Mathematics by Peter 'O' Neil, publisher: Cengage Learning .
3. Advanced Engineering Mathematics *by R.K.Jain and S.R.K.Iyengar; Narosa Publications*

VNR Vignana Jyothi Institute of Engineering & Technology

I Year B.Tech CSE – I Sem	L	T/P/D	C
	3	0	3

(5BS21)ENGINEERING PHYSICS

Course Objectives

- To **supplement** and **enhance** the knowledge of basic concepts in physics essentially required in the study of interaction of light with matter and behavior of a particle quantum mechanically.
- To **Study** and **understand** various phenomena of light- Interference, Diffraction, Dispersion and total internal reflection.
- To **learn** and **enhance** the basic concepts in physics required to deal with large number of particles and behavior of an electron in metals.
- To **understand** the basic principles and working of lasers and optical fibers.
- To **learn** simple applications of these concepts and principles in engineering and technology**.**

Course Outcomes:

After completion of the course the student is able to

- **Realize** influence of diffraction and resolvability in optical elements.
- **Recognize** importance of interference in thin films.
- **Distinguish** LASER light from ordinary light and describe propagation of light through   Optical fiber by Total Internal reflection.
- **Illustrate** behavior of a particle in one dimensional potential box.
- **Understand** behavior of electron in a periodic potential in real crystal and classify Solids based on conduction**.**

UNIT I
INTERFERENCE:
Introduction, Superposition principle, Resultant amplitude, Coherence - Methods to obtain coherent sources, Interference, Young's Double Slit Experiment, interference thin films by reflection, Newton's rings Experiment-Formation of Rings and Experimental Method, Characteristics of rings, Applications.

UNIT II
DIFFRACTION:
Introduction, Distinguish between Fraunhofer and Fresnel diffraction, diffraction at single slit (Phasors approach). Diffraction at double slit, circular aperture, and multiple slits (grating)(Qualitative Approach)-Width of Principal Maxima and Dispersion, Resolution of spectral lines, Rayleigh criterion, and resolving power of grating.

UNIT III

LASERS AND OPTICAL FIBERS:

Introduction, 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, Semiconductor Laser, Principle of optical fiber and Properties, Acceptance angle and acceptance cone, Numerical aperture, Types of fibers based on refractive index profiles, Qualitative analysis of attenuation in optical fibers, Application of Lasers and Optical fibers.

UNIT IV

ELEMENTS OF QUANTUM MECHANICS:

Waves and particles, De Broglie hypothesis, Matter waves, Davisson and Germer experiment, Heisenberg's uncertainty principle- Applying it to Non existence of electron in Nucleus and Single slit Experiment, Schrodinger Wave Equation – Wave function and its Physical Significance, Particle in one dimensional potential box(wave functions, probability densities and energy states), Maxwell-Boltzmann, Bose-Einstein and Fermi-Dirac statistics (non-mathematical treatment).

UNIT V

ELECTRON THEORY OF METALS:

Energy levels in one dimension, Effect of temperature on the Fermi-Dirac distribution, Electrical conductivity & Ohm's law, Electrical Resistivity of Metals (Qualitative), Electron in a periodic potential, Bloch Theorem, Kronig-Penney model (non-mathematical treatment), Origin of energy band formation in solids, Classification of materials into conductors, semiconductors & Insulators and Concept of effective mass of an electron.

TEXT BOOKS:
   (1) Physics vol.2, by Halliday, Resnick and Krane; John Wiley & Sons
   (2) Engineering Physics by R.K.Gaur and S.L.Gupta; Dhanpat Rai and Sons

REFERENCES:
   (1) Optics by Ghatak and Thyagarajan, Tata Mc Graw
   (2) Concepts of Modern physics by Arthur Beiser, McGraw Hill Inc.
   (3) Introduction to Solid State Physics by Charles Kittel : John Wiley & Sons
   (4) Applied Physics by P.K.Mittal, IK International Publishing House (P) Ltd.
   (5) Engineering Physics by G Sahashra Buddhe; University Press

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I Year B.Tech CSE – I Sem	L	T/P/D	C
	3	0	3

(5BS32)ENGINEERING CHEMISTRY

Pre-requisites: Basic knowledge of mathematics and chemistry.
Course Objectives:
- Understanding the concept of generating electricity by batteries.
- Conceptual knowledge of corrosion science.
- Acquiring the knowledge of preparation, properties and usage of polymers.
- Applying the concept of hardness to analyze various boiler troubles in steam generation.
- Familiarize the features of carbon nanotubes, composites and self- healing materials.

Course Outcomes:
After completion of the course the student is able to
- Interpret the chemical applications of the various types of batteries used in the present day world.
- Acquire the knowledge of corrosion for protecting structures and safeguarding the economy.
- Evaluate the suitability of various polymers for different applications.
- Analyze and compare the different softening techniques of water.
- Summarize the applications of carbon nanotubes, composites and self- healing materials.

UNIT-I
Batteries and Fuel cells   (10 periods)
Electrochemistry-definition, types of cells- differences between electrolytic and electrochemical cells, conditions of reversibility, principle of batteries, Primary cells-(Dry cell, Mercury battery) and secondary cells -lead-acid cell; Ni-Cd cell; lithium- ion cells (intercalated); Fuel cells : methanol – oxygen fuel cell, advantages of fuel cells; Solar cells - principle and applications.

UNIT-II
Corrosion and its control (12 periods)
Introduction; Causes and effects of corrosion; Theories of corrosion – chemical and electrochemical corrosion (reactions); Types of corrosion (Differential aeration corrosion: pitting, crevice and waterline corrosion, Differential metal corrosion: galvanic corrosion) ; Factors affecting corrosion – nature of metal (position of metal in galvanic series-differences between electrochemical & galvanic series; passivity; purity of metal; nature of

oxide film; nature of corrosion product), and nature of environment (effect of temperature; effect of pH; humidity; formation of oxygen concentration cells).

Corrosion control methods – cathodic protection-sacrificial anode and impressed current cathodic protection.

Surface coatings –differences between galvanizing and tinning; cladding; electroplating (copper plating), Paints - constituents and functions.

UNIT-III
Polymers (8 periods)

Plastics - Thermoplastic resins, and Thermosetting resins, fabrication of plastics – compression, injection. Preparation, properties, and engineering applications of PE, PVC, Teflon, Bakelite, Nylon and Kevlar.

Rubber

Processing and vulcanization, preparation, properties, and engineering applications of Buna-S; Butyl rubber and Thiokol rubber**.**

UNIT-IV
Water and its Treatment (10 periods)

Introduction; Hardness - causes, expression of hardness, units, types of hardness, numerical problems. Estimation of temporary & permanent hardness of water by EDTA method (no numerical problems). Boiler troubles - scale & sludge formation, caustic embrittlement, boiler corrosion, priming & foaming. Softening of water by zeolite and ion exchange process (no numerical problems), Desalination processes. reverse osmosis.

UNIT-V
Smart materials (8 periods)

Nanomaterials -Introduction; preparation and applications of nanomaterials with special reference to carbon nanotubes.

Composites-Need for composites, classification based on reinforcing material (Fiber reinforced composites –glass, carbon and aramid), applications of composites.

Self-healing materials- Definition, features, principle of self-healing materials and their applications.

TEXT BOOKS:
1. Text Book of Engineering Chemistry by Y.Bharathi Kumari, Jyotsna Cherukuri; Publisher: VGS Book Links.
2. Engineering Chemistry by P.C.Jain & Monica Jain, Publisher: Dhanpatrai Publishing Company.

REFERENCES:
1. Text Book of Engineering Chemistry by S.S. Dhara & Mukkanti; Publisher: S.Chand & Co.
2. Engineering Chemistry by O G Palanna; McGraw Hill Edu.Pvt.Ltd.
3. Text Book of Engineering Chemistry by R.Gopalan, D.Venkappayya, Sulochana Nagarajan; Publisher: Vikas Publishers.
4. Engineering Chemistry by R.P.Mani, S.N. Mishra, B.Rama Devi, Cengage Learning Publications.

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I Year B.Tech CSE – I Sem

L	T/P/D	C
3	0	3

(5BS01) ENGLISH

Introduction

This is the age of information and communication technologies. Engineers and technical professionals need to convey technical information in English for various purposes.

Besides learning general English as an international language, engineering students need to be equipped with adequate writing ability so that they can communicate technical information clearly on at least a basic level. A good English writing proficiency can be a contributing factor to professional recognition and career prospects. This course teaches those writing strategies that scientists, engineers, and others will need in order to write successfully on the job. It initiates the students into Technical Writing. The purposes of technical writing are to inform and persuade. This program aims to train students in writing clear, concise and effective English and also develop their reading skills.

This Syllabus is therefore, a Pragmatic English Writing and Reading Program for engineering students with intermediate proficiency. The program covers a syllabus outline and instructional approaches on basic writing and reading skills with particular reference to technical writing.

Course Objectives:
- To equip the students with all the LSRW skills for academic writing and speaking.
- To equip the students with basic grammar, infrastructural patterns, reading techniques and grammatical constructions required in technical writing as well as oral communication.
- To acquaint the students with the writing process in preparation for academic and workplace writing.
- Equip the students with the concept of coherence and cohesion for meaningful and coherent communication.

Course Outcomes:
After going through this course the student will be able to
- Comprehend technical writing produced in the engineering profession
- Understand the writing process and create logical paragraphs
- Use infrastructural patterns in writing and speaking
- Students communicate coherently orally and in writing.

Methodology

A Task-based, process oriented methodology will be used by the teachers to give a practical orientation to the teaching of language. An inductive approach will be used to demonstrate the use of language in context. This should enable the students to internalize the language structures and vocabulary used in context. Students will be exposed to numerous examples and ample practice will be given in the contextual use of language structures.

Unit I :   Review of Grammar
- i)   Common Errors   v) Use of Articles and Prepositions
- ii)   Subject-Verb Agreement   vi) Conjunctions

| iii) Adverbs | vii) pronoun reference |
| iv) Transitional elements | |

Unit II   : Prose 1
- Heaven's Gate by Pico Iyer
- The Connoisseur by Nergis Dalal

Unit III   Reading and Writing Skills
- Reading Comprehension -- Skimming & scanning
- Reading Comprehension -- Intensive & extensive reading
- Paragraph Writing
- Letter Writing
- Memo Writing

Unit IV : Prose 2
- The Cuddalore Experience by Anu George
- The Odds Against Us by Satyajit Ray

Unit V : Writing Skills
1. Comparison and Contrast Pattern
2. Cause and Effect Pattern
3. Classification
4. Analogy (Introductory Level)
5. Problem-Solution Pattern

Prescribed Text Books
- **Enjoying Everyday English** by A. Ramakrishna Rao
- **Effective Technical Communication** by Ashraf Rizvi
- **Technical Writing Process and Product** by Gerson Sharon J. and Steven Gerson 3rd edition, New Jersey: Prentice Hall 1999

References
- M. Raman and S. Sharma, 2004; Technical Communication : Principles and Practices, OUP, (Indian Edition)
- Blanton, L.L. 1993; Composition Practice, Book 4 ,Second Edition, Heinle & Heinle Publishers, pp. 54
- Georges, T.M. 1996; A course in Analytical Writing for Science and Technology, http://www.mspiggy.etl.noaa.gov/write/

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

(5CS01) COMPUTER PROGRAMMING
(Common to EEE, ECE, CSE, EIE and IT)

Course objectives

- To **Relate** basics of programming language constructs and problem solving techniques
- To **classify** and implement derived data types
- To **analyze** and develop effective modular programming
- To **construct** mathematical problems and real time applications using C language

Course Outcomes:
After completion of the course student is able to

- **Understand** the computer fundamentals, basics of C Programming for problem solving and represent the same as algorithm, flow chart and pseudo code.
- **Solve** problems using C language constructs, basic and derived data types.
- **Desig**n programs using modular approach.
- **Choose** the appropriate programming constructs to solve a given problem.

UNIT- I
Computer fundamentals-Hardware, software, computer language , translators, Program Development steps-Algorithms, Pseudo code, flow charts, basic Linux commands ,Introduction to C Language – History, Simple C Program, Identifiers, Basic data types, user defined data types, Variables, Constants, type qualifiers, Managing Input / Output, Operators, Expressions, Precedence and Associativity, Expression Evaluation, Type conversions, Simple C Programming examples.

UNIT – II
Selection Statements – if and switch statements, Repetitive statements – while, for, do-while statements, C Programming examples, other statements related to looping – break, continue, go to, C Programming examples.

UNIT – III
Arrays– Basic concepts, one-dimensional arrays, two – dimensional arrays, multidimensional arrays, C programming examples.
Introduction to Structured Programming, Functions- basics, user defined functions, inter function communication, Standard functions, Storage classes-auto, register, static, extern, scope rules, arrays to functions, recursive functions, example C programs.
.

UNIT – IV
Strings – Basic concepts, String Input / Output functions, arrays of strings, string handling functions, strings to functions, C programming examples

35

Derived types – Structures – Basic concepts, nested structures, arrays of structures, structures and functions, unions, bit fields, C programming examples.

UNIT – V
Preprocessor Directives, Pointers – Basic concepts, pointers and functions, pointers and strings, pointers and arrays, pointers and structures, self-referential structures , example C programs.

TEXT BOOKS:
1. C programming A Problem-Solving Approach by Behrouz A.Forouzan,E.V.Prasad,RichardF.Gilberg
2. How To Program:C, Dietel & Dietel, Seventh Edition,PHI

REFERENCES:

1. The C Programming Language by Brian W. Kernighan, Dennis M. Ritchie.
2. Absolute beginner's guide to C, Greg M. Perry, Edition 2,Publisher: Sams Pub., 1994.
3. Computer Programming and Data Structures by E Balagurusamy, Tata McGraw Hill.
4. Let Us C Yashavantkanetkar BPB

VNR Vignana Jyothi Institute of Engineering and Technology

I Year B.Tech CSE – I Sem

	L	T/P/D	C
	3	0	3

(5CE03) ENVIRONMENTAL STUDIES
(Common to ALL)

Course Objectives

After completion of the course student is able to
- **Recognize** the importance of environment and ecosystem
- **Identify &Analyze** human activities and its impact on environment.
- **List and understand** about the importance of natural resources, Biodiversity & effect of environment pollution
- **Understand** about environmental regulations ,economy and environment interaction

Course Outcomes

On successful completion of this course, it is expected that students should be able to
- **Acquire** the knowledge about importance of environment & ecosystem
- **Develop** skills in understanding of various environmental problems
- **Find** the solution and strategies to protect the Environment
- **List & Distinguish** various organizations, regulations for environment protection

UNIT-I

Environmental Studies:

Introduction, Definition, scope and importance. **Ecosystems**: Introduction, types, characteristic features, structure and functions of ecosystems. Bio-geo-chemical cycle, Classification of Ecosystem.

Bio-diversity and its conservation- Value of bio-diversity, Bio-geographical classification of India – India as a mega diversity habitat, Threats to bio-diversity –Hot-spots, habitat loss, poaching of wild life, loss of species, seeds, etc. Conservation of bio-diversity – In-situ and Ex-situ conservation.

UNIT-II

Natural Resources: classification of Resources, Land resources, Common property resources, Land degradation, Soil erosion and desertification, Effects of modern agriculture, fertilizer –pesticide problems, Forest resources, Use and over-exploitation, food resources, food miles.

Mining and dams – benefits & effects, Water resources, Use and over - utilization of surface and groundwater, Floods, droughts, Water logging and salinity, Conflicts over Water, Energy resources.

UNIT-III

Environmental pollution and its control: Classification of pollution and pollutants, Air pollution, Causes, Effects, Control measures, ambient air quality standards, water pollution causes, effects, control measures, water quality standards, Marine pollution causes, effects & control measures, noise pollution causes, effects and control measures, land pollution causes, effects and control measures, solid waste management, e-waste management.

UNIT-IV

Global environmental problems and global efforts: Nuclear hazards, Nuclear Pollution, Global warming, Acid rains, ozone layer depletion, over population, hazardous waste. Clean development mechanism, green building, carbon credits, carbon trading.
International Conventions/protocols: UNEP, UNFCC, Earth summit, Kyoto protocol, Montreal protocol and Stockholm declaration.

UNIT-V

Environmental policy, legislation, rules and regulations : National Environmental Policy Environmental Protection act, Legal aspects Air (Prevention anc Control of pollution) Act-1981, Water(Prevention and Control of pollution) Act-1974, Water pollution Cess Act-1977, Forest Conservation Act, Municipal solid waste management and handling rules, biomedical waste management and handling rules, hazardous waste management and handling rules .
Economy and Environment, The economy and environment interaction, Economics of development, preservation and Conservation, Sustainability: theory and practices.
Environmental Impact Assessment, Rain water harvesting, cloud seeding and watershed management.

TEXT BOOKS :
1. Environmental Science by Y.Anjaneyulu, B S Publications, 2004.
2. Environmental studies by Deeksha dave, Cengage learning India Pvt. Ltd, 1st edition, 2011.

REFERENCES :
1. Environmental Studies for UG Courses, Bharucha Erach, UGC Publications, Delhi, 2004.
2. Environmental Encyclopedia by Cunningham, W.P., et al., Jaico Publishing House, Mumbai, 2003.
3. Environmental sciences and Engineering by P.Venugopal Rao, PHI Learning Pvt. Ltd.,
4. Environmental Science and Technology by M. Anji Reddy, B S Publications, 2010.

I Year B.Tech CSE – I Sem	L	T/P/D	C
	0	3	2

(5ME53) IT AND ENGINEERING WORKSHOP
(Common to EEE, ECE, CSE, EIE and IT)

Course Prerequisites: basic knowledge about different Trades, computer hardware, Operating System, different trades in mechanical engineering.

Course Objectives:
- To study/demonstrate the concepts of computer w.r.t. it's hardware.
- To install the operating system and perform various tasks
- To conduct the experiments related to production engineering technology.
- To demonstrate the usage of power tools, CNC lathe and machine shop for different exercises

Course Outcomes:

After Completion of the course the student is able to
- **Identify,** assemble and dissemble the given configuration of a computer.
- **Install** the operating system in the given configuration of a computer and execute commands for LINUX Operating System
- **To develop** components using the techniques of carpentry, tin smithy, forging, etc. listed in trades for exercises.
- **To work** out the given models in machine shop and CNC lathe.

ITWORKSHOP

- Computer Hardware: Identification of Peripherals
- Study of UPS and SMPS
- Assembling and disassembling of a PC
- Simple diagnostic exercises – Related to hardware
- Installation of Windows Operating System
- Installation of Linux Operating System
- Linux Basic Commands
- Simple diagnostic exercises –Related to Operating System

TEXTBOOKS:
1.   IT Essentials PC Hardware and Software Companion Guide Third Edition by Davis Anfinson and Ken Quamme CISC Press, Pearson Education.
2.   PC Hardware and A+ Handbook – Kate J. Chase PHI (Microsoft)

ENGINEERING WORKSHOP

TRADES FOR EXCERCISES
At least **two** exercises from each trade:

1. Carpentry
2. Tin-Smithy
3. Fitting
4. Welding
5. Electrical Wiring

TRADES FOR DEMONSTRATION and EXPOSURE:
1. Power tools in construction, wood working, electrical engineering and mechanical engineering.
2. Machine shop.
3. CNC Lathe
4. 3D Printing

TEXT BOOKS:
1.   Workshop Manual *by* P.Kannaiah and K.L.Narayana; *Publisher: Scitech*.

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I Year B.Tech CSE – I Sem	L	T/P/D	C
	0	3	2

(5CS51)COMPUTER PROGRAMMING LABORATORY

Course objectives

- **Gain** a working knowledge of C programming to write modular, efficient and readable C programs by Identifying the structural elements and layout of C source code.
- **Declare** and **manipulate** single and multi-dimensional arrays of the C data types and derived data types like structures, unions.
- **Use** functions from the portable C library and to describe the techniques for creating program modules using functions and recursive functions.
- **Manipulate** character strings in C programs. Utilize pointers to efficiently solve problems

Course Outcomes:

After completion of the course student is able to

- **Use** the fundamental process of problem solving using any programming environment.
- **Design and develop** the efficient solution for a given problem using different basic and derived data types
- **Solve** the given problem using C language constructs, functions.
- **Choose** the data type, language construct for a given problem, design and record the solution using algorithm, flowchart

Week 1
a. Basic Linux commands
b. Simple C programs -to implement basic arithmetic operations – sum, average, product, smallest, largest of the numbers, difference, quotient and remainder of given numbers etc.

Week 2
Programs on if, else-if, nested if, else if ladder - largest and smallest of given numbers, to find the grade of a student based on marks, roots of a quadratic equation etc.

Week 3
a. Programs on switch-case – to check the type of a given character, to find the grade of a student etc.
b. Programs on while and do-while- to find factorial, Fibonacci series, GCD, sin(x), cos(x) series , to check whether a given number is an Armstrong, Palindrome, Perfect, number conversion, and Prime number etc.

Week 4
Programs on for loop- sum of n natural numbers, factorial, sin(x), to generate Pascal's triangle etc.

Week 5

a. Programs on nested loops – check for Fibonacci prime, Pyramids of numbers, generation of prime numbers in the given range, multiplication table etc.
b. programs using break, go to, continue.

Week 6
a. Programs on 1-D array-finding Minimum and maximum element, Sorting and Searching etc.
b. Programs on 2-D array – Sum, product and Multiplication of two Matrices etc.
Week 7
a. Programs on Functions-Implementation of user defined functions categories, passing of arrays to functions etc.
b. Programs on recursion - factorial of a given integer, GCD of two given integers etc.
Week 8
a. Programs on String handling functions-Copying, reverse, substring, concatenation.
b. Programs on structure and unions.
Week 9
Midterm exam
Week 10
Programs using pointers- pointer basic operations
Week 11
Programs on pointers towards structures,
Week 12
Programs on pointers to arrays
Week 13
Programs on pointers to strings
Week 14
Programs on pointers to functions
Week 15
Programs on preprocessor directives
Week 16
Internal Lab Exam

TEXT BOOKS:
1. C programming A Problem-Solving Approach by Behrouz A.Forouzan,E.V.Prasad,RichardF.Gilberg
2. How To Program:C, Dietel & Dietel, Seventh Edition,PHI

REFERENCES:

1. The C Programming Language by Brian W. Kernighan, Dennis M. Ritchie.
2. Absolute beginner's guide to C, Greg M. Perry, Edition 2,Publisher: Sams Pub., 1994.
3. Computer Programming and Data Structures by E Balagurusamy, Tata McGraw Hill.
4. Let Us C Yashavantkanetkar BPB

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I Year B.Tech CSE – I Sem	L	T/P/D	C
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(5BS25) ENGINEERING PHYSICS AND ENGINEERING CHEMISTRY LABORATORY

ENGINEERING PHYSICS LAB

Course Objectives

- To practically **learn** interaction of light with matter through physical phenomena like interference, diffraction and dispersion.
- To **understand** the periodic motion and formation of standing waves and to know the characteristics of the capacitors and resistors.
- To **compare** the experimental results with the class room learning.

Course Outcomes:

After completion of the course the student is able to

- **Demonstrate** the optical phenomena with formation of Newton Rings, and formation of spectra with a grating and a prism.
- **Illustrate** periodic motion by measuring rigidity modulus of a material and formation of standing waves by Melde's apparatus and also discharging of a capacitor.
- **Correlate** the experimental results with the class room learning

Any Eight Experiments from the following:
1. Dispersive Power of the material of a Prism using Spectrometer
2. Diffraction Grating (both with Laser and non laser source)
3. Single Slit with laser light
4. Newton Rings
5. Finding thickness of a thin wire or sheet by forming a wedge shaped film
6. Energy gap of a semiconductor material
7. To determine the rigidity modulus of material of a wire
8. Melde's experiment
9. Sonometer Experiment
10. AC frequency by sonometer method
11. Numerical Aperture and Acceptance angle of an optical fiber cable
12. Attenuation and Bending losses in optical fiber
13. Stewart Gee's experiment
14. Characteristics of LED/Laser Diode.
15. Photo cell/ Solar Cell
16. RC circuit

REFERENCES:

1) Essential Practical Lab Manual in Physics: by Dr.P.RaghavendraRao,P.Pavankumar and B.Ashok (inhouse document)
2) Engineering Physics Practicals by B.Srinivasa Rao, V.K.V.Krishna and K.S.Rudramamba, University Science Press, New Delhi

ENGINEERING CHEMISTRY LABORATORY

Pre-requisites: Basic knowledge of Volumetric Analysis and Mathematics.

Course Objectives

- Familiarize the preparation of solutions and operation of instruments
- Conduct of experiment, collection and analyzing the data
- Summarizing the data and find the applicability of the experiment to common society

Course Outcomes
- Understanding the preparation of standard solutions and handling of instruments
- Knowledge of experimentation and recording the data
- Interpretation of results to real world scenario

LIST OF EXPERIMENTS

1. **Titrimetry:** Estimation of hardness of water by EDTA method.

2. **Conductometry:** Conductometric titration of acid vs base.

3. **Colorimetry:** Estimation of copper by colorimetric method.

4. **pH metry:** Determination of pH of sample solutions.

5. Determination of viscosity of sample oil by Redwood Viscometer.

6. **Preparations:** Soap and Nanoparticles.

TEXT BOOKS:

1. Laboratory Manual on Engineering Chemistry by S.K.Bhasin and Sudha Rani; Publisher: Dhanpat Rai.
2. Laboratory Manual on Engineering Chemistry by Y.Bharathi Kumari and Jyotsna Cherukuri; Publisher: VGS Book Links.

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	3	0	3

(5BS12) ORDINARY DIFFERENTIAL EQUATIONS AND LAPLACE TRANSFORMS

Course prerequisites: Differentiation and Integration
Course Objectives:
- **Understand** the methods of solving first order differential equations and learn about its applications to basic engineering problems.
- **Understand** the methods of solving higher order differential equations and learn about its applications to basic engineering problems.
- **Understand** the method of series solutions of second order ordinary differential equations.
- **Apply** the convolution theorem to evaluate Laplace Transform of the functions.

Course Outcomes:
After completion of the course the student is able to
- **Solve** the problems in first order differential equations.
- **Solve** the problems in second order differential equations.
- **Obtain** the series solutions of second order ordinary differential equations.
- **Learn** Laplace Transform as a tool.

UNIT I
Ordinary Differential Equations of First Order and Their Applications:
Differential equations of first order and first degree - Exact differential equation , Linear and Bernoulli differential equation , Applications of differential equations of first order and first degree - Newton's law of cooling, Law of natural growth and decay, Orthogonal trajectories and basic circuits(L-R Circuits, R-C Circuits).

UNIT II
Differential Equations of Higher Order and Their Applications:
Differential equations of higher order - homogeneous and non-homogenous type, differential equations of second order and higher order with constant coefficients with right hand side term of the type e^{ax} sin (ax), cos (ax), polynomials in x, e^{ax} V(x), x V(x) and method of variation of parameters, applications to spring mass system ,Simple harmonic motion and L-C-R Circuits.

UNIT III
Differential Equations with Variable Coefficients:
Euler-Cauchy's 2nd order differential equations, Series solutions of second order Ordinary Differential Equations, Regular point, Regular singular point, Frobineous Method.

UNIT IV
Laplace Transforms:
Existence condition, Laplace transform of Elementary functions, Properties of Laplace transforms, Laplace transform of special functions (Unit step function, Dirac delta function and Periodic function).
UNIT V
Inverse Laplace Transforms:
Inverse Laplace transform of functions using partial fractions, Convolution theorem (statement only). Solving linear differential equations and Integro-differential eqations using Laplace transform.

TEXT BOOKS:
1. Higher Engineering Mathematics – B. S. Grewal,Khanna publishers.
2. Advanced Engineering Mathematics *by R.K.Jain and S.R.K.Iyengar; Narosa Publications.*

REFERENCES:
1. Advanced Engineering Mathematics by Erwin Kreyszig, 8th Edition; Publisher: John Wiley.
2. Advanced Engineering Mathematics by Peter V. O'Neil, 9th Edition; Publisher: Cengage Learning
3. A First Course in Differential Equations by Dennis G. Zill; Publisher: Brooks Cole publiers

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(5BS13) COMPUTATIONAL METHODS

Course Prerequisites: Elementary transformations of matrices, differentiation and integration.

Course Objectives:

- Understand the numerical methods for non linear systems, evaluating definite integrals and solving Ordinary Differential Equations.
- Understand various methods of interpolation and application.
- Understand the Echolen form and Normal form of a matrix and its applications in solving linear system of equations.
- Solving system of linear equations using Jacobi and Gauss-Seidal methods.

Course Outcomes:

After completion of the course the student is able to

- Apply the numerical methods to find a root of algebraic and transcendental equations.
- Apply the numerical methods to find the solutions of ordinary differential equations.
- Find the rank using Echelon form, Normal form and compute eigen values.
- Solve linear equations using Jacobi method and Gauss-Seidal method

UNIT I
Solutions of non-linear systems:
Introduction; Mathematical preliminaries; Solution of algebraic and transcendental equations –bisection method, the method of false position, Fixed point iterative method , Newton - Raphson method, and their order of convergence.

UNIT II
Interpolation:
Introduction; Errors in polynomial interpolation; Finite differences; Forward differences; Backward differences; Central differences; Symbolic relations and separation of symbols; Differences of a polynomial; Newton's formulae for interpolation; Central difference interpolation formulae; Gauss's central difference formulae and Lagrange's interpolation formulae.

UNIT III
Numerical differentiation and Integration:
Numerical differentiation based on interpolation, Numerical integration: Trapezoidal rule, Simpson's 1/3 rule, and Simpson's 3/8 rule, Gaussian quadrature 2 & 3 point formulae.
Numerical solutions of ordinary differential equations:
Solution of initial value problems by Taylor's series - Picard's method of successive approximations, Euler's method, and Runge - Kutta methods.

UNIT IV
Matrices:
Elementary Transformations, Rank of matrix, Echelon and Normal forms, Consistency of linear simultaneous equations, Eigen values and eigen vectors and their properties, Caley – Hamilton theorem (without proof), Quadratic forms - reduction of quadratic form to canonical form by linear(congruent) and orthogonal transformations.

UNIT V
Complex Matrices and Iterative Methods for Real Systems:
Unitary, Hermitian and skew – Hermitian matrices. Iterative methods for solving a system of linear equations (Jacobi method, Gauss-Seidal algorithm) and Power method to find largest and smallest eigen values.

TEXT BOOKS:
1. Numerical Methods in Engineering and Science–B.S. Grewal, 3rdedition Publisher: Khanna
    Publishers
2. Advanced Engineering Mathematics by R.K.Jain and S.R.K.Iyengar; Narosa
    Publications.

REFERENCES:
1. Advanced Engineering Mathematics by Erwin Kreyszig, 8th Edition; Publisher: John Wiley and Sons.
2. Elementary Numerical Analysis – an algorithmic approach -Samuel D. Conte and Carl De Boor (2006); 3rd edition; Publisher: Tata McGraw Hill

(Beyond Syllabus: Types of errors and analysis)

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(5BS24) APPLIED PHYSICS

Course Objectives

- To **learn** different types of Operators and expectation values in Quantum Mechanics.
- To **study** nature of dielectric, magnetic and conducting properties of materials.
- To **visualize** different kinds of materials in engineering and technology.

Course Outcomes:

After completion of the course the student is able to

- **Identify** different types of Operators and expectation values in Quantum mechanics.
- **Recognize** materials' magnetic, dielectric and conducting behavior.
- **Show** case some applications of crystals and different kinds of materials in engineering.

UNIT I
ADVANCED QUANTUM MECHANICS:

Schrodinger equation revisited: Time dependent wave equation, Linearity and Superposition, Expectation values and Operators (Position, Momentum and Energy operators), Finite Potential well, Tunnel Effect, Problems.

UNIT II
SEMICONDUCTOR PHYSICS:

Fermi level in Intrinsic and Extrinsic semiconductors, Intrinsic semiconductor and carrier concentration, Extrinsic semiconductor and carrier concentration, Equation of continuity, Direct and indirect band gap semiconductors, Hall Effect, Formation of p-n junction, open circuit p-n junction, Energy diagram of diode, I/V characteristics of p-n junction diode, p-n diode as a rectifier, Diode equation.

UNIT III
MAGNETIC PROPERTIES OF MATERIALS:

Permeability, Field intensity, magnetic field induction, Magnetization and Magnetic susceptibility, Origin of magnetic moment, Bohr magneton, Classification of magnetic materials (Dia, Para and Ferro), Domain theory of ferromagnetism, Hysteresis curve, Soft and Hard magnetic materials, Ferrites and their applications.

UNIT IV
DIELECTRIC PROPERTIES:
Electric dipole, Dipole moment, Dielectric constant, Electronic, Ionic and Orientation Polarization – Molor Polarization and Experimental determination of Molor Polarization, Calculation of Polarizibilities, Frequency dependence of Polarization- Internal fields, Claussius – Mossotti equation, Piezo and Ferro electricity.

UNIT V
SUPERCONDUCTORS:
Experimental survey and superconductivity phenomenon, Meissner effect, Critical fields and Persistent currents, Type I and Type II superconductors, London equations, Penetration depth-flux quantization, BCS Theory, Josephson Effect, High temperature Superconductors, Applications of Superconductors.

TEXT BOOKS:
1. Concepts of Modern physics by Arthur Beiser, McGraw Hill Inc.
2. Applied Physics by P.K.Mittal, IK International Publishing House (P) Ltd

REFERENCES
1. Engineering Physics by G Sahashra Buddhe; University Press
2. Quantum Mechanics by Gupta Kumar Sharma
3. Elements of Solid State Physics by J.P.Srivatsva, PHI Publishers
4. Engineering Physics by M.R.Srinivasan, New Age Publishers
5. Electronic Devices and circuits by Milliman and Halkias

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

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(5CS11) CODE OF ETHICS
(Common to CSE and IT)

Course objectives:

- **Understand** core values that shape the ethical behavior of an engineer.
- **Awareness** towards the professional ethics and human values.
- **Identify** the global ethical issues.

Course outcomes:

After completion of the course the student is able to

- **Connect** to the moral anatomy and infer different ethical theories.
- **Identify** the social responsibilities as an engineer keeping in view the safety , risk and rights.
- **Exemplify** some global issues related to code of ethics.
- **Recognize** and **correlate** to sample code of ethics disseminated by different professional bodies

UNIT-I
Human Values:
Morals, Values and Ethics , Integrity, Work Ethic, Service Learning, Civic Virtue, Respect for Others, Living Peacefully, caring, Sharing, Honesty, Courage, Valuing Time, Co-operation, Commitment, Empathy, Self-Confidence, Character, Spirituality-The role of engineers in modern society, social expectations.

UNIT-II
Engineering Ethics:
Senses of Engineering Ethics, Variety of moral issues, Types of inquiry, Moral dilemmas, Moral Autonomy, Kohlberg's theory, Gilligan's theory, Consensus and Controversy, Professions and Professionalism, Professional Ideals and Virtues, Theories about right action, Self-interest, Customs and Religion, Uses of Ethical Theories.
Computer Ethics:
Internet and free speech, Power Relationships, Property, Privacy, Additional issues.

UNIT-III
Engineering as Social Experimentation:
Engineering as Experimentation, Engineers as responsible Experimenters, Codes of Ethics, A Balanced Outlook on Law.
Workplace Responsibilities and Rights:

Confidentiality and conflicts of interest, Team work and Rights.

UNIT-IV

Safety, Responsibility and Rights: Safety and Risk, Assessment of Safety and Risk, Risk Benefit Analysis and reducing risk, Govt. Regulator's approach to risks - the three mile island and Chernobyl case studies &Bhopal - Threat of Nuclear power, depletion of ozone, greenery effects Collegiality and Loyalty, Respect for Authority, Collective Bargaining, Confidentiality, Conflicts of Interest, Occupational Crime, Professional Rights, Employee Rights, Intellectual Property Rights (IPR) - Discrimination

UNIT-V

Global Issues:

Multinational Corporations, Environmental Ethics, Computer Ethics, Weapons Development, Engineers as Managers, Consulting Engineers, Engineers as Expert Witnesses and Advisors, Moral Leadership, Sample Code of Ethics ACM, CSI, IEEE, Institution of Engineers (India), etc.

TEXT BOOKS

1. Mike Martin and Roland Schinzinger, Ethics in Engineering, McGraw Hill. New York 1996.
2. Govindarajan. M, Natarajan. S, Senthilkumar. V.S, Engineering Ethics, Prentice Hall of India, 2004.

REFERENCES

1. Charles E Harris, Michael S Pritchard and Michael J Rabins, Engineering Ethics Concepts and Cases, Thompson Learning, United States, 2000
2. John R Boatright, Ethics and the Conduct of Business, Pearson Education, New Delhi, 2003.
3. Edmund G Seebauer and Robert L Barry, Fundamentals of Ethics for Scientists and Engineers, Oxford University Press, Oxford, 2001.

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

(5IT02) DATA STRUCTURES
(Common to EEE, ECE, CSE, EIE and IT)

Course Objectives:

- To **summarize** efficient storage mechanisms of data for an easy access.
- **Implementation** of various basic and advanced data structures.
- To **introduce** various techniques for representation of the data in the real world.
- To **develop** application using data structures.

Course Outcomes:
After completion of the course the student is able to

- **Identify** different file handling functions and understand the basics of different data structures.
- **Classify** various linear data structures, its operations and applications
- **Illustrate and implement** basic non linear data structures.
- **Compare and analyze** various sorting and searching techniques.

UNIT-I
File Management:
File I/O – Basic concepts, text files and binary files, file input / output operations, file status functions (error handling), C programming examples, command-line arguments.
Data Structures – Introduction to data structures, abstract data types, dynamic memory allocation.

UNIT –II
Linear list – Singly linked list implementation, insertion, deletion and searching operations on linear list, circular linked list implementation, double linked list implementation, insertion, deletion and searching operations. Applications of linked lists.

UNIT-III
Stacks-Operations, array and linked representations of stacks, stack applications-infix to postfix conversion, postfix expression evaluation, recursion implementation.
Queues-operations, array and linked representations. Circular queue operations, dequeuers, applications of queue.

UNIT-IV
Trees – Definitions, binary tree representation, binary search tree, binary tree traversals.
Graphs – Definitions, graph representations, graph traversals.

UNIT-V

Searching and Sorting – Big O Notation, Sorting- selection sort, bubble sort, insertion sort, quick sort, merge sort,
Searching-linear and binary search methods.

TEXT BOOKS:
1. C Programming& Data Structures, B.A.Forouzan and R.F. Gilberg, Third Edition, Cengage Learning.
2. Data Structures Using C (Paperback) by Aaron M. Tenenbaum

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

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I Year B.Tech CSE –II Sem

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	2	4	4

(5ME19) ENGINEERING DRAWING
(Common to EEE, ECE, CSE, EIE and IT)

Course Prerequisites: Geometrical construction

Course Objectives:

- Understand the Usage of Drawing Instruments & Auto Cad Commands.
- Understand the Construction Method for Drawing Engineering Curves.
- Understand the Concept of Principal of Projections of Lines, Planes and Solids.
- Understand the Conversion of Isometric to Orthographic Projections and Vice-Versa.

Learning Outcomes:
After Completion of the course the student is able to

- Apply Auto Cad Commands to Construct Engineering Curves.
- Draw the Projections of Lines, Planes and Solids with different Positions.
- Construct different positions of Lines, Planes and Solids in Auto Cad Software.
- Visualize the Objects in the Conversion Process of Isometric Projections to Orthographic projections and Vice-Versa.

UNIT – I
Introduction to Engineering Drawing; Introduction to AutoCAD; Construction of Ellipse, Parabola and Hyperbola – General and Special methods; Cycloidal curves.

UNIT – II
Projections of points; Projections of lines and planes – inclined to one plane and inclined to both the planes.

UNIT – III
Projections of solids: Prism, Pyramid, Cylinder, Cone - axis inclined to one plane and inclined to both the planes.

UNIT – IV
Isometric projections of lines, planes and simple solids.

UNIT – V

Conversion of orthographic views into isometric views and vice-versa.

TEXT BOOKS

1. Engineering Drawing By N.D.Bhatt.
2 Engineering Graphics By K.L. Narayana & P.Kannayya.

REFERENCES

1. Engineering Drawing and Graphics: Venugopal/ New age
2. Engineering Drawing: Johle / TMH

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(5IT52) DATA STRUCTURES LABORATORY
(Common to EEE, ECE, CSE, EIE and IT)

Course Objectives:

- To **understand** storage mechanism and implement related programs
- To **develop** skills to design and analyze simple linear and nonlinear data structures
- To **Strengthen** the ability to identify and apply the suitable data structure for the given real world problem
- To **gain** knowledge in practical applications of data structures

Course Outcomes:

After completion of the course the student is able to:

- **Apply** various file I/O operations for data storage and retrieval.
- **Develop** programs to demonstrate the ADT for linear and non linear data structures
- **Implement** various sorting and searching algorithms.
- **Choose and Apply** the appropriate data structure to solve a given problem

Week 1:   1.   Programs on files-Implementation of file handling functions, file error handling.
2.   Programs on command line arguments.

Week 2:
3.   Programs on dynamic memory allocation.
4.   Write a program to perform creates, insert, delete and search operations in Single Linked List.

Week 3:   5.   Write a program to perform create, insert , delete and search operations in Circular Linked List

| **Week 4:** | 6. Write a program to perform create, insert and deletion operations in Double Linked List |

| **Week 5:** | 7. Write a program to implement stack using Arrays |
| | 8. Write a program to implement stack using Linked List |

| **Week 6:** | 9. Write a program to convert infix expression to postfix expression using stack |
| | 10. Write a program to evaluate postfix expression |

| **Week 7:** | 11. Programs using recursion |
| | 12. Write a program to convert infix expression to prefix expression using stack |

| **Week 8:** | 13. Write a program to implement Linear queue using Array |
| | 14. Write a program to implement Linear queue using Linked List |

| **Week 9:** | 15. Write a program to implement insertions and deletions in a Circular Queue. |
| | 16. Write a program to implement insertions and deletions in a Dequeue. |

| **Week 10:** | **Midterm Exam** |

| **Week 11:** | 17. Write a program to implement Linear search, Binary search |
| | 18. Write a program to implement Bubble sort, Selection sort |

| **Week 12:** | 19. Write a program to implement Insertion sort |
| | 20. Write a program to implement Merge sort |

| **Week 13:** | 21. Write a program to implement Quick sort. |

| **Week 14:** | 22. Implementation of a binary tree representation using Arrays |
| | 23. Write a program to implement tree traversals. |

| **Week 15:** | 24. Implementation of a Graph representation using Adjacency Matrix |
| | 25. Write a program to implement graph traversals. |

| **Week 16:** | **Final Internal Lab Exam** |

TEXT BOOKS:

1. C Programming & Data Structures, B.A.Forouzan and R.F. Gilberg, Third Edition, Cengage Learning.
2. Data Structures Using C (Paperback) by Aaron M. Tenenbaum

REFERENCES:

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

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(5BS02) ENGLISH LANGUAGE COMMUNICATION SKILLS LABORATORY

The English language Communication Skills Lab aims to provide practice in all the four skills of LSRW, with a special emphasis on listening and speaking skills.

Course Objectives
- Provide ample practice in LSRW skills and train the students in oral presentations, public speaking, role play and situational dialogue.
- Provide practice in word usage, grammatical construction, structural patterns, and improve comprehension abilities in the students.
- Train students to use neutral pronunciation through phonetic sounds, symbols, stress and intonation.
- Enable students to transfer information from verbal to graphic representation and vice versa.

Course Outcomes
After going through this course the student will be able to
- Comprehend spoken and written discourse.
- Speak fluently with neutral pronunciation and exhibit interpersonal skills.
- Write accurately, coherently and lucidly making appropriate use of words depending on context and present data clearly.
- Introduce oneself to people and be able to speak extempore.

Syllabus for Lab Sessions
Unit 1
  Computer Aided Language Lab:
- Grammar : Nouns and Pronouns; Articles; The Present Tense
- Vocabulary: Lesson 1
- Listening Comprehension
  Communication Skills Lab: Introduction of Self and others
Unit 2
  Computer Aided Language Lab:
  1. Grammar: Concord; Adjectives; The Past Tense
  2. Vocabulary: Lesson 2
  3. Listening Skills
  Communication Skills Lab: Seeking and Giving Information, Giving and Taking Instructions
Unit 3
  Computer Aided Language Lab:
Grammar --- Adverbs, Conjunctions, Prepositions; The Future Tense
- Vocabulary: Lesson 3
- Telephoning Skills

Communication Skills Lab: Role Play/ Situational Dialogues
Unit 4
 Computer Aided Language Lab:
    1. Grammar ---- Active and Passive Voice
    2.Vocabulary: Lesson 4
    3. Listening Comprehension
 Communication Skills Lab: **i) JAM**/ Short Talk ii) Information Transfer a) Interpretation of Graph
Unit 5
 Computer Aided Language Lab:

 1. Introduction to Technical Writing
  A. Definition of a Technical Term
  B. Description of a Mechanism
  C. Description of a Technical Process
 2. Vocabulary: Lesson 5
Communication Skills Lab **:** Presentation Skills: Oral Presentation

   Computer Aided Language Lab Requirements:

  The English Language Lab shall have two parts:
 i) **The Computer aided Language Lab** for 30 students with 30 systems, one master console, LAN facility and English language software for self- study by learners.
 ii) **The Communication Skills Lab** with conference tables and movable chairs for 30 students and audio-visual   aids with a P.A System, a T. V., a digital stereo – audio & video system and a camcorder
 • **System Requirement (Hardware component):**
  Computer network with Lan with 30 multimedia systems with the following specifications:
   • P – IV Processor
   • Speed – 2.8 GHZ
   • RAM – 512 MB Minimum
   • Hard Disk – 80 GB
   • Headphones of High quality
 iv) Suggested Resources:
  Software consisting of the prescribed topics elaborated above may be procured and used. Additionally, the abundantly available online resources may also be used.
List of suggested software:
  • **Tense Busters (5 Levels)**
  • **Walden Educare**
  • **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)

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(5BS17) PROBABILITY STATISTICS AND QUEUING THEORY

Course prerequisites: permutations and combinations, basic statistics

Course Objectives:

- **Understand** the elementary ideas in basic probability.
- **Understand** the different types of probability distribution functions
- **Understand** the basic concepts in estimation theory and test of hypothesis
- **Understand** the basic concepts of queuing theory.

Course Outcomes:

Students will be able to

- **Solve** problems involving basic probability.
- **Apply** the knowledge of different probability distributions to Test of Hypothesis.
- **Calculate** correlation, regression coefficients.
- **Apply** the knowledge of different probability distributions to solve problems in queuing theory.

UNIT I

Probability and Distributions

Sample space and events, Probability- The axioms of probability, some elementary theorems, conditional probability, Baye's theorem. Random variables - discrete and continuous. distributions - Binomial, Poisson and Normal distributions–related properties.

UNIT II

Correlation and Regression

Coefficient of correlation, regression coefficient, the lines of regression, rank correlation

UNIT III

Sampling Distributions and Testing of Hypothesis

Sampling distributions, sampling distribution of means (σ known and unknown). Point estimation, interval estimation.Tests of hypothesis - null hypothesis, alternate hypothesis, type I, type II errors, critical region. Inferences concerning means and proportions- Large samples- test of hypothesis for single mean and difference between the means. Test of hypothesis for the proportions- single and difference between the proportions, confidence interval for the mean and proportions.

UNIT IV

Tests of significance- Small samples

Tests of significance-t distributions, confidence interval for the t- distribution, F-distributions and Chi square distributions.

UNIT V

Queuing Theory

Queuing theory -Arrival process and service process- Pure birth and death process, M/M/1 model with finite and infinite capacities, M/M/C model with infinite capacity.

TEXT BOOKS

1. Probability and Statistics for Engineers – Richard .A.Johanson, 1995, 5th Edition, Prentice-Hall.
2. Some problems in the theory of queues. -Kendall, D. G. (1951) *Journal of the Royal Statistical Society*, Series B, **13**, 151–185..

REFERENCES

1. Applied Statistics for Engineers-Jay.L.Devore, Nicholas. R.Famum, Jimmy.A.Doi, 3rd Edition, Cengage
2. An Introduction to Probability Theory and Its Applications- Feller, W. (1968– Volume I and II. 2nd edn. John Wiley Inc., New York, NY.
3. The Single Server Queue -Cohen, J. W. (1969) .Wiley Interscience, New York, NY.

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II Year B.Tech CSE- I Sem   **L   T/P/D   C**
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(5EE22) ELEMENTS OF ELECTRICAL AND ELECTRONICS ENGINEERING
(Common to CSE and IT)

Course Objectives:

- To understand the basic concepts of circuit analysis
- To analyze electrical circuits using network theorems and analysis of AC circuits
- To learn principle of operation, construction and characteristics of various electronic devices.
- To know about different applications of these devices

Course Outcomes:

After completion of the course the student is able to**:**

Apply various network reduction techniques for electrical circuit analysis

- Analyze electrical circuits using network theorems
- Use devices in real life applications
- Analyze and Design applications using these devices

UNIT I

Introduction to Electrical Circuits:Circuit Concept – Types of Elements– Types of sources-R-L-C parameters-Kirchhoff's laws- network reduction techniques–series, parallel, series parallel circuits, Source transformation–Mesh and Nodal analysis

UNIT-II

Network Theorems: Star-delta transformation, Super position, Reciprocity, Thevenin's, Norton's, Maximum power transfer theorems-Application of theorems for the analysis of DC circuits.

UNIT III

AC Circuits: Root mean square, average values, form factor and peak factor of alternating currents and voltages, Response of R-L, R-C and R-L-C circuits with sinusoidal excitation-Concept of reactance, impedance, phase and phase difference, Power factor, Real and reactive powers.

Diodes, Rectifiers and Filters:p-n Junction Diode, symbol, Diode Equation, Volt-Ampere Characteristics, Half wave Rectifier, Full wave rectifier, Bridge Rectifier, (Simple problems), Zener Diode, LED, LCD, Photo Diode.

UNIT IV:

Bipolar Junction Transistor(BJT)

NPN, PNP transistor Construction and principle of operation, symbol, input and output characteristics of transistor in Common Base, Common Emitter and Common Collector Configurations, Relation between alpha, beta and gamma, Transistor as an Amplifier.

UNIT V:

 Introduction to Amplifies

Definition of voltage gain, current gain, input resistance and output resistance in amplifies Concept of feedback, classification of feedback amplifies, General characteristics of negative feedback amplifies, effect of feedback on amplifies, Introduction to feedback topologies, Barkhausen criteria, principle of operation of LC and crystal oscillators

TEXT BOOKS

1. Basic Electrical Engineering - By M.S.Naidu and S. Kamakshiah – TMH.
2. Electrical circuits by Sudhkar and Shyam Mohan-TMH
3. Electronic Devices and Circuits – J.Millman, C.C.Halkias, and SatyabrathaJit, Tata McGraw Hill, 2nd Edition, 2007.
4. Electronic Devices and Circuits – David A Bell, Oxford University Press, 5th edition (2008)

REFERENCES:

1. Electrical and Electronic Technology – By Hughes- Pearson Education.
2. Electrical engineering fundamentals by Vincent Del Toro
3. Electrical Circuit Theory and Technology – by John Bird, Elsevier Science & Technology, 2007
4. Integrated Electronics - J.Millman and Christos.C.Halkias, and Satyabratha, Jit Tata McGraw Hill, 2nd Edition, 2008.
5. Electronic Devices and Circuits – T.F. Bogart Jr., J.S.Beasley and G.Rico, Pearson Education, 6th Edition, 2004.
6. Electronic Devices and Circuits- S. S Salivahanan, N. Sursh Kumar, A. Vallava Raju,2ndEdition., TMH,   2010
7. Electronic Devices and Circuits – R.L. Boylestad and Louis Nashelsky, Pearson/Prentice Hall, 11th Edition, 2006.

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(5IT03) ADVANCED DATA STRUCTURES THROUGH C++
(Common to CSE and IT)

Course Objectives:
- **Declaration** and use of various data types and data structures.
- **Understand** applicability for the various data structures and the concept of logic encapsulation.
- To **design** and code algorithms for solutions and to implement algorithms into programming code.
- **Demonstrate** data structure problem solutions, search and retrieval of information.

Course Outcomes:
After completion of the course the student is able to

- **Understand** the concepts of object-oriented programming to solve real world problems
- **Analyze** the efficiency of linear and nonlinear data structures
- **Solve** the given problem by identifying the appropriate data structure
- **Classify** the searching techniques and analyze the complexities.

UNIT - I
Different strategies for problem solving need for OOP, Overview of OOP Principles-Encapsulation, Inheritance, and Polymorphism. C++ class overview-class definition, objects, class members, access control, class scope, constructors and destructors, inline functions, static class members, this pointer, friend functions, dynamic memory allocation and de allocation (new and delete).

UNIT - II
Polymorphism and Inheritance: Function overloading, operator overloading, generic programming-Function and class templates, inheritance basics, base and derived classes, different types of inheritance, base class access control, virtual base class, function overriding, run time polymorphism using virtual functions, exception handling mechanism, abstract classes.

UNIT – III
Performance Analysis: Introduction to Time complexity and space complexity of Algorithms, Big O, Omega and Theta notations-Only Basic Level, Review of basic data structures. Implementation of List ADT , Stack ADT , Queue ADT using template classes, Priority Queue-Definition, ADT, Operations-Insertion, Deletion, Heap-Definition, Max Heap and Min Heap ,Insertion and deletion, Heap Sort.

UNIT - IV
Dictionaries-Definition, ADT, Linear List representation, operations- insertion, deletion and searching, Hash Table representation, Hash function-Division Method, Collision, Collision Resolution Techniques-Separate Chaining, open addressing-linear probing, quadratic probing, double hashing, Rehashing.

UNIT - V
Search trees: Binary search trees, definition, ADT, implementation, operations-searching, insertion and deletion, Balanced search trees- AVL trees, definition, height of an AVL tree, representation, operations-insertion, deletion and searching. Search trees B-Trees-B-Tree of order m, height of a B-Tree, insertion, deletion and searching.

TEXT BOOKS:
1. Mastering C++ by K.R.Venugopal , RajKumar and T.Ravishankar , TATA McGrawHill.(Unit-I,Unit-II)
2. Data structures, Algorithms and Applications in C++,S.Sahni, University press (India) pvt ltd, 2nd edition, Orient Longman pvt.ltd. (Unit-III,Unit-IV)
3. Data Structures and Algorithm Analysis in C++, Mark Allen Weiss, Pearson Education , Second edition. (Unit-III,Unit-IV,Unit-V)

REFERENCES:
1. Data structures using C and C++, Langsam, Augenstein and Tanenbaum, PHI/Pearson Education.
2. Problem solving with C++, The OOP, Fourth edition, W.Savitch, Pearson education.
3. Data Structures and Algorithms in C++, Second Edition, Adam Drozdek, Vikas Publishing House, Thomson International Student Edition.
4. The C++ Programming Language B. Stroustrup, 3rd edition Pearson Education.

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(5CS02) MATHEMATICAL FOUNDATIONS FOR COMPUTER SCIENCE
(Common to CSE and IT)

Course Objectives:

- **Reason** mathematically about basic data types and structures used in computer algorithms and systems.
- **Create** elementary proofs.
- **Apply** different methods for solving recurrence relations.
- **Construct** various kinds of graphs.

Course Outcomes:

After completion of the course the student is able to

- **Analyze** the theory and techniques of mathematical logic, graphs.
- **Illustrate** the basic applications of set theory and relations.
- **Solve** recurrence relation problems using appropriate method.
- **Apply** the knowledge and skills obtained to investigate and **solve** discrete mathematical problems.

UNIT I

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

UNIT II

Set Theory: notations, inclusion and equality sets, operations on sets, venn diagrams.
Relations: Properties of binary Relations, equivalence, transitive closure, compatibility and partial ordering relations, Hasse diagram. Functions: Inverse Function, Composition of functions, recursive Functions.

UNIT III

Recurrence Relations: Generating Functions, Function of Sequences, Calculating Coefficients of generating functions, Recurrence relations, Solving recurrence relation by substitution and Generating functions, the method of Characteristic roots, solution of Inhomogeneous Recurrence Relations.

UNIT IV

Graph Theory and Applications: Basic Concepts, Isomorphism and Sub graphs, Multi graphs, and Euler circuits, Hamiltonian graphs, Planer graphs – Different representation of a planer graph.

UNIT V

Trees – Properties of trees – Distance and centers in tree – Rooted and binary trees. Spanning trees ,BFS,DFS, Spanning trees in a weighted graph ,Chromatic Numbers.

TEXT BOOKS

1. Discrete mathematical structures with applications to computer science J.P.Trembly,
    R.Manohar, Tata M c Graw Hill.
2. Narsingh Deo, "Graph Theory: With Application to Engineering and Computer Science", Prentice Hall of India, 2003.

REFERENCES

1. Discrete Mathematics and its Applications, 5th edition, Kenneth.H.Rosen, TMH.
2. Discrete Mathematical Structures Theory and applications, Mallik and Sen, Cengage.
3. " Discrete Mathematics for Computer Scientists & Mathematicians," Second edition, J.L.Mott, A. Kandel, T.P. Baker, PHI.
4. Logic and Discrete Mathematics, Grass Man and Tremblay,Pearson Education.
5. " Discrete Mathematics for Computer Scientists & Mathematicians," Second edition, J.L.Mott, A. Kandel, T.P. Baker, PHI.

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(5BS41) BUSINESS ECONOMICS AND FINANCIAL ANALYSIS
Course Prerequisites: Basic knowledge of Economics

Course Objectives:
The objective of this course is to:

- To explain different forms of organizing private and public sector business enterprises and to analyze the significance of Business Economics in solving the problems of business enterprise. Also to define and analyze the concepts of Demand, Elasticity of Demand and Demand Forecasting Methods.
- To analyze the various types of costs and to determine the level of output at which there is neither profit nor loss. To estimate capital requirements and to describe various sources of mobilizing funds. Also to identify least cost combinations of inputs produce desired quantity of output.
- To describe the features of different market structure and pricing strategies.
- To explain the basic accounting concepts and conventions. To elaborate the importance of finance function for evaluating the economic status of a business unit.

Course outcomes:
After completion of the course the student is able to

Select the suitable form of business organization which meets the requirement of selected business also perform decision – making function effectively in an uncertain frame work by applying concepts of Managerial Economics. Meet and manipulate the demand efficiently and plan the future course of action.

- Apply right kind cost to reduce cost by paying attention towards the costs which can be reduced. Take decision whether to buy or produce? Reduce the cost of capital by selecting best source of fund mobilization and select best investment opportunity which yields higher rate of return.
- Fix the right price which can best meets the predetermined objectives of the business firm under different market conditions. Able to select best combination of inputs to produce required quantity of output.
- Prepare books of accounts and know over all financial position of the business enterprise which enables the concerned to take appropriate measures to improve the situation. Also interpret the financial position from difference angles and initiates the measures/ efforts in that direction.

UNIT I

Business and new economic environment

Characteristic features of business; Features and evaluation of sole proprietorship; Partnership; Joint stock company; Public enterprises and their types; Changing business environment in post- liberalization scenario.

UNIT II

Introduction to business economics, and demand analysis

Definition; Nature and scope of managerial economics - demand analysis determinants; Law of demand and its exceptions.

Elasticity of demand and demand forecasting

Definition; Types; Measurement and significance of elasticity of demand; Demand forecasting; Factors governing demand forecasting; Methods of demand forecasting - survey methods, statistical methods, expert opinion method, test marketing, controlled experiments, and judgmental approach to demand forecasting.

UNIT III

Cost analysis

Cost concepts - opportunity cost, fixed vs. variable costs, explicit costs vs. implicit costs, and out of pocket costs vs. imputed costs; Break-even analysis (BEA) - determination of break-even point (simple problems), managerial significance, and limitations of BEA.

Capital and capital budgeting

Capital and its significance; Types of capital; Estimation of fixed and working capital requirements; Methods and sources of raising finance.

Nature and scope of 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 IV

Theory of production

Production function - isoquants and isocosts, least cost combination of inputs, and laws of returns; Internal and external economics of scale.

Market structures

Types of competition; Features of perfect competition, monopoly, and monopolistic competition; Price-output determination in case of perfect competition and monopoly.

Pricing policies and methods

Cost plus pricing; Marginal cost pricing; Sealed bid pricing; Going rate pricing, Limit pricing, Market skimming pricing, Penetration pricing, Two-part pricing, Block pricing, Bundling pricing, Peak load pricing, Cross subsidization.

UNI T V

Introduction to financial accounting

Double-entry book keeping; Journal; Ledger; Trial balance; Final accounts - trading account, profit and loss account, and balance sheet with simple adjustments.

Financial analysis through ratios

Computation; Analysis and interpretation of liquidity ratios - current ratio, and quick ratio; Activity ratios - inventory turnover ratio, and debtor turnover ratio; Capital structure ratios – debt-equity ratio, and interest coverage ratio; Profitability ratios - gross profit ratio, net profit ratio, operating ratio, P/E ratio, and EPs.

TEXT BOOK
1. Managerial Economics and Financial Analysis *by*Aryasri, 2009; *Publisher: Tata McGraw Hill.*
2. Managerial Economics *by*Varshney&Maheswari, 2009; *Publisher: Sultan Chand.*

REFERENCES
1. Financial Accounting for Management: An analytical perspective *by*Ambrish Gupta, 2010; *Publisher: Pearson Education.*
2. Managerial Economics *by* H. Craig Peterson & W. Cris Lewis; *Publisher: Prentice Hall of India.*

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(5CS03) DIGITAL LOGIC DESIGN
(Common to CSE and IT)

Course Objectives:

- **Analyze** and explore uses of logic functions for building digital logic circuits
- **Explore** the Combinational logic circuits.
- **Examine** the operation of sequential (synchronous and asynchronous) circuits.
- **Understand** the programming concepts of HDL for simulating any type of logic circuits.

Course Outcomes:

After completion of the course the student is able to

- **Apply** fundamental concepts in designing digital logic circuits which includes
- data representation, Boolean Algebra, simplification techniques, gate level logic implementations, HDLs.
- **Relate** combinational logic circuits and develop hardware designs using HDL
- **Design** sequential logic circuits and modelling using HDL
- **Develop** asynchronous sequential circuits using memory elements.

UNIT-I

NUMBERS SYSTEMS AND CODES

Review of number systems- number base conversion-binary arithmetic- binary weighted and non-weighted codes – Complements-Signed binary numbers-Error Detection and Correcting Codes-Binary Logic.

UNIT-II

BOOLEAN ALGEBRA and GATE LEVEL MINIMIZATION

Postulates and theorems- representation of switching functions-SOP and POS forms – Canonical forms-digital logic gates –Karnaugh Maps –minimization using three variable, four variable and five variable K-Maps, Don't Care Conditions- NAND and NOR implementation , Other Two-Level Implementation –Exclusive –OR function - Integrated Circuits-Hardware Description Language(HDL)

UNIT-III

DESIGN OF COMBINATIONAL CIRCUITS

Tabular Minimization- Combinational Circuits- Analysis and Design Procedure- Binary adder and subtractors – Carry Look-ahead adder-Decimal adder-Binary multiplier-magnitude comparator-BCD adder- Decoders- Encoders-Multiplexers-Random Access

Memory-Read Only Memory-Programmable Logic Array-Programmable Array Logic - HDL for Combinational Circuits

UNIT-IV
DESIGN OF SEQUENTIAL CIRCUITS
Combinational Vs Sequential Circuits – Latches-Flip Flops-RS flip flop, JK flip flop, T flip flop, D flip flop, Master-Slave Flip flop- Flip Flops excitation functions –Conversion of one flip flop to another flip flop- Asynchronous Vs Synchronous circuits-Analysis of clocked sequential circuits-State Table-State Diagram-State Reduction and State Assignment-Mealy and Moore Machines-capabilities and limitations of Finite State Machine-State equivalence and machine minimization-Design of synchronous counters- Ripple Counters-Asynchronous counters-Registers-Shift Registers- HDL for Sequential circuits.

UNIT-V
ASYNCHRONOUS SEQUENTIAL LOGIC
Introduction-Analysis Procedure, Circuits with Latches, Design Procedure-Reduction of state and flow Tables – Race Free State Assignment Hazards, Design examples.

TEXT BOOKS: :
1. DIGITAL DESIGN , Third Edition , M.Morris Mano, Pearson Education/PHI.
2. Switching and Finite Automata Theory by Zvi. Kohavi, Tata McGraw Hill.

REFERENCES:
1. FUNDAMENTALS OF LOGIC DESIGN, Roth, 5th Edition,Thomson
2. Switching and Logic Design, C.V.S. Rao, Pearson Education
3. Digital Principles and Design Donald D.Givone, Tata McGraw Hill, Edition.
4. Fundamentals of Digital Logic & Micro Computer Design , 5TH Edition, M. Rafiquzzaman John Wiley

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(5EE62)ELEMENTS OF ELECTRICAL AND ELECTRONICS LABORATORY
(Common to CSE and IT)

Course Objectives:
- To understand the basic concepts of circuit analysis
- To analyze electrical circuits using network theorems and analysis of AC circuits
- To learn principle of operation, construction and characteristics of various electronic devices.
- To know about different applications of these devices

Course Outcomes:

After completion of the course the student is able to
- apply basic network theorems for solving electrical networks.
- Analyze various Electrical networks using Kirchhoff's laws.
- use the electronic devices in real time applications
- Calculate h-parameters of BJT under various configurations.

PART A:
1. Verification of KVL and KCL
2. Verification of Superposition theorem
3. Verification of Reciprocity theorem
4. Verification of Thevenin's theorem
5. Verification of Norton's theorem
6. Verification of Maximum Power Transfer Theorem

PART B:
1. Forward and Reverse Bias V-I characteristics of PN junction Diode.
2. Zener diode V-I characteristics
3. Half Wave and Full Wave rectifier without filters.
4. Characteristics of a BJT under CE configuration.
5. Characteristics of a BJT under CB configuration
6. Frequency response of CE Amplifier.

Note: Any 10 of the above experiments 5 from each part to be conducted

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(5IT53) ADVANCED DATA STRUCTURES THROUGH C++ LABORATORY
(Common to CSE and IT)

Course Objectives:
- **Declaration** and **use** of various data types.
- **Understand** applicability for the various data structures.
- To **analyze** solutions for storage management computing problems.
- **Demonstrate** data structure problem solutions.

Course Outcomes:

After completion of the course the student is able to

- **Develop** C++ programs for simple applications that make use of classes and objects .
- **Solve** programs using Polymorphism, inheritance, templates and exceptional handling.
- **Implement** linear and non-linear data structures .
- **Execute** problems on dictionaries and searching techniques.

Week-1, 2, 3
C++Programs - covering- Unit-I concepts

Week-4, 5, 6:
Advanced C++ Programs – Covering – Unit-II concepts

Week 7, 8:
C++ programs to implement the following using an array and Linked List
    a) Stack ADT   b) Queue ADT

Week 9:
C++ Programs to implement Priority Queue and its operations using heap, Heap Sort

Week 10:
Lab Internal Examination-I

Week 11:
C++ Programs to implement dictionaries and its operations using.
a)   Linear List   b) Hash Table using Division Method.

Week 12:
Collision Resolution Techniques- Separate Chaining, Linear Probing , quadratic Probing

Week 13:
C++ Programs to implement – double Hashing and Rehashing.

Week 14:
Write a C++ program to perform the following operations on Binary Search Tree (BST)
a) Creation   b) Search   c) Deletion   d) Insert e) Display – Pre, Post
and In order

Week 15:
Write a C++ program to perform the following operations on B-Tree of order m
a) Creation   b) Insert c) Display

Week 16:
Lab Internal Examination - II

TEXT BOOKS:
1. Mastering C++ by K.R.Venugopal , RajKumar and T.Ravishankar , TATA McGrawHill.
2. Data structures, Algorithms and Applications in C++,S.Sahni, University press (India)
   pvt ltd, 2nd edition, Orient Longman pvt.ltd.
3. Data Structures and Algorithm Analysis in C++, Mark Allen Weiss, Pearson Education,
   Second Edtion.

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(5CS04) FORMAL LANGUAGES AND AUTOMATA THEORY

(Common to CSE and IT)

Course Objectives

- **Explain** the theoretical foundations of computer science concerning– the relationships between languages and machines, the inherent limits of what can be computed, and the inherent efficiency of solving problems.
- **Identify** a language's location in the Chomsky hierarchy (regular sets, context-free, context-sensitive, and recursively enumerable languages).
- **Convert** among equivalently powerful notations for a language, including among DFAs, NFAs, and regular expressions, and between PDAs and CFGs.
- **Build** the foundation for students to pursue research in the areas of automata theory, formal languages, and computational power of machines.

Course Outcomes

After completion of the course the student is able to

- **List** computational devices according to their computational power, and tools which will allow us to tell if a device is powerful enough to solve a given computational problem.
- **Relate** the concepts of grammar with the concept of programming language.
- **Design** Solutions for problems related to Finite Automata, RE, CFG, PDA and Turing Machine.
- **Analyze** various problems and categorize them into P, NP, NP-Complete and NP-Hard problems.

UNIT-I

Fundamentals: strings, Alphabet, Language, Operations, Chomsky hierarchy of languages, Finite state machine Definitions, finite automation model, acceptance of strings and languages, DFA and NFA, transition diagrams and language recognizers. NFA with ε transitions –Equivalence between NFA with and without ε transitions, NFA to DFA conversion, minimization FSM, equivalence between two FSM's, Output machines- Moore and Mealy machine.

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). Regular Grammars – right linear and left linear grammars, equivalence between regular grammar and FA,

UNIT –III

Context Free Grammar, derivation trees, sentential forms, right most and left most derivations of strings. Ambiguity in Context free Grammars. Minimization of Context free grammars, CNF, GNF, Pumping Lemma for Context Free Languages. Enumeration of properties of CFL (proofs omitted).

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 (proofs not required), Introduction to DCFL and DPDA.

UNIT –IV

Turing Machine: Definition, model, Design of TM, computable functions, recursively enumerable languages. Church's hypothesis, counter machine, types of Turing Machines (proofs not required)

UNIT –V

Computability Theory: Linear Bounded Automata and context sensitive languages, LR (0) grammar, decidability of problems, Universal TM, Un decidable problems about Turing Machine – Post's Correspondence Problem - The classes P and NP.

TEXT BOOKS:
1. "Introduction to Automata Theory, Languages and Computations", H.E.Hopcroft, And J.D Ullman, Second Edition, Pearson Education, 2003.
2. "Theory of Computer Science- Automata Languages and computation", Mishra and Chandra Shekaran, Second Edition PHI.

REFERENCES:
1. "Elements of The theory of Computation", H.R.Lewis and C.H.Papadimitriou, Second Edition, Pearson   Education/PHI, 2003
2. "Introduction to Languages and the Theory of Computation", J.Martin, Third Edition, TMH, 2003.
3. "Introduction of the Theory and Computation", Micheal Sipser, Thomson Brokecole, 1997.
4. "Formal languages and Automata Theory", K.V.N.Sunitha & N.Kalyani TMH,2010.

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(5CS05) DATA BASE MANAGEMENT SYSTEMS
(Common to CSE and IT)

Course Objectives:
- **Introduction** of Data Base Management concepts and to give the description of structure of Data Base systems.
- **Understand** concepts of ER model and model the data base for the given scenarios and prepare the database through normalization.
- **Know** the features of various models of data and query representations.
- **Introduce** the concepts and protocols related to transaction management and understand the concepts of data storage

Course Outcomes:
After completion of the course the student is able to
- **Understand** the fundamentals of relational systems including data models, database architectures, and database manipulations.
- **Formulate** queries using relational algebra, Relational Calculus and SQL
- **Develop** database schema for a given scenario using normalization techniques.
- **Summarize** the concepts of transaction processing, concurrency control, recovery and data storage techniques

UNIT-I

Introduction to Databases and Database Management System - Database system Applications - Advantages of DBMS over File System - Data Models – Instances and schema - View of Data - Database Languages -DDL-DML - Database Users and Administrator - Database System Structure.

UNIT-II

Database Design and ER diagrams – Attributes and Entity Sets – Relationships and Relationship Sets – Constraints - Keys - Design Issues - Entity-Relationship Diagram- Weak Entity Sets - Extended E-R Features- Database Design with ER model - Database Design for Banking Enterprise

UNIT – III

Introduction to the Relational Model – Structure of RDBMS - Integrity Constraints over Relations – Enforcing Integrity Constraints – Querying Relational Data - Relational Algebra and Calculus.

Introduction to SQL- Data Definition commands, Data Manipulation Commands, Basic Structure, Set operations Aggregate Operations - Join operations - Sub queries and correlated queries, SQL functions , views ,Triggers, Embedded SQL.

UNIT – IV

        Functional Dependencies– Introduction , Basic Definitions, Trivial and Non trivial dependencies, closure of a set of dependencies, closure of attributes, irreducible set of dependencies- Schema Refinement in Database Design- Problems Caused by Redundancy – Decompositions – Problem Related to Decomposition –- Lossless Join Decomposition – Dependency Preserving Decomposition - FIRST, SECOND, THIRD Normal Forms – BCNF –– Multivalued Dependencies – Fourth Normal Form.

UNIT-V

        Transaction concept- Transaction state- Implementation of atomicity and Durability- Concurrent executions – Serializability, Recoverability.Lock Based Protocols, Timestamp Based Protocols, Validation Based Protocols, Multiple Granularity, Dead Lock Handling – Failure Classification – Storage Structure - Recovery and Atomicity- Log Based recovery – Recovery with concurrent transactions – Checkpoints.

        File Organization – Organization of records in file - Data Dictionary Storage – Indexing and Hashing – Basic Concepts , Ordered Indices,B$^+$Tree Index files, B-tree index files – Static Hashing – Dynamic Hashing – Comparison of Indexing with Hashing.

TEXT BOOKS:

1. Database System Concepts, Silberschatz, Korth, Sudarshan,Seventh Edition, McGraw hill (1, 2, 3 & 5 Units).
2. Introduction to Database Systems, C.J.Date, Pearson Education (4th Unit)

REFERENCES:

1. Database Management Systems, Raghu ramakrishnan, Johannes Gehrke, TATA Mc Graw Hill.
2. Fundamentals of Database Systems, Elmasri Navrate Pearson Education Data base Systems design, Implementation, and Management, Peter Rob & Carlos Coronel 7th Edition.
3. Fundamentals of Database Systems, Elmasri Navrate Pearson Education

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(5IT04) COMPUTER ORGANIZATION
(Common to ECE, CSE, EIE and IT)

Course Objectives:

- To **understand** the basic structure and operation of a digital computer.
- To **analyse** the operations of the arithmetic unit including the algorithms & implementation of fixed-point and floating-point addition, subtraction, multiplication & division.
- To **learn** the different ways of communicating with I/O devices and standard I/O interfaces.
- To **analyse** the hierarchical memory system including cache memories, secondary memory and virtual memory.

Course Outcomes:

After completion of the course the student is able to

- **Interpret** the functional architecture of computing systems
- **Explain** memory unit, control unit and I/O unit functionalities.
- **Make** use of fixed- and floating-point algorithms and analyze micro programming instructions
- **Analyze** instruction level parallelism and Concepts of advanced pipeline techniques

UNIT- I

BASIC STRUCTURE OF COMPUTERS: Introduction, Computer Evolution and performance, System Buses, bus Structures, Improvements in Chip Organization and Architecture,The evolution of the INTEL x86 architecture, Embedded system and the arm processor.

Register Transfer Language and Micro operations: Register Transfer language, Register Transfer, Arithmetic Micro operations, Logic Micro operations, Shift Micro operations, and Arithmetic logic shift unit.

UNIT- II

BASIC COMPUTER ORGANIZATION AND DESIGN: Instruction Codes, Computer Registers, computer instructions – instruction Cycle, memory reference instructions, input-output and interrupt. Central Processing Unit: Stack organization, instruction formats, addressing modes, data transfer and manipulation, program control, CISC and RISC.

UNIT- III

THE MEMORY ORGANIZATION: The Computer System: Characteristics of Computer Memory Systems, The Memory Hierarchy Semiconductor Main Memory, SRAM and DRAM, External Memory, performance considerations, RAID, virtual memory, secondary storage.

MICROPROGRAMMED CONTROL: Control memory, address sequencing, micro program example, and design of control unit, hardwired control, and micro programmed control.

UNIT- IV

COMPUTER ARITHMETIC: Addition and subtraction, multiplication algorithms, Division algorithms, floating-point arithmetic operations, Decimal arithmetic unit, Decimal arithmetic operations.

INPUT-OUTPUT ORGANIZATION: Peripheral devices, input-output interface, asynchronous data transfer, modes of transfer, priority interrupt, direct memory access.

UNIT- V

PIPELINE AND VECTOR PROCESSING: Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction pipe line, RISC pipeline Vector Processing, Array Processors.

TEXT BOOKS:

1. Computer Organization and Architecture – William Stallings Sixth edition, Pearson/PHI
2. Computer System Architecture – M. Morris Mano, III edition, Pearson/PHI

REFERENCES:

1. Fundamentals of Computer Organization and Design, SivaramaDandamudi
2. Computer organization – Carl Hamacher, ZvonksVranesic, Safeazaky, V edition, McGraw Hill
3. Computer Architecture a Quantitative approach, John L. Hennessy and David A Patterson, Fourth edition Elsevier.
4. Computer Architecture Fundamentals and Principles of Computer Design, Joseph D/ Dumas II, BS Publication

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(5CS06) DESIGN AND ANALYSIS OF ALGORITHMS
(Common to CSE and IT)

Course Objectives:
- **Design** and **analysis** of algorithms is a basis of computer science. The objective of this course is to cover key techniques for designing and analyzing algorithms. The topics include (but not limited to) (1) divide and conquer, (2) dynamic programming, (3) greedy algorithms, (4) backtracking, (5) branch and bound, (6) time and space complexity analysis, , and (7) theory of NP.
- **Learning** classic algorithms
- **Devise** correct and efficient algorithms for solving a given problem
- **Validate**/Verify correctness of an algorithm.

Course outcomes:
After completion of the course the student is able to

- **Analyze** asymptotic performance of algorithms.
- **Explain** algorithmic design paradigms like Divide-and-Conquer, Dynamic programming, Greedy, Backtracking, Branch and Bound.
- **Appl**y disjoint operations on graph applications.
- **Classify** class P,NP, NP-hard and NP-complete problems.

UNIT I: Introduction

Algorithm, Psuedo code for expressing algorithms, Performance Analysis-Space complexity, Time complexity, Asymptotic Notation- Big oh notation, Omega notation, Theta notation.

Disjoint Sets- disjoint set operations, union and find algorithms, spanning trees, connected components and biconnected components.

UNIT II: Divide and conquer

General method , applications-Binary search, Quick sort, Merge sort, Strassen's matrix multiplication**.**

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

UNIT III: Dynamic Programming

General method, Principle of optimality, applications-Multistage graphs, 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- Recursive Permutation Generator ,N-queen problem, sum of subsets problem, Graph coloring, Hamiltonian cycles.

UNIT V: Branch and Bound

General method, applications - Travelling sales person problem,0/1 knapsack problem- LC Branch and Bound solution, FIFO Branch and Bound solution. **NP-Hard and NP-Complete problems**: Basic concepts, non deterministic algorithms, NP - Hard and NP Complete classes, Cook's theorem.

TEXT BOOKS:
1. Fundamentals of Computer Algorithms, Ellis Horowitz, Satraj Sahni and Rajasekharam, Galgotia publications pvt. Ltd.
2. Introduction to Algorithms, second edition, T.H.Cormen, C.E.Leiserso R.L.Rivest,and C.Stein, PHI Pvt. Ltd./ Pearson Education

REFERENCES:
1. Algorithm Design: Foundations, Analysis and Internet examples M.T.Goodrich and R.Tomassia,John wiley and sons.
2. Introduction to Design and Analysis of Algorithms A strategic approach R.C.T.Lee, S.S.Tseng, R.C.Chang and T.Tsai, Mc Graw Hill.
3. Data structures and Algorithm Analysis in C++, Allen Weiss, Second edition, Pearson education.
4. Design and Analysis of algorithms, Aho, Ullman and Hopcroft, Pearson education.
5. Algorithms Richard Johnson baugh and Marcus Schaefer, Pearson Education

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(5CS07) SOFTWARE ENGINEERING
(Common to CSE and IT)

Course Objectives:
- **Identifying** and analyzing Life cycle phases
- **Prepare** both the functional and non functional Requirements for a small software project
- **Understand** process of Requirements Engineering & Design engineering.
- **Demonstrate** an ability to apply different testing techniques.

Course Outcomes:

After completion of the course the student is able to

- **Analyze** software engineering framework activities and process models that can be tailored with appropriate methods for developing the projects
- **Understand** the Requirements Engineering Process, Design relevant software system models and validate desired user model with realistic constraints.
- **Develop** quality software products by applying software testing strategies and product metrics over the entire system life cycle
- **Define** contemporary issues of handling risk management in Software development

UNIT I: Introduction to Software Engineering:

Changing nature of Software, Software Myths. A Generic View of Process:-Software engineering-A layered technology, The Capability Maturity Model Integration (CMMI)

Process Models:-The water fall model, Incremental process models, evolutionary process models, the unified process.

UNIT II: Software Requirements:

Functional and nonfunctional requirements, User requirements, System requirements, Interface specification, the software requirements document. Requirements Engineering Process:

Feasibility studies, requirements elicitation and analysis, requirements validation, requirements management

UNIT III

System models: context models, behavior models, data models, object models, structured methods Design engineering: design process and design quality, design concepts the design model Creating an architectural design: software architecture, data design, architectural styles and patterns, architectural design

UNIT IV

Test Strategies: A strategic approach to software testing Black box and White box Testing, Validation Testing, System Testing, Product Metrics , Software Quality, Metrics for analysis model, Metrics for design model, Metrics for source

code, Metrics for testing, Metrics for maintenance Metrics for process and products. Software measurement, Metrics for software quality

UNIT V

Risk Management Reactive vs proactive risk strategies, Software risks, Risk identification, Risk projection Risk refinement, RMMM, RMMM plan Quality Management, Quality concepts, Software quality assurance, Software reviews, Formal technical reviews, Statistical Software Quality Assurance, Software reliability, ISO 9000 Quality standards

TEXT BOOKS:
1. Roger S.Pressman, Software engineering- A practitioner's Approach, McGraw-Hill International Edition, 5th edition, 2001.
2. Ian Sommerville, Software engineering, Pearson education Asia, 6th edition, 2000.

REFERENCES:
1. Pankaj Jalote- An Integrated Approach to Software Engineering,Springer Verlag, 1997.
2. James F Peters and Witold Pedryez, "Software Engineering – An Engineering Approach", John Wiley and Sons, New Delhi, 2000.
3. Ali Behforooz and Frederick J Hudson, "Software Engineering \ Fundamentals", Oxford
University Press, New Delhi, 1996.

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(5CS15) JAVA PROGRAMMING
(Common to CSE and IT)

Course Objectives:
- **Understand** fundamental concepts and constructs of Java
- **Implement** Different object-oriented Concepts in Java.
- **Develop** the concepts of Multi-Threading and IO-Streams
- **Construct** GUI models.

Course Outcomes:
After completion of the course the student is able to
- **Solve** different mathematical problems using OOP Paradigm
- **Implement** various error handling techniques in developing Applications.
- **Design and analyze** the solutions for Thread and I/O management Concepts.
- **Develop** Applications using Applet Programming and Event Handling Techniques.

UNIT-I Fundamentals of Object Oriented programming:

Object oriented paradigm - Basic concepts of Object Oriented Programming - Benefits of OOP - Applications of OOP

Java Evolution: Java Features - How Java differs from C and C++ - Java and Internet - Java and World Wide Web - Web Browsers - Hardware and Software Requirements - Java Environment. Overview of Java Language: Simple Java Program - Java Program Structure - Java Tokens- Java Statements - Implementing a Java Program - Java Virtual Machine - Constants - Variables - Data types - Scope of Variables-Symbolic Constants-Type Casting and type promotions – Operators, Operator Precedence and Associativity - Control Statements – break - continue- Arrays-Multi dimensional arrays, Wrapper Classes - Simple examples.

UNIT-II Classes:

Classes and Objects - Constructors – methods - this keyword – garbage collection- finalize - Overloading methods and constructors - Access Control-Static members – nested and inner classes – command line arguments - variable length arguments.

Inheritance: Forms of inheritance – specialization, specification, construction, extension, limitation, combination, benefits and costs of inheritance. Super uses-final - polymorphism, method overriding - dynamic method dispatch –abstract classes – exploring String class.

UNIT-III Packages and Interfaces:

Defining and accessing a package – understanding CLASSPATH – access protection importing packages – Interfaces - Defining and implementing an interface, Applying interfaces, Variables in interfaces and extended interfaces. Exploring java.lang and java.util packages.

Exception Handling-Fundamentals, usage of try, catch, multiple catch clauses, throw, throws and finally. Java Built in Exceptions and creating own exception subclasses.

UNIT – IV Multithreaded Programming:

Java Thread life cycle model – Thread creation - Thread Exceptions - Thread Priority – Synchronization - Messaging - Runnable Interface - Interthread Communication - Deadlock - Suspending, Resuming and stopping threads.

I/O Streams: File – Streams – Advantages - The stream classes – Byte streams – Character streams.

UNIT – V Applet Programming:

How Applets differ from Applications - Applet Life Cycle - Creating an Applet - Running the Applet- Designing a Webpage - Applet Tag - Adding Applet to HTML file - More about Applet Tag - Passing parameters to Applets - Aligning the display.

Event handling: basics of event handling, Event classes, Event Listeners, delegation event model, handling mouse and keyboard events, adapter classes, AWT Class hierarchy - AWT Controls - Layout Managers and Menus, limitations of AWT.

TEXT BOOKS:
1. The Complete Reference Java J2SE 5th Edition, Herbert Schildt, TMH Publishing Company Ltd, NewDelhi.
2. Big Java 2nd Edition, Cay Horstmann, John Wiley and Sons

REFERENCES:
1. Java How to Program, Sixth Edition, H.M.Dietel and P.J.Dietel, Pearson Education/PHI
2. Core Java 2, Vol 1, Fundamentals, Cay.S.Horstmann and Gary Cornell, Seventh Edition, Pearson Education.
3. Core Java 2, Vol 2, Advanced Features, Cay.S.Horstmann and Gary Cornell, Seventh Edition, Pearson Education.

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(5CS52) DATA BASE MANAGEMENT SYSTEMS LABORATORY
(Common to CSE and IT)

Course Objectives:

- **Provide** a strong formal foundation in database concepts and relational model.
- **Familiarize** the students with the nuances of database environments towards data-process oriented framework
- **Present** SQL and procedural interfaces of SQL comprehensively
- **Introduction** to systematic database design approaches covering conceptual design, logical design and an overview of physical design
- **Present** the concepts and techniques relating to query processing by SQL engines

Course outcomes:

After completion of the course the student is able to:

- **Understand** the given scenario, design it through ER model and normalize the schema
- **Make** use of basics of SQL and construct queries using SQL in database creation and interaction.
- **Apply** PL/SQL for processing database
- **Develop** the solutions using database concepts for real time requirements.

Scenario: (Roadway Travels)

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

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

- Reservations and Ticketing
- Cancellations

Reservations & 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 booking office.

In the process of computerization of Roadway Travelsyou 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 using SQL to retrieve the data from the 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 supposed 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 problem carefully and come up with the entities in it. Identify 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 other keys like candidate keys, partial keys, if any.

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 cardinalities 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.

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

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 relational database tables to minimize duplication of information and, in so doing, to safeguard the database against certain types of logical or structural problems, namely data anomalies. 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 the table is updated, leading to a loss 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.

Experiment 5: Practicing DDL and DML commands

Create all the normalized tables that are identified in Experiment 4.

Insert data into the above tables.

Experiment 6: Querying

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

Practice the following Queries:

1. Display 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 V 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 7 Querying (continued...)

You are going to practice queries using Aggregate functions (COUNT, SUM, AVG, and MAX and MIN), GROUP BY, HAVING and Creation and dropping 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 9WO1 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 seats.
7. Display the details of passengers who travelled within the last 3 months.
8. Create a view for the details of passengers who cancelled their tickets.

Experiment 8: Create tables for the following schema.

Student(snum: integer, sname: string, major: string, level: string, age: integer)

Class(name: string, meets at: time, room: string, fid: integer)

Enrolled(snum: integer, cname: string)

Faculty(fid: integer, fname: string, deptid: integer)

Experiment 9: Querying

1. Find the names of all Juniors (Level = JR) who are enrolled in a class taught by I. Teacher.

2. Find the age of the oldest student who is either a History major or is enrolled in a course taught by I. Teacher.
3. Find the names of all classes that either meet in room R128 or have 5 or more students enrolled.
4. Find the names of all students who are enrolled in two classes that meet at the same time.
5. Find the names of faculty members who teach in every room in which some class is taught.
6. Find the names of faculty members for whom the combined enrollment of the courses that they teach is less than 5
7. Print the Level and the average age of students for that Level, for each Level.
8. Print the Level and the average age of students for that Level, for all Levels except JR.
9. Print the Level and the average age of students for that Level, whose average age is greater than 20.
10. Find the names of students who are enrolled in the maximum number of classes.
11. Find the names of students who are not enrolled in any class.
12. Count the number of junior level students.
13. Display all the students whose names starts with the letter "p".
14. Display all the teachers whose names contain letter 'a' or 'l' in their names.

Experiment 10: PL/SQL Programs
1. Program to find sum of first 'n' natural no.s
2. Program to find reverse of a number
3. Insert the values of areas of a circle into a table called areas taking radius values from 2 to 8.

Experiment 11: 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.Practice the following programs using cursors.
1. Write a cursor program to retrieve the details of all students using cursors (Use students table in experiment 9)
2. Write a PL/SQL block to update the level of students from JL to "junior Level" and SL to "senior Level"and insert a record in newlevel table.
3. Write a cursor program to display the details of Senior Level students .

Experiment 12: Procedures
In this session you are going to learn Creation of stored procedure, Execution of procedure and modification of procedure. Practice procedures using the above database.

Experiment 13: 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.

TEXT BOOKS
1. Introduction to SQL,Rick F.Vander Lans,Pearson education.
2. Oracle PL/SQL, B.Rosenzweig and E.Silvestrova,Pearsoneducation

REFERENCES:
1. Oracle PL/SQL Programming,Steven Feuerstein,SPD.
2. SQL & PL/SQL for Oracle 10g,Black Book, Dr.P.S.Deshpande,Dream Tech.
3. Oracle Database I I g PL/SQL Programming,M.Laughlin.TMH.
4. SQL Fundamentals,! J.Patrick,Pearson Education.

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(5CS53) JAVA PROGRAMMING AND DESIGN AND ANALYSIS OF ALGORITHMS LABORATORY
(Common to CSE and IT)

Course Objectives:
- **Write** the Java Programs related to classes and methods.
- **Build** Solutions for exceptions and basic I/O streams.
- **Develop** solid Java programming skills and the ability to design simple case studies.
- **Implement** the algorithms of different Algorithm Designing Techniques.

Course Outcomes:
Upon completion of this course, student should be able to:
- **Design and Analyze** programs to solve real world problems based on object-oriented principles.
- **Implement** concurrent programming using Multithreading and Stream concepts
- **Implement** GUI Applications using Applet Programming, Event Handling Techniques.
- **Develop** Efficient Programs for Linear and Non Linear Data Structures with suitable Algorithm designing.

Week 1:
1. Write a java program to print all the twin primes below 1000. (A twin prime is a prime number that differs from another prime number by two. (3, 5), (5, 7), (11, 13), (17, 19), (29, 31), (41, 43), .821, 823), etc. .
2. Write a java program to implement matrix multiplication. (Take the input from keyboard).
3. Write a Java program for sorting a given list of names in ascending order.

Week 2:
4. The Fibonacci sequence is defined by the following rule. The first two values in the sequence are 1 and 1. Every subsequent value is the run of the two values preceding it. Write a Java program that uses both recursive and non-recursive functions to print the nth value in the Fibonacci sequence.
5. Write a Java program that prompts the user for an integer and then prints out all prime numbers up to that integer.

Week 3:
6. Write a Java program that checks whether a given string is a palindrome or not. Ex: MALAYALAM is a palindrome.

7. Write a Java program that prints all real solutions to the quadratic equation $ax2 +$ $bx + c = 0$. Read in a, b, c and use the quadratic formula. If the discriminant $b2 - 4ac$ is negative, display a message stating that there are no real solutions.
8. Write a java program to implement constructor overloading.

Week 4:
9. Write a java program to implement variable length arguments
10. Write a java program to implement the use of inner classes.

Week 5:
11. Write a java program to implement dynamic method dispatch.
12. Write a Java program that illustrates how run time polymorphism is achieved.

Week 6:
13. Write a java program that illustrates the following
    a. Handling predefined exceptions b. Handling user defined exceptions
14. Write a java program that illustrates the following
    - Creation of simple package.
    - Accessing a package.
    - Implementing interfaces.

Week 7:
15. Write a Java program for creating multiple threads
    a. Using Thread class   b. Using Runnable interface
16. Write a Java program for creating multiple threads. The main method sleeps for 10 seconds at the end of which all the threads should be terminated.

Week 8:
17. Write a Java program that correctly implements producer consumer problem using the concept of inter thread communication.

Week 9:
18. Write a Java program that implements a simple client/server application. The client sends data to a server. The server receives the data, uses it to produce a result, and then sends the result back to the client. The client displays the result on the console. For ex: The client sends a Celsius value, and the result produced by the server is the Fahrenheit value.
19. Write a Java program that reads on file name from the user then displays information about whether the file exists, whether the file is readable, whether the file is writable, the contents of file and the length of the file in bytes.

Week 10:

20. Write a Java program that: (Use classes and objects)
    a) Implements stack ADT.   b) Converts infix expression into Prefix form.

21. Write an applet that displays a simple message.

Week 11:
22. Write a java program for passing parameters to applets
23. 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.

Week 12:
24. Write a Java program for handling mouse and keyboard events.

Week 13:
25. Write a Java program for handling menu events.

Week 14:
26. Find Minimum cost spanning tree using Prims &Kruskals Algorithms.
27. Write a program to find optimal Binary search tree.

Week 15:
28. Implement n-Queens and Hamiltonian Cycle Problem Using BackTracking.

TEXT BOOKS:
1. The Complete Reference Java J2SE 5th Edition, Herbert Schildt, TMH Publishing Company Ltd, New Delhi.
2. Big Java 2nd Edition, Cay Horstmann, John Wiley and Sons

REFERENCES:
1. Java How to Program, Sixth Edition, H.M.Dietel and P.J.Dietel, Pearson Education/PHI
2. Core Java 2, Vol 1, Fundamentals, Cay.S.Horstmann and Gary Cornell, Seventh Edition, Pearson Education.
3. Core Java 2, Vol 2, Advanced Features, Cay.S.Horstmann and Gary Cornell, Seventh Edition, Pearson Education

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(5BS04) GENDER SENSITIZATION
(Common to All Branches)

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

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

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

UNIT-II

GENDER AND BIOLOGY:

Missing Women: Sex Selection and Its Consequences (Towards a word of Equals: Unit-4)

Declining Sex Ratio. Demographic Consequences.

Gender Spectrum: Beyond the Binary (Towards a word of Equals: Unit-10)

Two or Many? Struggles with Discrimination.

Additional Reading: Our Bodies, Our health (Towards a word of Equals: Unit-13)

UNIT-III

GENDER AND LABOUR:

Housework: the Invisible Labour (Towards a word of Equals: Unit-3)

"My Mother doesn't Work.""Share the Load."

Women's Work: Its Politics and Economics (Towards a word of Equals: Unit-7)

Fact and Fiction. Unrecognized and Unaccounted work. Further Reading: Wages and Conditions of Work.

UNIT-IV

ISSUES OF VOILENCE:

Sexual Harassment: Say No! (Towards a word of Equals: Unit-6)

Sexual Harassment: not Eve-Teasing-Coping with Everyday Harassment-Further Reading: "Chupulu".

Domestic Violence: Speaking Out (Towards a word of Equals: Unit-8)

Is Home a Safe Place?-When Women Unite [Film]. Rebuilding Lives. Further Reading: New Forums for Justice.

Thinking about Sexual Violence (Towards a word of Equals: Unit-11)

Blaming the Victim-"I fought for my Life..."- Further reading: The Caste Face of Violence.

UNIT-V

GENDER AND STUDIES:

Knowledge: Through the Lens of Gender (Towards a word of Equals: Unit-5)

Point of View. Gender and the Structure of Knowledge. Further Reading: Unacknowledged Women Artists of Telangana.

Whose History? Questions for Historians and Others (Towards a word of Equals: Unit-9)

Reclaiming a Past. Writing Other Histories. Further Reading. Missing Pages from Modern Telangana History.

Essential Reading: all the Units in the Textbook, "Towards a word of Equals: A Bilingual Textbook on Gender" written by A. Suneetha, Uma Bhrugubanda, Duggirala Vasanta, Rama Malkote, Vasudha Nagaraj, Asma rasheed, Gogu Shyamala, Deepa Sreenivas and Susie Tharu.

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

REFERENCES:

1. Sen, Amartya. "More than One Million Women are Missing." New York Review of Books 37.20 (20 December 1990). Print. 'We Were Making History...' Life Stories of Women in the Telangana People's Struggle. New Delhi: Kali for Women, 1989.
2. Tripti Lahiri. "By the Numbers: Where Indian Women Work." Women's Studies Journal (14 November 2012) Available online at : http://blogs.wsj.com/India real time/2012/11/14/by-the-numbers-where-India-women-work/>
3. K. Satyanarayana and Susie tharu(Ed) Steel Nibs are Sprouting: New Dalit Writing from South India Dossier 2: Telugu and Kannada http://harpercollins.co.in/BookDetail.asp?Book Code =3732
4. Vimala . "Vantillu (The Kitchen)". Women Writing in India: 600 BC to the Present. Volume II: The 20th Century. Ed. Susie Tharu and K. Lalita. Delhi: Oxford University Press, 1995. 599-601.
5. Shatrughna, Veena et al. Women's Work and its Impact on Child Health and Nutrition, Hyderabad, National Institute of Nutrition, Indian Council of Medical Research. 1993.
6. Stree Shakti Sanghatana. " We Were Making History.....'Life Stories of Women in the Telangana People's Struggle. New Delhi: Kali for Women, 1989.
7. Menon, Nivedita. Seeing like a Feminist. New Delhi: Zubaan-Penguin Books, 2012.
8. Jayaprabha, A. "Chupulu (Stares)", Women Writing in India: 600 BC to the Present. Volume II: The 20th Century. Ed. Susie Tharu and K. Lalita. Delhi: Oxford University Press, 1995. 596-597.
9. Javeed, Shayan and Anupam Manuhaar. "Women and wage Discrimination in India: A Critical Analysis."International Journal of Humanities and Social Science Invention 2.4 (2013).
10. Gautam , Liela and Gita Ramaswamy. "A 'conversation' between a Daughter and a Mother."Broadsheet on Contemporary Politics, Special issue on Sexuality and Harassment: gender Politics on Campus Today. Ed. Madhumeeta Sinha and Asma rasheed. Hyderabad: Anveshi Research Center for Women's Studies, 2014.
11. Abdulali Sohaila "I Fought For My Life ...and Won. "Available online at: http://www.thealternative.in/lifestyle/i-fought-for-my-lifeand-won-sohaila-abdulal/
12. Jeganathan Pradeep, Partha Chatterjee (Ed). "Community, Gender and Violence Subaltern Studies XI' Permanent Black and ravi Dayal Publishers, New Delhi, 2000.
13. K. Kapadia. The Violence of Development: the Politics of Identity, Gender and Social Inequalities in India. London: Zed Books, 2002.
14. S. Benhabib. Situating the Self: Gender, Community, and Postmodernism in Contemporary Ethics, London: Routledge, 1992.
15. Virginia Woolf. A Room of One's Own. Oxford: Black Swan. 1992.

16. T. Banuri and M. Mahmood, Just Development: Beyond Adjustment with a Human Face, Karachi: Oxford University Press, 1997

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III Year B.Tech CSE – I Sem	L	T/P/D	C
	3	0	3

(5IT08) OPERATING SYSTEMS
(Common to ECE, CSE, EIE and IT)

Course Objectives:

- **Analyze** the tradeoffs inherent in operating system design.
- **Summarize** various approaches to solve the problem of process concurrency in an operating system.
- **Evaluate** the memory usage trade-offs in terms of size (main memory, auxiliary memory) and processor speed.
- **Understand** disk storage strategies and file strategies with protection and security issues.

Course Outcomes:

After completion of the course the student is able to:

- **Understand** System calls and evaluate process scheduling criteria of OS
- **Develop** procedures for process synchronization and scheduling services of an OS
- **Describe** the role of paging, segmentation, and virtual memory in operating systems.
- **Distinguish** disk access, file systems supported by an OS and extend operating systems protection& security aspects.

UNIT I
Computer System and Operating System Overview: Overview of Computer System hardware, Operating System Objectives and functions, Evolution of operating System, Example Systems. Operating System Services, System Calls, System Programs.
Process Management: Process Description, Process Control Block, Process States
UNIT II
CPU Scheduling: Basic Concepts, Scheduling Criteria, Scheduling Algorithms and evaluation, Threads Overview, Threading issues.
Concurrency: Cooperating Processes, Inter-process Communication, Principles of Concurrency, Mutual Exclusion, Software and hardware approaches, Semaphores, Monitors, Message Passing, Classic problems of synchronization.
UNIT III

Principles of deadlock: System Model, Deadlock Characterization, Methods for handling Deadlocks, Deadlock Prevention, Deadlock avoidance, Deadlock detection, Recovery from Deadlocks, Dining philosopher's problem.

UNIT IV
Memory Management: Basic concepts, Swapping, Contiguous memory allocation, Paging, Segmentation, Virtual memory, Demand paging, Page-replacement algorithms, Thrashing.
Secondary storage structure: Disk structure; Disk scheduling, Disk management, Swap-space Management, RAID structure, Stable-storage Implementation, Tertiary-Storage Structure

UNIT V
File Management: File system-File concepts, Access methods, Directory structure, File system mounting and File sharing and Protection. Implementing file systems-File system structure and implementation, Directory implementation, Allocation methods, Free-space management, Efficiency and performance
Protection &Security: Protection mechanisms, OS Security issues, threats, Intruders, Viruses,
Case studies: windows, Unix, Linux.

TEXT BOOKS:
1. Operating System Principles- Abraham Silberchatz, Peter B. Galvin, Greg Gagne 7th Edition, John Wiley.
2. Operating Systems - Internal and Design Principles, Stallings, Fifth Edition-2005, Pearson education/PHI

REFERENCES:
1. Operating System A Design Approach-Crowley,TMH.
2. Modern Operating Systems, Andrew S Tanenbaum 2nd edition Pearson/PHI.
3. An Introduction to Operating Systems, Concepts and Practice, PHI, 2003 - Pramod Chandra P. Bhat.
4. Operating Systems – A concept based approach – DM Dhamdhere – 2nd Edition TMH

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III Year B.Tech CSE – I Sem   L   T/P/D   C
                                                                                3   0   3

(5CS08) OBJECT ORIENTED ANALYSIS AND DESIGN
(Common to CSE and IT)

Course Objectives:
- **Identify** the need and process of modeling a software intensive system using the artifacts Unified Modeling Language
- **Understand** the CRC (structural) approach for a given case study
- **Identify** the various behaviors that supports the CRC (structural) approach
- **Explore** various diagrams with advanced behavioral elements that enables the deployment of a model for a given case study

Course Outcomes: After completion of the course the student is able to:
- **Relate** object-oriented concepts representation through artifacts of UML.
- **Build** classes, their relationships and collaborations (CRC) for given case study.
- **Choose** the order of activities carried out for each behavior exhibited by the system
- **Analyze and design** all UML diagrams and their advanced behavioral concepts to deploy the model for given case study

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, Common modeling techniques.

UNIT-III
Class and Object Diagrams: Terms, concepts, modeling techniques for class and object diagrams, Common modeling techniques.
Basic Behavioral Modeling-I: Interactions, Interaction diagrams, Common modeling techniques

UNIT-IV Basic Behavioral Modeling-II: Use cases, Use case diagrams, Activity diagrams, Common modeling techniques.
Advanced Behavioral Modeling: Events and signals, state machines, processes and Threads, time and space, state chart diagrams, Common modeling techniques.

UNIT-V Architectural Modeling: Component, Deployment, Component diagrams, Deployment diagrams, Common modeling techniques, Case Studies
TEXT BOOKS:

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

REFERENCES:

1. Meilir Page-Jones: Fundamentals of Object Oriented Design in UML, Pearson Education.

2. Atul Kahate: Object Oriented Analysis & Design, The McGraw-Hill.\

3. Mark Priestley: Practical Object-Oriented Design with UML,TATA McGrawHill

4. Appling UML and Patterns: An introduction to Object – Oriented Analysis and Design and Unified Process, Craig Larman, Pearson Education.

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III Year B.Tech CSE – I Sem	L	T/P/D	C
	3	0	3

(5IT06) COMPUTER NETWORKS
(Common to ECE, CSE, EIE and IT)

Course Objectives:
- **Analyze** the terminology and concepts of the OSI and TCP-IP reference model.
- **Examine** various error correction and error detection methods.
- **Learn** addressing mechanisms efficiently to build a network.
- **Understand** and **predict** the Pros and cons of existing protocols and its working procedures.

Course Outcomes:
After completion of the course the student is able to:

- **Understand** modern network architectures from a design and performance perspective
- **Illustrate** the various flow and error control techniques and identify the best method for efficient data transmission and applying various routing algorithms for a network and determine the optimal path.
- **Interpret** QoS improving techniques, analysis of various Congestion Control mechanisms and implementation of TCP and UDP
- **Analyze** the functions of various Application Layer protocols

UNIT- I
Data Communications: Components – Direction of Data flow – Networks – Components and Categories – Types of Connections – Topologies –Protocols and Standards – ISO / OSI model, Example Networks such as ATM, Frame Relay, ISDN
Physical layer: Transmission modes, Multiplexing, Transmission Media, Switching, Circuit Switched Networks, Datagram Networks, Virtual Circuit Networks.

UNIT- II
Data link layer: Introduction, Framing, and Error – Detection and Correction – Parity – LRC – CRC Hamming code, Flow and Error Control, Noiseless Channels, Noisy Channels, HDLC, Point to Point Protocols.
Medium Access sub layer: ALOHA, CSMA/CD, LAN – Ethernet IEEE 802.3, IEEE 802.5 - IEEE 802.11, Random access, Controlled access, Channelization.

UNIT -III

Network layer: Logical Addressing, Internetworking, Tunneling, Address mapping, ICMP, IGMP, Forwarding, Uni-Cast Routing Protocols, Multicast Routing Protocols.

UNIT- IV

Transport Layer: Process to Process Delivery, UDP and TCP protocols, Data Traffic, Congestion, Congestion Control, QoS, Integrated Services, Differentiated Services, QoS in Switched Networks.

UNIT-V

Application Layer: Domain name space, DNS in internet, electronic mail, SMTP, FTP, WWW, HTTP, SNMP.

TEXT BOOKS:
1. Data Communications and Networking – Behrouz A. Forouzan , Fourth Edition TMH,2006.
2. Computer Networks — Andrew S Tanenbaum, 4th Edition. Pearson Education/PHI.

REFERENCES
1. Data communications and Computer Networks, P.C .Gupta, PHI.
2. An Engineering Approach to Computer Networks-S.Keshav, 2nd Edition, Pearson Education.
3. Understanding communications and Networks, 3rd Edition, W.A. Shay, Cengage Learning.
4. Computer Networking: A Top-Down Approach Featuring the Internet. James F. Kurose&Keith W. Ross,3rd Edition, Pearson Education.
5. "Data and Computer Communication", William Stallings, Sixth Edition, Pearson Education, 2000.

III Year B.Tech CSE – I Sem	**L**	**T/P/D**	**C**
	3	**1**	**4**

(5CS09) COMPILER DESIGN
(Common to CSE and IT)

Course Objectives:

- **Illustrating** different phases of compilation.
- **Describe** the steps and algorithms used by language translators and features.
- **Enumerating** top down and bottom up parsing techniques used in compilation process.
- **Learning** the effectiveness of optimization.
- **Introducing** the syntax directed translation and type checking

Course Outcomes:
After completion of the course the student is able to**:**

- **Illustrate** the phases of compilation and develop the lexical analyzer
- **Make** use of parsing techniques in determining the syntactical structure of programming language constructs
- **Translate** the programming language constructs into Intermediate representations
- **Apply** code optimization and code generation techniques on intermediate code in generating target code.

UNIT–I
Overview of Compilation: Phases of Compilation – Lexical Analysis, Regular Grammar and regular expression for common programming language features, pass and Phases of translation, interpretation, bootstrapping, data structures in compilation – LEX lexical analyzer generator.

UNIT–II
Top down Parsing: Context free grammars, Top down parsing – Backtracking, LL (1), recursive descent parsing, Predictive parsing, Preprocessing steps required for predictive parsing.
Bottom up parsing: Shift Reduce parsing, LR and LALR parsing, Error recovery in parsing, handling ambiguous grammar, YACC – automatic parser generator.

UNIT–III
Syntax Directed Translation: Syntax Directed Definitions, Evaluation orders for SDD's, Applications of SDD.
Intermediate Code Generation - variants of syntax tree, Three address codes.
Run-Time Environments: Storage Organization, Stack allocation of Space, Access to Nonlocal Data on the stack, Heap Management.

UNIT–IV

Code optimization: The Principal sources of optimization, Optimization of basic blocks, Loops in flow graphs, DAG representation of basic blocks, peephole optimization Introduction to global data flow analysis, Iterative solution of data-flow equations, code improving transformations.

UNIT–V

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

TEXTBOOKS
1. Compilers Principles, Techniques & Tools – Second Edition – Alfred V. Aho, Monica S. Lam, Ravi Sethi and Jeffery D. Ullman- Pearson Addison Wesley 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.
5. Systems programming and operating systems – D.M Dhamdhere ,2nd edition,tata McGraw-hill publishing comp pvltd.

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III Year B.Tech I Sem	L	T/P/D	C
(Open Elective – I)	3	0	3

(5CE71) DISASTER MANAGEMENT
Course Objectives

Student will be able to

- Understand the difference between a hazard and disaster
- Know about various disasters and their impacts
- Understand Different approaches of disaster risk reduction
- Understand Disaster risks in India

Course Outcomes

After completion of the course the student is able to

- Acquire the knowledge disaster Management
- Understand the vulnerability of ecosystem and infrastructure due to a disaster
- Acquire the knowledge of Disaster Management Phases
- Understand the hazard and vulnerability profile of India

UNIT-1

Introduction to disaster

Concepts and definitions (Disaster, Hazard, Vulnerability, Resilience, Risks)

UNIT-II

Disasters: Classifications, Causes, Impacts (including social, economic, political, environment, health, psychosocial, etc.)

Differential impacts-in terms of caste, class, gender, age, location, disability Global trends in disasters. Urban disaster, pandemics, complex emergencies, Climate change

UNIT-III

Approaches to disaster Risk reduction

Disaster cycle-its analysis, phase, Culture of safety, prevention, mitigation and preparedness, community based DRR, Structural measures, roles and responsibilities of community. Panchayati Raj Institutions/Urban Local Bodies (PRIs/ULBs), states, center and other stake-holders.

UNIT-IV

Inter-relationship between Disaster and Development

Factors affecting Vulnerabilities, differential impacts, impact of development projects such as dams, embankments, change in land-use etc. Climate change Adaption. Relevance of indigenous knowledge, appropriate technology and local resources.

UNIT-V

Disaster Risk Management in India

Hazard and vulnerability profile of IndiaComponents of Disaster relief: Water, food, sanitation, shelter, health, waste managementInstitutional arrangements (Mitigation, Response and Preparedness, DM Act Policy, Other related polices, plan, programmes and legislation)

Project Work :(Field Work, Case Studies):

The project/fieldwork is meant for students to understand vulnerabilities and to work on reducing disaster risks and to build a culture of safety. Projects must be conceived creatively based on the geographic location and hazard.

REFERENCES:

1. Alexander David, Introduction in 'Confronting Catastrophe', oxford University press, 2000

2. Andharia J. Vulnerability in disaster Discourse, JTCDM, Tata Institute of Social Sciences working paper no.8, 2008

3. Blaikie, P, Cannon T, Davis I, Wisner B 1997. At Risk Natural Hazards, Peoples' Vulnerability and Disaster, Rutledge.

4. Coppola P Damon, 2007. Introduction to International Disaster Management.

5. Carter, Nick 1991.Disaster Management: A Disaster Manager's Handbook. Asian Development Bank, Manila Philippines.

6. Cuny,F.1983. Development and Disasters, Oxford University Press

7. Govt.of India; Disaster Management Act 2005,Government of India, New Delhi.

III Year B.Tech CSE – I sem	L	T/P/D	C
Open Elective1	**3**	**0**	**3**

(5EE71) RENEWABLE ENERGY TECHNOLGIES

Course Objectives:

• To provide necessary knowledge about the modeling, design and analysis of various PV systems

• To show that PV is an economically viable, environmentally sustainable alternative to the world's energy supplies

• To understand the power conditioning of PV and WEC system's power output

Course Outcomes:

After Completion of the course the student is able to

• Model, analyze and design various photovoltaic systems

• Know the feasibility of various storage systems

• Design efficient stand alone and grid connected PV and WEC power systems

UNIT I

Introduction to photovoltaic (pv) systems:

Historical development of PV systems- Overview of PV usage in the world Photovoltaic effect-conversion of solar energy into electrical energy.

Solar cells and arrays

Behavior of solar cells-basic structure and characteristics: types - equivalent circuit-modeling of solar cells including the effects of temperature, irradiation and series/shunt resistances on the open-circuit voltage and short-circuit currentSolar cell arrays- PV modules-PV generators- shadow effects and bypass diodes- hot spot problem in a PV module and safe operating area- Terrestrial PV module modelingInterfacing PV modules with different loads.

UNIT II

Energy storage alternatives for pv systems

Methods of Energy storage –Pumped Energy Storage – Compressed Energy Storage – Storage batteries- lead-acid- nickel cadmium-nickel-metal-hydride and lithium type batteries. Small storage systems employing ultra capacitors- properties- modeling of batteries.

UNIT-III

Wind Energy Conversion systems (WECS)

Basic Principle of WECS, Nature of Wind, Wind survey in india, Components of WECS, Power Vs Speed, TSR, Maximum Power operation, WECS- Trade off- Control Requirements, Basic Principle of Induction generator for WECS

UNIT-IV

Converters for PV and Wind

AC-DC Rectifier, DC-AC inverter (Basic operation) Grid interface voltage and frequency control, Battery charger (Basic operation)

Power conditioning of PV systems

Array Design, Sun Tracking, Single axis-Dual Axis, Maximum Power point Tracking- PO method- IC method

UNIT-V

Stand Alone systems:

PV Stand Alone, Electric Vehicle, Wind stand Alone, Standalone Hybrid systems- Hybrid with diesel, Hybrid with Fuel cell- Mode controller- Load sharing, systems sizing, wind farm sizing- Power and Energy estimates, , Residential systems, PV water pumping, PV powered lighting-

TEXT BOOKS

1. Patel M. R., "Wind and Solar Power Systems Design, Analysis, and Operation", CRC Press, New York, 2nd Edition, 2005
2. Goetzberger, Hoffmann V. U., "Photovoltaic Solar Energy Generation", SpringerVerlag,Berlin, 2005.

REFERENCES

1.   Komp R.J., "Practical Photovoltaics: Electricity from solar cells", Aatec Publications,Michigan, 3rd Edition, 2001.
2. Castaner L., Silvestre S., "Modeling Photovoltaic Systems Using PSpice", John Wiley & Sons, England, 2002.
3. Jenny Nelson, "The physics of solar cells", Imperial College Press, London, 2004.

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III Year B. Tech CSE – I Sem	**L**	**T/P/D**	**C**
Open Elective - 1	**3**	**0**	**3**

(5ME71) DIGITAL FABRICATION

Course Objectives:

- Understand the need of digital fabrication
- Understand about Two dimensional layer by layer techniques
- Know about extrusion based systems, post processing and the software issues involved in digital fabrication
- Know the applications of digital fabrication

Learning Outcomes:

After completion of the course the student is able to

- Understand the importance of digital fabrication
- Identify different techniques involved in two dimensional layering
- Analyze the software issues involved in digital fabrication and know about extrusion based systems and post processing
- Apply the knowledge gained in the digital fabrication

UNIT I:

Introduction to Additive Manufacturing: Introduction to AM, AM evolution, Classification of Additive Manufacturing, Distinction between AM & CNC Machining, Advantages of AM

UNIT II:

Two- Dimensional Layer- by Layer Techniques: Stereolithography (SL), Solid Foil Polymerization (SFP), Selective Laser Sintering (SLS), Selective Powder Building (SPB), Ballistic Particle Manufacturing (PM).

UNIT III:

Extrusion Based Systems: Introduction, basic principles, Fused Deposition Modeling, Materials, Limitations of FDM
Post Processing: Introduction, Support Material Removal, Surface Texture Improvements, Accuracy Improvements, Aesthetic Improvements.

UNIT IV:

Software Issues for Additive Manufacturing: Introduction, Preparation of CAD Models: The STL file, Problems with STL files, STL file manipulation, Beyond the STL file, Additional software to assist AM

UNIT V:

AM Applications

Applications in design, Applications in Engineering Analysis and Planning

Medical Applications: Customized Implants and Prosthesis

Aerospace applications and Automotive Applications

Other Applications: Jewelry Industry, Coin Industry, Tableware Industry.

Text Books:

1. Ian Gibson, David W Rosen, Brent Stucker, "Additive Manufacturing Technologies: Rapid Prototyping to Direct Digital Manufacturing", Springer 2010.

2. Chuaa Chee Kai, Leong Kah Fai, "Rapid Prototyping: Principles & Applications", World Scientific, 2010.

References:

1. Ali K.Karmani, Emand Abouel Nasr, "Rapid Prototyping: Theory and Practice", Springer 2006.

2. Andreas Gebhardt, Understanding Additive Manufacture: Rapid Prototyping, Rapid Tooling and Rapid Manufacture, Hanser Publishers, 2013.

3. Hopkinson, N.Haque, and Dickens Rapid Manufacturing: Advanced Research in Virtual and Rapid Prototyping, Taylor and Francis, 2007.

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III Year B. Tech CSE– I Sem	L	T/P/D	C
Open Elective - 1	3	0	3

(5EC71) PRINCIPLES OF COMMUNICATIONS
(Qualitative Analysis only)

Course Objective:
- To make students understand different types of communication.
- To make students understand different modulation technique
- To make students understand basics of wireless communications.
- To make students understand basics of cellular communications.

Course Outcome:
After completion of the course the student is able to:
- Analyze the techniques used for signal modulation and demodulation.
- Distinguish the need for PPM, PWM, Multiplexing.
- Learn basics of wireless networks.
- Understand the fundamental concepts of Cellular & Mobile communications

UNIT I
Introduction
Block diagram of Electrical communication system, Radio communication, Types of communications: Analog, pulse and digital.
Analog Modulation
Need for modulation, Types of Analog modulation, Amplitude Modulation, Angle Modulation: Frequency & Phase modulations. Generation and Demodulation techniques.Advantages of FM over AM, Bandwidth consideration, Narrow band and Wide band FM, Comparison of FM & PM.

UNIT II
Pulse Modulations
Sampling, Nyquist rate of sampling, Sampling theorem for Band limited signals, PAM, regeneration of base band signal, PWM and PPM, Time Divison Multiplexing, Frequency Divison Multiplexing, Asynchronous Multiplexing.

UNIT III
Digital Communication
Advantages, Block diagram of PCM, Quantization, effect of quantization, quantization error, Base band digital signal, DM, ADM, ADPCM and comparison. Digital Modulation : ASK, FSK, PSK, DPSK, QPSK demodulation, offset and non-offset QPSK, coherent and incoherent reception, Modems.

UNIT IV
Introduction to Wireless Networking
Introduction, Difference between wireless and fixed telephone networks, Development of wireless networks, Traffic routing in wireless networks.

UNIT V
Cellular Mobile Radio Systems
Introduction to Cellular Mobile System, concept of frequency reuse, Performance criteria, uniqueness of mobile radio environment, operation of cellular systems, Hexagonal shaped cells, Analog and Digital Cellular systems. Cell splitting.

Handoffs and Dropped Calls
Handoff, dropped calls and cell splitting, types of handoff, handoff initiation, delaying handoff, forced handoff, mobile assisted handoff, Intersystem handoff, micro cells, vehicle locating methods, dropped call rates and their evaluation.

TEXT BOOKS
1. Communication Systems Analog and Digital – R.P. Singh and SD Sapre, TMH, 20th reprint, 2004.
2. Principles of Communications – H. Taub and D. Schilling, TMH, 2003.
3. Wireless Communications, Principles, Practice – Theodore, S. Rappaport, 2nd Ed., 2002,PHI.

REFERENCES:

1. Electronic Communication Systems – Kennedy and Davis, TMH, 4th edition, 2004.
2. Communication Systems Engineering – John. G. Proakis and Masoud Salehi, PHI, 2ndEd.   2004.
3. Wireless Communication and Networking – William Stallings, 2003, PHI.

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III Year B.Tech CSE – I Sem	**L**	**T/P/D**	**C**
Open Elective - 1	**3**	**0**	**3**

(5CS71)OBJECT ORIENTED PROGRAMMING THROUGH JAVA

Course Objectives:
- **Implement** Different object-oriented Concepts in Java.
- **Develop** the concepts of Multi-Threading and IO-Streams
- **Construct** GUI models.

Course Outcomes:
After completion of the course the student is able to:
- **Solve** different mathematical problems using OOP Paradigm
- **Choose** packages, interfaces, exceptional handling techniques for developing Applications
- **Design and Analyze** the solutions for Thread and I/O management Concepts.
- **Develop** Applications using Applet Programming and Event Handling Techniques.

UNIT-I Fundamentals of Object Oriented programming:
Object oriented paradigm - Basic concepts of Object Oriented Programming - Benefits of OOP - Applications of OOP

Java Evolution: Java Features - How Java differs from C and C++ - Java and Internet - Java and World Wide Web - Web Browsers - Hardware and Software Requirements - Java Environment. Overview of Java Language: Simple Java Program - Java Program Structure - Java Tokens- Java Statements - Implementing a Java Program - Java Virtual Machine - Constants - Variables - Data types - Scope of Variables-Symbolic Constants-Type Casting and type promotions – Operators, Operator Precedence and Associativity - Control Statements – break - continue- Arrays-Multi dimensional arrays, Wrapper Classes - Simple examples.

UNIT-II Classes:
Classes and Objects - Constructors – methods - this keyword – garbage collection- finalize - Overloading methods and constructors - Access Control- Static members – nested and inner classes – command line arguments - variable length arguments.

Inheritance: Forms of inheritance – specialization, specification, construction, extension, limitation, combination, benefits and costs of inheritance. Super uses- final - polymorphism, method overriding - dynamic method dispatch –abstract classes – exploring String class.

UNIT-III Packages and Interfaces:
Defining and accessing a package – understanding CLASSPATH – access protection importing packages – Interfaces - Defining and implementing an interface, Applying interfaces, Variables in interfaces and extended interfaces. Exploring java.lang and java.util packages.
Exception Handling-Fundamentals, usage of try, catch, multiple catch clauses, throw, throws and finally. Java Built in Exceptions and creating own exception subclasses.

UNIT – IV Multithreaded Programming:
Java Thread life cycle model – Thread creation - Thread Exceptions - Thread Priority – Synchronization - Messaging - Runnable Interface - Interthread Communication - Deadlock - Suspending, Resuming and stopping threads.

I/O Streams: File – Streams – Advantages - The stream classes – Byte streams – Character streams.

UNIT – V Applet Programming:
How Applets differ from Applications - Applet Life Cycle - Creating an Applet - Running the Applet- Designing a Webpage - Applet Tag - Adding Applet to HTML file - More about Applet Tag - Passing parameters to Applets - Aligning the display.

Event handling: basics of event handling, Event classes, Event Listeners, delegation event model, handling mouse and keyboard events, adapter classes, AWT Class hierarchy - AWT Controls - Layout Managers and Menus, limitations of AWT.

TEXT BOOKS:
1. The Complete Reference Java J2SE 5th Edition, Herbert Schildt, TMH Publishing Company Ltd, NewDelhi.
2. Big Java 2nd Edition, Cay Horstmann, John Wiley and Sons

REFERENCES:
1. Java How to Program, Sixth Edition, H.M.Dietel and P.J.Dietel, Pearson Education/PHI
2. Core Java 2, Vol 1, Fundamentals, Cay.S.Horstmann and Gary Cornell, Seventh Edition, Pearson Education.
3. Core Java 2, Vol 2, Advanced Features, Cay.S.Horstmann and Gary Cornell, Seventh Edition, Pearson Education.

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III B.Tech – CSE- I Semester	L T/P/D C

Open Elective I   **3   0   3**

(5EI71)**Principles of Measurements and Instrumentation**

Course Objectives:

- To provide basic knowledge in transduction principles, sensors and transducer technology and measurement systems.
- To provide better familiarity with the concepts of Sensors and Measurements.
- To provide the knowledge of various measurement methods of physical parameters like velocity, acceleration, force, pressure and viscosity.

Course Outcomes:
After completion of the course the student is able to

- Able to identify suitable sensors and transducers for real time applications.
- Able to translate theoretical concepts into working models.
- Able to understand the basic of measuring device and use them in relevant situation.

UNIT: I
Introduction to measurements. Physical measurement. Forms and methods of measurements. Measurement errors. Statistical analysis of measurement data. Probability of errors. Limiting errors.Standards. Definition of standard units. International standards. Primary standards. Secondary standards. Working standards. Voltage standard. Resistance standard. Current standard. Capacitance standard. Time and frequency standards.

Unit: II
Passive Sensors:
Resistive Sensors: Potentiometers, Strain Gages, Resistive Temperature Detectors (RTDs),Thermistors, Light-dependent Resistors (LDRs), Resistive Hygrometers ,
Capacitive Sensors: Variable capacitor, Differential capacitor, **Inductive Sensors:** Reluctance variation sensors, Eddy current sensors

Unit: III
METROLOGY
Measurement of length – Plainness – Area – Diameter – Roughness – Angle – Comparators – Gauge blocks. Optical Methods for length and distance measurements.

VELOCITY AND ACCELERATION MEASUREMENT

Relative velocity – Translational and Rotational velocity measurements – Revolution counters and Timers - Magnetic and Photoelectric pulse counting stroboscopic methods. Accelerometers-different types, Gyroscopes-applications.

Unit: IV

Force and Pressure Measurement

Gyroscopic Force Measurement – Vibrating wire Force transducer.
Basics of Pressure measurement –Manometer types – Force-Balance and Vibrating Cylinder Transducers – High and Low Pressure measurement

Unit: V

FLOW, Density and Viscosity Measurements

Flow Meters- Head type, Area type (Rota meter), electromagnetic type, Positive displacement type, Density measurements – Strain Gauge load cell method – Buoyancy method.
Units of Viscosity, Two float viscorator –Industrial consistency meter

TEXT BOOKS:

1.   Measurement Systems – Applications and Design – by Doeblin E.O., 4/e, McGraw Hill International, 1990.
2.   Principles of Industrial Instrumentation – Patranabis D. TMH. End edition 1997

REFERENCES:

1.   Sensor Technology Hand Book – Jon Wilson, Newne 2004.
2.   Instrument Transducers – An Introduction to their Performance and design – by Herman K.P.Neubrat, Oxford University Press.
3.   Measurement system: Applications and Design – by E.O.Doeblin, McGraw Hill Publications.
4.   Electronic Instrumentation by H.S.Kalsi.

VNR Vignana Jyothi Institute of Engineering & Technology

III Year B.Tech CSE – I Sem	**L**	**T/P/D**	**C**
Open Elective-1	**3**	**0**	**3**

(5IT71)CYBER SECURITY

Course Objectives:
- **Identify** the key components of cyber security in network
- **Describe** risk management processes and practices
- **Define** types of service delivery process and storage management process
- **Access** additional external resources to supplement knowledge of cyber forensics and laws

Course Outcomes:
After completion of the course the student is able to
- **Categorization** of cyber-crime and an understanding social, political, ethical and psychological dimensions cyber security
- **Demonstrate** cyber offenses tools, methods used in cyber crime
- **Document** an appropriate procedure of Risk Management and Security Standards
- **Understanding** computer forensics and analyzing them

UNIT-I
INTRODUCTION TO CYBER CRIME: Introduction Cybercrime: Definition and Origins of the word, Cybercrime and Information Security, Who are Cybercriminals, Classifications of Cybercrimes, E-mail Spoofing, Spamming, Cyber defamation, Internet Time Theft, Salami Attack/ Salami Technique, Data Diddling, Forgery, Web Jacking, Newsgroup Spam/ Crimes Emanating from Usenet Newsgroup, Industrial Spying/Industrial Espionage, Hacking, Online Frauds, Pornographic Offenses, Software Piracy, Computer Sabotage, E-Mail Bombing/Mail Bombs, Usernet Newsgroup as the Source of Cybercrimes, Computer Network Intrusions, Password Sniffing, Credit Card Frauds, Identity Theft, Cybercrime: The Legal Perspectives, Cybercrimes: An Indian Perspective, Cybercrime and the Indian ITA 2000, Hacking and the Indian Law(s), A Global Perspective on Cybercrimes, Cybercrime and the Extended Enterprise.

UNIT-II
CYBER OFFENSES: HOW CRIMINALS PLAN THEM: Introduction, Categories of Cybercrime, How Criminals Plan the Attacks, Reconnaissance, Passive Attacks, Active Attacks, Scamming and Scrutinizing Gathered Information, Attack (Gaining and Maintaining the System Access), Social Engineering, Classification of Social Engineering,

Cyber stalking, Types of Stalkers, Cases Reported on Cyber stalking, How Stalking Works?, Real-Life Incident of Cyber stalking, Cyber cafe and Cybercrimes, Botnets: The fuel for Cybercrime, Botnet, Attack Vector, Cloud Computing, Why Cloud Computing?, Types of Services, Cybercrime and Cloud Computing.

UNIT-III
TOOLS AND METHODS USED IN CYBER CRIME: Introduction, Proxy Servers and Anonymizers, Phishing, How Phishing Works, Password Cracking, Online Attacks, Offline Attacks, Strong, Weak and Random Passwords, Random Passwords, Keyloggers and Spywares, Software Keyloggers, Hardware Keyloggers, Antikeylogger, Spywares, Virus and Worms, Types of Viruses, Trojan Horses and Backdoors, Backdoor, How to Protect from Trojan and Backdoors, Steganography, Steganalysis, Dos and DDos Attacks, Dos Attacks, Classification of Dos Attacks, Types of Levels of Dos Attack, Tools Used to Launch Dos Attacks, DDos Attacks, How to protect from Dos/DDos Attacks, SQL Injection, Steps for SQL Injection Attack, How to Prevent SQL Injection Attacks.

UNIT-IV
UNDERSTANDING COMPUTER FORENSICS: Introduction, Historical Background of Cyber forensics, Digital Forensics Science, The Need for Computer Forensics, Cyber forensics and Digital Evidence, The Rules of Evidence, Forensics Analysis of E-Mail, RFC2822, Digital Forensics Life Cycle, The Digital Forensics Process, The Phases in Computer Forensics/Digital Forensics, Precautions to be Taken when Collecting Electronic Evidence, Chain of Custody Concept, Network Forensics, Approaching a Computer Forensics Investigation, Typical Elements Addressed in a Forensics Investigation Engagement Contract , Solving a Computer Forensics Case, Computer Forensics and Steganography, Rootkits, Information Hiding, Forensics and Social Networking Sites: The Security/Privacy Threats, Challenges in Computer Forensics, Technical Challenges: Understanding the Raw Data and its Structure, The Legal Challenges in Computer Forensics and Data Privacy Issues, Special Tools and Techniques, Digital Forensics Tools Ready Reckoner, Special Technique: Data Mining used in Cyber forensics, Forensics Auditing.

UNIT-V
CYBERCRIME AND CYBERTERRORISM: SOCIAL, POLITICAL, ETHICAL and PSYCHOLOGICAL DIMENSIONS: Introduction, Intellectual Property in the Cyberspace, Copyright, Patent, Trademarks, Trade Secret, Trade Name, Domain Name, The Ethical Dimension of Cybercrimes, Ethical Hackers: Good Guys in Bad Land, The Psychology, Mindset and Skills of Hackers and Other Cybercriminals, Inside the Minds and Shoes of Hackers and Cybercriminals, Hackers and Cybercriminals: Evolution of Technical prowess and Skills, Ethical Hackers, Sociology of Cybercriminals, Personality Traits of

Cybercriminals and Younger Generation's views about Hacking, Information Warfare: Perception or An Eminent Reality?, Cyberwar Ground is HOT, Cyber Jihadist on the Rise.

TEXT BOOKS:
1. Cyber Security- Understanding Cyber Crimes, Computer Forensics and Legal Perspectives by Nina Godbole and Sunit Belpure, Publication Wiley.

REFERENCES:
1. Management of Information Security, M. E. Whitman, H. J. Mattord, Nelson Education, CENGAGE Learning, 2011, 3rd Edition.
2. Guide to Computer Forensics and Investigations, B. Nelson, A. Phillips, F. Enfinger, C. Steuart, Nelson Education / CENGAGE Learning, 2010, 4th Edition

VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY

B.Tech. III Year I Semester   **L T/P/D C**
Open Elective I   **3   1   3**
(5AE71) PRINCIPLES OF AUTOMOBILE ENGINEERING

Course objectives:
- Understand the layout of an automobile and functionalities subsystems
- Provide overview on concepts of engine, cooling, lubrication and fuel systems
- Present constructional features and working of automotive driveline and running systems
- Study the fundamentals and principles of automotive electrical systems

Learning outcomes:
After completion of the course the student is able to:
- Explain the functionalities of automotive systems and subsystems
- Give an overview on engine and engine subsystems.
- Describe working of automotive driveline and running systems
- Discuss the concepts of automotive starting, ignition and charging systems

UNIT I
INTRODUCTION: Classification of automobiles, layout of an automobile, automobile sub systems and their role. Types of chassis, role and requirement of a chassis frame, types of frames, materials, loading points and types of bodies.

UNIT II
ENGINE: Classification and components of an engine, principle and working of four stoke and two stroke SI and CI engines.Carburetor, diesel fuel injection and introduction to electronic fuel injection system.Cooling - Necessity of cooling, air-cooling and water cooling. Lubrication – Mist, splash and forced system.

UNIT III
DRIVE LINE: Clutches, principle, single plate clutch, multi plate clutch and centrifugal clutch. Gear box - Need, sliding mesh, constant mesh and synchromesh gear box.Propeller shaft, universal joint, differential, wheels and tyres.

UNIT IV
RUNNING SYSTEMS: Suspension systems – Objective, rigid axle and independent suspension system and torsion bar. Steering system – Layout, steering mechanism,

steering geometry and steering gearboxes. Brake system –Principle, stopping distance, types of brakes and actuation.

UNIT V
ELECTRICAL SYSTEMS: Starting system - Principle, working of different starter drive units and solenoid switches. Ignition system **-** Conventional ignition system types, ignition advance and retarding mechanisms. Charging system - Alternatorprinciple, construction and working, cut-outs and regulators.

TEXT BOOKS:
1. Advanced Vehicle Technology, Heinz Heisler,Butterworth Heinemann Publishers, 2002.
2. Automobile Electrical Equipment,Crouse W H, McGraw Hill Book Co., Inc., New York 3rd edition,1986.

REFERENCES:
1. Motor Vehicle, Garrett T K, Newton K. and Steeds W., Butter Worths & Co. Publishers Ltd., New Delhi, 2001.
2. Automotive Electrical Equipment, Kholi P L,Tata McGraw Hill Co., Ltd., New Delhi, 1975.
3. Automotive Chassis and Body, Crouse W H, McG raw Hill Book Co., 5th edition, 1976.
4. Automotive Mechanics, Giri N K, Khanna Publications, 2006

VNR Vignana Jyothi Institute of Engineering & Technology

III Year B.Tech CSE – I Sem	**L**	**T/P/D C**
Open Elective-1	**3**	**0 3**

(5BS71) PROFESSIONAL ETHICS AND HUMAN VALUES
Introduction

Human values and ethics have a significant role to play in the betterment of our society. Ethics and values are a liberating force, enabling higher performance, better quality relationships and an expanded sense of purpose and identity. This syllabus aims to present a framework for understanding human values and their role in life, work, business and leadership. It aims to transform individuals from having self-focused, survivalist mindset that has scant regard for ethics, through to compliance with laws and conventions, and then to the aspiration to live a higher ethical and spiritual life.

It mainly focuses on improving the capacities of leadership /management through training in human values and professional ethics. It serves to contribute to good governance in the organizations and foster an environment that supports and encourages just practices and fairplay.

Course Objectives:
- To create an awareness on Engineering Ethics and Human Values.
- To study the moral issues and decisions confronting individuals and organizations engaged in engineering profession.
- To study the related issues about the moral ideals, character, policies, and relationships of people and corporations involved in technological activity.

Course Outcomes:
After completion of the course the student is able to:
- Learn the moral issues and problems in engineering; find the solution to those problems.
- Learn the need for professional ethics, codes of ethics and roles, concept of safety, risk assessment.
- Gain exposure to Environment Ethics & computer ethics; know their responsibilities and rights

UNIT I
Introduction to Human Values and Ethics Human Values: Morals, Values and Ethics – Integrity – Work Ethic – ServiceLearning – Civic Virtue – Respect for Others –

Living Peacefully – caring – Sharing –Honesty – Courage – Valuing Time – Co-operation – Commitment – Empathy – Self-Confidence – Character – Spirituality.

Introduction to Ethical Concepts: Definition of industrial ethics and values, Ethical rules of industrial worker- Values and Value Judgments -- Moral Rights and Moral rules 121 -- Moral character and responsibilities -- Privacy, confidentiality, Intellectual property and the law -- Ethics as law.

UNIT II
Understanding Engineering Ethics: Action Oriented- Ethical Vision- Indian Ethos-Ethics Defined-Engineering Ethics: Various Connotations of Engineering Ethics, Why Study Engineering Ethics?, Personal and Business Ethics-Ethics and the Law-Senses of 'Engineering Ethics' – Variety of moral issues –Types of inquiry – Moral dilemmas – Moral Autonomy – Kohlberg's theory –Gilligan's theory – Consensus and Controversy – Professions and Professionalism –Professional Ideals and Virtues – Theories about right action – Selfinterest –Customs and Religion – Uses of Ethical Theories - Engineering as a Profession -- Professional Societies -- Core Qualities of Professional Practitioners -- Professional Institutions, Operating in a Pluralistic Society - Environments and Their Impact - Economic Environment -- Capital Labor-- Price Levels -- Government Fiscal and Tax Policies – Customers -- Technology

UNIT III
Engineering as Social Experimentation – Comparison with Standard Experiments, Knowledge Gained Conscientiousness, Relevant Information, Learning from the Past, Engineers as managers, consultants, and Leaders, Accountability, Engineers as responsible Experimenters – Codes of Ethics – A Balanced Outlook on Law. Engineers and Managers -- Organizational complaint procedures - Government agencies Resolving Employee concerns – Limits on acceptable behavior in large corporations -- Ethical and legal considerations, Organizational responses to offensive behavior and harassment.

UNIT IV
Workplace Rights and Responsibilities Professional Responsibility: The basis and scope of Professional Responsibility -- Professions and Norms of Professional Conduct -- Ethical Standards versus Profession -- Culpable mistakes -- the Autonomy of professions and codes of ethics - - Employee status and Professionalism -- Central Professional Responsibilities of Engineers: The emerging consensus on the Responsibility for safety among engineers, Hazards and Risks. Safety and Risk – Assessment of Safety and Risk – Risk Benefit Analysis and reducing risk - Ethical standards vs. Professional conduct - Collegiality and Loyalty – Respect for Authority – Collective Bargaining –Confidentiality – Conflicts of Interest – Occupational Crime – Professional Rights –Employee Rights – Intellectual Property Rights (IPR) –

Discrimination - Organizational complaint procedures - Government agencies - Resolving Employee concerns.

UNIT V

Ethics in Global Context and Global Issues: Multinational Corporations – Environmental Ethics – Computer Ethics – Weapons Development – Engineers as Managers – Consulting Engineers – Engineers as Expert Witnesses and Advisors – Moral Leadership – Sample Code of Ethics like ASME, ASCE, IEEE, Institution of Engineers (India), Indian Institute of Materials Management, Institution of Electronics and Telecommunication Engineers (IETE), India, etc.122

TEXT BOOKS:

1. Ethics in Engineering, Mike Martin and Roland Schinzinger, McGraw Hill. New York 1996.
2. Ethics in Engineering Practice and Research, Caroline Whitbeck, Elsevier.
3. Engineering Ethics, Govindarajan. M, Natarajan. S, Senthilkumar. V.S, Prentice Hall of India, 2004.

REFERENCES:

1. Engineering Ethics, Charles D Fleddermann, Prentice Hall, New Jersey, 2004 (Indian Reprint).
2. Engineering Ethics Concepts and Cases, Charles E Harris, Michael S Pritchard and Michael J Rabins, Thompson Learning, United States, 2000 (Indian Reprint now available).
3. Ethics and the Conduct of Business, John R Boatright, Pearson Education, New Delhi, 2003.
4. Fundamentals of Ethics for Scientists and Engineers, Edmund G Seebauer and Robert L Barry, Oxford University Press, Oxford, 2001.
5. Ethics in Engineering, Fourth Edition, Mike W. Martin, Rolan Schinzinger, Mc Graw Hill publishers
6. Engineering Ethics-An industrial Perspective, Gail Dawn Baura
7. Ethics and Values in Industrial-Organizational Psychology, Joel Lefkowitz

III Year B.Tech CSE – I Sem	L	T/P/D	C
	0	3	2

(5BS03) ADVANCED ENGLISH COMMUNICATION SKILLS LABORATORY

Introduction
This course aims to offer students a practical approach to Technical Writing, and provide a relevant, contemporary and authoritative introduction to the dynamic field of technical communication that prepares them for Workplace Communication. Each unit in the syllabus is devised so as to include a writing component as well as an oral component.

Course objectives:
- **Enable** the students to create clear, accurate, and succinct content to write business letters, resume, SOP, Proposals and Technical Reports for academics as well as for workplace
  Enable students to adjust technical content to meet the needs of a specific target audience
- **Groom** students to speak accurately and fluently and prepare them for real world activities through behavioral skills.
- **Train** students in soft skills through role play and group discussion to improve their EQ.

Course Outcomes:
After completion of the course the student is able to:

- **Summarize** and **synthesize** information and produce technical writing that is required in academics as well as in the engineering profession
- **Write** covering letters, resume, SOP, Project Proposals and Technical Reports
- **Speak** fluently and address a large group of audience and participate in debates and discussions.
- **Negotiate** terms, manage complex situations through interpersonal skills, persuade people and make quick decisions.

Methodology
Writing Component
A Process- Genre methodology will be used in teaching the technical genres. This method would enable students to understand the use of particular lexico-grammatical patterns required of in the context of technical writing. They would learn to use language to express the particular communicative intent that is required of in the context of writing these genres.

UNIT I
- Oral Communication :Talking About Yourself
- Applications and Covering letters

- Resume Writing
- Verbal Ability: Vocabulary (Technical and Non-Technical) reading and listening (analysis and reasoning)

UNIT II
- Oral Communication: Making Presentations
- Writing an SOP
- Summarizing and Synthesizing Information

UNIT III
- . Oral Communication: Group Discussions
- Writing Abstracts

UNIT IV

- Oral Communication : Debate
- Writing Reports

UNIT V

Soft Skills

TEXT BOOKS:
1. Ashraf Rizvi, M (2005). Effective Technical Communication, Tata Mc Graw Hill Publishing Company Limited, New Delhi.
2. Anderson, Paul V. (2003). Reports. In Paul V. Anderson's Technical Communication: A Reader-Centered Approach (5th ed..) (pp. 457-473). Boston: Heinle.
3. William S. Pfeiffer, (2012) Technical Communication: A Practical Approach (7th ed.) Longman

REFERENCES
1. Burnett, Rebecca. Technical Communication. 5th Ed., Heinle, 2001.
2. Gerson Sharon J. and Steven Gerson : Technical Writing Process and Product. 3rd edition, New Jersey: Prentice Hall 1999
3. Markel, Mike. Technical Communication: Situations and Strategies (8th EDITION (2006-2007)
4. R. C. Sharma and K. Mohan, Business Correspondence and Report Writing, Third Edition, TMH, 2002. (Indian Edition)
5. M. Raman and S. Sharma, Technical Communication : Principles and Practices, OUP, 2004. (Indian Edition)

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III Year B.Tech CSE – I Sem

L	T/P/D	C
0	3	2

(5IT59) OPERATING SYSTEMS AND COMPUTER NETWORKS LABORATORY
(Common to CSE and IT)

Course Objectives:
- **Learn and understand** various error correction and detection mechanisms.
- **Examine** basic networking commands and networking algorithms.
- **Explore** operating system processor scheduling and deadlock mitigation techniques
- **Analyze** various file, disk and memory management mechanisms.

Course Outcomes:
After completion of the course the student is able to:
- **Implement** data link layer functionalities such as framing, error detection mechanisms
- **Design and implement** various network applications such as data
- transmission between client and server, file transfer, real-time multimedia transmission.
- **Implement** various processor scheduling and page replacement algorithms
- **Implement** disk scheduling and file allocation strategies

OPERATING SYSTEMS LAB

WEEK 1
1. Simulate the following CPU scheduling algorithms
    a)   Round Robin   b) SJF   c) FCFS

WEEK 2
2. Simulate the following algorithms
    a)   Best fit   b) worst fit   c) first fit

WEEK 3
3. Simulate the following file allocation strategies
    a) Sequential   b) Indexed   c) Linked

WEEK 4
4. Simulate algorithms for deadlock avoidance and deadlock detection

WEEK 5
5.   Simulate the following page replacement algorithms
     a)FIFO   b) Optimal   c) LRU
WEEK 6
6.   Simulate the following disk scheduling algorithm
     a) SCAN   b) CSCAN   c) LOOK
WEEK 7
Lab internal
COMPUTER NETWORKS LAB
WEEK 8
7.   Implement the data link layer framing methods such as character, character
     stuffing and bit stuffing.
WEEK 9
8.   Implement on a data set of characters the three CRC polynomials – CRC 12,
     CRC 16 and CRC CCIP.
WEEK 10
9.   Basic Networking commands.
WEEK 11
10. Establishing a network between computers.

WEEK 12
11. Configuring FTP Server for file sharing.
WEEK 13
12. Implement Dijkstra's algorithm to compute the Shortest path through a graph.
WEEK 14
 Lab internal
TEXT BOOKS

1.   Operating System Principles- Abraham Silberchatz, Peter B. Galvin, Greg Gagne
     7th Edition, John Wiley.
2.   Data Communications and Networking – Behrouz A. Forouzan , Fourth Edition
     TMH,2006.

III Year B.Tech CSE – I Sem	**L**	**T/P/D**	**C**
	0	**3**	**2**

(5CS54) COMPILER DESIGN & OOAD LABORATORY
(Common to CSE and IT)

COURSE OBJECTIVES: Student should be able to

- **Identify** the requirements in use-case driven approach and specify the behavioural aspects exhibited in each use case for a given case study.

- **Classify** various classes, relationships, their responsibilities to be carried out on collaborating , based on these interactions deployment of model for a given case study can be done.

- **Understanding** of the language translation peculiarities by designing complete translator for mini language.

- **Provide** practical knowledge in implementation of language translator.

COURSE OUTCOMES:

After completion of the course the student is able to:

- **Identify** user requirements and represent use case, interaction, activity and state diagram.

- **Develop** the class, component diagrams and deploy the model using the deployment diagram for a given case study

- **Design and implement** language processors in C

- **Develop** various phases of compiler using lex, yacc or C.

COMPILER DESIGN

Consider a 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. A simple program written in this language is:

Week 1
Design a Lexical analyzer for a mini 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.

Week 2
Implement the lexical analyzer using lex or C.

Week 3
Calculate first and follow for the given grammar using C language.
Week 4

Design Predictive parser for the given grammar
Week 5
Write a Lex program to construct a lexical analyzer
Week 6
Write a Yacc Program to construct a parse tree for the given grammar

OBJECT ORIENTED ANALYSIS AND DESIGN LABORATORY

The student should take up the case studies of ATM system, Library Management System (LMS) and Model it in different views i.e. Use case view, logical view, component view, Deployment view.

Week 7
Design a Use case Diagram for ATM system, LMS
Week 8
Design a Sequence Diagram for ATM system, LMS
Design a Collaboration Diagram for ATM system, LMS
Week 9
Design a Activity Diagram for ATM system, LMS
Week 10
Design a State Chart Diagram for ATM system, LMS
Week 11
Design a Class Diagram for ATM system, LMS
Week 12
Design a Component Diagram for ATM system, LMS
Design a Deployment Diagram for ATM system, LMS

TEXTBOOKS
1. lex&yacc – John R. Levine, Tony Mason, Doug Brown, O'reilly
2. Grady Booch, James Rumbaugh, Ivar Jacobson: The Unified Modeling Language UserGuide, Pearson Education.

REFERENCES:
1. Modern Compiler Implementation in C- Andrew N. Appel, Cambridge UniversityPress.
2. Meilir Page-Jones: Fundamentals of Object Oriented Design in UML, Pearson Education.
3. Atul Kahate: Object Oriented Analysis & Design, The McGraw-Hill.

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III Year B.Tech CSE – II Sem	L	T/P/D	C
	3	1	4

(5IT12) WEB TECHNOLOGIES
(Common to CSE and IT)

Course Objectives:

- **Learn** various fundamental concepts for developing websites and web based applications.
- To **know** about technology for data transportation among incompatible systems and applications.
- **Write** various programs to develop static and dynamic websites.
- To **implement** various frameworks for developing well architected web applications.

Course Outcomes:
After completion of the course the student is able to

- **Understand** the concepts and design web pages with HTML, java script and CSS.
- **Analyze** XML for transferring data across documents and Java beans for storing the data.
- **Build** server interaction in web applications using servlets, jsps and JDBC.
- **Develop** frame work based technologies and optimize the applications.

UNIT I
HTML Common tags: List, Tables, images, forms, Frames; Cascading Style sheets. Introduction to Java Scripts, Objects in Java Script, Dynamic HTML with Java Script.

UNIT II
Introduction to XML: Document type definition, XML Schemas, Document Object model, Presenting XML, Using XML **Processors:** DOM and SAX.
Java Beans: Introduction to Java Beans, Advantages of Java Beans, BDK Introspection, Using Bound properties, Bean Info Interface, Constrained properties Persistence, Customizes, Java Beans API, Introduction to EJB's.

UNIT III
Web Servers and Servlets: Tomcat web server, Installing the Java Software Development Kit, Tomcat Server & Testing Tomcat, Introduction to Servlets: Lifecycle of a Servlet, JSDK, The Servlet API, The javax. Servlet Package, Reading Servlet parameters, Reading

Initialization parameters. The javax. Servlet HTTP package, Handling Http Request & Responses, Using Cookies-Session Tracking, Security Issues.

UNIT IV
Database Access: Database Programming using JDBC, JDBC drivers, Studying Javax.sql.* package, Accessing a Database from a Servlet.
Introduction to JSP: The Problem with Servlet. The Anatomy of a JSP Page, JSP Processing. JSP Application Design with MVC Setting Up and JSP Environment.

UNIT V
JSP Application Development: Generating Dynamic Content, Using Scripting Elements Implicit JSP Objects, Conditional Processing : Displaying Values Using an Expression to Set an Attribute, Declaring Variables and Methods Error Handling and Debugging Sharing Data Between JSP pages, Requests, and Users Passing Control and Date between Pages – Sharing Session and Application Data – Memory Usage Considerations, Accessing a Database from a JSP page, Deploying JAVA Beans in a JSP Page, Introduction to struts framework.

TEXT BOOKS
1.   Web Programming, building internet applications, Chris Bates 2nd edition,

     WILEY Dreamtech   (UNIT s 1, 2)

2.   Core servlets and java server pages volume 1: core technologies by Marty Hall   and

     Larry Brown Pearson (UNITs 3,4,5)

REFERENCES:

1.   Programming World Wide Web-Sebesta, Pearson.

2.   Internet and World Wide Web – How to program by Dietel and Nieto PHI/Pearson

     Education Asia.

3.   Jakarta Struts Cook book , Bill Siggelkow, S P D O'Reilly.

4.   Java : The complete Reference, 7th Edition by Herbert Schildt. TMH.

III Year B.Tech CSE – II Sem	L	T/P/D	C
	3	0	3

(5CS12) INTRODUCTION TO ANALYTICS
(Common to CSE and IT)

Course Objectives:
- To introduce the terminology, technology and its applications.
- To introduce the concept of Analytics for Business.
- To introduce the tools, technologies & programming languages which is used in day to day analytics cycle.

Course Outcomes:

After completion of the course the student is able to

- **Understand** the basic concepts of R programming for Data analysis.
- **Apply** NOSQL tools for data creation and retrieval
- **Classify** the Statistical techniques for analysis
- **Solve** Business problems using relevant methods

Unit I
Introduction to Analytics and R Programming (NOS 2101):
Introduction to R, RStudio (GUI): R Windows Environment, Introduction to various data types, Numeric, Character, date, Data frame, array, matrix etc., Reading Datasets, Working with different file types txt, csv etc., Outliers, Combining Datasets, R Functions and loops.
Manage your work to meet requirements (NOS 9001):
Understanding Learning Objectives, Introduction to work & meeting requirements, Time Management, Work Management & Prioritization , Quality & Standards Adherence.

Unit II
Summarizing Data & Revisiting Probability (NOS 2101):
Summary Statistics-Summarizing data with R, Probability, Expected, Random, Bivariate Random variables, Probability distribution, Central Limit Theorem etc.,

Work Effectively with Colleagues (NOS 9002):
Introduction to work effectively, Team Work, Professionalism, Effective Communication skills etc.,

Unit III
SQL using R:
Introduction to NOSQL, Connecting R to NOSQL databases. Excel and R integration with R Connector.

Unit IV
Correlation and Regression Analysis (nos 9001):

Regression Analysis, Assumptions of OLS Regression, Regression Modelling Correlation, ANOVA, Forecasting, Heteroscedasticity, Autocorrelation, Introduction to Multiple Regression etc..

Unit V
Understand the Verticals-Engineering, Financial and others (NOS 9002):
Understand systems viz., Engineering Design, Manufacturing, Smart Utilities, Production lines, Automotive, Technology etc.,
Understanding Business problems related to various businesses

Requirements Gathering
Gathering all the data related to Business Objective.

TEXT BOOK:
1. Student's Handbook for Associate Analytics.

REFERENCES:
1. **Introduction to Probability and Statistics Using R.** ISBN:978-0-557-24979-4, is a textbook written for an undergraduate course in probability and statistics.
2. **An Introduction to R,** by Venables and Smith and the R Development Core Team. This may be downloaded for free from the R Project website(http://www.r-project.org/, see Manuals).
   There are plenty of other free references available from the R Project website.
3. Montgomerey, Douglas C., and George C. Runger, **Applied statistics and probability for engineers**. John Wiley & Sons, 2010.
4. **The Basic Concepts of Time Series Analysis.**
   http://anson.ucdavis.edu/~azari/sta137/AuNotes.pdf
5. **Time Series and Mining with R,** Yanchang Zhao**.**

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III Year B.Tech CSE – II Sem	**L**	**T/P/D**	**C**
	3	**0**	**3**

(5IT10) LINUX INTERNALS
(Common to CSE and IT)

Course Objectives:

- **Understand** basic principles of Linux Internals.
- To **learn** Linux process control and shell programming.
- **Explain** the basic Methods on which the Linux kernel is built upon.
- To **familiarize** students with basic Linux administration.

Course Outcomes:
After completion of the course the student is able to

- **Analyze** shell types and understand basic Linux commands
- **Understand** Linux file systems and the associated system calls
- **Outline** process and signal creation
- **Explain** network-based communication with IPC and 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, sed – scripts, operation, addresses, commands, applications, awk – execution, fields and records, scripts are using system commands in awk.

Working with the Bourne again shell(bash): Introduction, shell responsibilities, pipes and input Redirection, output redirection, 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, debugging shell scripts.

UNIT-II Files: File Concept, File System Structure, Inodes, File Attributes, File types, Library functions, the
standard I/O and formatted I/O in C, stream errors, kernel support for files, System calls, file descriptors, low level file access – File structure related system calls(File APIs), file and record locking, file and directory management – Directory file APIs, Symbolic links & hard links.

UNIT-III
Process – Process concept, Kernel support for process, process attributes, process control - process creation, waiting for a process, process termination, zombie process, orphan

process, Process APIs. 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, Pipes, and FIFOs, Introduction to three types of IPC-message queues, semaphores and shared memory. Message Queues-Kernel support for messages, UNIX system V APIs for messages, client/server example. Semaphores-Kernel support for semaphores, UNIX system V APIs for semaphores.

UNIT-V
Sockets: Introduction to Sockets, Socket Addresses, Socket system calls for connection oriented protocol and connectionless protocol, example-client/server programs.
Case Study: Case Study on open source Linux Interface.

TEXT BOOKS:
1. Unix System Programming using C++, T.Chan, PHI.

2. Unix Concepts and Applications, Sumitabha Das, TMH, 4th Edition, 2006.

REFERENCE BOOKS:
1. Linux System Programming, Robert Love, O'Reilly, SPD.

2. Advanced Programming in the UNIX environment, 2nd Edition, W.R.Stevens, Pearson

    Education.

3. Unix Network Programming, W.R.Stevens, PHI.

4.   Unix for programmers and users, 3rd Edition, Graham Glass, King Ables, Pearson

    Education.

5. Beginning Linux Programming, N. Mathew, R. Stones, Wrox, 4th edition, Wiley India

    Edition, rp-2008.

III Year B.Tech CSE – II Sem   **L   T/P/D   C**

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(5CS13) DATA MINING
(Common to CSE and IT)

Course Objectives:

- **Introduce** the basic concepts and techniques in building a Data Warehouse

- **Apply** preprocessing methods for any given raw data

- **Develop** skills of using recent data mining software for solving practical problems

- **Implement** and apply basic algorithms for supervised and unsupervised learning

- **Explore** efficient and cost effective methods for maintaining data warehouse systems

Course Outcomes:
After completion of the course Students is able to:

- **Appraise** raw input and process to generate relevant data for a range of data mining algorithms.

- **Evaluate and measure** interesting patterns from heterogeneous databases.

- **Identify** the appropriate data-mining algorithm for resolving the real-time applications.

- **Design and implement** data-mining projects using sample, realistic data sets and modern tools.

UNIT I:
Introduction: Fundamentals of data mining, KDD process, Data Mining Functionalities, Classification of Data Mining systems, Data Mining Task primitives, Integration of a Data mining System with a Database or a Data warehouse systems, Major issues in Data Mining.
Data Preprocessing: Needs for Preprocessing the Data, Data Cleaning, Data Integration and Transformation, Data Reduction, Discretization and Concept Hierarchy Generation.

UNIT II:
Data Warehouse and OLAP Technology for Data Mining: Data Warehouse, Multidimensional Data Model, Data Warehouse Architecture, Data Warehouse Implementation, From Data Warehousing to Data Mining.

Data Cube computation and Data Generalization: Efficient Methods for Data Cube Computation, Further Development of data cube and OLAP Technology, Characterization and Discrimination: Attribute-Oriented Induction.

UNIT – III
Mining Frequent, Associations and Correlations: Basic Concepts, Frequent Itemset mining methods, Mining Multilevel Association Rules from Transaction Databases, Mining Multidimensional Association Rules from Relational Databases and Data Warehouses, From Association Mining to Correlation Analysis, Constraint-Based Association Mining.

UNIT – IV
Classification and Prediction: Issues Regarding Classification and Prediction, Classification by Decision Tree Induction, Bayesian Classification, Classification by Back propagation, Classification Based on Concepts from Association Rule Mining, Other Classification Methods, Prediction, Classifier Accuracy.

UNIT – V
Cluster Analysis Introduction: Types of Data in Cluster Analysis, A Categorization of Major Clustering Methods, Partitioning Methods, Density-Based Methods, Grid-Based Methods, Model-Based Clustering Methods, Outlier Analysis.
Mining Complex Types of Data: Mining Spatial Databases, Mining Multimedia Databases, Mining Time-Series and Sequence Data, Mining Text Databases, Mining the World Wide Web.

TEXT BOOKS:
    1. Data mining: Concepts and Techniques, Jiawei Han and Micheline Kamber, 2nd Edition, Elsevier, 2006.
    2. Data Mining Techniques – ARUN K PUJARI, University Press.

REFERENCES:
1. Introduction to data mining, Pang-Ning Tan, Michael Steinbach, Vipin Kumar, Addison-Wesley, 2005. ISBN : 0321321367.
2. Mining Introductory and advanced topics –MARGARET H DUNHAM, PEARSON EDUCATION
3. Lecture Notes on Data Mining, Micheal W.Berry, Murray Browne, World Scientific Publishing Co
4. Data Mining for Association Rules and Sequential Patterns: Sequential and Parallel Algorithms, Jean-Marc Adamo, ISBN: 0387950486
5. Data Warehousing in the Real World – SAM ANAHORY & DENNIS MURRAY. Pearson Edn Asia.

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III Year B.Tech   IISem   **L   T/P/D   C**
                                                                     3   0   3
(5CE72) INTRODUCTION TO GEOGRAPHICAL INFORMATION SYSTEM
(Open Elective – 2)

Course Objectives
- To **describe** and **define** various concepts of Remote Sensing and GIS.
- To enable the students to **analyze** data using GIS.
- To make the students **appraise** the importance of accuracy in GIS.
- To enable the students to **apply** GIS knowledge in solving various problems in real world scenario.

Course Outcomes
After completion of the course Students is able to:

- Students will be able to **describe** different concepts and terms used in GIS
- Students will be able to **compare** and process different data sets
- Students will be able to **evaluate** the accuracy and **decide** whether a data set can be used or not.
- Students will be able **demonstrate** various applications GIS.

UNIT I:
Introduction to GIS: Introduction, History of GIS, GIS Components, GIS Applications in Real life, The Nature of geographic data, Maps, Types of maps, Map scale, Types of scale, Map and Globe, Co-ordinate systems, Map projections, Map transformation, Geo-referencing,

UNIT II:
Spatial Database Management System: Introduction: Spatial DBMS, Data storage, Database structure models, database management system, entity-relationship model, normalization
Data models and data structures: Introduction, GIS Data model, vector data structure, raster data structure, attribute data, geo-database and metadata,

UNIT III:
Spatial Data input and Editing: Data input methods – keyboard entry, digitization, scanning, conversion of existing data, remotely sensed data, errors in data input, Data accuracy, Micro and Macro components of accuracy, sources of error in GIS.
Spatial Analysis: Introduction, topology, spatial analysis, vector data analysis, Network analysis, raster data analysis, Spatial data interpolation techniques
UNIT IV: Implementing a GIS and Advanced GIS
Implementing a GIS: Awareness, developing system requirements, evaluation of alternative systems, decision making using GIS

Advanced GIS: WebGIS concept**,** webGIS fundamentals, Potential of web GIS, Server side strategies, client side strategies, mixed strategies, webGIS applications

UNIT V: Applications of GIS

GIS based road network planning, Shortest path detection using GIS, Hazard Zonation using remote sensing and GIS, GIS for solving multi criteria problems, GIS for business applications, Mineral mapping using GIS.

TEXT BOOKS:

1. Introduction to Geographic Information systems by Kang-tsung Chang, McGrawHill Education (Indian Edition), 7th Edition, 2015.
2. Fundamentals of Geographic Information systems by Michael N. Demers, 4th Edition, Wiley Publishers, 2012.

REFERENCES:

1. Geographic Information systems – An Introduction by Tor Bernhardsen, Wiley India Publication, 3rd Edition, 2010.
2. Remote Sensing and GIS by Basudeb Bhatta, Oxford University Press, 2nd Revised Edition, 2011.
3. Textbook of Remote Sensing and Geographical Information systems by M.Anji Reddy, B.S.Publications, 4th Edition, 2012.
4. Textbook of Remote Sensing and Geographical Information systems by Kali Charan Sahu, Atlantic Publishers and Distributors, 1st Edition, 2007.

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III Year B.Tech – II Sem

L	T/P/D	C
3	0	3

(5EE72) ENERGY AUDITING CONSERVATION AND MANAGEMENT
(Open Elective-2)

Course Objectives

- To **understand** the necessity of conservation of Energy.
- To **know** the methods of Energy management.
- To **identity** the factors to increase the efficiency of electrical equipment.
- To **know** the benefits of carrying out energy Audits.

Course Outcomes:

After completion of the course Students is able to:

- To **conduct** Energy Audit of industries.
- To **manage** energy Systems
- To **specify** the methods of improving efficiency of electric motor.
- To **improve** power factor and to design a good illumination system
- To **calculate** pay back periods for energy saving equipment.

Unit I Basic principles of Energy audit

Energy audit- definitions, concept , types of audit, energy index, cost index ,pie charts, Sankey diagrams, load profiles, Energy conservation schemes- Energy audit of industries- energy saving potential, energy audit of process industry, thermal power station, building energy audit

Unit II Energy management

Principles of energy management, organizing energy management program, initiating, planning, controlling, promoting, monitoring, reporting- Energy manager, Qualities and functions, language, Questionnaire - check list for top management

Unit III Energy efficient Motors

Energy efficient motors, factors affecting efficiency, loss distribution, constructional details, characteristics - variable speed, variable duty cycle systems, RMS hp- voltage variation- voltage unbalance- over motoring- motor energy audit

Unit IV Power Factor Improvement, Lighting and energy instruments

Power factor – methods of improvement, location of capacitors, p.f with non-linear loads, effect of harmonics on p.f. , p.f motor controllers - Good lighting system design and

practice, lighting control, lighting energy audit - Energy Instruments- watt meter, data loggers, thermocouples, pyrometers, flux meters, tongue testers ,application of PLC's

Unit V Economic aspects and analysis

Economics Analysis-Depreciation Methods, time value of money, rate of return, present worth method, replacement analysis, life cycle costing analysis- Energy efficient motors-calculation of simple payback method, net present worth method- Power factor correction, lighting - Applications of life cycle costing analysis, return on investment.

TEXT BOOKS:
1. Energy management, W.R. Murphy & G. Mckay Butter worth, Heinemann publications.
2. Energy management, Paul o' Callaghan, Mc-graw Hill Book company-1st edition, 1998

REFERENCES:
1. Energy efficient electric motors, John .C. Andreas, Marcel Dekker Inc Ltd-2nd edition, 1995-
2. Energy management handbook, W.C.Turner, John wiley and sons
3. Energy management and good lighting practice: fuel efficiency- booklet12-EEO

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III Year B.Tech ME/ AE II Sem	**L**	**T/P/D**	**C**
	3	**1**	**3**

(5ME72) OPTIMIZATION TECHNIQUES
(Open Elective -2)

Course Prerequisites: Mathematics, Operation Research
Course Objectives:

- To **understand** the classification of optimization techniques and its practical use.
- To **understand** about the optimization of one dimensional optimization methods.
- To **know** about constrained minimization methods.
- To **understands** Geometric and dynamic programmings.

Learning Outcomes:
After completion of the course Students is able to:

- **Apply** the different types of optimization techniques for different purposes.
- **Formulate** and **solve** the problems by using one dimensional unconstrained minimization methods.
- **Formulate** and **solve** the problems (industrial/research) by using the geometric programming.
- **Formulate** and **solve** the industrial problems by using the dynamic programming methods.

UNIT I
Introduction: Engineering Applications; Statement of the Optimal Problem: Classification; Optimization Techniques. *Classical Methods*: Single Variable Optimization; Multivariable Optimization without any Constraints with Equality and Inequality Constraints.

UNIT II
One-Dimensional Minimization Methods: Uni-model Function; Elimination Methods – Dichotomous Search, Fibonacce and Golden Section Methods; Interpolation Methods – Quadratic and Cubic Interpolation Methods.

UNIT III
Unconstrained Minimization Methods: Univariate, Conjugate Directions, Gradient and Variable Metric Methods.*Constrained Minimization Methods*: Characteristics of a constrained problem; Direct Methods of feasible directions; Indirect Methods of interior and exterior penalty functions.

UNIT IV

Geometric Programming: Formulation and Solutions of Unconstrained and Constrained geometric programming problems.

UNIT V

Dynamic Programming: Concept of Sub-optimization and the principle of optimality; Calculus, Tabular and Computational Methods in Dynamic Programming; An Introduction to Continuous Dynamic Programming.

TEXT BOOKS:
1. Optimization (Theory & Applications), S.S. Rao, Wiley Eastern Ltd., New Delhi.
2. Optimization Concepts and Applications in Engineering, Ashok D.Belegundu and Tirupathi R Chandrupatla, Pearson Education.

REFERENCES:
1. Optimization: Theory and Practice, C.S.G. Beveridge and R.S. Schechter, MGH, New York.
2. Engineering Optimization by S.S Rao
3. Operations Research by S D Sharama

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III Year B.Tech ECE – II Sem

L	T/P/D	C
3	0	3

(5EC72) INTRODUCTION TO MICRO PROCESSORS AND CONTROLLERS
(Open Elective -2)

Course Objectives:
- **Differentiate** various number systems
- **Develop** simple application using 8085 microprocessors
- **Develop** simple applications using 8051 microcontrollers

Course outcomes:

After completion of the course Students is able to:
- **Understand** basic computing concepts
- **Know** architecture of 8085 micro processors and 8051 Microcontrollers
- **Interface** peripherals to microprocessor
- **Program** internal resources of 8051 microcontroller

UNIT I
Introduction to Computing

Numbering and Coding Systems: Binary, Decimal, Hexadecimal and conversions, Binary and Hexadecimal Arithmetic, Complements, Alphanumeric codes. Digital Premier, Inside the Computer

UNIT II
8085 Microprocessor

Features, Architecture and operation of 8085, Programming Model, External Memory for 8085

UNIT III
Programmable Peripheral Devices

Programmable Peripheral Interface (8255), USART (8251), Programmable Interval Timer (8253) and interfacing.

UNIT IV
8051 Microcontrollers

Microcontrollers and Embedded Processors, Overview of the 8051 family, Architecture and Programming Model of 8051, Timers and Counters, parallel and serial ports, Interrupts, Special Function Register formats, Internal Memory Organization

UNIT V
Applications

8051 Programming in C: Data types for the 8051, programs for IO operations, programs on Timer operations, Serial IO ports, and interrupts, Case Study: DC Motor Control

TEXT BOOKS:
1. Microprocessor Architecture, Programming and Applications with the 8085/8080A, Gaonkar
2. The 8051 Microcontroller and Embedded Systems: Using Assembly and C, 2nd Edition, Muhammad Ali Mazidi,Janice Gillispie Mazidi, Rolin D. McKinlay

REFERENCE BOOKS:
1. The 8051 Microcontroller : programming, architecture by Ayala & Gadre, Cengage Publications
2. Digital Design – Morris Mano, PHI, 3rd Edition, 2006.

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III Year B.Tech II Sem	**L**	**T/P/D**	**C**
Open Elective - II	**3**	**0**	**3**

(5EC95) WIRELESS COMMUNICATIONS AND NETWORKS

Prerequisite: Computer Networks

Course Objectives:
- Understand fundamentals of wireless communications
- Know basics of wireless networks
- Differentiate fixed IP and Mobile IP
- Learn design of basic wireless LAN network

Course outcomes:
After Completion of the course the student is able to
- Understand the fundamental concepts of Cellular communications
- Differentiate various multiple access techniques
- Learn wireless protocols used in wireless Networks
- Understand mobile IP requirements

UNIT I
WIRELESS COMMUNICATIONS & SYSTEM FUNDAMENTALS:
Introduction to wireless communications systems, examples, comparisons & trends. Cellular concepts-frequency reuse, strategies, interference & system capacity, trunking and grade of service, improving coverage &capacity in cellular systems.

UNIT II
MULTIPLE ACCESS TECHNIQUES FOR WIRELESS COMMUNICATION:
FDMA, TDMA, SSMA (FHMA/CDMA/Hybrid techniques), SDMA technique (AS applicable to wireless communications). Packet radio access-protocols, CSMA protocols ,reservation protocols ,capture effect in packet radio , capacity of cellular systems .

UNIT III
WIRELESS NETWORKING:
Introduction, differences in wireless & fixed telephone networks, traffic routing in wireless networks –circuit switching, packet switching X.25 protocol. Wireless data services – cellular digital packet data (CDPD), advanced radio data information systems, RAM mobile data (RMD). Common

channel signaling (CCS), ISDN-Broad band ISDN & ATM, Signalling System no .7(SS7)-protocols, network services part, user part, signaling traffic, services and performance.

UNIT IV

MOBILE IP AND WIRELESS APPLICATION PROTOCOL:

Mobile IP Operation of mobile IP, Co-located address, Registration, Tunneling, WAP Architecture, overview, WML scripts, WAP service, WAP session protocol, wireless transaction, Wireless datagram protocol.

UNIT V

WIRELESS LAN TECHNOLOGY:

Infrared LANs, Spread spectrum LANs, Narrow bank microwave LANs, IEEE 802 protocol Architecture, IEEE802 architecture and services, 802.11 medium access control, 802.11 physical layer.

BLUE TOOTH: Overview, Radio specification, Base band specification, Links manager Specification, Logical link control and adaptation protocol. Introduction to WLL Technology.

TEXTBOOKS:

1. Wireless Communication and Networking – William Stallings, PHI, 2003.
2. Wireless Communications, Principles, Practice – Theodore, S. Rappaport, PHI, 2nd Edn.,2002.
3. Principles of Wireless Networks – Kaveh Pah Laven and P. Krishna Murthy,Pearson Education, 2002.

REFERENCES:

1. Wireless Digital Communications – Kamilo Feher, PHI, 1999Page 26 of 38

III Year B.Tech CSE – II Sem	L	T/P/D	C
	3	0	3

(5CS72)OPEN SOURCE TECHNOLOGIES
(Open Elective - 2)

Course Objectives

- **Understand** Perl, Python, PHP and Ruby to new situations and learn from the experience.
- **Assist** Perl programmer or database administrator to compile large programming set.
- **Incorporate** PHP into HTML files, Write basic PHP scripts, Process form input, Write and use functions.
- **Apply** advanced techniques, tools, and methodologies that can be used to build complex, scalable, PHP applications.

Course Outcomes

After completion of the course Students is able to:

- **Understand** text processing applications using PERL and enable them on internet.
- **Build** web based applications with encryption functions using PHP.
- **Design** automated tasks and conduct data analysis using Python.
- **Inspect** PERL, PYTHON, PHP, RUBY languages in developing interactive web applications

UNIT I.
Introduction to PERL

Scripts and Programs, Origin of Scripting, Scripting Today, Characteristics of 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, advance Perl - finer points of looping, pack and unpack, file system, eval, data structures, packages, modules, objects, interfacing to the operating system, Creating Internet ware applications, Dirty Hands Internet Programming, security Issues.

UNIT II
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, PHI3 Authentication and Methodologies -Hard Coded, File Based, Database Based, IP Based, Login Administration, Uploading Files with PHI3, Sending Email using PHP, PHI3Encryption Functions, the Merypt package, Building Web sites for the World - Translating Websites- Updating Web sites Scripts, Creating the Localization Repository, Translating Files, text. Generate Binary Files, Set the desired language within your scripts. Localizing Dates, Numbers and Times.

UNIT IV.
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.

UNIT V
Ruby
Basics of Ruby, classes, objects and variable, arrays, Exception Handling ,threads, Regular Expressions, Strings, Objects in Ruby

TEXT BOOKS:
1. Programming Perl Larry Wall, T.Christiansen and J.Orwant, O'Reiily,SPD.
2. Guide to Programming with Python, M.Dawson, Cengage Learning.
3. The Ruby Programming Language 1st Edition by David Flanagan
4. Professional PHP Programmingby Jesus M. Castagnetto , Harish Rawat , Deepak T. Veliath (WROX publication)

REFERENCES:
1. Perl Power, J.P.Flynt, Cengage Learning.
2. Perl by Example, E, Quigley, Pearson Education.
3. Programming Ruby: The Pragmatic Programmer's Guide, by Pragmatic Dave Thomas, Andy Thomas
4. Professional PHP6 by WROX publication

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III Year – B.Tech-II Sem	**L**	**T/P/D**	**C**
	3	**0**	**3**

(5EI72) Lab VIEW PROGRAMMING
(Open Elective-2)

Course Objectives:
- **Understand** the new concept in measurement and automation.
- **Understand** how to control an external measuring device byinterfacing a computer.
- **Competent** in data acquisition and instrument control.
- **Program** for networking and other applications like Digital image processing control system and signal processing.

Course Outcome:

After completion of the course Students is able to:
- **Develop** a Virtual Instrument using LabVIEW to communicate with real world.
- **Identify** salient traits of a virtual instrument and incorporate these traits in their projects.
- **Experiment**, analyze and document in the laboratory prototype measurement
- **Develop** program for application like networking, Digital image processing ,control system, etc

UNIT I:

Virtual Instrumentation:

istorical perspective, advantages, block diagram and architecture of a virtual instrument, data-flow techniques, graphical programming in data flow, comparison with conventional programming. Development of Virtual Instrument using GUI, ActiveX Programming.

UNIT II:

Structures and sequence:

Controlling program execution with structures: While and For loops, Shift registers, Case and Sequence structure and Sub VI

Unit III:

Composite Data and Displays:

Arrays and Structures: Two dimension array, Auto Indexing to set the for loop count, Building arrays with auto indexing, Array Acrobats, Polymorphism, Cluster Order, Cluster to pass data, Bundling and unbundling cluster, Interchangeable arrays and cluster , Error Cluster and Error handling functions:

Chart update modes, Single Plot chart, Wiring multiple plot chart, Single Plot verus Multiple plot data types, The X scroll bar, clearing the chart, Stacked and overlaid plots, Multiple Y

scales and chart history lengths.: Activity: Temperature monitor, Graphing a sine wave, XY plot to plot a circle,Temperature analysis and 3D graphs.

Unit IV:
Strings, File output and Signal Measurements and generation:
Single line strings, online string updation, Scroll bar, Writing and reading a measurement file,Writing and reading from a spread sheet, Computer to real world interface using LabVIEW, Creating Ni DAQ Task in Measurement and Automation Explorer (MAX), Generating code from MAX, DAQ timing and trigger, Multichannel and continuous acquisition, Streaming Data file and Counting frequency and events.VI Chassis requirements. Common Instrument Interfaces: Current loop, RS 232C/ RS485, GPIB.

Unit V:
Applications:
Networking basics for office & Industrial applications, VISA and IVI, VI toolsets, Distributed I/O modules, Development of Control system, Industrial Communication, Image acquisition and processing,

TEXT BOOKS:
1. Gary Johnson, LabVIEW Graphical Programming, 2nd edition,McGraw Hill,Newyork, 1997.
2. Lisa K. wells & Jeffrey Travis, LabVIEW for everyone, Prentice Hall, New Jersey, 1997.

REFERENCES:
1. Kevin James, PC Interfacing and Data Acquisition: Techniques for Measurement, Instrumentation and Control, Newnes,2000.

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III Year B.Tech II Sem	**L**	**T/P/D**	**C**
Open Elective - II	**3**	**0**	**3**

(5EI79) FUNDAMENTALS OF ROBOTICS

Course Objectives

The course is intended for students to:

· Understand the Robot coordinate system and control system
· Learn different types of Robot sensors and actuators
· Identify different types of Robot grippers and their applications.
· Acquire Knowledge on kinematics and vision systems used for different Robots

Course Outcomes

After completion of the course the student is able to:

· Gain knowledge about basic concepts of robots.
· Appreciate the usage of different actuators, sensors and grippers in Robotics.
· Analyze the direct and the inverse kinematic problems.
· Able to identify the applications of Machine Vision in Robotics.

UNIT I:
Basic Concepts:
An over view of Robotics, classification of Robots, Robot Components, Robot degrees of freedom, Robot Joints, Robot Coordinates, Robot reference frames, Programming modes, Robot Characteristics.

UNIT II:
Sensors:
Sensor characteristics, Position sensors, Velocity sensors, Acceleration sensors, Force and Pressure sensors, Torque sensors, Microswitches, Light and infrared sensors, Touch and tactile sensors, Proximity sensors, Range finders.

Unit III:
Actuators and Grippers:
Characteristics of actuating system, Comparison of actuating systems, Hydraulic actuators, Pneumatic devices, Electric motors, Magneto-strictive actuators, Shape-Memory Metals, Electro-active Polymer Actuators.
Classification of Grippers, Drive system for Grippers, Mechanical Grippers, Magnetic Grippers, Vacuum Grippers, Adhesive Grippers, Hooks and Scoops, Gripper Force analysis and design, Active and Passive Grippers.

UNIT IV:
Kinematics:

Robots as Mechanisms, Matrix Representation, Homogeneous Transformation Matrices, Representation of Transformations, Inverse of Transformation Matrices, Forward and Inverse Kinematics with Equations.

UNIT V:
Vision:
Image acquisition, Illumination Techniques, Imaging Geometry, Basic Relationships between Pixels, Segmentation, Description, Segmentation and Description of 3-D Structures, Recognition, Interpretation.

TEXT BOOKS

1. Saeed B. Niku ,Introduction To Robotics : Analysis, Control, Applications ,Wiley, 2nd Edition .
2. Deb.S.R, "Robotics technology and flexible Automation", John Wiley

REFERENCES

1. Mikell P Groover, Nicholas G Odrey, Mitchel Weiss, Roger N Nagel, Ashish Dutta, "Industrial Robotics, Technology programming and Applications", McGraw Hill, 2012.
2. K.S.Fu, R.C.Gonzalez, C.S.G Lee, "Robotics- Control ,Sensing ,Vision and Intelligence ",McGraw-Hill International Edition.
3. Klafter. R.D, Chimielewski. T.A, Negin. M, "Robotic Engineering–An integrated approach", Prentice Hall of India, New Delhi

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III Year – B.Tech-II Sem	L	T/P/D	C
	3	0	3

(5IT72) RELATIONAL DATABASE MANAGEMENT SYSTEMS
(Open Elective - 2)

Course Objectives:

- To **describe** database management systems (DBMS) concepts and relational data model.

- To **employ** DBMS concepts to organize, maintain and retrieve information efficiently and effectively from a DBMS.

- To **discuss** the concepts of transactions and transaction processing systems

- To **examine** the issues and techniques relating to concurrency and recovery in multi-user database environments

Course Outcomes:
After completion of the course Students is able to:

- **Describe** the fundamental concepts of database management. These concepts include aspects of database design, database languages, and database-system implementation.

- **Employ** the Relational Database Model to understand the Logical and Physical aspects of the DBMS architecture.

- **Analyze** and **Apply** normal forms for real time database applications.

- **Evaluation** of transaction properties and file organization methods

UNIT-I
Introduction to Databases and Database Management System - Database system Applications - Advantages of DBMS over File System - Data Models – Instances and schema - View of Data - Database Languages -DDL-DML - Database Users and Administrator - Database System Structure.

UNIT-II
Database Design and ER diagrams – Attributes and Entity Sets – Relationships and Relationship Sets – Constraints - Keys - Design Issues - Entity-Relationship Diagram- Weak Entity Sets - Extended E-R Features-   Database Design with ER model - Database Design for Banking Enterprise

UNIT – III

Introduction to the Relational Model – Structure of RDBMS - Integrity Constraints over Relations – Enforcing Integrity Constraints – Querying Relational Data - Relational Algebra and Calculus.

Introduction to SQL- Data Definition commands, Data Manipulation Commands, Basic Structure, Set operations Aggregate Operations - Join operations - Sub queries and correlated queries, SQL functions , views ,Triggers, Embedded SQL.

UNIT – IV

Functional Dependencies– Introduction , Basic Definitions, Trivial and Non trivial dependencies, closure of a set of dependencies, closure of attributes, irreducible set of dependencies- Schema Refinement in Database Design- Problems Caused by Redundancy – Decompositions – Problem Related to Decomposition –- Lossless Join Decomposition – Dependency Preserving Decomposition - FIRST, SECOND, THIRD Normal Forms – BCNF —- Multi valued Dependencies – Fourth Normal Form.

UNIT-V

Transaction concept- Transaction state- Implementation of atomicity and Durability- Concurrent executions – Serializability, Recoverability

File Organization – Organization of records in file - Data Dictionary Storage – Indexing and Hashing – Basic Concepts , Ordered Indices,B^+Tree Index files, B- tree index files

TEXT BOOKS:

1. Database System Concepts, Silberschatz, Korth , Sixth Edition, McGraw hill (1,2,3 and 5 Units)

2. Introduction to Database Systems, C.J.Date, Pearson Education (4th Unit)

REFERENCES:

1. Fundamentals of Database Systems, ElmasriNavrate Pearson Education
2. Database Management Systems, Raghu ramakrishnan, Johannes Gehrke, TATA Mc Graw Hill(1,2,3 and 5 Units)
3. Data base Systems design, Implementation, and Management, Peter Rob and Carlos Coronel 7th Edition.
4. Data Base Systems using Oracle : A simplified guide to SQL and PL /SQL, Shah, PHI

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B.Tech. III Year II Semester　　　　　　　　　　　**L T/P/D C**
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(5AE72) MODERN AUTOMOTIVE TECHNOLOGIES
(Open Elective-2)

Course objectives:
- **Provide** an overview on advanced engine control system concepts
- **Study** the concepts and drivetrain configurations of electric and hybrid electric vehicles
- **Present** principle, working and automotive applications of fuel cell and solar technology
- **Aware** of intelligent vehicle technologies like navigation, safety, security and comfort systems

Learning outcomes:

After completion of the course Students is able to:

- **Apply** advanced engine control system concepts in engineering
- **Discuss** electric and hybrid electric drivetrain technologies and drivetrain components
- **Describe** automotive applications of fuel cell and solar technology
- **Appreciate** the technological advancements driver assistance systems

UNIT I
ADVANCED ENGINE CONTROLS: Concept of an electronic engine control system, electronic fuel injection - throttle body fuel injection, multi point fuel injection, gasoline direct injection, common rail direct injection, electronic ignition control, engine mapping, on-board diagnostics – engine control module and powertrain control module.

UNIT II
ELECTRIC AND HYBRID VEHICLES: Electric vehicles -Layout of an electric vehicle, performance, energy consumption, advantage and limitations. Hybrid electric vehicles - Concepts, types of hybrid drive train architecture, merits and demerits.

UNIT III

FUEL CELL AND SOLAR VEHICLES: Fuel cell vehicle – Operating principle, types of fuel cells, fuel cell options for fuel cell vehicle and fuel cell hybrid vehicle. Solar vehicle - Solar photovoltaic cell, solar array, solar car electrical system and drive train.

UNIT IV

TELEMATICS AND COMFORT SYSTEMS: Global positioning system, geographical information systems, navigation system, automotive vision system, adaptive cruise control system, active suspension system, power steering and power windows.

UNIT V

SAFETY AND SECURITY SYSTEMS: Active and passive safety, airbags, seat belt tightening system, collision warning systems, anti lock braking systems, traction control system, electronic immobilizers, remote keyless entry, smart card system, number plate coding.

TEXT BOOKS:
1. William B Riddens, "Understanding Automotive Electronics", 5th edition, Butter worth Heinemann Woburn,1998.
2. Mehrdad Ehsani, Yimin Gao, sebastien E. Gay and Ali Emadi, "Modern Electric, Hybrid Electric and Fuel Cell Vehicles: Fundamentals, Theory and Design", CRC Press, 2005.

REFERENCES:
1. Ljubo Vlacic, Michel Parent and Fumio Harashima, "Intelligent Vehicle Technologies", Butterworth-Heinemann publications, Oxford, 2001.
2. "Automotive Hand Book" Robert Bosch, SAE, 5th edition, 2000.
3. Iqbal Husain, "Electric and Hybrid Vehicles: Design Fundamentals, CRC Press, 2003.
4. "Navigation and Intelligent Transportation Systems – Progress in Technology", Ronald K Jurgen, Automotive Electronics Series, SAE, USA, 1998.

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B.Tech. III Year II Semester   L T/P/D C
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(5BS72) ENTERPRENEURESHIP
(Open Elective-2)

Course Objective:
- To introduce basics of entrepreneurship development and the skills set required for innovation.
- To understand changing business trends to enhance decision making skills.
- To learn analytical and conceptual skills of identifying opportunities and check on their feasibility for start-ups.
- To motivate the engineers to choose entrepreneurship as a career for personal and societal growth.

Course Outcome:
After completion of the course the students are able:
- To identify business opportunities and equip themselves in preparing business plans
- To analyze and evaluate different proposals and its requirements for start-up's.
- To pitch the ideas to launch their own venture.
- To assess the impact of competition and find methods to overcome the problems in business.

UNIT-1:
 Entrepreneurial Skills-Opportunities
Entrepreneurship as a career, Personality and Skill Set of Entrepreneur, The Wisdom of Five WHY's and in action, Value and Growth-Stories of Successful Enterprises.
Innovation and Entrepreneurship: Three Learning Milestones of Innovation: Use of Minimum Viable Product-Startup's must tune the baseline towards the ideal-Pivot or Persevere.

UNIT-2:
Changing Business Environment-Role of Entrepreneur
The Role of Quality and Design, Beyond "The right place at the right time", Current trends in Business, Entrepreneurial Management.

UNIT-3:
Origins Of Lean Start-up-Business Plans

The Concept of Vision to Steering:From Start-Define-Learn-Experiment to Leap-Test-Measure-Pivot.

UNIT-4:
Validation of Projects and Products
Projects Evaluation by Budgeting Techniques, Value vs Waste, Analogs and Antilogs, Analysis Paralysis, Why first products are not meant to be perfect-Experiences,Forecasting and Experimenting of Products.

UNIT-5:
Start-up Methods and Understanding Competition
Accelerating Start-up's, optimization versus learning, Kanban Diagram of work as it progresses from stage to stage, the value of three A's: Actionable, Accessible and Auditable, Engines of growth to determine product/market fit,adopting smaller batches, reasons for Failures in Start-up's, Pricing Strategies Based On Competition

Text Books:
1. EricRies, "The Lean Startup", Crown Business, New York. v.3.1.
2. Hisrich, Entrepreneurship, Tata McGraw Hill, New Delhi, 2001.
3. S.S.Khanka, Entrepreneurial Development, S.Chand and Company Limited, New Delhi, 2001.

Refrences:
1. Mathew Manimala, Entrepreneurship Theory at the Crossroads, Paradigms & Praxis,Biztrantra ,2nd Edition ,2005
2. Prasanna Chandra, Projects – Planning, Analysis, Selection, Implementation and Reviews,Tata McGraw-Hill, 1996.
3. P.Saravanavel, Entrepreneurial Development, Ess Pee kay Publishing House, Chennai -1997.
4. Arya Kumar. Entrepreneurship. Pearson. 2012
5. Donald F Kuratko, T.V Rao. Entrepreneurship: A South Asian perspective. Cengage Learning.2012

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III Year B.Tech CSE – II Sem	L	T/P/D	C
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(5CS55) DATA MINING AND ANALYTICS LABORATORY
(Common to CSE)

Data Mining Laboratory

Course Objectives:

- **Demonstrate** the basic concepts and techniques of Data Mining using WEKA machine learning toolkit.

- **Performing** data preprocessing tasks for data mining in WEKA

- **Applying** various classification algorithms on data sets using the WEKA machine learning toolkit

- **Exploring** clustering and Association rule techniques using the WEKA

Course Outcomes:
After completion of the course, the students are expected to:

- **Explore** the data preprocessing steps using WEKA tool.

- **Develop and analyze** the principle algorithms and techniques used in data mining, such as clustering, association mining, classification and prediction.

- **Implement** statistical analysis techniques using R for solving practical problems

- **Design** appropriate statistical tests using R and visualize the outcome

Task-1(a)
Title: Introduction to the Weka machine learning toolkit
Aim: To learn to use the Weak machine learning toolkit

  1. What options are available on main panel?
  2. What is the purpose of the the following in Weka:
          1. The Explorer
          2. The Knowledge Flow interface
          3. The Experimenter
          4. The command-line interface
  3. Describe the **arff**file format.
  4. Press the Explorer button on the main panel and load the weather dataset and answer the following questions
          1. How many instances are there in the dataset?
          2. State the names of the attributes along with their types and values.

3. What is the class attribute?

4. In the histogram on the bottom-right, which attributes are plotted on the X,Y-axes? How do you change the attributes plotted on the X,Y-axes?

5. How will you determine how many instances of each class are present in the data

6. What happens with the Visualize All button is pressed?

7. How will you view the instances in the dataset? How will you save the changes?

Task-1(b)

1. What is the purpose of the following in the Explorer Panel?
    1. The Preprocess panel
        1. What are the main sections of the Preprocess panel?
        2. What are the primary sources of data in Weka?
    2. The Classify panel
    3. The Cluster panel
    4. The Associate panel
    5. The Select Attributes panel
    6. The Visualize panel.
2. Load the weather dataset and perform the following tasks:
    1. Use the unsupervised filter Remove With Values to remove all instances where the attribute 'humidity' has the value 'high'?
    2. Undo the effect of the filter.
    3. Answer the following questions:
        1. What is meant by filtering in Weka?
        2. Which panel is used for filtering a dataset?
        3. What are the two main types of filters in Weka?
        4. What is the difference between the two types of filters? What is the difference between and attribute filter and an instance filter?
3. Load the iris dataset and perform the following tasks:
    1. Press the Visualize tab to view the Visualizer panel.
    2. What is the purpose of the Visualizer?
    3. Select one panel in the Visualizer and experiment with the buttons on the panel.

Task-2

Title: Classification using the Weka toolkit
Aim: To perform classification on data sets using the Weka machine learning toolkit
Requirements
1. Load the 'weather.nominal.arff' dataset into Weka and run Id3 classification algorithm. Answer the following questions
    1. List the attributes of the given relation along with the type details
    2. Create a table of the weather.nominal.arff data
    3. Study the classifier output and answer the following questions
        1. Draw the decision tree generated by the classifier
        2. Compute the entropy values for each of the attributes

3. What is the relationship between the attribute entropy values and the nodes of the
Decision tree?
4. Draw the confusion matrix? What information does the confusion matrix provide?
5. Describe the following quantities:
1. TP Rate   2. FP Rate
3. Precision   4. Recall

Task 3:
Title: Performing data preprocessing tasks for data mining in Weka
Aim: To learn how to use various data preprocessing methods as a part of the data mining
Requirements
Application of Discretization Filters
1. Perform the following tasks
1. Load the 'sick.arff' dataset
2. How many instances does this dataset have?
3. How many attributes does it have?
4. Which is the class attribute and what are the characteristics of this attribute?
5. How many attributes are numeric? What are the attribute indexes of the numeric attributes?
6. Apply the Naive Bayes classifier. What is the accuracy of the classifier?

2. Perform the following tasks:
1. Load the *'sick.arff'* dataset.
2. Apply the supervised discretization filter.
3. What is the effect of this filter on the attributes?
4. How many distinct ranges have been created for each attribute?
5. Undo the filter applied in the previous step.
6. Apply the unsupervised discretization filter. Do this twice:
1. In this step, set 'bins'=5
2. In this step, set 'bins'=10
3. What is the effect of the unsupervised filter filter on the datset?
7. Run the the Naive Bayes classifier after apply the following filters
1. Unsupervised discretized with 'bins'=5
2. Unsupervised discretized with 'bins'=10
3. Unsupervised discretized with 'bins''=20.
8. Compare the accuracy of the following cases
1. Naive Bayes without discretization filters
2. Naive Bayes with a supervised discretization filter
3. Naive Bayes with an unsupervised discretization filter with different values for
the 'bins' attributes.

Task 4:
Title : Performing clustering using the data mining toolkit
Aim : To learn to use clustering techniques
     Requirements
1.Perform the following tasks:
1. Load the 'bank.arff' data set in Weka.

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2. Write down the following details regarding the attributes:
    1. names
    2. types
    3. values.
3. Run the Simple K-Means clustering algorithm on the dataset
    1. How many clusters are created?
    2. What are the number of instances and percentage figures in each cluster?
    3. What is the number of iterations that were required?
    4. What is the sum of squared errors? What does it represent?
    5. Tabulate the characteristics of the centroid of each cluster.
    6. Visualize the results of this clustering (let the X-axis represent the cluster name, and the Y-axis represent the instance number)
        1. Is there a significant variation in age between clusters?
        2. Which clusters are predominated by males and which clusters are predominated by females?
        3. What can be said about the values of the region attribute in each cluster?
        4. What can be said about the variation of income between clusters?
        5. Which clusters are dominated by married people and which clusters are dominated by unmarried people?
        6. How do the clusters differ with respect to the number of children?
        7. Which cluster has the highest number of people with cars?
        8. Which clusters are predominated by people with savings accounts?
        9. What can be said about the variation of current accounts between clusters?
        10. Which clusters comprise mostly of people who buy the PEP product and which ones are comprised of people who do not buy the PEP product?
4. Run the SimpleKMeans algorithm for values of K (no. of clusters) ranging from 1 to 12. Tabulate the sum of squared errors for each run. What do you observe about the trend of the sum of squared errors?
5. For the run with K=12, answer the following questions:
    1. Is there a significant variation in age between clusters?
    2. Which clusters are predominated by males and which clusters are predominated by females?
    3. How do the clusters differ with respect to the number of children?
    4. Which clusters comprise of people who buy the PEP product and which ones are comprised of people who do not buy the PEP product?
    5. Do you see any differences in your ability to evaluate the characteristics of clusters generated for K=6 versus K=12? Why does this difference arise?

Task 5:
Title
Using Weka to determine Association rules

Aim

To learn to use Association algorithms on datasets

Requirements

1. Perform the following tasks
    1. Define the following terms
            1. item and item set
            2. Association
            3. Association rule
            4. Support of an association rule
            5. Confidence of an association rule
            6. Large item set
            7. Association rule problem
    2. What is the purpose of the Apriori Algorithm
2. Perform the following tasks:
    1. Load the 'vote.arff' dataset
    2. Apply the Apriori association rule
    3. What is the support threshold used? What is the confidence threshold used?
    4. Write down the top 6 rules along with the support and confidence values.
    5. What does the figure to the left of the arrow in the association rule represent?
    6. What does the figure to the right of the arrow in the association rule represent?
    7. For rule 8, verify that numerical values used for computation of support and confidence are
in accordance with the data by using the Preprocess panel. Then compute the support and confidence values. Are they above the threshold values?
3. Perform the following tasks:
    1. Load the dataset 'weather.nominal.arff'.
    2. Apply the Apriori association rule
            1. Consider the rule "temperature=hot ==> humidity=normal." Compute the support and confidence for this rule.
            2. Consider the rule "temperature=hot humidity=high ==> windy=TRUE." Consider the support and confidence for this rule.
            3. Is it possible to have a rule like the following rule:
            "outlook=sunny temperature=cool" ==> humidity=normal play=yes
4. Perform the following tasks:
            1. Load the bank-data.csv file.
            2. Apply the Apriori association rule algorithm. What is the result? Why?
            3. Apply the supervised discretization filter to the age and income attributes.
            4. Run the Apriori rule algorithm
            5. List the rules that were generated.

Text Books:
    1. Data mining: Concepts and Techniques, Jiawei Han and Micheline Kamber, 2nd Edition, Elsevier, 2006.
    2. Data Mining Techniques – ARUN K PUJARI, University Press.

REFERENCES:
1. SQL-PL/SQL by Ivan Bayrose
2. Data Warehousing Fundamentals By Paulraj
3. Data Mining Introductory & Advanced Topic by Margaret H. Dunham
4. Data Mining Techniques – ARUN K PUJARI, University Press.
5. Data Mining for Association Rules and Sequential Patterns: Sequential and Parallel Algorithms, Jean-Marc Adamo, ISBN: 0387950486

INTRODUCTION TO ANALYTICS (ASSOCIATE ANALYTICS-I)

Course Objectives:
- To Introduction the terminology, technology and its applications
- To introduction the concept of Analytics for Business
- To introduction the tools, technologies and Programming Language R which is used by day to day analytics cycle

COURSE OUTCOMES:

- Explore various R environment, related software and documentation, R andstatistics.
- Illustrate statistical computing which includes programming in R, reading data into R, accessing R packages.
- Demonstrate different debugging, and organizing and commenting R code.
- Extract large data sets to perform visualization and Statistical data analysis.

Course Description:
In this course students will learn how to program in R and how to use R for effective data analysis. Students will learn how to install and configure software necessary for a statistical programming environment; discuss generic programming language concepts as they are implemented in a high-level statistical language. The course covers practical issues in statistical computing which includes programming in R, reading data into R, accessing R packages, writing R functions, debugging, and organizing and commenting R code. Topics in statistical data analysis and optimization will provide working examples.

Schedule:
- **Week 1:** Introduction and preliminaries: The R environment, Related software and documentation, R and statistics
- **Week 2:** Simple manipulations: numbers and vectors
- **Week 3:** Objects, their modes and attributes, Intrinsic attributes: mode and length, Changing the length of an object

- **Week 4:** Ordered and unordered factors
- **Week 5:** Arrays and matrices
- **Week 6:** Lists and data frames
- **Week 7:** Mid Term Examination-I
- **Week 8:** Reading data from files
- **Week 9:** Probability distributions
- **Week 10:** Grouping, loops and conditional execution
- **Week 11:** Writing your own functions
- **Week 12:** Statistical models in R
- **Week 13:** Graphical procedures: High-level plotting commands, Low-level plotting commands
- **Week 14:** Mid Term Examination-II

TEXT BOOKS:

1. An Introduction to R, Notes on R: A Programming Environment for Data Analysis and Graphics Version 3.2.3 (2015-12-10), W. N. Venables, D. M. Smith and the R Core Team

2. Students Hand book for Associate Analytics

REFERENCES:

1. Introduction to Probability and Statistics Using R, ISBN: 978-0-557-24979-4 is a Text book written for an undergraduate course in Probability and Statistics.
2. An Introduction to R, by Venables and Smith and the R Development Core team. This may downloaded for free from the R project website (http://www.r-project.org/, see manuals). There are plenty of other free references available from the R Project website.
3. Montgomery, Douglas C, and George C, Runger, Applied Statistics and Probability for Engineers, John Wiley & Sons, 2010.

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III Year B.Tech CSE – II Sem	L	T/P/D	C
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(5IT58) WEB TECHNOLOGIES LABORATORY
(Common to CSE and IT)

Course Objectives:

- **Learn** various fundamental concepts for developing websites and web based applications.
- **Know** about the technology for data transportation among incompatible systems and applications.
- **Develop** static and dynamic websites.
- **Implement** various client side and server side scripting technologies for developing web applications.

Course Outcomes:

After completion of the course Students is able to:

- **Design** client side interactive pages using HTML,java script and CSS.
- **Create** XML documents and transfer them across the systems.
- **Compose** server side pages using servlets, JSP and JDBC.
- **Develop** enterprise applications by integrating client and server side pages.

WEEK 1

Design the following static web pages required for an online book store web site.

1) HOME PAGE:

The static home page must contain three frames.

Top frame   : Logo and the college name and links to Home page, Login page, Registration page, Catalogue page and Cart page (the description of these pages will be given below).

Left frame   : At least four links for navigation, which will display the catalogue of respective links. For e.g.: When you click the link "CSE" the catalogue for CSE Books should be displayed in the Right frame.

Right frame: The pages to the links in the left frame must be loaded here. Initially this page contains description of the web site.

Logo	Web Site Name			
Home	Login	Registration	Catalogue	Cart

CSE	
ECE	
EEE	Description of the Web Site
CIVIL	

Fig 1.1

2) LOGIN PAGE:

This page looks like below:

Web Site Name				
Logo				
Home	Login	Registration	Catalogue	Cart

CSE	
ECE	Login :
EEE	Password:
CIVIL	

Submit   Reset

3) CATOLOGUE PAGE:

The catalogue page should contain the details of all the books available in the web site in a tabular format.

The details should contain the following:

1. Snap shot of Cover Page.
2. Book Title, Author Name, Publisher.
3. Price.
4. Add to cart button.

Logo	Web Site Name

Home	Login	Registration	Catalogue	Cart
CSE ECE EEE CIVIL		Book : XML Bible Author : Winston Publication : Wiely	$ 40.5	
		Book : AI Author : S.Russel Publication : Princeton hall	$ 63	
		Book : Java 2 Author : Watson Publication : BPB publications	$ 35.5	
		Book : HTML in 24 hours Author : Sam Peter Publication : Sam publication	$ 50	

WEEK 2
4) CART PAGE:

The cart page contains the details about the books which are added to the cart.

The cart page should look like this:

Logo	Web Site Name			
Home	Login	Registration	Catalogue	Cart

IT				
CSE	Book name	Price	Quantity	Amount
ECE				
EEE	Java 2	$35.5	2	$70
CIVIL	XML bible	$40.5	1	$40.5
			Total amount -	$130.5

5) REGISTRATION PAGE:

Create a "registration form "with the following fields

   1) Name (Text field)
   2) Password (password field)

   3) E-mail id (text field)

   4) Phone number (text field)

   5) Sex (radio button)

   6) Date of birth (3 select boxes)

   7) Languages known (check boxes – English, Telugu, Hindi, Tamil)

   8) Address (text area)

WEEK 3

VALIDATION:

a) Write JavaScript to validate the following fields of the above registration page.

>   1.   Name (Name should contains only alphabets and the length should not be less than 6 characters).
>   2.   Password (Password should not be less than 6 characters length).
>   3.   E-mail id (should not contain any invalid and must follow the standard pattern name@domain.com)
>   4.   Phone number (Phone number should contain 10 digits only).

b) Write JavaScript to validate the above login page with the above parameters.

WEEK 4

Design a web page using CSS (Cascading Style Sheets) which includes the following:

>   1) Use different font, styles:
>
>   In the style definition you define how each selector should work (font, color etc.).
>   Then, in the body of your pages, you refer to these selectors to activate the styles.
>   For example:

```
<HTML>
<HEAD>
<style type="text/css">
B.headline {color:red; font-size:22px; font-family:arial; text-decoration:underline}
</style>
</HEAD>
<BODY>
<b>This is normal bold</b><br>
<b class="headline">This is headline style bold</b>
</BODY>
</HTML>
```

>   2) Set a background image for both the page and single elements on the page.
>   You can define the background image for the page like this:

```
BODY {background-image:url(myimage.gif);}
```

3) Control the repetition of the image with the background-repeat property.

   As background-repeat: repeat
   Tiles the image until the entire page is filled, just like an ordinary background

image in plain HTML.

4) Define styles for links as

       A:link
       A:visited
       A:active
       A:hover

Example:

```
<style type="text/css">
A:link     {text-decoration: none}
A:visited {text-decoration: none}
A:active  {text-decoration: none}
A:hover  {text-decoration: underline; color: red;}
</style>
```

5) Work with layers:

For example:

```
LAYER 1 ON TOP:
<div style="position:relative; font-size:50px; z-index:2;">LAYER 1</div>
<div style="position:relative; top:-50; left:5; color:red; font-size:80px; z-

LAYER 2 ON TOP:
<div style="position:relative; font-size:50px; z-index:3;">LAYER 1</div>
<div style="position:relative; top:-50; left:5; color:red; font-size:80px; z-
```

6) Add a customized cursor:

Selector {cursor:value}
For example:

```
<html>
<head>
```

```
<style type="text/css">
.xlink {cursor:crosshair}
.hlink{cursor:help}
</style>
</head>
<body>
<b>
<a href="mypage.htm" class="xlink">CROSS LINK</a>
<br>
<a href="mypage.htm" class="hlink">HELP LINK</a>
</b>
</body>
</html>
```

WEEK 5

Write an XML file which will display the Book information which includes the following:

> 1) Title of the book

> 2) Author Name

> 3) ISBN number

> 4) Publisher name

> 5) Edition

> 6) Price

Write a Document Type Definition (DTD) to validate the above XML file.

Display the XML file as follows.

The contents should be displayed in a table. The header of the table should be in color GREY. And the Author names column should be displayed in one color and should be capitalized and in bold. Use your own colors for remaining columns.

Use XML schemas XSL and CSS for the above purpose.

Note: Give at least for 4 books. It should be valid syntactically.

Hint: You can use some xml editors like XML-spy

WEEK 6

VISUAL BEANS:

Create a simple visual bean with a area filled with a color.

The shape of the area depends on the property shape. If it is set to true then the shape of the area is Square and it is Circle, if it is false.

The color of the area should be changed dynamically for every mouse click. The color should also be changed if we change the color in the "property window ".

WEEK 7

Install TOMCAT web server.

While installation assign port number 8000 to TOMCAT. Make sure that these ports are available i.e., no other process is using this port.

Access the above developed static web pages for books web site, using these servers by putting the web pages developed in week-1 and week-2 in the document root.

Access the pages by using the urls: http://localhost:8000/vnr/books.html

WEEK 8

User Authentication :

Assume four users user1, user2, user3 and user4 having the passwords pwd1,pwd2,pwd3

and pwd4 respectively. Write a servelet for doing the following.

1. Create a Cookie and add these four user id's and passwords to this Cookie.

2. Read the user id and passwords entered in the Login form (week1)   and authenticate with the values (user id and passwords) available in the cookies.

If he is a valid user (i.e., user-name and password match) you should welcome him by name(user-name) else you should display " You are not an authenticated user ".

Use init-parameters to do this. Store the user-names and passwords in the web.xml and access them in the servlet by using the getInitParameters() method.

WEEK 9

Install JSDK.

User Authentication :

Assume four users user1, user2, user3 and user4 having the passwords pwd1, pwd2, pwd3

and pwd4 respectively. Write a servelet for doing the following.

1. Use init-parameters to do this. access them in the servlet by using the

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getInitParameters() method.

2. Read the user id and passwords entered in the Login form (week1) and authenticate with the values (user id and passwords) with above accessed values.

If user is a valid user (i.e., user-name and password match) you should welcome user by name (user-name) else you should display " You are not an authenticated user ".

WEEK 10

Install a database (Mysql or Oracle).

Create a table which should contain at least the following fields: name, password, email-id, phone number (these should hold the data from the registration form).

Practice 'JDBC' connectivity.

Write a java program/servlet/JSP to connect to that database and extract data from the tables and display them. Experiment with various SQL queries.

Insert the details of the users who register with the web site, whenever a new user clicks the submit button in the registration page (week2).

WEEK 11

Write a JSP which does the following job: Insert the details of the 3 or 4 users who register with the web site (week9) by using registration form. Authenticate the user when he submits the login form using the user name and password from the database (similar to week8 instead of cookies).

WEEK 12

Create tables in the database which contain the details of items (books in our case like Book name, Price, Quantity, Amount)) of each category. Modify your catalogue page (week 2) in such a way that you should connect to the database and extract data from the tables and display them in the catalogue page using JDBC.

TEXT BOOKS:

1. Web Programming, building internet applications, Chris Bates 2nd edition, WILEY Dreamtech.

2. Core servlets and java server pages volume 1: core technologies By Marty Hall and Larry Brown Pearson.

III Year B.Tech CSE – II Sem

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(5CS56) LINUX INTERNALS LABORATORY
(Common to CSE)

Course Objectives:

- **Apply** the basic commands to handle the Linux Environment.
- **Use** the Shell/C scripting constructs to modify the file system content.
- **Implement** the process management concepts using C language.
- **Design** Client-Server Applications using Sockets and TCP/UDP protocols.

Course Outcomes:

After completion of the course Students is able to:

- **Make** use of Shell Scripts in managing Linux Environment
- **Construct** C Scripts to handle the File system in Linux.
- **Implement** the IPC Mechanisms in Linux operating system using C language
- **Build and Analyze** the Client-Server Environment using various protocols.

List of Experiments

1. Basic Linux Commands   File handling utilities, Security by file permissions, Process   utilities, Disk utilities, sed, awk, grep.
2. 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.
3. Write a shell script that deletes all lines containing a specified word in one or more files supplied as arguments to it.
4. 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.
5. C programming examples using Linux Operating systems.
6. Write a shell script that receives any number of file names as arguments checks if every argument supplied is a file or a directory and reports accordingly. Whenever the argument is a file, the number of lines on it is also reported.
7. Write a shell script that accepts a list of file names as its arguments, counts and reports theoccurrence of each word that is present in the first argument file on other argument files.
8. Write a shell script to list all of the directory files in a directory.
9. Write a shell script to find factorial of a given integer.

10. Write an awk script to count the number of lines in a file that do not contain vowels.
11. Write an awk script to find the number of characters, words and lines in a file.
12. Implement in C the following Unix commands using System calls
    a)Cat   b) mv
13. Write a C program to emulate the Unix ls – l   command.
14. Write a C program on zombie process
15. Write a C program that illustrates the following.
a)   Creating a message queue.
b)   Writing to a message queue.
c)   Reading from a message queue.
16. Write a C program that illustrates file locking using semaphores.

Text Books:
1.   Unix System Programming using C++, T.Chan, PHI.
2.   Unix Concepts and Applications, 4th Edition, Sumitabha Das, TMH,2006.

References:
   1.   Beginning Linux Programming, 4ᵗʰ Edition, N.Matthew, R.Stones,Wrox, Wiley India Edition,rp-2008

2.   Linux System Programming, Robert Love, O'Reilly, SPD.
3.   Advanced Programming in the Unix environment, 2nd Edition, W.R.Stevens, Pearson Education.
4.   Unix Network Programming ,W.R.Stevens,PHI.
5.   Unix for programmers and users, 3rd Edition, Graham Glass, King Ables, Pearson Education.

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(5CS17) BIG DATA ANALYTICS
(Common to CSE and IT)

COURSE OBJECTIVES:
- To explore the fundamental concepts of data analytics
- To learn to analyze the data analysis techniques
- To explore the techniques related to mining streams
- To understand, explore Hadoop framework technology and its associated tools along with visualization methods

COURSE OUTCOMES:
After completion of this course the student is able to:
- **Identify** the major sources of data; apply pre-processing tasks and summary statistics on data
- **Understand** the concept of Hadoop and analyze data on HDFS and its comparison with other systems.
- **Explain** Hadoop framework and its components-PIG, HIVE, HBASE, ZOOKEEPER
- **Examine** Machine Learning algorithms and represent data using visualization tools.

Unit I:
Data Management (NOS 2101):
Design Data Architecture and manage the data for analysis, understand various sources of Data like Sensors/signal/GPS etc. Data Management, Data Quality (noise, outliers, missing values, duplicate data) and Data Preprocessing.
Export all the data onto Cloud ex. AWS/Rackspace etc.
Maintain Healthy, Safe & Secure Working Environment(NOS 9003):
Introduction, workplace safety, Report Accidents & Emergencies, Protect health & safety as your work, course conclusion, assessment.

Unit II
Big Data Tools(NOS 2101):
Introduction to Big Data tools like Hadoop, Spark, Impala etc. Data ETL process, Identify gaps in the data and follow-up for decision making.
Provide Data/Infromation in Standard Formats(NOS 9004):

Introduction, Knowledge management, Standardized reporting & compliances, Decision Models, course conclusion, Assessment.

Unit III
Big Data Analytics:
Run descriptives to understand the nature of the available data, collate all the data sources to suffice business requirement, Run descriptive statistics for all the variables and observer the data ranges, Outlier detection and elimination.

Unit IV
Machine Learning Algorithms(NOS 9003):
Hypothesis testing and deremining the multiple analytical analytical methodologies, Train Model on 2/3 sample data using various Statistical / Machine learning algorithms, test model on 1/3 sample for prediction etc.,

U nit V
(NOS 9004)
Data Visualization(NOS 2101):
Prepare the data for Visualization, Use tools like Tableau, QlickView and D3, Draw insighs out of Visualization tool. Product Implementation

TEXT BOOK:
1. Student's Handbook for Associate Analytics.

REFERENCE BOOKS:
1. Introduction to Data Mining, Tan, Steinbach and Kumar, Addison Wesley, 2006.
2. Data Mining Analysis and Concepts, M. Zaki and W.Meira (the authors have kindly made an online version available) http://www.dataminingbook.info/uploads/book.pdf
3. Mining of Massive Datasets Jure Leskovec Stanford Univ. Anand Rajaraman Milliway Labs Jeffrey D. Ullman Stanford Univ.
4. (http://www.vistrails.org/index.php/Course:_Big_Data_Analysis)

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(5BS42)MANAGEMENT SCIENCE

Course Prerequisites: Business Economics and Financial Analysis

Course Objectives:

- **Understand** the principles, functions, theories and practices of different management areas and to provide them with practical exposure to cases of success/failure in business.

- **Expose** with a systematic and critical understanding of organizational theory, structures and design.

- **Comprehend** conceptual models of strategic management and to familiarize with the tools of operations and project management.

- **Understand** the role of human relations in the management of operations and to provide basic insights into contemporary management practices.

Course outcomes:

After completion of the course Students is able to:

- **Function** effectively in multidisciplinary teams to accomplish a common goal of organizations.

- **Apply** theories to improve the practice of management.

- **Appreciate** the management challenges associated with high levels of change in the organizations.

- **Develop** global vision and management skills at both a strategic level and interpersonal level.

UNIT I
Introduction to management

Concepts of management - nature, importance, and functions of management; Taylor's scientific management theory; Fayol's principles of management; Mayo's Hawthorne experiments; Maslow's theory of human needs; Douglas McGregor's theory X and theory Y; Herzberg's two-factor theory of motivation; System and contingency approach to management; Planning – meaning, significance, and types of plans; Decision making and

steps in decision making process; Leadership styles; Social responsibilities of management.

Organizing - Meaning, and features; Process of organization; Principles of organization; Elements of organization; Organization chart; Span of control - Graicunas formulae; Centralisation and decentralization; Types of mechanistic and organic structures of organisation - line organization, line and staff organization, functional organization, committee organization, matrix organization, virtual organisation, cellular organisation, team structure, boundaryless organization, inverted pyramid structure, and lean and flat organization structure; Their merits, demerits and suitability.

UNIT II
Human resources management
Concepts of HRM; Basic functions of HR manager - human resource planning (definition; objectives; process), recruitment (definition; sources; techniques), selection (definition; process), induction and orientation, training and development (definition; need; methods), employee exit process, employee relations management, employee compensation and benefits administration, job evaluation (objectives; process; methods), and performance appraisals (objectives; process; methods).

UNIT III
Strategic management
Mission; Goals; Objectives; Policy; Strategy; Programmes; Elements of corporate planning process - environmental scanning; value chain analysis, BCG matrix, generic strategy alternatives, SWOT analysis, and steps in strategy formulation and implementation; Balance score card; Capability maturity model (CMM)/ People capability maturity model(PCMM).

UNIT IV
Operations management
Plant location; Types of plant layout; Methods of production – job, batch, and mass production; Work study-basic procedure involved in method study and work measurement.
Materials management
Objectives; Need for inventory control; EOQ, ABC Analysis; Purchase procedure; Value analysis; JIT, Six sigma; TQM; Supply chain management; Stores management and stores records.
Marketing
Functions of marketing; Marketing mix, and marketing strategies based on product life cycle; Channels of distribution.

UNIT V

Project management – **network analysis**

Network analysis; Programme evaluation review technique - PERT (probability of completing the project within given time); Critical path method - CPM (Identifying critical path); Project cost analysis; Project crashing; Simple problems.

TEXT BOOK

1. Management Science by Aryasri; Publisher: Tata McGraw Hill, 2009.
2. Principles and Practice of Management - L.M. Prasad; Publisher: Sultan Chand Publications, New Delhi.

REFERENCES

1. Principles of Marketing: A South Asian Perspective by Kotler Philip, Gary Armstrong, Prafulla Y. Agnihotri, and Eshan ul Haque , 2010, 13th Edition, Publisher: Pearson Education/ Prentice Hall of India.
2. Management by James Arthur, Finch Stoner, R. Edward Freeman, and Daniel R. Gilbert 6th Ed; Publisher: Pearson Education/Prentice Hall.
3. A Handbook of Human Resource Management Practice by Michael Armstrong, 2010; Publisher: Kogan Page Publishers.
4. Operations Management: Theory and Practice by B. Mahadevan, 2010; Publisher: Pearson Education.
5. Strategic Management by V.S.P. Rao and V. Hari Krishna, 2010; Publisher: Excel Books.

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(5CS16) NETWORK SECURITY
Common to CSE)

Course Objectives:

- Outline security concepts, threats, attacks, services and mechanisms.
- Describe various cryptosystems- symmetric key cryptography, public key cryptography.
- Apply authentication services, mechanisms and Email security.
- Discuss the concepts of IP Security, web security, viruses and firewalls.

Course Outcomes:

After completion of this course, students should be able to:

- **Analyze** the basics of security attacks, services, goals and mechanism .
- **Apply** variety of cryptographic algorithms, Hash Functions and protocols underlying network security and authentication applications.
- **Examine and analyze** various Email and Web Security mechanisms.
- **Understand** the System Level Security issues.

SYLLABUS:
UNIT I
INTRODUCTION: Security Attacks, Services Mechanisms, A model for Internetwork security, Classical Encryption techniques, Fiestel Cipher Structure, Data Encryption Standard, Block Cipher Design Principles and Modes of Operation, Triple DES, RC-4, Evaluation criteria for AES, AES Cipher, Placement of Encryption Function, Traffic Confidentiality.

UNIT II
PUBLIC KEY CRYPTOGRAPHY
Confidentiality using Symmetric Encryption – Principles of Public key Cryptosystems, RSA algorithm, Key Management, Diffie-Hellman key Exchange, Elliptic Curve Cryptography. Buffer overflow, TCP session hijacking, ARP attacks, route table modification, UDP hijacking and man-in-the-middle attacks.
UNIT III
AUTHENTICATION AND HASH FUNCTIONS

Authentication requirements, Authentication functions, Message Authentication Codes, Hash Functions, Security of Hash Functions and MACs, MD5 message Digest algorithm , Secure Hash Algorithm, HMAC, Digital Signatures, Authentication Protocols, Digital Signature Standard, Authentication Applications: Kerberos, X.509 Authentication Service

UNIT IV
NETWORK SECURITY: Email Security and Web Security
Electronic Mail Security – PGP/ SMIME, IP security- Architecture, Authentication Header, Encapsulating Security Payload, Key Management, Web Security- Secure Socket Layer, Transport Layer Security and Secure Electronic Transaction

UNIT V
SYSTEM LEVEL SECURITY
Intrusion detection – password management – Viruses and related Threats – Virus Counter measures – Firewall Design Principles – Trusted Systems.

TEXT BOOKS
1. William Stallings, "Cryptography And Network Security – Principles and Practices", Prentice Hall of India, Fourth Edition, 2005.
2. "Hack Proofing your network" by Ryan Russell, Dan Kaminsky, Rain Forest, Puppy, Joe Grand, DavidAhmad, Hal Flynn Ido Dubrawsky, Steve W.Manzuik and Ryan Permeh, wiley Dreamtech

REFERENCES
1. Network Security Essentials: Applications and Standards by William Stallings.Prentice Hall, Hardcover, Published November 1999, 366 pages, ISBN 0130160938
2. Charles B. Pfleeger, Shari Lawrence Pfleeger, "Security in Computing", Third Edition, Pearson Education, 2003
3. Cryptography: Theory and Practice by Douglas R. Stinson, CRC press, hardcover, Published March, 1995. ISBN 0-8493-8521-0
4. Bruce Schneier, "Applied Cryptography", John Wiley & Sons Inc, 2001

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(5CS10) ARTIFICIAL INTELLIGENCE & NEURAL NETWORKS
(Common to CSE)

Course Objectives:

- **Understand** and analyze the importance and basic concepts of artificial intelligence and the use of agents.
- **Identify**, explore the complex problem solving approaches and strategies.
- **Explore** and analyze the basic concepts of neural networks and learning process.
- **Analyze** the concepts of neural network algorithms for various domains.

Course Outcomes:
After completion of the course Students is able to:

- **Apply** the basic concepts of artificial intelligence, use of agents in the real time applications.
- **Solve** complex problems using Searching techniques.
- **Design, construct and evaluate** a Neural Network system, with learning process models.
- **Make Use** of moderate techniques necessary to implement and evaluate Neural Network algorithms.

UNIT I
Introduction to AI – Foundations of AI – History of AI - Intelligent Agents – Agents and Environments – Nature of Environments – Structure of Agents – Problem solving Agents – Problem formulation – Example Problems

UNIT II
Search Techniques – Uninformed Search Strategies – Breadth first search – Depth first search – Depth limited search – Iterative deepening depth first search - Bi-directional search – comparison – Search with partial information - Heuristic search – Greedy best first search – A* search – Memory bounded heuristic search - Heuristic functions - Local search algorithms - Hill climbing – Simulated annealing search - Local beam search – Genetic algorithms

UNIT III
Constraint satisfaction problems – Backtracking search for CSP's - local search for constraint satisfaction problem.
Adversarial search – Games - Minimax algorithm - optimal decisions in multiplayer games - Alpha beta pruning - evaluation functions - cutting off search.

UNIT IV

What is a neural network, Human Brain, Models of a Neuron, Neural networks viewed as Directed Graphs, Network Architectures, Artificial Intelligence and Neural Networks. Learning Laws, Error Correction learning, Memory based learning, Hebbian learing, Competitive, Boltzmann learning.

UNIT V

Adaptive filtering problem, Unconstrained Organization Techniques, Linear least square filters, least mean square algorithm, Perceptron and its convergence theorem, Introduction to Multilayer Perceptron, Back propagation algorithm

TEXT BOOKS

1. Artificial Intelligence: A modern approach by Stuart Russell and Peter Norvig,3rd Edition, Prentice Hall, 2010.
2. Neural networks A comprehensive foundation, Simon Haykin, Pearson Education, 2nd Edition, 2004

REFERENCES

1. Artificial Intelligence by Elaine Rich & Kevin Knight,2nd Edition, TMH
2. Artificial Intelligence, A New Synthesis by Nils J. Nilsson, ELSEVIER
3. Artificial Neural Networks by Yegnanarayana.B, PHI

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(5IT75) MOBILE COMPUTING
(Elective-I)
(Common to CSE and IT)

Course Objectives:

- **Summarize** the necessity of wireless communication and the basics of GSM network.

- **Understand** various wireless MAC Protocols.

- **Define** the architecture for IEEE802.11, Bluetooth.

- **Analyze** wired and wireless networks, network and transport layer protocols

- **Appraise** Data Dissemination Methods for Synchronization.

Course Outcomes:
After completion of the course Students is able to:

- **Describe** the wireless communication technologies and understand the protocols used in the layered architecture of GSM.

- **Understand** the major Multiple Access Protocols.

- **Interpret** WLAN and Bluetooth Architectures

- **Summarize** network layer and transport layer protocols and issues related to database management in mobile computing.

UNIT-I
Introduction to Mobile Communications and Computing:
Mobile Computing (MC): Introduction to MC, Novel applications, Limitations, and Architecture.
GSM: Mobile services, System architecture, Radio interface, Protocols, Localization and calling, Handover, Security, and New data services-GPRS.

UNIT-II
(Wireless) Medium Access Control (MAC): Motivation for a Specialized MAC (Hidden and Exposed Terminals, Near and Far Terminals), SDMA, FDMA, TDMA, CDMA.

UNIT-III
WIRELESS LAN: Infra red Vs radio transmission, Infrastructure and Ad-hoc Network, IEEE 802.11:System Architecture, Protocol Architecture, Bluetooth : User Scenarios, Architecture.
UNIT-IV

Mobile IP Network Layer: Mobile IP (Goals, assumptions, entities and terminology, IP packet delivery, agent advertisement and discovery, registration, tunneling and encapsulation, optimizations), Dynamic Host Configuration Protocol (DHCP).

Mobile Transport Layer: Traditional TCP, Indirect TCP, Snooping TCP, Mobile TCP, Fast retransmit/fast recovery, Transmission/ time-out freezing, Selective retransmission, Transaction oriented TCP.

UNIT-V

Database Issues: Hoarding techniques, caching invalidation mechanisms. **Data Dissemination:** Communications asymmetry, classification of new data delivery mechanisms, pushes based mechanisms, pull-based mechanisms, hybrid mechanisms, selective tuning (indexing) techniques.

TEXT BOOKS:
1. "Mobile Communications", Jochen Schiller, Addison-Wesley, Second Edition, 2004
2. "Mobile Computing", Raj Kamal, Oxford University Press ,2007

REFERENCE BOOKS:
1. "Mobile Computing Principles: Designing and Developing Mobile Applications with UML and XML", Reza Behravanfar, Cambridge University Press, Oct2004.
2. "Mobile and Wireless Design Essentials", Martyn Mallick, Wiley DreamTech, 2003.
3. "Principles of Mobile Computing", Hansmann, Merk, Nicklous, Stober,
4. "Handbook of Wireless Networks and Mobile Computing", Stojmenovic and Cacute, Wiley, 2002,

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(5IT81) INFORMATION SECURITY MANAGEMENT
(SECURITYANALYST-I)
(ELECTIVE -1)
(Common to CSE)

Course Objectives:

- To introduce the terminology, technology and its applications

- To introduce the concept of Security Analyst

- To introduce the tools, technologies & programming languages which is used in day to day security analyst job role.

Course Outcomes:

After completion of the course, the student will be able to

- **Explain** the fundamentals of Information Security Management.
- **Identify** the areas of data leakage and implements the DLP system
- **Design and explain** Information security Policies procedures and guidelines
- **Illustrate** information security management roles, responsibilities

UNIT-I
Information Security Management:
Information Security Overview, Threats and Attack Vectors, Types of Attacks, Common Vulnerabilities and Exposures (CVE),Security Attacks, Fundamentals of Information Security, Computer Security Concerns, Information Security Measures etc.
Manage your work to meet requirements (NOS 9001).

UNIT-II
Fundamentals of Information Security:
Key Elements of Networks, Logical Elements of Network, Critical Information Characteristics, Information States etc.
Work effectively With Colleagues (NOS 9002).

UNIT-III
Data Leakage:
What is Data Leakage and statistics, Data Leakage Threats, Reducing the Risk of Data Loss, Key Performance Indicators (KPI) and Database Security etc..
UNIT-IV
Information Security Policies, Procedures and Audits:

Information Security Policies-necessity-key elements & characteristics, Security Policy Implementation, Configuration, Security Standards-Guidelines & Frameworks etc.

UNIT-V
Information Security Management-Roles and Responsibilities:
Security Roles & Responsibilities, Accountability, Roles and Responsibilities of Information Security Management, team-responding to emergency situation-risk analysis process etc.
TEXT BOOK:

1. Management of information security by Michael E.Whitman and Herbert J.Mattord

REFERENCES:

1)http://www.iso.org/iso/home/standards/management-standards/iso27001.htm

2)http://csrc.nist.gov/publications/nistpubs/800-55-Rev1/SP800-55-rev1.pdf

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(5CS74) GAMING ENGINEERING
(Elective-I)
(Common to CSE)

Course Objectives:

- **Discuss** the event-based programming & resource management as it relates to rendering time, including level-of-detail and culling.
- **Describe** the various components in a game/game engine.
- **Identify** leading open source game engine components & game physics.
- **Demonstrate** game animation & exposure to processing real world problems on GPU.

Course Outcomes:

After completion of the course Students is able to:

- **Understand** all game development problems and issues, such as story creation, character control, scene management, selection of programming language, mathematical analysis, physical analysis, graphics, multimedia, artificial intelligence, and others.
- **Describe** the hardware and software components of a gaming system.
- **Design and model** a single-user 2D and 3D game and also model a multi-user PC or Mobile game
- **Evaluate** complex logic problems using the tools and techniques found in Computer Science, Software Engineering, and Game Programming.

UNIT I: Introduction to Game Programming

History of Computer Games, Game design principles and architecture, Game design process, Basic Structure of a Game ,Using XNA and working with Xbox 360, Structure of an XNA application , Installing XNA and opening your first XNA project, Working with XNA's Sprite Manager ,Component programming, C# vs. Java .

UNIT II: 2-D Game Design

Rendering 2D images to the screen, Scaling, rotating and positioning 2D images, Keyboard input, Playing sound effects in XNA, Per-pixel texture manipulations, Random terrain slope generation, Alpha blending, Collision detection, And even a complete 2D particle engine for the explosions.

UNIT III: 3-D Game Design

Effect file, First triangle: defining points, displaying them using XNA, World space: defining points in 3D space, defining camera position, Rotation & translation, Indices, Terrain

basics, Terrain from file, reading user input on the keyboard, Adding colors, Lighting basics, Terrain lighting.

UNIT IV: 3-D Game Programming Using HLSL

Graphics Processing Unit (GPU), Running a game on GPU, HLSL introduction, Vertex format, Vertex shader, Pixel shader, Per-pixel colors, Textured triangle, Triangle strip, World transform, World normals, Per-pixel lighting, Shadow map, Render to texture, Projective texturing, Real shadow, Shaping the light, Preshaders.

UNIT V: Case Studies

Creating a Shooters (2-D) game and Creating a Flight Sim(3-D) game.

TEXT BOOKS:
1. XNA 3.0 Game Programming Recipes: A Problem-Solution Approach, Riemer Grootjans, A Press, 2009.
2. Beginning XNA 3.0 Game Programming: From Novice to Professional, Alexandre Santos Lobao, Bruno Pereira Evangelista, Antonio Leal de Farias , Riemer Grootjans, A Press, 2009

REFERENCES
1. Learning XNA 4.0: Game Development for the PC, Xbox 360, and Windows Phone 7, Aaron Reed, O'Reilly, 2011.
2. Microsoft XNA Game Studio Creator's Guide, Second Edition, Stephen Cawood and Pat McGee, Mc. Graw Hill, New York, 2009.
3. http://www.riemers.net/eng/Tutorials/xnacsharp.php

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(5CS75) COMPUTER GRAPHICS AND ANIMATION
(Elective-I)
(Common to CSE and IT)

Course Objectives:

- **Analyze** the basics of graphics and its representations.

- **Identify** various 2D and 3D transformation techniques used in graphics

- **Understand** the principles of Visible Surface Detection Methods.

- **Discuss** the animation design sequence.

Course Outcomes:

After completion of the course Students is able to:

- **Demonstrate** the basic algorithms to draw the object

- **Differentiate** 2D and 3D Transformations and Viewing.

- **Apply** the surface detection techniques to eliminate hidden surfaces of an object

- **Create** animation sequences of an object.

UNIT I: INTRODUCTION

Introduction: Usage of Graphics and their applications, Presentation Graphics-Computer Aided Design- Computer Art- Entertainment- Education and Training-Visualization- Image Processing- Graphical User Interfaces

Over view of Graphics systems: Video Display Devices- Raster Scan systems-random scan systems-Graphics monitors and workstations-Input devices.

Output primitives: Points and Lines-Line Drawing Algorithms-Line function- Mid Point Circle Generating Algorithm- Mid Point Ellipse Generating Algorithm.

Filled Area Primitives: Boundary Fill Algorithm, Flood Fill Algorithm

UNIT II :TWO DIMENSIONAL GEOMETRICALTRANSFORMATION AND VIEWING

Two dimensional geometric transformations - Matrix representations and homogeneous coordinates, composite transformations; Two dimensional viewing - viewing pipeline, viewing coordinate reference frame; widow-to-viewport coordinate transformation, Cohen – Sutherland line clipping algorithm and Southerland-Hodgeman polygon clipping algorithm.

UNIT III:THREE DIMENSIONAL GEOMETRICAL TRANSFORMATION, VIEWING AND OBJECT REPRESENTATION

Three dimensional geometric and modeling transformations -Translation,Rotation, Scaling, composite transformations; Three dimensional viewing - viewing pipeline, viewing coordinates, Projections, Clipping.

Three dimensional object representations - Polygon surfaces - Polygon tables - Plane equations - Polygon meshes; Curved Lines and surfaces, Quadratic surfaces; Blobby objects; Spline representations

UNIT IV :VISIBLE SURFACE DETECTION ALGORITHMS

Visible surface detection methods: Back-Face Detection Method, Depth buffer, Scan line, Depth sorting, BSP-tree methods, Area sub-division and Octree 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 by Donald Hearn & M. Pauline Baker, Pearson Education, New Delhi, 2004.
2. "Computer Graphics principles &practice", second edition in c, foley, VanDam, Feiner and Hughes, Pearson Education

REFERENCES

1. "Procedural elements for Computer Graphics", David Rogers, Tata McGraw hill,2nd edition
2. "Computer Graphics", Steven Harington, TMH
3. "Principles of interactive Computer Graphics" Neuman and sproul, TMH

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(5CS76) INTRODUCTION TO INTERNET OF THINGS
(Elective – II)
(Common to CSE and IT)

Course objectives:

- **Introduce** the current vision of the Internet of Things and its impact on the world.
- To **provide** an appreciation for the standardization of IoT protocols that is necessary for IoT to become reality.
- **Implement** basic IoT applications in real time scenario

Course outcomes:
After completion of the course Students is able to:

- **Understand** the working of Internet of things and Domain specific IoT.
- **Identify and interpret** design methodology of IoT platform.
- **Illustrate** the interfacing of Raspberry Pi on embedded board through Python.
- **Examine** the Networking model of IoT

UNIT-I:Introduction to Internet of Things:
Introduction, physical design of IoT, logical design of IoT-functional blocks, communicational models, communication APIs, IoT enabling technologies, IoT levels, deployment templates.

UNIT-II:Domain Specific IoTs :
Introduction, home automation, cities, environment, energy, retail, logistics, agriculture, industry.

UNIT-III:Developing Internet of Things:
Introduction, IoT design methodology, Case Study on IoT System for Weather Monitoring, Motivation for using Python.

UNIT-IV:Hardware and Software for IoT:
Logical design using Python-data types, control flow, functions, packages, file handling, classes, Python packages of Interests for IoT

UNIT-V: IPv6 for smart object networks and the internet of the things:
Introduction, The depletion of the IPv4 address space, NAT : A solution to IPv4 Address Exhaustion, Architectural discussion.

Text Books

1. Arshdeep Bahga, Vijay Madisetti, Internet of Things: A hands on approach, 2014, VPT publishers;
2. Jean- Philippe Vasseur, Adam Dunkels , Interconnecting Smart Objects with IP :The Next Internet ,2010,Morgan Kaufmann Publishers

Reference Books

1. Cuno Pfister , Getting Started with the Internet of Things 2011,OREILLY
2. Charalampos Doukas, Building Internet of Things With the Arduino: Volume 1 , 2012 ,Create Space Independent Publishing Platform
3. Adrian Mcewen, Hakin Cassimally Designing the Internet of Things 2015, Wiley.
4. Olivier Hersent, David Boswarthick, Omar Elloumi, The Internet of Things: Key Applications and Protocols Wiley-Blackwell 2012.

Journal Papers:

1. Keoh, Sye Loong, Sahoo Subhendu Kumar, and Hannes Tschofenig. "Securing the internet of things: A standardization perspective." Internet of Things Journal, IEEE 1.3 (2014): 265-275.
2. Ortiz, Antonio M., et al. "The cluster between internet of things and social networks: Review and research challenges." Internet of Things Journal, IEEE 1.3 (2014): 206-215.

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(5CS77) BUILDING ENTERPRISE APPLICATIONS
(Elective-II)
(Common to CSE)

Course Objectives:

- **Expose** the data model in a web application and define the Enterprise Architect's roles, responsibilities and deliverables.

- **Demonstrate** non-functional requirements (NFRs) and describe common problems and solutions.

- **Translate** business requirements into architecture.

- **Apply** various evaluation criteria to choosing architectural elements and patterns, tools, servers and frameworks.

Course Outcomes:

After completion of the course Students is able to:

- **Understand** different strategies and technologies for developing cross platform, distributed, object-oriented applications in Java

- **Discuss** issues involved in building robust e-business systems in Java

- **Develop** the Enterprise Java applications using J2EE architecture.

- **Explain** about security threats and mechanisms.

UNIT-I
Introduction: Challenges of Enterprise Application Development, The Platform for Enterprise Solutions, J2EE Application Scenarios: Multitier Application Scenario, Stand-Alone Client Scenario, Web-Centric Application Scenario, Business-to-Business Scenario, MVC Architecture
J2EE Platform Technologies: Component Technologies, Platform Roles and Services, Service Technologies, Communication technologies.
UNIT –II
Client Tier: Requirements and constraints- Operating Environment, Deployment, Web clients-protocols, Content format, types of web clients, EJB Clients, Enterprise information system clients
Web Tier: Web Applications and Web Containers, Dynamic content creation, Internationalization and Localization, Application Designs, Application Migration
Unit –III
Enterprise Java beans Tier: Business Logic, Enterprise Beans as J2EE Business Objects, Session Beans, and Design Guidelines
Enterprise Information System Tier: Enterprise Information System Capabilities and Limitations.
Enterprise Information System Integration Scenarios, Relational Database Management System Access,

Application Component Provider Tasks, Application Programming Model.
Unit –IV
Transaction Management : Properties of Transactions, J2EE Platform Transactions, Scenarios,JTA Transactions ,Transactions in Applets and Application Clients ,Transactions in Web Components ,Transactions in Enterprise Information systems

Unit –V
Security : Security Threats and Mechanisms, Authentication-Protection ,Authentication Mechanisms , Authentication Call Patterns , Auto-Registration, Exposing Authentication Boundaries with References , Authorization.

Text Books :
1. Designing Enterprise Applications with the Java TM 2 Platform, Enterprise Edition , Nicholas Kassem and the Enterprise Team Version
2. Inderjeet Singh, Beth Stearns, Mark Johnson the Enterprise Team "Designing Enterprise Applications with the J2EE Platform, Second Edition".

References:

1. Anubhav Pradhan, Satheesha B. Nanjappa, Senthil K.Nallasamy and Veerakumar Esakimuthu "Raising Enterprise Applications".
2. Tom Valesky, 'Enterprise JAVA Beans', Pearson Education, 2002.
3. Mastering Enterprise Java Beans and the JAVA ™ 2 platform, Enterprise Edition, ED Roman, Wiley Publications.
4. J2EE Connector Architecture and Enterprise Application Integration By Rahul Sharma, Beth Stearns, Tony Ng

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(5CS78) ADVANCED DATABASES
(Elective – II)
(Common to CSE and IT)

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Course Objectives

- **Introducing** Distributed Database Management System and its Design issues
- **Exploring** several algorithms for processing queries and be able to use them
- **Describe** the methods to translate complex conceptual data models into logical and Physical database designs
- **Demonstrating** query optimization and its algorithms
- **Enumerating** the concepts behind distributed transaction processing

Course Outcomes:

After completion of the course Students is able to:

- **Understand** data processing and architecture of Distributed database.
- **Apply** Partitioning and Fragmentation techniques to the data distributed across the network
- **Design and optimize** query processing strategies on distributed fragments
- **Explain** transaction processing and concurrency control in distributed databases

UNIT-1: Introduction:
Distributed Data Processing, Distributed Database System, Promises of DDBSs, Problem areas.

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

UNIT-III: Query Processing and decomposition:
Query Processing Objectives, Characterization of query processors, layers of query processing, query decomposition, Localization of distributed data.

UNIT-IV: Distributed query Optimization:
Query optimization, centralized query optimization, Distributed query optimization algorithms.

UNIT-V: Transaction Management
Definition, properties of transaction, types of transactions.

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Distributed concurrency control: Serializability, concurrency control Mechanisms & Algorithms, Time stamped & Optimistic concurrency control Algorithms, Deadlock Management.

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

Reference Books:
1. Henry F Korth, A Silberchatz and Sudershan : Database System Concepts, MGH
2. Raghuramakrishnan and Johhanes Gehrke: Database Management Systems,MGH
3. M. Stonebraker, Readings in Database Systems, 2nd Edition, Morgan Kauffman, 1993

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(5IT77) CLOUD COMPUTING

(Elective - II)

(Common to CSE and IT)

Course Objectives:
- **Understand** the Virtualization paradigms
- **Learn** the Cloud Computing fundamentals and its importance to various organizations.
- **Analyze** the concepts of IaaS, PaaS, SaaS, Public and Private Clouds.
- **Develop** applications in cloud security.

Course Outcomes:
After completion of the course Students is able to:

- **Understand** the virtualization concepts, key technologies, strengths, and limitations of cloud computing
- **Explain** the architecture and infrastructure of cloud computing-SaaS, PaaS, IaaS, public cloud, private cloud, hybrid cloud.
- **Analyze** the security, privacy, and interoperability of cloud computing.
- **Identify** problems, analyze, and evaluate cloud computing solutions.

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UNIT I
Introduction to Virtualization: Objectives of virtualization, history of virtualization, benefits of virtualized technology, the virtual service desk, what can be virtualized, related forms of computing, cloud computing, software as a service – SaaS, grid computing, utility computing, virtualization processes.

UNIT II
Virtualization Technologies-I: ubuntu (server edition), altiris, windows, server, software virtualization, vmware, intel virtualization, red hat virtualization, softgrid application, Linux virtualization, desktop virtualization, hardware virtualization, resource virtualization, processor virtualization, application virtualization.
Virtualization Technologies-II: Storage virtualization, virtualization density, para-virtualization, OS virtualization, virtualization software, data storage virtualization, Intel virtualization technology, thinstall virtualization suite, net framework virtualization, windows

virtualization on fedora, storage virtualization technologies, virtualization level, security monitoring and virtualization, oracle virtualization.

UNIT III
Introduction to Cloud Computing: Cloud Introduction and overview- Components, Infrastructure and Services, Why Use Cloud Computing, Benefits and Limitations, Cloud Application Architectures, Cloud Infrastructure Models, Cloud Computing Technology- Hardware & Software Infrastructure

Cloud Computing Architecture: Requirements, Introduction to Cloud Computing Architecture, various kinds of Cloud Computing Architecture, Grid Computing, Transactional Computing, On Demand Computing, and Distributed Computing.

UNIT IV
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 V
Security: Security issues in Cloud Computing - Data Security, Network Security, and Host Security
Cloud computing security challenges, Cloud computing security architecture, Cloud computing life cycle issues

Disaster Recovery: Disaster Recovery Planning, Disasters in the Cloud, Disaster Management. Scaling a Cloud Infrastructure- Capacity Planning, Cloud Scale.
Case Studies: Amazon S3, Google APP Engine, IBM Clouds, Oracle OBIEE

TEXT BOOKS:
1. Cloud Computing Virtualization Specialist Complete Certification Kit - Study Guide Book, Ivanka Menken Gerard Blokdijk, 2009.
2. Cloud Computing: Principles and Paradigms by RajkumarBuyya, James Broberg and Andrzej M. Goscinski, Wiley, 2011.
3. Cloud Security: A Comprehensive Guide to Secure Cloud Computing By Ronald L. Krutz, Russell Dean Vines

REFERENCES:
1. Cloud Computing: A Practical Aprroach, Anthony T.Velte, TobeJ.Velte, Robert Elsenpeter, Publication Person Education, 2009
2. Storage Virtualization: Technologies for Simplifying Data Storage and Management, Tom Clark,Addison-Wesley, 2005

3. Cloud Computing Technologies and Strategies of the Ubiquitous Data Center, Curtis Franklin Jr.Brian J.S. Chee**,** 2010.
4. Introduction to Cloud Computing: Business & Technology, Timothy Chou,2009

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(5CS57) NETWORK SECURITY LABORATORY
(Common to CSE)

Course Objectives (COs):
- Outline Cryptographic Algorithms.
  Identify the need of evaluating the performance of various Cryptographic Algorithms
- Apply various types of attacks.
- Discuss proxy based security protocols.

Course Outcomes (COs):

Upon completion of this course, students should be able to:
- **Implement** Symmetric & Asymmetric Cryptographic Algorithms
- **Evaluate** the performance of Cryptographic Algorithms
- **Identify and resolve** attacks in the network.
- **Demonstrate** Proxy based Security Protocols

Week 1& 2: Understanding of Classical cryptographic Algorithm and Implementation of the same in C or C++.
Week 3:Implementation of DES and AES.
Week 4:Implementation of RSA, ECC and Diffie-Hellman Key Exchange.
Week 5:Performance Evaluation of Various Cryptographic Algorithms.
Week 6:Working with Sniffers for Monitoring network communication.
Week 7:Implementation of SHA-512, SSL & TLS.
Week 8&9: Using IP TABLES on Linux and setting the Filtering rules.
Week 10: Understanding the buffer overflow and format string attacks.
Week 11&12: Implementation of proxy based security protocols in C or C++ with features like Confidentiality, Integrity and Authentication.

REFERENCES:

http://linuxcommand.org/man_pages/openssl1.html
http://www.openssl.org/docs/apps/openssl.html
http://www.queen.clara.net/pgp/art3.html
http://www.ccs.oml.gov/~hongo/mail/resourses/contrib/gpg-howto/gpg-howto.html
http://netfiles.uiuc.edu/ehowes/www/gpg/pg-com-0.html
http://www.ethereal.com/docs/user-guide/

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(5CS58)BIG DATA ANALYTICS LABORATORY
(Common to CSE)

COURSE OBJECTIVES:

- Explore and understand various HDFS commands in Hadoop environment
- Understand the concept of Hadoop framework and its components
- Explore various Big Data tools for data processing
- Analyse data using Visualization tools

COURSE OUTCOMES:

After completion of the course the student is able to:

- Explore various HDFS commands on Hadoop file system
- Illustrate Map Reduce programming framework on large data sets in a distributed environment
- Demonstrate different Big Data tools such as HIVE, PIG, and SQOOP
- Extract large data sets to perform visualization and data analysis tasks

1.   HDFS(Storage)

A. Hadoop Storage File system

Your first objective is to create a directory structure in HDFS using hdfs commans . Create the local files using linux commands and should move the files to HDFS directory that allows loading of files into cluster to process the data and can do vice versa .

1.   Write a command to create the directory structure in HDFS.
2.   Write a Command to move file from local unix/linux machine to HDFS cluster.

B. Viewing Data Contents, Files and Directory
Try to perform these simple steps:

1.   Write HDFS command Look at the HDFS files and directory of under your Hadoop cluster.

2. Write HDFS command to see contents of files which are present in Hadoop cluster.

C.Getting Files data from the Hadoop Cluster to Local Disk.:

1. Find out HDFS command to take file from HDFS to local file system.

If we want process any data first should move into Hadoop cluster using HDFS commands. All files storage in Haddoop cluster will be using HDFS .

Lab Instructions:

Your objective is to use all HDFS commands to move in and out to hadoop cluster for process data.

2. Map Reduce Programming (Processing data) .

Hadoop Map-Reduce framework is developed using Java, but the framework allows you to write programs in other languages as well.

1. Word Count
The word count problem is the most famous using map reduce program. Same thing we can do with java but takes lot of time with huge file, in MR it will process less time even with huge files. The objective is to count the frequency of words of a large text.

Lab Instructions:
1. Develop the word count map-reduce program to count the words with given input file. Before you start, execute the prepare step, to load the data into HDFS.

2. Most Frequent Words Count
Use the output from the previous program to list the most frequent words with their counts.

Lab Instructions :
1. Use the same strategy of breaking the programs in three parts. Copy the files from the previous exercise and use them as a starting point.
2. Load the data from the output by using third filter to load the files.

3. Data Processing Tool – Hive(NOSQL query based language)
Hive command line tool allows you to submit jobs via bash scripts.

Identifying properties of a data set :
We have a table 'user_data' that contains the following fields :

data_date : string
user_id : string
properties : string

The properties field is formatted as a series of **attribute=value pairs**.
Ex : Age=21;state=CA;gender=M;

Lab Instructions :

1. Create the table in HIVE using hive nosql based query .
2. Fill the table with sample data by using some sample data bases .
3. Write a program that produces a list of properties with minimum value(min_value), largest value(max_value) and number of unique values. Before you start, execute the prepare step to load the data into HDFS.
4. Generate a count per state.
   Now that extracted the properties, calculate the number of records per state.

Lab Instructions :
1. Write a program that lists the states and their count from the data input.

5. Data Processing Tool – Pig(Latin based scripting lang)

Pig command line tool like the Hive allows you to submit jobs via bash scripts.

A. Simple Logs
We have a set of log files and need to create a job that runs every hour and perform some calculations.
The log files are delimited by a 'tab' character and have the following fields:

- site
- hour_of_day
- page_views
- data_date

The log files are located on the prepare folder. Load them in HDFS at data/pig/simple_logs folder and use them as the input.
Important: In order to load tab delimited files use pigStorage('\u0001').

Lab Instructions:
Create a program to :
1. Calculate the total views per hour per day.
2. Calculate the total views per day.
3. Calculate the total counts of each hour across all days.
4. We can write word count script by passing text file as input

6. SQOOP

It is used to import and export data from SQL to HDFS and Vice versa.
Before processing any data first need to import data into HDFS. As of now seen importing files into HDFS but using sqoop tool we can import SQL table data into hive table.

1. Create table in HIVE using hive query language .
2. Import the sql table data into hive using sqoop tool .
3. Export hive table data into local machine and into SQL .

7. Programs on Data Visualization Techniques.

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(5CS18) PREDICTIVE ANALYTICS
(Common to CSE and IT)

COURSE OBJECTIVES:

COURSE OUTCOMES:

After completion of the course the student is able to:

- **Apply** prediction modeling techniques - classification, regression, and clustering

- **Develop** the knowledge, skill, and competences.

- **Analyze** the time series methods, forecasting and feature extraction.

- **Build** the mechanism for working with documents

Unit I
Introduction to Predictive Analytics & Linear Regression (NOS 2101):
What and Why Analytics, Introduction to Tools and Environment, Application of Modelling in Business, Databases & Types of data and variables, Data Modelling Techniques, Missing imputations etc.

Need for Business Modelling, Regression – Concepts, Blue property-assumptions-Least Square Estimation, Variable Rationalization and Model Building etc.

Unit II
Logistic Regression (NOS 2101):
Model Theory, Model fit Statistics, Model Conclusion, Analytics applications to various Business Domains etc.

Regression Vs Segmentation – Supervised and Unsupervised Learning, Tree Building – Regression, Classification, Overfitting, Pruning and complexity, Multiple Decision Trees etc.,

Unit III
Objective Segmentation(NOS 2101):

Regression Vs Segmentation – Supervised and Unsupervised Learning Tree Building – Regression, Classification, Overfitting, pruning and complexity, Multiple Decision Trees etc.,

Develop Knowledge, skill and competences (NOS 9005)
Introduction to knowledge skills & competences, Training & Development, Learning & Development, Policies and Record keeping,etc.

Unit IV
Time Series Methods / Forecasting, Feature Extraction **(NOS 2101):**
Arima, Measures of Forecast Accuracy, STL approach, Extract features from generated model as Height, Average, Energy etc and Analyze for prediction.
Project

Unit V
Working with Documents (NOS 0703):
Standard Operating Procedures for documentation and Knowledge Sharing, Defining purpose and scope documents, Understanding Structure of documents – case studies, articles, white papers, technical reports, minutes of meeting etc., Style and format, Intellectual Property and copyright, Document preparation tools – Visio, Power point, word, Excel etc., Version control, Accessing and updating corporate knowledge base, Peer review and feedback.
TEXT BOOK:

1.   Student's Handbook for Associate Analytics – III.

REFERENCES:

1.   Gareth James . Daniela Witten . Trevor Hastie Robert Tibshirani. An Introduction to Statistical Learning with Applications in R

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(5CS79) SEMANTIC WEB AND SOCIAL NETWORKS
(Elective –III)
(Common to CSE and IT)

Course Objectives:

- **Explore** and understand the concepts to represent knowledge.
- **Discuss** various Ontology description languages
- **Illustrate** semantic web services, methods and tools to develop ontology.
- **Outline** social web and related communities

Course Outcomes:
After completion of the course Students is able to:

- **Identify** and debate on various description languages in semantic web.
- **Analyze** vocabulary, properties and characteristics to annotate the requirements of semantic web languages.
- **Apply** ontology methods and tools to represent knowledge in the form of ontology.
- **Predict** human behavior in social web and related communities in visualizing social networks.

UNIT 1: The Future of the Internet: Introduction, The Syntactic web, The Semantic Web, Ontology in Computer Science: Defining the term Ontology, Taxonomies versus Ontologies, Thesauri versus Ontologies, Classifying Ontologies, Web Ontology Description Languages, Ontologies, Categories and Intelligence, Knowledge Representation in Description Language: Introduction, The family of Attributive languages, Inference Problems.

UNIT II: RDF and RDF Schema: Introduction, XML Essentials, RDF, RDF Schema, Summary of the RDF/RDF Schema Vocabulary, OWL: Introduction, Requirements for Web Ontology Description Languages, Header Information, Versioning and Annotation Properties, Datatype and Object Properties, Property Characteristics, Classes, Individuals, Summary of the OWL Vocabulary.

UNIT III: Rule Languages: Introduction, Usage Scenarios for Rule Languages, Semantic Web Services: Web Service Essentials, OWL-S Service Ontology, Methods for Ontology Development, Ontology Sources: Metadata, Upper Ontologies, Semantic Web and Software Tools: Metadata and Ontology Editors.

UNIT IV: Introduction to the Semantic Web and Social Networks: Limitations of the Semantic Web, Development of the Semantic Web, The Emergence of the Social Web, Social Network Analysis: What is social network Analysis, Development of Social Network Analysis, Key Concepts and Measures in Network Analysis.

UNIT V: Electronic Sources for Network Analysis: Electronic Discussion Networks, Blogs and online Communities, Web based Networks, Building Semantic Web Applications with Social Network Features.

TEXT BOOKS
1. Semantic Web: Concepts, Techniques and Applications – Karin K. Breitman, Marco Antonio Casanova, Walter Truszkowski, Springer, 2007.
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,JohnWiley&Sons.
2. Semantic Web and Semantic Web Services -Liyang LuChapman and Hall/CRC Publishers,(Taylor & Francis Group)

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(5IT82) INFORMATION SECURITY ASSESSMENT&AUDITS
(SECURITY ANALYST-II)
(Elective –III)
(Common to CSE and IT)

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COURSE OBJECTIVES:

- To introduce the technology and fundamentals of Information Security and performance metrics

- To introduce Security audit, reporting

- To introduce Security Vulnerability and Vulnerability Assessments

- To introduce Information Security Risk and Configuration Management

COURSE OUTCOMES:

After Completion of the course the student is able to

- **Outline** the fundamentals of Information Security Metrics and Audit

- **Identify** the areas for security auditing, Perform security auditing and report the information

- **Illustrate** Vulnerability Management and provide solutions

- **Summarize** Risk treatment, Management and Provide control Policies for Configuration Management

Unit- I
Information Security Performance Metrics and Audit:
Security Metrics and Reporting, Common Issues and Variances of Performance Metrics, Introduction to Security Audit, Servers and Storage devices, Infrastructure and Networks , Communication Routes, Information Security Methodologies(Black-box , White- box,Grey-box), Phases of Information Security Audit and Strategies, Ethics of an Information Security Auditor etc.

Maintain Healthy, Safe & Secure Working environment(NOS 9003).
Unit-II
Information Security Audit Tasks, Reports and Post Auditing Actions:
Pre-audit checklist, InformationGathering, Vulnerability Analysis, External Security Audit, Internet Network Security Audit, Firewall Security Audit, IDS Security Auditing, Social Engineering Security Auditing, Web Application Security Auditing, Information Security Audit Deliverables &Writing Report, Result Analysis, Post Auditing Actions, Report Retention etc.

Provide Data/Information in Standard formats (NOS 9004).
Unit-III:
Vulnerability Management:
Information Security Vulnerabilities – Threats and Vulnerabilities, Human-based Social Engineering, Computer-based Social Engineering,Social Media Countermeasures, Vulnerability Management- Vulnerability Scanning, Testing, Threat management, Remediation etc.
UNIT-IV

Information Security Assessments:
Vulnerability Assessment, Classification, Types of Vulnerability Assessment, Vulnerability Assessment Phases, Vulnerability Analysis Stages, Characteristics of a Good Vulnerability Assessment Solutions & Considerations, Vulnerability Assessment Reports-Tools and choosing a right Tool, Information Security Risk Assessment, Risk Treatment, Residual Risk, Risk Acceptance, Risk Management Feedback Loops etc.

UNIT-V

Configuration Reviews:
Introduction to Configuration Management, Configuration Management requirements-Plan-Control, Development of configuration Control Policies, Testing Configuration Management etc.

TEXT BOOKS:
1. Assessing Information Security (strategies, tactics, logic and framework) by A Vladimirov, K.Gavrilenko, and A.Michajlowski
2. "The Art of Computer Virus Research and Defense by Peter Szor".

REFERENCES:
1. https://www.sans.org/reading-room/whitepapers/threats/implementing-vulnerability-magament-process-34180
   http://csrc.nist.gov/publications/nistpubs/800-40-Ver2/SP800-40v2.pdf

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(5CS80) BIO INFORMATICS
(Elective-III)
(Common to CSE)

Course Objectives:

The course introduces undergraduate students to the emerging interdisciplinary field of Bioinformatics, combining elements of the Computational Sciences with the Biological Sciences. In this course,

- The student will be able to **understand** basic concepts of internet & network protocols and how the concepts of computer sciences relate to problems in biological sciences.

- The students will be able to **understand** the scope, basic concepts of Bioinformatics, Biological information resources and Retrieval System

- **Emphasis** would be laid on **understanding** Scientific Databases & Algorithms, Sequence Analysis and Dynamic Programming applicable to Modern Biology

- The students will have sufficient **understanding** of Biological databases and their types

Course Outcomes:

After completion of the course Students is able to:

- **Understand** the contents and properties of the most important terms like bio-informatically databases, Bioinformatics, DNA, Elementary commands of retrieval system

- **Explain** the various sequencing methods, sequencing algorithms, Multiple sequence alignment

- **Analyze** genes, genomes and gene expression and apply the major steps in pair wise and multiple sequence alignment, build the principle for, and execute pair wise sequence alignment by dynamic programming

- **Discuss** on Biological databases, Bio Chemical databases and utility of this course content in real world application.

UNIT I

Introduction to Bioinformatics: Scope of Bioinformatics, History of Bioinformatics; Biological information resources and retrieval system Elementary commands and protocols, ftp, telnet, http

UNIT II

Basic Sequencing: DNA mapping and sequencing , Map Alignment , sequencing methods like Shotgun and Sanger method

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UNIT III

Sequencing Alignment and Dynamic Programming: BLAST, Heuristic Alignment algorithms , global sequence alignments-Needleman Wunsch algorithm, Smith-Waterman algorithm-Local sequence alignments

UNIT IV

Evolutionary Trees and Phylogeny: Multiple sequence alignment and phylogenetic analysis.

UNIT V

Databases: Introduction to Biological databases, Organization and management of databases, Structure databases- PDB(Protein Data Bank), Molecular modeling databases(MMDB),Primary databases NCBL,EMBL,DDBJ, Secondary Databases-Swissprot, KEGG, Bio Chemical databases- KEGG, BRENDA, WIT, EXPASY

TEXT BOOKS

1. Bioinformatics Basics, Applications in Biological Science and Medicine by Hooman H. Rashidi and Lukas K.buehler CAC Press 2000
2. Algorithms on strings trees and sequences Dan Gusfield, Cambridge University Press 1997

REFERENCES

1. Bioinformatics: David Mount 2000,CSH Publications
2. Bioinformatics: A machine Learning Approach P.Baldi. S.Brunak,   MIT Press 1988
3. Developing Bioinformatics Computer Skills", Gibas C, Jambeck P
4. Bioinformatics: A Practical   Guide to the Analysis of Genes and Proteins" , Baxevanis AD, Ouellette BFF (eds):

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(5CS82) SOFTWARE PROJECT MANAGEMENT
Elective –III
(Common to CSE and IT)

Course Objectives:

- To **Identify** and Discuss the conventional and contemporary software project management principles.

- The **ability** to assess and plan project schedule and assign resources.

- **Apply** an appropriate project development methodology among various alternating Processes.

- **Identify** project risks, understand the responsibilities, monitor and track project deadlines and the capability to work in a team environment.

Course Outcomes:
After completion of the course Students is able to:

- **Adapt** the knowledge of managing, economics for conventional Vs modern software projects and Sketch various artifacts sets for better understanding of software development

- **Utilize** knowledge of process Workflows and Checkpoints to track the project progress

- **Identify** the importance of Iterative Process Planning (WBS) and Process Automation for a given specific software application

- **Make use** of extensive knowledge on Project Controls like seven core metrics and understand Project Organizations and Responsibilities.

UNIT-I
Conventional Software Management: The waterfall model, conventional software Management performance. Overview of Project Planning – Stepwise Project Planning. Improving Software Economics: Reducing Software product size, improving software processes, improving team effectiveness, improving automation, Achieving required quality, peer inspections.

UNIT – II
The old way and the new way: The principles of conventional software Engineering, principles of modern software management, transitioning to an iterative process.
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.

UNIT – III

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.

UNIT – IV

Process Automation: Automation Building blocks.
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 discriminants.

UNIT – V

Project Organizations and Responsibilities:
Line-of-Business Organizations, Understanding Behavior – Organizational Behavior
Future Software Project Management: Modern Project Profiles, Next generation Software economics, modern process transitions.
Emerging Trends in Project Management
Globalization Issues in Project management, import of the internet on project Management, People Focused Process Models

TEXT BOOKS
1. Software Project Management, Walker Royce: Pearson Education, 2005.
2. Ramesh Gopalaswamy " Managing and global Software Projects", Tata Mc Graw Hill,2003.

REFERENCES
1. Software Project Management, Bob Hughes and Mike Cotterell: Tata McGraw-Hill Edition.
2. Software Project Management, Joel Henry, Pearson Education.
3. Software Project Management in practice, Pankaj Jalote, Pearson Education .2005.

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(5CS81) COGNITIVE SCIENCE
Elective – IV
(Common to CSE)

Course Objectives:
- **Identify** the basics of Cognitive Science with focus on acquisition, representation, and use of knowledge by individual minds, brains, and machines, as well as groups, institutions, and other social entities
- **Analyze** the mind and intelligence, embracing psychology, artificial intelligence, neuroscience and linguistics
- **Label** the basics of cognitive Psychology.
- **Relate** the role of Neuro science in Cognitive field

Course Outcomes:
After completion of the course Students is able to:
- **Describe** the concepts and role of computers in Cognitive Science, Nature of Artificial Intelligence, Psychology, Neuroscience, Language Acquisition, Neuropsychology.
- **Explain** the philosophical and theoretical perspectives, Cognitive Architecture, Cognitive Processes, mind organization, cognitive organization, Computation of Cognitive Functioning at machines level.
- **Analyze** the Information Processing Models of the Mind, Strategies for Brain mapping, and function of Nervous System.
- **Demonstrate** the use of neuroscience in cognitive domain in present industry and familiarize with Cognitive function measurement tools, Robotics and Challenges of neuroscience in cognitive domain in present industry.

UNIT I
INTRODUCTION TO COGNITIVE SCIENCE
The Cognitive view –Some Fundamental Concepts – Computers in Cognitive Science – Applied Cognitive Science – The Interdisciplinary Nature of Cognitive Science – Artificial Intelligence: Knowledge representation -The Nature of Artificial Intelligence - Knowledge Representation – Artificial Intelligence: Search, Control, and Learning

UNIT II COGNITIVE PSYCHOLOGY
Cognitive Psychology – The Architecture of the Mind - The Nature of Cognitive Psychology- A Global View of The Cognitive Architecture- Propositional Representation-Schematic Representation Cognitive Processes, Working Memory, and Attention- The Acquisition of Skill- The Connectionist Approach to Cognitive Architecture 32

UNIT III COGNITIVE NEUROSCIENCE

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Brain and Cognition Introduction to the Study of the Nervous System – Neural Representation – Neuropsychology- Computational Neuroscience - The Organization of the mind - Organization of Cognitive systems - Strategies for Brain mapping – A Case study: Exploring mindreading

UNIT IV LANGUAGE ACQUISITION, SEMANTICS AND PROCESSINGMODELS

Language Acquisition: Milestones in Acquisition – Theoretical Perspectives- Semantics and Cognitive Science – Meaning and Entailment – Reference – Sense – Cognitive and Computational Models of Semantic Processing – Information Processing Models of the Mind- Physical symbol systems and language of thought- Applying the Symbolic Paradigm- Neural networks and distributed information processing- Neural network models of Cognitive Processes

UNIT V HIGHER-LEVEL COGNITION

Reasoning – Decision Making – Computer Science and AI: Foundations & Robotics – New Horizons - Dynamical systems and situated cognition- Challenges – Emotions and Consciousness – Physical and Social Environments - Applications

Text Books:
1. Cognitive Science: An Introduction, Second Edition by Neil Stillings, Steven E. Weisler, Christopher H. Chase and Mark H. Feinstein ,1995
2. Cognitive Science: An Introduction to the Science of the Mind José Luis Bermúdez, Cambridge University Press, New York,2010

References:
1. Cognitive Psychology, Robert L. Solso, Otto H. MacLin and M. Kimberly MacLin, 2007, Pearson Education
2. Cognitive Science: An Introduction to the Study of Mind (2006) by J. Friedenberg and G. Silverman
3. How the mind works, Steven Pinker, 2009 6. Cognitive Science: An Interdisciplinary Approach by Carolyn Panzer Sobel and Paul Li, 2013 7. Mind: Introduction to Cognitive Science, Paul Thagard, 2nd Edition, MIT Press, 200
4.Wilson, Robert A., & Keil, Frank C. (eds.), The MIT Encyclopedia of the Cognitive Sciences (MITECS), MIT Press, 2001 [Primary text; available on Cognet].
5. Sternberg, Robert J., Cognitive Psychology, 4th ed., Cengage Learning India, 2008

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IV Year B.Tech CSE- IISem   **L   T/P/D   C**
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(5IT76) INFORMATION RETRIEVAL SYSTEMS
(Elective-IV)
(Common to CSE and IT)

Course Objectives:

- **Describe** fundamentals of DBMS, Data warehouse and Digital libraries
- **Discover** various pre-processing techniques and searching and indexing approaches in text mining
- **Distinguish** and differentiate various clustering approaches and study different similarity measures
- **Know** about query languages and online IR system

Course Outcomes:
After completion of the course Students is able to:

- **Understand** the relationships between the Repository Systems
- **Apply** knowledge of data structures and indexing methods in information retrieval Systems
- **Implement** clustering, searching techniques and algorithms on Information systems
- **Analyze** clustering techniques and algorithms using evaluation measures

UNITI
Introduction: Definition, Objectives, Functional Overview, Relationship to DBMS, Digital libraries and Data Warehouses. Information Retrieval System Capabilities, Search, Browse, Miscellaneous.

UNIT II
Cataloguing and Indexing: Objectives, Indexing Process, Automatic Indexing, Information Extraction. Data Structures: Introduction, Stemming Algorithms, Inverted file structures, N-gram data structure, PAT data structure, Signature file structure, Hypertext data structure. Automatic Indexing: Classes of automatic indexing, Statistical indexing, Natural language, Concept indexing, Hypertext linkages.

UNIT III
Document and Term Clustering: Introduction, Thesaurus generation, Item clustering, Hierarchy of clusters. User Search Techniques: Search statements and binding, Similarity measures and ranking, Relevance feedback, Selective dissemination of information search, weighted searches of Boolean systems, Searching the Internet and hypertext.

UNIT IV

Information Visualization: Introduction, Cognition and perception, Information visualization technologies. Text Search Algorithms: Introduction, Software text search algorithms, Hardware text search systems. Information System Evaluation: Introduction, Measures used in system evaluation, Measurement example – TREC results.

UNIT V

Multimedia Information Retrieval, Models and Languages: Data Modelling, Query Languages, Indexing and Searching.Libraries and Bibliographical systems, online IR system, OPACs, Digital Libraries.

TEXT BOOKS:

1. Information Storage and Retrieval systems Theory and Implementation Second Edition
2. Modern Information RetrivalBy Ricardo Baeza-Yates, Pearson Education, 2007.

REFERENCES:

1. Information Retrieval: Algorithms and Heuristics by David A Grossman and OphirFrider, 2nd Edition, Springer.
2. Information Retrieval Data Structures and Algorithms, Frakes, W.B., Ricardo Baeza-Yates: Prentice Hall, 1992.
3. Modern Information RetrivalBy Yates Pearson Education.
4. Information Storage &Retieval By Robert Korfhage – John Wiley & Sons
5. Natural Language Processing and Information Retrieval, T.Siddiqui and U.S.Tiwary, Oxford University Press.

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IV Year B.Tech CSE- II Sem

L	T/P/D	C
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(5CS83)SOFTWARE DEFINED NETWORKS
(Elective – IV)
(Common to CSE)

Course Objectives:
- This course provides a **comprehensive** introduction to Software Defined Networking (SDN) and presents SDN in context with more familiar network services and challenges
- It **identifies** the impact of SDN on traffic management and the potential for network service growth
- It **provides** students with the basic concepts and explains the importance of virtualization, particularly the impact of virtualization on servers and networks
- It also **introduces** students with the impact on service providers, legacy networks, and network vendors.

Course Outcomes:
After completion of the course Students is able to:

- **Understand** the concepts, Virtual and Physical Memory Mapping and Software Defined Networking.
- **Identify** the design, implementation of SDN and Service providers of SDN.
- **Describe** the core issues of Open flow - Switch Specification, ports, and packet processing pipeline.
- **Demonstrate** Enterprise Networks ,SDN and Transport Networks, SDN and Optical Transport Networks

UNIT I:Introduction to Software Defined Networking
Virtualization, Virtual Memory, Virtual Memory Operation, Virtual and Physical Memory Mapping,
Server Virtualization, Storage Virtualization, Software Defined Networking, Network Limitations, Network Control Plane.

UNIT II:SDN Implementation:
Introduction, SDN Implementation, SDN Design, Separation of the Control and Data Planes, Edge-Oriented Networking, SDN Operation, Service Providers and SDN

UNIT III
Openflow Introduction, Overview of the OpenFlow Switch Specification,OpenFlow Ports,OpenFlow Packet-Processing Pipeline,OpenFlow Channel, Message Handling,OpenFlow Channel Connections, Controller Modes, Auxiliary Connection Use for Performance and Reliability, Flow Table Synchronization, Bundle Messages,OpenFlow

Configuration-and-Management Protocol, Remote Configuration and The OpenFlow Conformance Testing Program

UNIT IV
SDN Controllers: Network Programmability, The Management Interface, The Application-Network Divide Modern Programmatic Interfaces, Virtualization and Data Plane I/O, Services Engineered Path Service Locations and Chaining.

UNIT V
SDN Evolution Introduction, SDN and Enterprise Networks, SDN and Transport Networks, SDN and Optical Transport Networks, Increasing WAN Utilization with SDN,SDN Scalability Issues, Controller Designs for Scalability ,Potential SDN Scalability Issues, Network Types, SDN Management ,Load Adaptation.

TEXT BOOKS:
1. Software Defined Networking: Design and Deployment, 1st Edition Patricia A. Morrealeand James
    M. AndersonCRC press.
2. SDN: Software Defined Networks Thomas D. Nadeau and Ken Gray Orielly media

REFERENCE BOOKS:
1. Software Defined Networking with OpenFlow by Siamak Azodolmolky wiley Publications
2. Software Defined Networks: A Comprehensive Approach by Paul Goransson, Chuck BlackPublisher Morgan Kaufmann
3. Open Networking Foundation (ONF) Documents,   https://www.opennetworking.org, 2015.
4. OpenFlow standards, http://www.openflow.org, 2015.
5. Online Reading Lists, including:
    http://www.nec-labs.com/~lume/sdn-reading-list.html, 2015.

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

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(5CS84) MULTI CORE TECHNOLOGIES
Elective – IV
(Common to CSE)

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Course Objectives:
- **Formulate** the parallelism techniques
- **Explain** the cache memory hierarchy
- **Explore** the multi core architecture and techniques
- **Understand** the parallel programing for multi core systems

Course Outcomes:

After completion of the course Students is able to:

- **Identify** the limitations of ILP and the need for multicore architectures

- **Understand** the concepts of high-performance computer architecture and various synchronization primitives.

- **Analyze** Parallel programming for Shared Memory architecture using OpenMP libraries.

- **Implement and evaluate** the parallelism techniques for the creation of efficient multi core CPU programs.

UNIT-I

INTRODUCTION TO MULTIPROCESSORS AND SCALABILITY: Scalable design principles – Principles of processor design – Instruction Level Parallelism, Thread level parallelism. Parallel computer models –Symmetric and distributed shared memory architectures – Performance Issues.

UNIT-II

Brief introduction to cache hierarchy and communication latency, Shared memory multiprocessors, general architectures and the problem of cache coherence.
SYNCHRONIZATION PRIMITIVES: Atomic primitives; locks: TTS, ticket, array; barriers: central and tree; performance implications in shared memory programs.

UNIT-III

MULTI-CORE ARCHITECTURES - Introduction to multi-core architectures -Software and hardware multi-threading – SMT and CMP architectures –Design issues – Case studies – Intel Multi-core architecture – SUN CMP architecture., issues involved into writing code for multi-core architectures, development of programs for these architectures, program optimizations techniques.

UNIT IV

PARALLEL PROGRAMMING: Fundamental concepts – Designing for threads –scheduling - Threading and parallel programming constructs – Synchronization –Critical sections – Deadlock. Threading, API's, OpenMP – Threading a loop – Thread overheads – Performance issues – Library functions. Solutions to parallel programming problems – Data races, deadlocks and live locks – Non-blocking algorithms – Memory and cache related issues.

UNIT-V
CHIP MULTIPROCESSORS: Why CMP (Moore's law, wire delay); shared L2 Vs tiled CMP; core complexity; power/performance; Snoopy coherence: invalidate vs. update, MSI, MESI, MOESI, MOSI; performance trade-offs; pipelined snoopy bus design; Memory consistency models: SC, PC, TSO, PSO, WO/WC, RC.

TEXTBOOKS:
1. Shameem Akhter and Jason Roberts, "Multi-core Programming", Intel Press, 2006.
2. Michael J Quinn, Parallel programming in C with MPI and OpenMP, Tata Mcgraw Hill, 2003.

REFERENCES:
1. John L. Hennessey and David A. Patterson, "Computer architecture – A quantitative approach", Morgan Kaufmann/Elsevier Publishers, 4th. Edition, 2007.
2. David E. Culler, Jaswinder Pal Singh, "Parallel computing architecture: A hardware/ software approach", Morgan Kaufmann/Elsevier Publishers, 1999.
3. Richard Y. Kain, "Advanced Computer Architecture a Systems Design Approach", PrenticeHall, 2011.