Institute Vision

To emerge as a Centre of Excellence for Learning and Research in the domains of engineering, computing and management.

Institute Mission

- Provide congenial academic ambience with state-art of resources for learning and research.
- Ignite the students to acquire self-reliance in the latest technologies.
- Unleash and encourage the innate potential and creativity of students.
- Inculcate confidence to face and experience new challenges.
- Foster enterprising spirit among students.
- Work collaboratively with technical Institutes / Universities / Industries of National and International repute

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

VISION

To contribute for the society through excellence in Computer Science and Engineering with a deep passion for wisdom, culture and values.

MISSION

M 1: Provide congenial academic ambience with necessary infrastructure and learning resources.
M 2: Inculcate confidence to face and experience new challenges from industry and society.
M 3: Ignite the students to acquire self-reliance in State-of-the-Art Technologies
M 4: Foster Enterprising spirit among students

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES.
(AUTONOMOUS)
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

REGULATION 2016

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs):

PEO1: Excel in Computer Science and Engineering program through quality studies, enabling success in computing industry**. (Professional Competency)**

PEO2: Surpass in one's career by critical thinking towards successful services and growth of the organization, or as an entrepreneur or in higher studies. **(Successful Career Goals)**

PEO3: Enhance knowledge by updating advanced technological concepts for facing the rapidly changing world and contribute to society through innovation and creativity. **(Continuing Education and Contribution to Society)**

PROGRAMME SPECIFIC OUTCOME (PSOs):

PSO1: Have Ability to understand, analyse and develop computer programs in the areas like algorithms, system software, web design, big data analytics, and networking.

PSO2: Deploy the modern computer languages, environment, and platforms in creating innovative products and solutions.

PROGRAMME OUTCOMES (PO's)

Computer Science and Engineering Graduates will be able to:

PO1 - Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization for the solution of complex engineering problems.

PO2 - Problem analysis: Identify, formulate, research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO3 - Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for public health and safety, and cultural, societal, and environmental considerations.

PO4 - Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5 - Modern tool usage: Ability to design and develop hardware and software in emerging technology environments like cloud computing embedded products, real-time systems, Internet of Things, Big Data etc.

PO6- Engineering and Society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO7- Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO8- Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9- Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10-Communication: Communicate effectively on complex engineering activities with the engineering community and with the society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO11- Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO12- Life-long learning: Basic knowledge in hardware/software methods and tools for solving real-life and R&D problems with an orientation to lifelong learning.

ACADEMIC REGULATIONS FOR B. TECH (REGULAR-FULL TIME)

(Effective for the students admitted into I year from the Academic Year 2016-2017 onwards)

1. ELIGIBILITY FOR ADMISSION

Adminission of the B.Tech program shall be made subjects to the eligibility qualifications and Specialization prescribed by the University for each Program from time to time. Admission shall be made either on the basis of Merit/ Rank Obtained by the Qualifying candidates in EAMCET/ECET or otherwise specified whichever is relevant

2. AWARD OF B.TECH. DEGREE

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

i. Pursues a course of study for not less than four academic years and in not more than eight academic years.

ii. For Lateral entry students, shall pursue a course of study for not less than three academic years and in not more than six academic years**.**

iii. Registers for 176 credits and secure all 176 credits.

iv. **Lateral entry students shall register for 134 credits and secure all 134 credits**

3. Students, who fail to fulfill all the academic requirements for the award of the degree within eight academic years (for Regular Entry) / Six academic years (for Lateral entry) from the year of their admission, shall forfeit their seat in B.Tech. Course and their admission stands cancelled.

4. DISTRIBUTION AND WEIGHTAGE OF MARKS

4.1 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 subject. In addition, project work shall be evaluated for100 marks whereas audit courses shall be evaluated for a maximum of 30 internal marks.

i. For theory subjects the distribution shall be 30 marks for Internal Evaluation and 70 marks for the End-Examination.

ii. For practical subjects the distribution shall be 30 marks for Internal Evaluation and 70 marks for the End- Examination.

4.2 INTERNAL EXAMINATIONS:

i. For theory subjects, during the semester, there shall be two midterm examinations. Each midterm examination consists of objective paper for 10 marks and subjective paper for 20 marks with duration of 1hour 50 minutes (20 minutes for objective and 90 minutes for subjective paper).

Objective paper shall be for 10 marks. Subjective paper shall contain 5 questions of which student has to answer 3 questions evaluated* for 20 marks.

***Note 1:** The subjective paper shall contain 5 questions of equal Weightage of 10 marks and the marks obtained for 3 questions shall be condensed to 20 marks, any fraction shall be rounded off to the next higher mark.

Note 2: The midterm examination shall be conducted first by distribution of the Objective paper, simultaneously marking the attendance, after 20 minutes the answered objective paper shall be collected back. The student is not allowed to leave the examination hall. Then the descriptive question paper and the answer booklet shall be distributed. After 90minutes the answered booklets are collected back.

If the student is absent for the internal examination, no re-exam shall be conducted and internal marks for that examination shall be considered as zero.

First midterm examination shall be conducted for I,II units of syllabus and second midterm examination shall be conducted for III,IV & V units.

Final Internal marks shall be arrived at by considering the marks secured by the student in both the mid examinations with 80% weightage to the better mid exam and 20% to the other.

For Ex:

Marks obtained in first mid	: 25
Marks obtained in Second mid	: 20
Final Internal Marks	: (25x0.8) + (20x0.2) = 24

If the student is absent for any one midterm examination, the final internal marks shall be arrived at by considering 80% Weightage to the marks secured by the student in the appeared examination and zero to the other. For Ex:

Marks obtained in first mid: Absent Marks

obtained in Second mid: 25

Final Internal Marks : (25x0.8)+ (0x0.2) =20

4.3 END EXAMINATIONS:

(i). End examination of theory subjects shall have the following pattern:

a. There shall be two parts, Part-A and Part-B.

b. Part-A shall contain 10 compulsory short answer questions for a total of 20 marks such that each question carries 2 marks. There shall be 2 short answer questions from each unit.

c. Part-B Shall be either-or type questions of 10 marks each. Student shall answer any one of them.

d. Each of these questions from Part-B shall cover one unit of the syllabus.

(ii). End examination of theory subjects consisting of two parts of different subjects, for ex: Electrical & Mechanical Technology, shall have the following pattern:

a. Question paper shall be in two parts viz., Part A and Part B with equal weightage

b. In each part, there shall be 3 either-or type questions for 12, 12 and 11 marks.

Note: The answers for Part A & Part B shall be written in two separate answer books.

4.4 For practical subjects there shall be a continuous evaluation during the semester for 30 sessional marks and end examination shall be for 70 marks. Day-to-day work in the laboratory shall be evaluated for 30 marks by the concerned laboratory teacher based on the regularity/record/ viva. The end examination shall be conducted by the concerned laboratory teacher and senior expert in the same subject of the department.

In a practical subject consisting of two parts (ex: Electrical & Mechanical Lab), the end examination shall be conducted for 35 marks in each part. Internal examination shall be evaluated as above for 30 marks in each part and final internal marks shall be arrived by considering the average of marks obtained in two parts.

4.5 There shall one audit pass course in Professional ethics with no credits. There shall be no external examination. However, attendance in the audit course shall be considered while calculating aggregate attendance and student shall be declared pass in the audit course only when he/she secures 40% or more in the internal examinations. In case if student fails, re-exam shall be conducted for failed candidates every six months/semester at a mutual convenient date of college/student satisfying the conditions mentioned in item 1 & 2 of the regulations.

4.6 For the subject having design and/or drawing, such as Engineering Drawing, the distribution shall be 30 marks for internal evaluation and 70 marks for end examination.

Day-to-day work shall be evaluated for 15 marks by the concerned subject teacher based on the reports/submissions prepared in the class. And there shall be two midterm examinations in a semester for duration of 2hrs each for 15 marks with weightage of 80% to better mid marks and 20% for the other. The subjective paper shall contain 5 questions of equal weightage of 10 marks and the marks obtained for 3 questions shall be condensed to 15 marks, any fraction shall be rounded off to the next higher mark. There shall be no objective paper in internal examination. The sum of day to day evaluation and the internal test marks will be the final sessional marks for the subject.

In the end examination pattern for Engineering Drawing there shall be 5 questions, either-or type, of 14 marks each. There shall be no objective type questions in the end examination.

4.7 There shall be two comprehensive online examinations conducted by the respective colleges, one at the end of II year and the other at the end of III year, with 100 objective questions for 100 marks on the subjects studied in the respective semesters. The Principal is given the responsibility of preparing question bank/ question paper and conducting the online examination maintaining confidentiality. A student shall acquire 1 credit assigned to the comprehensive online examination only when he/she secures 40% or more marks. In case, if a student fails in comprehensive online examination, he shall reappear at the next supplementary examination when offered.

4.8 The laboratory records, internal test papers and end examination answer booklets shall be preserved for minimum of 2 years in the institution.

5. ATTENDANCE REQUIREMENTS:

5.1 A student shall be eligible to appear for University examinations if he acquires a minimum of 75% of attendance in aggregate of all the subjects in a semester/ I year.

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

5.3 Condonation of shortage of attendance in aggregate up to 10% (65% and above and below 75%) in each semester may be granted by the College Academic Committee.

5.4 Students whose shortage of attendance is not condoned in any semester are not eligible to take their end examination of that class and their registration shall stand cancelled.

5.5 A student will not be promoted to the next semester unless he satisfies the attendance requirements of the present semester. They may seek readmission for that semester when offered next.

5.6 A stipulated fee shall be payable towards Condonation of shortage of attendance to the College.

6. MINIMUM ACADEMIC REQUIREMENTS:

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

6.1 A student shall be deemed to have satisfied the minimum academic requirements and earned the credits allotted to each theory, practical, design, drawing subject or project if he secures not less than 35% of marks in the end examination and a minimum of 40% of marks in the sum total of the internal evaluation and end examination taken together. In case of audit courses he/she should secure 40% of the total marks.

6.2 A student shall be promoted from II to III year only if he/she fulfils the academic requirement of securing 40% of the credits in the subjects that have been studied up to II year II semester from the following examinations.

For I/I sem one regular and two supplementary examinations

For I/II sem one regular and one supplementary examinations.

For II/I sem one regular examinations.

For II/II sem one regular examinations.

6.3 A student shall be promoted from III year to IV year only if he/she fulfils the academic requirements of securing 40% of the credits in the subjects that have been studied up to III year II semester from the following examinations.

For I/I sem one regular and four supplementary examinations.

For I/II sem one regular and three supplementary examinations.

For II/I sem one regular and two supplementary examinations.

For II/II sem one regular and one supplementary examinations.

For III/I sem one regular examinations.

For III/II sem one regular examinations.

And in case if student is already detained for want of credits for particular academic year by sections 6.2 and 6.3 above, the student may make up the credits through supplementary exams of the above exams before the commencement of third or fourth year I semester class work respectively of next year.

6.4 MINIMUM ACADEMIC REQUIREMENTS: (For Later Entry Students)

The Following academic requirements have to be satisfied in addition to the attendance requirements mentioned in item no: 5

(i) A students shall be deemed to have satisfied them minimum academic requirements and earned the credits allotted to each theory practical, design drawing subjects or projects if he secures not less than 35% of marks in the end examinations and a minimum of 40 % of marks in the sum total of the internal evaluation and examination taken together. In the Seminar he/she should secure 40 %

(ii) A Student shall be promoted from III year to IV year only if he/she fulfils the academic requirements of securing 36 credits (40%) of the subjects that have been studied up to III year II semester from

- For II/I sem one regular and two supplementary examinations.
- For II/II sem one regular and one supplementary examinations.
- For III/I sem one regular examinations.
- For III/II sem one regular examinations.

And in case if student is already detained for want of credits for particular academic year by sections 6.2 and 6.3 above, the student may make up the credits through supplementary exams of the above exams before the commencement of third or fourth year I semester class work respectively of next year.

6.5 A student shall register and put up minimum attendance in all 176 credits and earn all the 176 credits. Marks obtained in all 176 credits shall be considered for the calculation of aggregate percentage of marks obtained.

7. COURSE PATTERN:

7.1 The entire course of study is for four academic years. All years shall be on semester pattern.

7.2 A student eligible to appear for the end examination in a subject, but absent or has failed in the end examination may appear for that subject at the next supplementary examination when offered.

7.3 When a student is detained due to lack of credits/shortage of attendance he may be re-admitted when the semester is offered after fulfilment of academic regulations. In such case, he/she shall be in the academic regulations into which he/she is readmitted.

8. WITH–HOLDING OF RESULTS:

If the candidate has any dues not paid to the university or if any case of indiscipline or malpractice is pending against him, the result of the candidate shall be withheld and he will not be allowed / promoted into the next higher semester. The issue of awarding degree is liable to be withheld in such cases.

9. GRADING

After each subject is evaluated for 100 marks, the marks obtained in each subject will be converted to a corresponding letter grade as given below, depending on the range in which the marks obtained by the student fall.

Table – Conversion into Grades and Grade Points assigned

Range in which the Marks In the Subject Fall	Grade	Grade Points Assigned
≥ 90	S	10
80-89	A	9
70-79	B	8
60-69	C	7
50-59	D	6
40-49	E	5
< 40	F (Fail)	0
Absent	Abs (Absent)	0

i. A student obtaining Grade F shall be considered failed and will be required to reappear for that subject when the next supplementary examination offered.

ii. For non credit courses „Satisfactory" or "Unsatisfactory" shall be indicated instead of the letter grade and this will not be counted for the computation of SGPA/CGPA.

9.1. SEMESTER GRADE POINT AVERAGE (SGPA) AND CUMULATIVE GRADE POINT AVERAGE (CGPA):

i. The Semester Grade Point Average (SGPA) is the ratio of sum of the product of the number of credits with the grade points scored by a student in all the courses taken by a student and the sum of the number of credits of all the courses undergone by a student, i.e.

$SGPA = \Sigma (Ci \times Gi) / \Sigma C_i$

Where, Ci is the number of credits of the i^{th} subject and Gi is the grade point scored by the student in the i^{th} course.

ii. The Cumulative Grade Point Average (CGPA) will be computed in the same manner taking into account all the courses undergone by a student over all the semesters of a program, i.e.

$CGPA = \Sigma (Ci \times Si) / \Sigma C_i$

Where „Si" is the SGPA of the i^{th} semester and C_i is the total number of credits in that semester.

iii. Both SGPA and CGPA shall be rounded off to 2 decimal points and reported in the transcripts.

iv. SGPA will be given to those who cleared all the subjects in that semester

GRADE POINT*:* It is a numerical weight allotted to each letter grade on a 10-point scale.

LETTER GRADE*:* It is an index of the performance of students in a said course. Grades are denoted by letters S, A, B, C, D, E and F.

10. AWARD OF CLASS:

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

Class Awarded	CGPA Secured
First Class with Distinction	≥ 7.5
First Class	≥ 6.5 < 7.5
Second Class	≥ 5.5 < 6.5
Pass Class	≥ 5.0 < 5.5

11. TRANSITORY REGULATIONS:

Discontinued, detained, or failed candidates are eligible for readmission as and when the semester is offered after fulfillment of academic regulations. Candidates who have been detained for want of attendance or not fulfilled academic requirements or who have failed after having undergone the course in earlier regulations or have discontinued and wish to continue the course are eligible for admission into the unfinished semester from the date of commencement of class work with the same or equivalent subjects as and when subjects are offered, subject to Section 2 and they will be in the academic regulations into which they get readmitted.

Candidates who were permitted with Gap Year shall be eligible for rejoining into the succeeding year of their B.Tech from the date of commencement of class work, subject to Section **2** and they will be in the academic regulations into which the candidate is presently rejoining.

12 MINIMUM INSTRUCTION DAYS:

The minimum instruction days including exams for each semester shall be 90 days.

13. REVALUATION

A candidate can apply for revaluation of his/ her end examination answer paper in a theory courses. The examination section shall issue a notification inviting applications for the revaluation after publishing the results. The application forms can be obtained from the examination section. A candidate can apply for revaluation of answer scripts in not more than **5**subjects at a time**.**

No revaluation for seminar, comprehensive Examination, practical and project work.

14. CONDUCT AND DISCIPLINE

(i) Students shall conduct themselves within and outside the precincts of the Institute in a manner befitting the students of an Institute of National importance

(ii) As per the order of the Hon'ble Supreme Court of India, ragging in any form is banned: acts **of** ragging will be considered as gross indiscipline and will be severely dealt with.

(iii) The following additional acts of omission and /or commission by the students within or outside the precincts of the college shall constitute gross violation of code of conduct and are liable to invoke disciplinary measures

(a) Ragging

(b) Lack of courtesy and decorum: indecent behaviour anywhere within or outside the campus.

(c) Willful damages or stealthy removal of any property /belongings of the Institute / Hostel or of fellow students

(d) Possession, consumption of distribution of alcoholic drinks or any kind of hallucinogenic drugs

(e) Mutilation or unauthorized possession of library books

(f) Hacking in computer systems

(g) Furnishing false statements to the disciplinary committee, or willfully withholding information relevant to an enquiry

(h) Organizing or participation in any activity that has potential for driving fellow students along lines of religion caste batch of admission hostel or any other unhealthy criterion .

(i) Resorting to noisy and unseemly behavior, disturbing studies of fellow students

(j) Physical or mental harassment of fresher through physical contact or oral abuse

(k) Adoption of unfair means in the examination.

(l) Organizing or participating in any group activity except purely academic and scientific Programmers in company with others in or outside campus without prior permission of the Principal

(m) Disturbing in drunken state or otherwise an incident in academic or students function or any other public event.

(n) Not obeying traffic rules in campus not following safety practices or causing potential danger to oneself or other persons in any way.

(o) Any other act or gross indiscipline

(iv) Commensurate with the gravity of the offence the punishment may be reprimand fine and expulsion from the hostel debarment from an examination rustication for a specified period or even outright expulsion from the College

(v) The reprimanding Authority for an offence committed by students in the Hostel and in the Department or the classroom shall be respectively, the managers of the Hostels and the Head of the concerned Department

(vi) In all the cases of offence committed by students in jurisdictions outside the purview of clause (12.v) the Principal shall be the Authority to reprimand them

(vii) All Major acts of indiscipline involving punishment other than mere reprimand shall be considered and decided by the Principal Students Disciplinary Committee appointed by the Principal

(viii) All other cases of Indiscipline of Students like adoption of unfair means in the examinations shall be reported to the Vice-Principal for taking appropriate action and deciding on the punishment to be levied.

(ix) In all the cases of punishment levied on the students for any offence committed the aggrieved party shall have the right to appeal to the Principal who shall constitute appropriate Committees to review the case.

14. Student transfers shall be as per the guidelines issued by the Government of Andhra Pradesh from time to time.

15. GENERAL:

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

15.2 Malpractices rules- nature and punishments are appended.

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

15.4 The college may change or amend the academic regulations or syllabi at any time and the changes or amendments shall be made applicable to all the students on rolls with effect from the dates notified by the college

DISCIPLINARY ACTIONS FOR MALPRACTICES / IMPROPER CONDUCT IN EXAMINATIONS

Sl.no	NATURE OF MALPRACTICES/ IMPROPER CONDUCT IF THE CANDIDATE	PUNISHMENT
1. (a)	possesses or keeps access in examination hall, any paper, note book, programmable calculators, cell phones, pager, palm computers or any other form of material concerned with or related to the subject of the examination (theory/ practical) in which he/she is appearing but has not made use of (material shall include any marks on the body of the candidate which can be used as an aid in the subject of the examination)	Expulsion from the examination hall and cancellation of the performance in that subject only.
(b)	Gives assistance or guidance or receives it from any other candidate orally or by any other body language methods or communicates through cell phones with any candidate or persons inside 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/she will be handed over to the police and a case is registered against him/her.
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	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical

	practical) in which the candidate is appearing.	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 will be cancelled and retained by the CE.
3.	Impersonates any other candidate in connection with the examination.	The candidate who has impersonated shall be expelled from examination hall and forfeits the seat. The performance of the original candidate, who has been impersonated, shall be cancelled in all the subjects of the examination (including practical's and project work) already appeared and shall not be allowed to appear for examinations of the remaining subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all university examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat. If the imposter is an outsider, he/she will be handed over to the police and a case is registered against him/her.

4.	Smuggles in the answer book or additional sheet or takes out or arranges to send out the question paper or answer book or additional sheet, during or after the examination.	Expulsion from the examination hall and cancellation of performance in that subject and all the other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all university examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.
5.	Uses objectionable, abusive or offensive language in the answer paper or in letters to the examiners or writes to the examiner requesting him to award pass marks.	Cancellation of the performance in that subject.
6.	Refuses to obey the orders of the Chief Superintendent/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 or causes any injury to his person or to any of his relatives whether by offensive words spoken or written or by signs or by visible representation or assaults the officer-in-charge, or any person on duty inside or outside the examination hall or any of his relatives, or indulges in any other act of misconduct or mischief which results in damage to or destruction of property in the examination hall or	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 forfeit their seats. In case of outsiders, they will be handed over to the police and a police case is registered against them.

	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.	
7.	Leaves the exam hall taking away answer script or intentionally tears off 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 the external 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.	Belongs to college, who is not a candidate for the particular examination or any person not connected with the college but indulges in any malpractice or improper conduct mentioned in clause 6 to 8.	Student of the college will be expelled from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred and forfeits the seat. Person(s) who do not belong to the college will be handed over to police and, a police case will be registered against them.
10.	Comes in a drunken state to the examination hall.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year.
11.	Copying is detected on the basis of internal evidence, such as, during valuation or during special scrutiny.	Cancellation of the performance in that subject and all other subjects the candidate has appeared including practical examinations and project work of that semester/year examinations.

Note: If any malpractice is detected which is not covered in the above clauses (1) to (11) shall be reported to the Principal for further action to award suitable punishment.

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

I B.Tech- I Semester

S.No	Subject Code	Subject	Subject Category	Scheme of Instructions Periods per Week				Scheme of Examination Maximum Marks		
				L	T	P/D	C	I	E	Total
1	16SAH111	Functional English-I	SH	3	1	-	3	30	70	100
2	16SAH114	Mathematics-I	SH	3	1	-	3	30	70	100
3	16CSE111	Computer Programming	ES	3	1	-	3	30	70	100
4	16MEC111	Engineering Drawing Practice	ES	3	1	-	3	30	70	100
5	16EEE111	Electrical Engineering	ES	3	1	-	3	30	70	100
6	16SAH116	English Communication Skills Lab	SH	-	-	3	2	30	70	100
7	16CSE112	Computer Programming Lab	ES	-	-	3	2	30	70	100
8	16EEE112	Electrical Engineering Lab	ES	-	-	3	2	30	70	100
Contact periods per week				15	5	9	-	-	-	-
Total periods per week				29			-	-	-	-
Total credits (5 Theory + 3 Labs)							21	-	-	-
Total Marks								240	560	800

I B.Tech- II Semester

S.No	Subject Code	Subject	Subject Category	Scheme of Instructions Periods per Week				Scheme of Examination Maximum Marks		
				L	T	P/D	C	I	E	Total
1	16SAH121	Functional English-II	SH	3	1	-	3	30	70	100
2	16SAH122	Mathematics-II	SH	3	1	-	3	30	70	100
3	16CSE121	Data Structures	ES	3	1	-	3	30	70	100
4	16SAH112	Engineering Physics	SH	3	1	-	3	30	70	100
5	16SAH113	Engineering Chemistry	SH	3	1	-	3	30	70	100
6	16SAH115	Engineering Physics and Engineering Chemistry Lab	SH	-	-	3	2	30	70	100
7	16CSE122	Data Structures Lab	ES	-	-	3	2	30	70	100
8	16MEC112	Engineering Workshop and IT Workshop Lab	ES	-	-	3	2	30	70	100
Contact periods per week				15	5	9	-	-	-	-
Total periods per week				29			-	-	-	-
Total credits (5 Theory + 3 Labs)							21	-	-	-
Total Marks								240	560	800

* Subject Offered only for Mechanical and Civil Engineering Departments.

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES.
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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

II B.Tech- I Semester

S.No	Subject Code	Subject	Subject Category	Scheme of Instructions Periods per Week				Scheme of Examination Maximum Marks		
				L	T	P/D	C	I	E	Total
1	16SAH211	Mathematics-III	SH	3	1	-	3	30	70	100
2	16CSE211	Mathematical Foundations of Computer Science	PC	3	1	-	3	30	70	100
3	16ECE215	Basic Electronics Engineering	ES	3	1	-	3	30	70	100
4	16CSE212	Advanced Data Structures through C++	PC	3	1	-	3	30	70	100
5	16ECE216	Digital Logic Design	ES	3	1	-	3	30	70	100
6	16CSE213	Design And Analysis of Algorithms	PC	3	1	-	3	30	70	100
7	16CSE214	Advanced Data Structures Lab	PC	-	-	3	2	30	70	100
8	16ECE217	Basic Electronics Engineering Lab	ES	-	-	3	2	30	70	100
9	16AUD211	Professional Ethics	AC	2	-	-	-	-	-	-
10	16PAT219	English Communication Skills	EEC	2	-	-	-	-	-	-
11	16PAT220	Personality Development Program-I	EEC	2	-	-	-	-	-	-
Contact periods per week				24	6	6	-	-	-	-
Total periods per week				36			-	-	-	-
Total credits (6 Theory + 2 Labs)							22	-	-	-
Total Marks								240	560	800

II B.Tech- II Semester

S.No	Subject Code	Subject	Subject Category	Scheme of Instructions Periods per Week				Scheme of Examination Maximum Marks		
				L	T	P/D	C	I	E	Total
1	16SAH212	Environmental Science	SH	3	1	-	3	30	70	100
2	16SAH222	Probability And Statistics	SH	3	1	-	3	30	70	100
3	16CSE221	Theory Of Computation	PC	3	1	-	3	30	70	100
4	16CSE222	Computer Organization	PC	3	1	-	3	30	70	100
5	16CSE223	Database Management Systems	PC	3	1	-	3	30	70	100
6	16CSE224	Object Oriented Programming through Java	PC	3	1	-	3	30	70	100
7	16CSE225	Object Oriented Programming Lab	PC	-	-	3	2	30	70	100
8	16CSE226	Database Management Systems Lab	PC	-	-	3	2	30	70	100
9	16CSE227	Online Comprehensive Test-I	EEC	2	-	-	1	-	-	-
10	16PAT228	Personality Development Program-II	EEC	2	-	-	-	-	-	-
Contact periods per week				22	6	6	-	-	-	-
Total periods per week				34			-	-	-	-
Total credits (6 Theory + 2 Labs)							23	-	-	-
Total Marks								240	560	800

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III B.Tech- I Semester

S.No	Subject Code	Subject	Subject Category	Scheme of Instructions Periods per Week				Scheme of Examination Maximum Marks		
				L	T	P/D	C	I	E	Total
1	16CSE311	Software Engineering	PC	3	1	-	3	30	70	100
2	16CSE312	Operating Systems	PC	3	1	-	3	30	70	100
3	16CSE313	Computer Networks	PC	3	1	-	3	30	70	100
4	16CSE314	Unix and Shell programming	PC	3	1	-	3	30	70	100
5	16ECE329	Microprocessors and Interfacing	ES	3	1	-	3	30	70	100
6	16CSE315	Compiler Design	PC	3	1	-	3	30	70	100
7	16CSE316	Network Simulation Lab	PC	-	-	3	2	30	70	100
8	16CSE317	Unix and Shell programming Lab	PC	-	-	3	2	30	70	100
9	P&T	Reasoning and Aptitude-I	EEC	2	-	-	-	-	-	-
Contact periods per week				20	6	6	-	-	-	-
Total periods per week				32			-	-	-	-
Total credits (6 Theory + 2 Labs)							22	-	-	-
Total Marks								240	560	800

III B.Tech- II Semester

S.No	Subject Code	Subject	Subject Category	Scheme of Instructions Periods per Week				Scheme of Examination Maximum Marks		
				L	T	P/D	C	I	E	Total
1	16CSE321	Data Mining and Warehousing	PC	3	1	-	3	30	70	100
2	16CSE322	Web Technologies	PC	3	1	-	3	30	70	100
3	16CSE323	Artificial Intelligence	PC	3	1	-	3	30	70	100
4	16CSE324	Object Oriented Analysis and Design	PC	3	1	-	3	30	70	100
5	16CSE325	**Core Elective-I**	CE	3	1	-	3	30	70	100
6	OE-I	**Open Elective-I**	OE	3	1	-	3	30	70	100
7	16CSE326	Data mining and Case Tools Lab	PC	-	-	3	2	30	70	100
8	16CSE327	Web Technologies Lab	PC	-	-	3	2	30	70	100
9	16CSE328	On-line Comprehensive Test-II	EEC	2	-	-	1	-	100	100
10	P&T	Reasoning and Aptitude-II	EEC	2	-	-	-	-	-	-
Contact periods per week				22	6	6	-	-	-	-
Total periods per week				34			-	-	-	-
Total credits (6 Theory + 2 Labs)							23	-	-	-
Total Marks								240	660	900

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IV B.Tech- I Semester

S.No	Subject Code	Subject	Subject Category	Scheme of Instructions Periods per Week				Scheme of Examination Maximum Marks		
				L	T	P/D	C	I	E	Total
1	16CSE411	Cryptography and Network Security	PC	3	1	-	3	30	70	100
2	16CSE412	Big Data and Analytics	PC	3	1	-	3	30	70	100
3	16CSE413	Mobile Application Development	PC	3	1	-	3	30	70	100
4	16CSE414	**Core Elective-II**	CE	3	1	-	3	30	70	100
5	16CSE415	**Core Elective-III**	CE	3	1	-	3	30	70	100
6	OE-II	**Open Elective-II**	OE	3	1	-	3	30	70	100
7	16CSE416	Big Data Analytics Lab	PC	-	-	3	2	30	70	100
8	16CSE417	Mobile Application Development Lab	PC	-	-	3	2	30	70	100
Contact periods per week				18	6	6	-	-	-	-
Total periods per week				30			-	-	-	-
Total credits (6 Theory + 2 Labs)							22	-	-	-
Total Marks								240	560	800

IV B.Tech- II Semester

S.No	Subject Code	Subject	Subject Category	Scheme of Instructions Periods per Week				Scheme of Examination Maximum Marks		
				L	T	P/D	C	I	E	Total
1	16CSE421	Internet of Things	PC	3	1	-	3	30	70	100
2	16MBA214	Business Management	SH	3	1	-	3	30	70	100
3	16CSE422	**Core Elective-IV**	CE	3	1	-	3	30	70	100
4	16CSE423	**Core Elective-V**	CE	3	1	-	3	30	70	100
5	16CSE424	Project Work	EEC	18	-	-	10	30	70	100
Contact periods per week				30	4	-	-	-	-	-
Total periods per week				34			-	-	-	-
Total credits (4 Theory + 1 Project Work)							22	-	-	-
Total Marks								150	350	500

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CORE ELECTIVES

III B.Tech- II Semester (Core Elective-I)

S.No	Subject Code	Subject	Subject Category	Scheme of Instructions Periods per Week				Scheme of Examination Maximum Marks		
				L	T	P/D	C	I	E	Total
1	16CSE325A	Computer Graphics and Multimedia	CE	3	1	-	3	30	70	100
2	16CSE325B	Principles of Programming Languages	CE	3	1	-	3	30	70	100
3	16CSE325C	Software Testing Methodologies	CE	3	1	-	3	30	70	100
4	16CSE325D	Network Programming	CE	3	1	-	3	30	70	100

IV B.Tech- I Semester (Core Elective-II)

S.No	Subject Code	Subject	Subject Category	Scheme of Instructions Periods per Week				Scheme of Examination Maximum Marks		
				L	T	P/D	C	I	E	Total
1	16CSE414A	Software Project Management	CE	3	1	-	3	30	70	100
2	16CSE414B	Advanced Computer Architecture	CE	3	1	-	3	30	70	100
3	16CSE414C	Soft Computing	CE	3	1	-	3	30	70	100
4	16CSE414D	System Modeling and Simulation	CE	3	1	-	3	30	70	100

IV B.Tech- I Semester (Core Elective-III)

S.No	Subject Code	Subject	Subject Category	Scheme of Instructions Periods per Week				Scheme of Examination Maximum Marks		
				L	T	P/D	C	I	E	Total
1	16CSE415A	Cloud Computing	CE	3	1	-	3	30	70	100
2	16CSE415B	Machine Learning	CE	3	1	-	3	30	70	100
3	16CSE415C	Distributed Systems	CE	3	1	-	3	30	70	100
4	16CSE415D	Network Management Systems	CE	3	1	-	3	30	70	100

IV B.Tech- II Semester (Core Elective-IV)

S.No	Subject Code	Subject	Subject Category	Scheme of Instructions Periods per Week				Scheme of Examination Maximum Marks		
				L	T	P/D	C	I	E	Total
1	16CSE422A	Distributed Databases	CE	3	1	-	3	30	70	100
2	16CSE422B	Wireless Communication Networks	CE	3	1	-	3	30	70	100
3	16CSE422C	Internetworking with TCP/IP	CE	3	1	-	3	30	70	100
4	16CSE422D	Mobile Computing	CE	3	1	-	3	30	70	100

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IV B.Tech- II Semester (Core Elective-V)

S.No	Subject Code	Subject	Subject Category	Scheme of Instructions Periods per Week				Scheme of Examination Maximum Marks		
				L	T	P/D	C	I	E	Total
1	16CSE423A	Design Patterns	CE	3	1	-	3	30	70	100
2	16CSE423B	Human Computer Interaction	CE	3	1	-	3	30	70	100
3	16CSE423C	Information Retrieval Systems	CE	3	1	-	3	30	70	100
4	16CSE423D	Service Oriented Architecture	CE	3	1	-	3	30	70	100

Note: SH- Science and Humanities; PC – Professional Core; ES – Engineering Science; CE-Core Elective; OE- Open Elective; EEC- Employability Enhancement Courses; AC – Audit Course

OPEN ELECTIVE-I

III B.Tech- II Semester

Offered Department	Subject Code	Subject	Subject Category	Scheme of Instructions Periods per Week				Scheme of Examination Maximum Marks		
				L	T	P/D	C	I	E	Total
S&H	16OSAH321	LASER and Optical Fibers	OE	3	1	-	3	30	70	100
	16OSAH322	Advanced Mathematics	OE	3	1	-	3	30	70	100
	16OSAH323	Mathematical Modeling	OE	3	1	-	3	30	70	100
MECH	16OMEC321	Industrial Robotics	OE	3	1	-	3	30	70	100
	16OMEC322	Optimization Techniques	OE	3	1	-	3	30	70	100
	16OMEC323	Mechatronics	OE	3	1	-	3	30	70	100
CIV	16OCIV321	Construction Equipment, Planning and Management	OE	3	1	-	3	30	70	100
	16OCIV322	Remote sensing and GIS	OE	3	1	-	3	30	70	100
	16OCIV323	Green Buildings and Energy Conversion	OE	3	1	-	3	30	70	100
EEE	16OEEE321	Power Plant Instrumentation	OE	3	1	-	3	30	70	100
	16OEEE322	Neural Network and Fuzzy System	OE	3	1	-	3	30	70	100
	16OEEE323	Sensors and Instrumentation	OE	3	1	-	3	30	70	100
ECE	16OECE321	Machine Vision Systems	OE	3	1	-	3	30	70	100
	16OECE322	MEMS and Micro Systems	OE	3	1	-	3	30	70	100
	16OECE323	Foundation of Nano - Electronics	OE	3	1	-	3	30	70	100

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OPEN ELECTIVE-II

IVB.Tech- I Semester

Offered Department	Subject Code	Subject	Subject Category	Scheme of Instructions Periods per Week				Scheme of Examination Maximum Marks		
				L	T	P/D	C	I	E	Total
S&H	16OSAH411	Applications of Graph Theory	OE	3	1	-	3	30	70	100
	16OSAH412	Introduction to Nano Science and Technology	OE	3	1	-	3	30	70	100
	16OSAH413	Entrepreneurship Development	OE	3	1	-	3	30	70	100
MECH	16OMEC411	Quality Control and Reliability Engineering	OE	3	1	-	3	30	70	100
	16OMEC412	Industrial Engineering and Psychology	OE	3	1	-	3	30	70	100
	16OMEC413	Power Generation Technologies	OE	3	1	-	3	30	70	100
CIV	16OCIV411	Transport and Environment	OE	3	1	-	3	30	70	100
	16OCIV412	Disaster Management	OE	3	1	-	3	30	70	100
	16OCIV413	Air Pollution and Control Engineering	OE	3	1	-	3	30	70	100
EEE	16OEEE411	Energy Auditing and Demand Management	OE	3	1	-	3	30	70	100
	16OEEE412	Fundamentals of Electrical Estimation and Costing	OE	3	1	-	3	30	70	100
	16OEEE413	Fundamentals of Electrical Power Utilization	OE	3	1	-	3	30	70	100
ECE	16OECE411	Medical Electronics	OE	3	1	-	3	30	70	100
	16OECE412	Fundamentals of Embedded Systems	OE	3	1	-	3	30	70	100
	16OECE413	Data Communication and Networks	OE	3	1	-	3	30	70	100

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EMPLOYABILITY ENHANCEMENT COURSES (EEC)

S.No	Subject Code	Subject	Offered Semester	Category	Scheme of Instructions Periods per Week			
					L	T	P/D	C
1	P&T	English Communication Skills	II-I	EEC	2	-	-	-
2	P&T	Personality Development Program-I	II-I	EEC	2	-	-	-
3	P&T	Personality Development Program-II	II-II	EEC	2	-	-	-
4	16CSE227	On-line Comprehensive Exam-I	II-II	EEC	2	-	-	1
5	P&T	Reasoning and Aptitude-I	III-I	EEC	2	-	-	-
6	16CSE328	On-line Comprehensive Exam-II	III-II	EEC	2	-	-	1
7	P&T	Reasoning and Aptitude-II	III-II	EEC	2	-	-	-
8	16CSE425	Project Work	IV-II	EEC	18	-	-	10
				Total	32	-	-	12

SUMMARY OF CREDIT ALLOCATION

S.NO	Subject Area	Credits As Per Semester								Total Credits
		I-I	I-II	II-I	II-II	III-I	III-II	IV-I	IV-II	
1.	SH	8	14	3	6	-	-	-	3	34
2.	ES	13	7	8	-	3	-	-	-	31
3.	PC	-	-	11	16	19	16	13	3	78
4.	CE	-	-	-	-	-	3	6	6	15
5.	OE	-	-	-	-	-	3	3	-	6
6.	EEC	-	-	-	1	-	1	-	10	12
7.	AC	-	-	Y	-	-	-	-	-	0
Total		**21**	**21**	**22**	**23**	**22**	**23**	**22**	**22**	**176**

PERCENTAGE WISE CREDIT DISTRIBUTIONS

S.No	Category	Credits Allocated	Percentage –wise Credit Distribution
1	SH- Science and Humanities	34	19.31
2	PC – Professional Core	78	44.31
3	ES – Engineering Science	31	17.61
4	CE- Core Elective	15	08.52
5	OE- Open Elective	6	03.40
6	EEC- Employability Enhancement Courses	12	06.81
7	AC – Audit Course	0	0
Total		**176**	**100**

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I B.Tech I Semester

L	T	P	C
3	1	0	3

16SAH111 FUNCTIONAL ENGLISH-I
(Common to All Branches)

Course Educational Objectives:

CEO1: To Provide Knowledge on Behavioral aspects, developing vocabulary by deriving various ways of forming words.

CEO 2: To cultivate Individual and Team Work skills, Knowledge on the usage of foreign language words in to English Language,

CEO3: To Cultivate Adaptability Skills in work place, Knowledge on Grammatical aspects of Verbs and Adverbs, words by applying stress, how to express one's opinions and dialogue writing.

CEO4: Acquiring of Entrepreneurship Skills, Usage of grammar aspects of Prepositions, Pronunciation of suffix words, and acquisition of writing skills.

CEO5: Contextual knowledge to recognize the need of ability to engage in independent and life-long learning in the broadest context of technological change.

UNIT-I

(a**) SUBHA-** a Short Story**-** by ***Rabindranath Tagore***

(b) **THE ONLY AMERICAN FROM OUR VILLAGE** –A short story- by***ArunJoshi***Exercises: 1.Creating Short Stories: (speaking activity by students) 2.Synonyms and Antonyms3.Reading Comprehension Skills4. Nouns-Kinds and Uses 5. Pronouns-Kinds and Uses .

UNIT-II

AZIM PREMJI–an Entrepreneur-***web source***

Exercises: 1. What are the Skills Necessary for an Entrepreneur-Discuss. (Speaking Activity by Students) 2. Synonyms and Antonyms 3. Cloze Test 4. Adjectives-Types –Comparison 5. Articles.

UNIT-III

THE LITTLE BLACK BOY –A poem- by***William Blake***

Exercises: 1.Which is Necessary for a Human being either Skin Complexion or Attitude-Discuss? (Speaking Activity by Students)2. Jumbled Sentences. 3. Adverbs-Kinds and Uses.

UNIT-IV

THE YEAR 2050-Reflections of a futurist- by***Theodore J. Gordon***

Exercises: 1. what are the Renewable and Non Renewable Energy Sources-Discuss? 2. Synonyms and Antonyms3. Developing Hints 4. Prepositions – Types-Uses 5.Conjunctions-Types-Uses.

UNIT-V

(a)WHITE WASHING THE FENSE-Team Work Skills-by***MarkTwain***

(b) SENOR PAYROLL –Adaptability Skills- by***William E. Barrett***

Exercises: 1. Is Soft Skills Necessary for a Professional-Discuss? 2. Synonyms and Antonyms 3.Letter Writing-Official 4. E-mail Writing 5.Writing Reports.

Course Outcomes:

COURSE OUTCOMES		PO's related to CO's
CO1	Knowledge on behavioral aspects and communicate effectively with others.	PO1,PO10
CO2	Knowledge on Acquiring Entrepreneurship Skills and Writing Skills.	PO,PO9,PO10
CO3	Cultivate knowledge to confidence in one's life skills.	PO1, PO9
CO4	Knowledge in recognizing the need of ability to engage in independent and life-long learning, communicate effectively in English.	PO1, PO10, PO12
CO5	Develop knowledge on Individual, Team work skills and Adaptability skills on the usage of foreign language words.	PO1,PO9

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	-	-	-	-	-	-	-	-	3	-	-
CO2	3	-	-	-	-	-	-	-	2	3	-	-
CO3	3	-	-	-	-	-	-	-	3	-	-	-
CO4	3	-	-	-	-	-	-	-	-	3	-	3
CO5	3	-	-	-	-	-	-	-	3	-	-	-
CO*	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**2.66**	**3**	**-**	**3**

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I B.Tech I Sem

16SAH114	**MATHEMATICS – I**	**L**	**T**	**P/D**	**C**
	(Common to all Branches)	**2**	**1**	**-**	**3**

Course Educational Objectives:

CEO1: To learn the reduction of a given matrix to echelon and normal forms, rank of a matrix, solve system of linear equations by different methods and determining the eigen values and eigen vectors and develop linear transformation with emphasis on the role of eigen-values and eigen-vectors.

CEO2: To understand the Taylor's and Maclaurin's series of function in single variable and to familiarize the knowledge of partial derivatives, extreme values in multi variables.

CEO3: To identify important characteristics of first order ordinary differential equations(FOODE) and develop appropriate method of obtaining solutions of FOODE and explore the use of FOODE as models in various applications

CEO4: To learn the concepts of Laplace Transforms and inverse Laplace Transforms and to explore the solving initial value problems by using Laplace transform method.

UNIT – 1: **MATRICES**

Rank - Echelon form and Normal form - Solution of linear system of homogeneous and non-homogeneous equations - Direct methods - Gauss elimination, Gauss Jordan method - Eigen values, Eigen vectors - Properties - Cayley-Hamilton theorem(without proof) - Inverse and powers of a matrix. – Diagonalizationof a matrix using similarity transformation only.

UNIT – 2: DIFFERENTIAL CALCULUS AND ITS APPLICATIONS

Taylor's and Maclaurin's series for single variable (simple examples) - Functions of several variables - Jacobian – Taylor's and Maclaurin's series for two variables - Maxima and minima of functions of two variables - Lagrangian method of undetermined multipliers with three variables only.

UNIT – 3:ORDINARY DIFFERENTIAL EQUATIONS OF FIRST ORDER, FIRST DEGREE AND ITS APPLICATIONS & SPECIAL FUNCTIONS

Exact equations, Equations reducible to exact, Linear and Bernoulli's equation Applications: Orthogonal Trajectories, Newton's law of cooling only.

Beta and Gamma functions – Evaluation of Integrals (Simple examples)

UNIT - 4: LAPLACE TRANSFORM - I

Laplace transform of standard functions - First shifting theorem - Second shifting theorem - Transform of Derivatives & Integrals - Inverse transform.

UNIT - 5: LAPLACE TRANSFORM – II

Laplace Transform ofUnit step function, Dirac's delta function and Periodic function - Convolution theorem - Application of Laplace transforms to ordinary differential equations of first and second order.

Course Outcomes:

On successful completion of this course, the students should be able to:

	COURSE OUTCOMES	PO's related to CO's
CO1	Demonstrate knowledge in first order ordinary differential equations, Develop analytical skills in solving problems involving first order ordinary differential equations and Develop skills in designing Mathematical models for Newton's Law of cooling, electrical circuits and orthogonal trajectories	PO1, PO2, PO3, PO12
CO2	Demonstrate knowledge in higher order linear differential equations and develop analytical skills in solving problems involving higher order non homogeneous linear differential equations	PO1, PO2, PO12
CO3	Demonstrate knowledge in Taylor's and Maclaurin's series of a function of single variable, finding maximum and minimum values attained by functions of several variables and Develop analytical skills in solving problems involving functional dependence and independence using partial derivatives	PO1, PO2,
CO4	Demonstrate knowledge in Laplace transform and inverse Laplace transform and use the appropriate shift theorems in finding Laplace and inverse Laplace transforms	PO1, PO2, PO12
CO5	Demonstrate knowledge in Laplace transform of some special functions to develop analytical skills in solving problems involving initial value problems for constant coefficient linear ordinary differential equations using Laplace transform	PO1, PO2, PO3, PO12

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	3	3	-	-	-	-	-	-	-	-	2
CO2	3	3	-	-	-	-	-	-	-	-	-	2
CO3	3	3	-	-	-	-	-	-	-	-	-	-
CO4	3	3	-	-	-	-	-	-	-	-	-	2
CO5	3	3	3	-	-	-	-	-	-	-	-	2
CO*	**3**	**3**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**2**

Text books:

1. Engineering Mathematics–I, 2012, T.K.V. Iyengar, B.Krishna Gandhi, S. Ranganatham and M.V.S.S.N. Prasad, S. Chand and Company Ltd, New Delhi.
2. Higher Engineering Mathematics, 34/e, 1999, Dr. B. S. Grewal, Khanna Publishers, Delhi.

Reference books:

1. Engineering Mathematics for JNTU, 2012, B.V. Ramana, Tata McGraw Hill Publishers, New Delhi.
2. A Text Book of Engineering Mathematics,2011, N.P.Bali,Laxmi publications(P)Ltd, New Delhi.
3. Higher Engineering Mathematics, Dr. M. K. VenkataRamana, National Pub, Madras
4. Engineering Mathematics, Volume - 1, 2012, E.Rukmangadachari, E.Keshava Reddy, Pearson Educations, Chennai.
5. Advanced Engineering Mathematics, 8/e, 2009, Erwin Kreyszig, Wiley India, New Delhi

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I B.Tech I Sem

L	T	P	C
3	1	0	3

16CSE111 **COMPUTER PROGRAMMING**
(Common to All Branches)

Course Educational Objectives:

CEO1: To Design an algorithm for a given problem and illustrate the flowchart to develop C programs using operators.
CEO2: To impart adequate knowledge on conditional and iterative statements to write C programs.
CEO 3: To develop programming skills using the arrays, functions and strings.
CEO 4: To enable effective usage of structures, pointers and to implement the memory management concepts.
CEO 5: To understand the sorting techniques and files concept to show input and output of files.

UNIT 1 - OVERVIEW OF COMPUTERS AND C PROGRAMMING BASICS

Overview of Computers: Computer Software - Algorithm–Flow Chart–Software Development Method.
C Programming Basics : Introduction to "C" Programming – Characteristics of C – Structure of a "C" program – Tokens –Constants- Variables – Data Types – Operators and their types-Expressions – Operator Precedence and Associativity– Managing Input and Output Operations.

UNIT 2 – SELECTION, ITERATION STATEMENTS AND ARRAYS

Selection Statements: if Statements - Switch Statement – goto statement.
Iteration Statements: for statement–while statement–do-while Statement.
Arrays: Initialization–Declaration - One-Dimensional Arrays-Two-Dimensional Arrays.

UNIT 3 –FUNCTIONS AND STRINGS

Functions: Library Functions - User Defined Functions–Function Prototype - Function Definition–Function Call – Return Statements - Category of Functions – Nesting of Functions – Passing Arrays to Functions- Recursion – Storage Classes – Pre-Processor Directives
Strings: Declaring and Initializing String Variables–Reading string from terminal - Writing stringto the screen - String Operations – String Handling Functions.

UNIT 4 – POINTERS, STRUCTURES AND UNIONS

Pointers: Definition–Initialization–Pointers Arithmetic–Pointers and Arrays.
Structures and Union: Introduction – Need for Structure Data type – Structure Definition – Structure Declaration – Accessing Structure Members - Structure within a Structure – Copying and Comparing Structure Variables - Structures and Arrays – Union.

UNIT 5 - FILE HANDLING, SORTING AND SEARCHING TECHNIQUES

File handling: File Accessing Methods – Sequential Access and Random Access- Basic Operations on Files – File Handling Function.
Sorting and Searching techniques: Bubble sort - Selection sort - Insertion sort – Quick sort – Merge sort - Linear search - Binary search.

Course Outcomes:

On successful completion of the course, the student will be able to

COURSE OUTCOMES		PO's related to CO's
CO1	Obtain the knowledge about the problem solving skills.	PO1, PO2
CO2	Develop programs using the basic elements like iteration statements, Arrays.	PO1, PO2, PO3
CO3	Understand about the code reusability with the help of user defined functions.	PO1, PO2
CO4	Solve the memory access problems by using pointers and design the programs on structures and unions.	PO1, PO2, PO4
CO5	Learn the basics of file handling mechanism that is essential for understanding the concepts of management systems.	PO1, PO2

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	3	-	-	-	-	-	-	-	-	-	-
CO2	3	2	3	-	-	-	-	-	-	-	-	-
CO3	3	3	-	-	-	-	-	-	-	-	-	-
CO4	3	3	-	3	-	-	-	-	-	-	-	-
CO5	2	3	-	-	-	-	-	-	-	-	-	-
CO*	**2.8**	**2.8**	**3**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

Text Books:

1. A Structured Programming Approach Using C by Behrouz A. Forouzan & Richard F. Gilberg, Third Edition, Cengage Learning.
2. Programming in C and Data Structures, 2/e, 2012, E.Balaguruswamy, Tata McGraw Hill, New Delhi.

Reference Books:

1. Programming in C and Data Structures, J.R.Hanly, Ashok N. Kamthane and A. AnandaRao, Pearson Education.
2. Yashavant P. Kanetkar. "Let Us C", BPB Publications, 2011.
3. Byron S Gottfried, "Programming with C", Schaum's Outlines, Second Edition, Tata McGraw-Hill, 2006.
4. Kernighan,B.W and Ritchie,D.M, "The C Programming language", Second Edition, Pearson Education, 2006.
5. Anita Goel and Ajay Mittal, "Computer Fundamentals and Programming in C", Dorling Kindersley (India) Pvt. Ltd., Pearson Education in South Asia, 2011.

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES.
(AUTONOMOUS)
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

I B.Tech I Semester

		L	T	P/D	C
16MEC111	**ENGINEERING DRAWING PRACTICE**				
	(Common to all branches)	**1**	**-**	**4**	**3**

Course Educational Objectives:

CEO1: To expose them to existing national and international standards related to technical drawings.
CEO2: To develop drawing skills for communication of concepts, ideas and design of engineering products.

CONCEPTS AND CONVENTIONS (Not for Examination)

Importance of drawings in engineering applications - Use of drafting instruments - BIS conventions and specifications - Size and layout of drawing sheets - Lettering, numbering and dimensioning - Basic geometrical constructions.

UNIT-1: ENGINEERING CURVES

Engineering Curves: Conics - Construction of ellipse, parabola and hyperbola by eccentricity method and rectangular hyperbola - Construction of cycloid, epi cycloid and hypo cycloid - Construction of involutes of square and circle - Tangent and normal for the above curves.

UNIT-2: PROJECTION OF POINTS, LINES AND PLANE SURFACES

Projection of Points: Principles of orthographic projection - Conventions - First angle projection and Third angle projections - Projection of points. **Projection of Lines:** Projection of straight lines (only first angle projections) inclined to one and both the principal planes - Determination of true lengths and true inclinations by rotating line method. **Projection of Planes:** Regular planes inclined to one and both the principal planes by change of position method.

UNIT-3: PROJECTION OF SOLIDS AND SECTION OF SOLIDS

Projection of Solids: Projection of simple solids like prisms, pyramids, cylinder and cone, when the axis is inclined to one and both the principal planes. **Section of Solids:** Sectioning of right regular solids like prisms, pyramids, cylinder and cone, the solids are in simple vertical position and inclined to one plane, when the cutting plane is inclined to one of the principal planes - Obtaining true shape of section.

UNIT-4: DEVELOPMENT OF SURFACES AND ISOMETRIC PROJECTIONS

Development of Surfaces: Development of lateral surfaces of simple and sectioned solids like prisms, pyramids, cylinder and cone. **Isometric Projection:** Principles of isometric projection - Isometric scale - Isometric projections of simple solids and truncated solids like prisms, pyramids, cylinder and cone.

UNIT-5: ORTHOGRAPHIC PROJECTIONS AND PERSPECTIVE PROJECTIONS

Orthographic Projections: Principles and methods of orthographic projections - Plane of projections- Representation of three dimensional objects - Layout of views - Conversion of 3D objects to 2Dobjects.

Perspective Projection: Perspective projection of lines, planes and simple solids like prisms and pyramids by visual ray method.

Course Outcomes:

COURSE OUTCOMES		PO's related to CO's
CO1	Construct the Engineering Curves and generate tangent and normal for those curves.	PO1, PO2, PO3, PO10
CO2	Draw the Projection of Points, Lines and Plane Surfaces.	PO1, PO2, PO3, PO10
CO3	Draw the Projection of Solids, Sections of Solids like Prisms, Pyramids, Cylinder and Cone.	PO1, PO2, PO3, PO10
CO4	Construct the Isometric Scale, Projections and develop the development of surfaces.	PO1, PO2, PO3, PO10
CO5	Draw the Orthographic and Perspective projections of Solids.	PO1, PO2, PO3, PO10

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	2	2	2	-	-	-	-	-	-	1	-	-
CO2	2	3	3	-	-	-	-	-	-	1	-	-
CO3	2	3	3			-	-	-	-	1	-	-
CO4	2	3	3	-	-	-	-	-	-	2	-	-
CO5	2	3	3	-	-	-	-	-	-	2	-	-
CO*	2	2.8	2.8	-	-	-	-	-	-	1.4	-	-

Text Books:

1. Engineering Drawing, N.D.Bhatt and V.M.Panchal, 50/e, Charotar Publishing House, 2010.
2. A Text book of Engineering Graphics, K.V.Natrajan, Dhanalakshmi Publishers, Chennai, 2009.

References Books:

1. Engineering Drawing, K.L.Narayana and P.Kannaiah, 2/e, Scitech Publishers, 2012.
2. Fundamentals of Engineering Drawing with an Introduction to Interactive Computer Graphics for Design and Production , Luzzader, Warren.J and Duff,John M., Eastern Economy Edition, Prentice Hall of India Pvt. Ltd, 2005 New Delhi,.
3. Engineering Graphics, K.Venugopal and V.Prabhu Raja, New Age International (P) Limited, 2008.
4. Engineering Drawing, M.B.Shah and B.C.Rana, 2/e, Pearson Education, 2009.
5. Engineering Drawing, BasantAgarwal and C.M.Agarwal, Tata McGraw Hill Publishing Company Limited, New Delhi, 2008.

I B.Tech I Semester

L	T	P	C
3	1	0	3

16EEE111 ELECTRICAL ENGINEERING

Course objectives:

CEO1: To demonstrate knowledge on basic electrical circuits
CEO2: To determine and analyze different parameters of periodic waveforms
CEO3: To understand the construction and operation of D.C. machines
CEO4: To understand the construction and operation of A.C. machines
CEO5: To impart knowledge on basic principles of electrical measuring instruments

UNIT-I: INTRODUCTION TO ELECTRICAL ENGINEERING

Ohm's Law, Basic Circuit Components, Kirchoff's laws, Simple Problems. Types of Sources, Series, Parallel Circuits, Star-Delta Transformation.Network Theorems-Superposition, Thevenin's&Nortons Theorems and Maximum Power Transfer Theorem.

UNIT-II: ALTERNATING QUANTITIES

Principles of AC Voltages, Waveforms, and Basic Definitions, R.M.S and Average values of AC Quantities, Form Factor and Peak Factor, PhasorRepresentaion of Alternating Quantities, Phasor Algebra, Analysis of AC circuits with Single Basic Network Elements, Single Phase Series and Parallel circuits.

UNIT-III: DC MACHINES

Principle of Operation of DC Generators, Types of DC Generators, EMF Equation in DC Generator, OCC of a DC Shunt Generator. Principle of Operation of DC Motors, Types of DC Motors, Torque Equation, Losses and Efficiency,Calculation in DC Motors, Speed control of DC Shunt motor - Swinburnes Test and Brake Test

UNIT-IV: TRANSFORMERS

Principles of Operation, Constructional Details, Losses and Efficiency, Regulation of Transformer, O.C and S.C Tests.

UNIT-V: MEASURING INSTRUMENTS

Introduction, Classification of Instruments, Operating Principles, Essential Features of Measuring Instruments, Moving Coil and Moving Iron Instruments.

Course Outcomes:
On successful completion of the course the student will be able to,

COURSE OUTCOMES		PO's related to CO's
CO1	Demonstrate knowledge on basic circuit components and basic concepts of electrical engineering, Analyze Circuits by different	PO1, PO2,
CO2	To determine and analyze different parameters of periodic waveforms and Analyze the steady state analysis of R, L,C circuits.controllers	PO1, PO2,
CO3	Demonstrate knowledge on Construction and performance of DC motor and Analyze Losses and Efficiency of motor by different methods	PO1, PO2, PO4, PO5
CO4	Demonstrate knowledge on Construction and performance of transformer and design of the parameters of equivalent circuit of single	PO1, PO2, PO3, PO5
CO5	To understand and evaluatethecalibration of different electrical measuring instruments	PO1, PO2, PO3, PO4

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	3	-	-	-	-	-	-	-	-	-	-
CO2	3	3	-	-	-	-	-	-	-	-	-	-
CO3	3	3	-	3	2	-	-	-	-	-	-	-
CO4	2	2	3	-	3	-	-	-	-	-	-	-
CO5	3	2	3	2	-	-	-	-	-	-	-	-
CO*	**2.8**	**2.6**	**3**	**2.5**	**2.5**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

Text Books:

1. Basic Electrical Engineering-by M.S Naidu and S Kamakshaiah, 3rd edition, 2009, Tata McGraw Hill Pvt.Ltd.
2. Basic Electrical Engineering by T.K.Nagasarkar and M.S Sukhija, 2nd edition, 2007, Oxford Press New Delhi.
3. Electronic Devices and Circuits ,N.Salivahanan, and N.Suresh Kumar, 3rd Edition TMH , 2012
4. Digital Design, Morris Mano, 3rd edition, Prentice Hall of India, , 2006New Delhi

References Books:

1.Theory and Problems of Basic Electrical Engineering by DP Kothari and IJ Nagrath, 1stedition, Prentice Hall of India, New Delhi.
2. Principle of Electrical Engineering by **V.**K Mehtha, 2nd edition, 2009, S Chand Publications, Delhi.
3. R.L. Boylestad, "Introductory Circuit Analysis", 9th edition, 2006, Pearson Education Publication, 2013

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I B. Tech I Semester

L	T	P	C
0	0	3	2

16SAH116 ENGLISH COMMUNICATION SKILLS (ECS) LAB
(Common to All Branches)

Course Educational Objectives:

The syllabus has been designed

CEO1: To Enhance Communication Skills Especially in Listening, Speaking with Confidence, Read Variety of Materials and to Improve their Writing Skills Effectively.
CEO2: Enable Students to Learn Better Pronunciation by using Proper Phonetic Sounds with Accurate Word Accent.
CEO3: Train Students to give Power point Presentations, Participation in Group Discussion and Facing Interviews with Confidence.

UNIT-I

1. Phonetic Sounds

2. Just a Minute

UNIT-II

3. Rules Regarding Stress

4. Listening Skills (TED Talks)

UNIT-III

5. Presentation Skills-Oral

6. Role Plays (Organizing Events in the College)

UNIT-IV

7. Book Review-Oral

8. Resume Writing

UNIT-V

9. Group Discussion Skills

10. Interview Skills

Course Outcomes:

On successful completion of the course, students will be able to

	Course Outcomes	POs related to COs
CO1	Understand the concepts on behavioral aspects, Development of vocabulary by deriving various ways of forming words, identification of Nouns and Pronouns and their usage, Pronunciation of Phonetic Vowel Sounds, Communicate effectively with others and how to read and understand a passage.	PO1, PO10
CO2	Develop Individual and Team Work skills, Knowledge on the usage of foreign language words, identification of and their usage	PO1, PO9, PO10
CO3	Cultivate Adaptability Skills in work place Knowledge on Grammatical aspects of Verbs and Adverbs. Writing dialogues effectively.	PO1, PO9, PO10
CO4	Understand in Acquiring of Entrepreneurship Skills Usage of grammar aspects on Prepositions Pronunciation of inflectional suffix words by describing objects, persons and places Acquiring writing skills through interpreting moral stories.	PO1, PO9, PO10
CO5	Knowledge to Recognize the need of ability to engage in independent and life-long learning Usage of grammar aspects on Conjunctions and Articles Communicate effectively in English over phone Reviewing a short stories and Expansion of proverbs.	PO1, PO10, PO12

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	-	-	-	-	-	-	-		3	-	-
CO2	3	-	-	-	-	-	-	-	3	3	-	-
CO3	3	-	-	-	-	-	-	-	3	3	-	-
CO4	3	-	-	-	-	-	-	-	3	3	-	-
CO5	3	-	-	-	-	-	-	-	3	-	-	3
CO*	3	-	-	-	-	-	-	-	3	3	-	3

Minimum Requirements for ELCS Lab:

The English Language Lab shall have two parts:

1. Computer Assisted Language Learning (CALL) Lab: The Computer Aided Language Lab For 60 Students With 60 Systems, One Master Console, Lan Facility And English Language Software For Self Study Learners.
2. The communication skills lab with movable chairs and audio-visual aids with a p.a. system, projector, a digital stereo-audio & video system and camcorder etc.

System Requirement (Hardware component)

Computer network with LAN with minimum 60 multimedia systems with the following specifications:

i) P-IV Processor-speed-2.8GHZ, RAM-512MB minimum, Hard Disk-80GB
ii) Headphones of High quality

Reference Books:

1. Everyday Dialogues in English, Robert J. Dixson ,Prentice-Hall of India Ltd., 2006, New Delhi
2. Body Language - Your Success Mantra, Dr ShaliniVerma, S.Chand& Co, 2009, New Delhi.
3.A Handbook for English language Laboratories, E.Sureshkumar, P.Sreehari, Foundation Books, Cambridge University Press, 2009, Chennai.

Suggested Software:

- Globarena software, Hyderabad
- Walden Software, Hyderabad
- English Pronouncing Dictionary, Daniel Jones 17/e with CD, CambridgeUniversity Press,
- New Delhi.
- DELTA's key to the Next Generation TOEFL Test, 6 audio CDS, 2007, New Age
    - International
- Publishers, Critical Study, New Delhi.
- Oxford Advanced Learners' Dictionary with CD,8/e, 2010, Oxford.
- Cambridge Advanced Learners' English Dictionary with CD, 3/e, 2010.
- Murphy's English Grammar with CD, 2004, Cambridge.

I B. Tech I Semester

L	T	P	C
0	0	3	2

16CSE112 COMPUTER PROGRAMMING LAB
(Common to All Branches)

Course Educational Objectives:

CEO1: To provide knowledge on flowchart and algorithm to the given problem
CEO2: To exercise conditional and iterative statements to Write C programs
CEO3: To develop the skill of C programs using arrays, strings and functions.
CEO4: To understand C programs using pointers and allocate memory using dynamic memory management functions.
CEO5: To analyze the files concept to show input and output of files in C

Exercise-1:

a. Write a C Program to Convert the Temperature Unit from Fahrenheit to Celsius using the Formula C= (F-32)/1.8.
b. Assume that any Month is of 30 Days. Now you are given Total Days. Write a C Program to find out the exact Number of Years, Months & Days.
c. Write a C Program to Calculate the Simple Interest.

Exercise-2:

a. Write a Program that Prints the Given 3 Integers in Ascending Order using if - else.
b. Write a Program to Calculate Commission for the Input Value of Sales Amount. Commission is Calculated as per the Following Rules:

i) Commission is **NIL** for Sales Amount Rs. 5000.
ii) Commission is 2% for Sales when Sales Amount is >Rs. 5000and <= Rs. 10000.
iii) Commission is 5% for Sales Amount >Rs. 10000.

c. A Character is Entered through Keyboard. Write a Program to Determine whether the Character Entered is a Capital Letter, a Small Case Letter, a Digit or a Special Symbol. The Following Table shows the Range of ASCII values for various Characters.

Characters	ASCII values
A - Z	65 - 90
a - z	97- 122
0 - 9	48 - 57

Special Symbols 0 - 47, 58 - 64, 91- 96, 123 – 127

Exercise-3:

a. Write a C Program to find the Roots of Quadratic Equation.
b. Write a Program, which takes two integer Operands and one Operator from the User, Performs the Operation and then Prints the Result. (Consider the Operators +,-,*, /, %, use switch Statement)

Exercise-4:

a. Write a C Program to find the Sum of Individual Digits of a Positive Integer.

b.A Fibonacci Sequence is defined as follows: the First and Second terms in the Sequence are 0 and 1. Subsequent terms are found by adding the Preceding two terms in the Sequence. Write a C Program to Generate the first n terms of the Sequence.

Exercise-5:

a. i) A Perfect Number is a Number that is the Sum of all its Divisors Except Itself. Six is the Perfect Number. The only Numbers that Divide 6 evenly are 1, 2, 3 and 6 (i.e., 1+2+3=6).

ii) An Abundant Number is one that is Less than the Sum of its Divisors (Ex: 12 <1+2+3+4+6).

iii) A Deficient number is one that is Greater than the Sum of its Divisors (Ex: 9 > 1+3).

Write a Program to Classify N Integers (Read N from keyboard) each as Perfect, Abundant or Deficient.

b. An Armstrong Number is a Number that is the Sum of the Cubes of its Individual Digits.

Write a C Program to Print Armstrong Numbers below 1000.

Exercise-6:

a. Write a C Program to Generate all the Prime Numbers between 1 And N, Where N is a Value Supplied by the User.

b. Write a C Program to Calculate the Following Sum: Sum = $1 - x^2/2! + x^4/4! - x^6/6! + x^8/8! - x^{10}/10!$

Exercise-7:

a.Write a C Program to find both the Largest and Smallest Number in a List of Integers.

b.Write a C Program to Perform the Following:

i) Addition of Two Matrices. ii) Multiplication of Two Matrices.

Exercise-8:

a. Write C Programs that use both Recursive and Non-Recursive Functions to find the Factorial of a Given Integer.

b. Write C Programs that use both Recursive and Non-Recursive Functions to find the GCD (Greatest Common Divisor) of Two Given Integers.

Exercise-9:

a. Write a C Program using Pointers to Read in an Array of Integers and Print its Elements in Reverse Order.

b. Swap/Exchange Values of two Integer Variables using Call by Reference.

Exercise-10:

a.Write a C Program that uses Functions to Perform the Following Operations:

i) To Insert a Sub-String into a Given Main String from a Given Position.

ii) To Delete n Characters from a Given Position in a Given String.

b**.** Write a C Program to Determine if the Given String is a Palindrome or Not.

Exercise-11:

a. Write a C Program that Displays the Position or Index in the String S where the String T Begins, or – 1 if S doesn't Contain T.

b. Write a C Program to Count the Lines, Words and Characters in a Given Text.

Exercise-12:

You are Supposed to Generate a Result Table which Consists of Student Id, Student Name, Marks of three Subject and Total Marks. Write a Program which takes Input for Ten Students and Displays Result Table. also Display Student Information Separately Who Got the Highest Total. Use Structures.

Exercise-13:

Write a C Program that uses Functions to Perform the Following Operations:
i) Reading a Complex Number ii) Writing a Complex Number
iii) Addition of two Complex Numbers iv) Multiplication of two Complex Numbers
(Note: Represent Complex Number using a Structure.)

Exercise-14:

a.Write a C Program which Copies one File to Another.
b. Write a C Program to Reverse the First n Characters in a File.
(Note: The File Name and n are Specified on the Command
Line.)

Exercise-15:

a. Write a C Program to Display the Contents of a File.
b.Write a C Program to Merge two Files into a Third File (i.e., the Contents of the First File Followed by those of the Second are Put in the Third File)

Course Outcomes:

On Successful completion of this course, the students will able to

COURSE OUTCOMES		POs related to COs
CO1	Apply the Knowledge to design the algorithm and flowchart for the given problem.	PO1
CO2	Analyze the concepts of control statements and arrays.	PO2
CO3	Design the programs for functions and strings	PO3
CO4	Solve the memory access problems by using pointers and design the programs on structures and unions.	PO4
CO5	Apply the file handling mechanisms that is essential for understanding the concepts of management systems.	PO5
CO6	Follow the ethical principles in implementing the programs	PO8
CO7	Do experiments effectively as an individual and as a team member in a group.	PO9
CO8	Communicate verbally and in written form, the understanding about the experiments.	PO10
CO9	Continue updating their skill related to loops, pointers and files implementing programs in future.	PO12

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	-	-	-	-	-	-	-	-	-	-	-
CO2	-	3	-	-	-	-	-	-	-	-	-	-
CO3	-	-	3	-	-	-	-	-	-	-	-	-
CO4	-	-	-	3	-	-	-	-	-	-	-	-
CO5	-	-	-	-	3	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	3	-	-	-	-
CO7	-	-	-	-	-	-	-	-	2	-	-	-
CO8	-	-	-	-	-	-	-	-	-	2	-	-
CO9	-	-	-	-	-	-	-	-	-	-	-	3
CO*	**3**	**3**	**3**	**3**	3	-	-	3	2	**2**	-	**3**

Reference Books:

1. Programming in C and Data Structures, E.Balaguruswamy, Tata McGraw Hill,2nd edition
2. Let us C, YashavantKanetkar, BPB, Thirteenth Revised and Updated edition (2013)
3. Programming in C and Data Structures, J.R.Hanly, Ashok N. Kamthane and A. AnandaRao, Pearson Education.
4. The Spirit of C, an introduction to modern programming, M.Cooper, Jaico Publishing House.
5. Mastering C, K.R. Venugopal and S.R. Prasad, TMH Publications.
6. Computer Basics and C Programming, V. Rajaraman, PHI Publications.

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES.
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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

I B.Tech I Semester

L	T	P	C
0	0	3	2

16EEE112 ELECTRICAL ENGINEERING LAB

Course objectives:

CEO1. To gain practical experience on fundamental electric laws.
CEO2. To gain practical experience on verification of theorems.
CEO3. To evaluate the performance characteristics of DC shunt generator
CEO4. To evaluate the efficiency of DC shunt machine
CEO5. To evaluate the performance characteristics of DC shunt motor
CEO6. To evaluate the efficiency of single- phase transformer

ANY TEN OF THE FOLLOWING:

1. Verification of KCL and KVL.
2. Verification of Superposition Theorem.
3. Verification of Thevinins Theorem.
4. Verification of Nortons Theorem.
5. Verification of Maximum Power Transfer Theorem.
6. Magnetization Characteristics of D.C Shunt Generator Determination of Critical Field Resistance.
7. Swinburne's Test of Dc Shunt Machine.
8. Brake Test on DC Shunt Motor. Determination of Performance Characteristics.
9. OC & SC Tests on Single- Phase Transformer to find the Efficiency.
10. Regulation of Single-Phase Transformer
11. Speed Control of DC Motor.

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

Course Outcomes		POs related to COs
CO1	Understand the fundamental electrical laws in engineering applications.	PO1
CO2	Verify different network theorems practically.	PO2
CO3	Design electrical circuits for measuring complicated electrical parameters.	PO3
CO4	Investigate AC Machines like Induction Motor and Transformer for solving complex problems.	PO4
CO5	Evaluate the Characteristics of D.C Shunt Generator and DC Motor through experimentation.	PO5
CO6	Follow the ethical principles in implementing the experiments.	PO8
CO7	Do experiments effectively as an individual and as a team member in a group.	PO9
CO8	Communicate verbally and in written form, the understanding about the experiments.	PO10
CO9	Continue updating their skill related to electrical circuits	PO12

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES.
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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	-	-	-	-	-	-	-	-	-	-	-
CO2	-	3	-	-	-	-	-	-	-	-	-	-
CO3	-	-	3	-	-	-	-	-	-	-	-	-
CO4	-	-	-	3	-	-	-	-	-	-	-	-
CO5	-	-	-	-	3	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	3	-	-	-	-
CO7	-	-	-	-	-	-	-	-	2	-	-	-
CO8	-	-	-	-	-	-	-	-	-	2	-	-
CO9	-	-	-	-	-	-	-	-	-	-	-	3
CO*	**3**	**3**	**3**	**3**	3	-	-	3	2	**2**	**-**	**3**

Text Books:

1. Basic Electrical Engineering-by M.S Naidu and S Kamakshaiah, 3rd edition, Tata McGraw Hill Pvt.Ltd,2009.
2. Basic Electrical Engineering by T.K.Nagasarkar and M.S Sukhija, 2nd edition, Oxford Press, 2007, New Delhi.

References Books:

1. Theory and Problems of Basic Electrical Engineering by DP Kothari and IJ Nagrath, 1st edition, Prentice Hall of India, New Delhi.
2. Principle of Electrical Engineering by **V.**K Mehtha, 2nd edition, S Chand Publications, 2009, Delhi.
3. Introductory Circuit Analysis, R.L. Boylestad, 9th edition, Pearson Education Publication, 2013.

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES.
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I B.TECH II SEM
16SAH121

L	T	P	C
3	1	0	3

FUNCTIONAL ENGLISH-II
(Common to All Branches)

Course Educational Objectives:

CEO1: To Provide Knowledge on developing Technical Vocabulary communicating in a verbal manner.
CEO2: To cultivate types of listening skills, Knowledge on the usage of foreign language words in to English Language,
CEO3: To acquire Knowledge on use of technology for societal aspects.
CEO4: To get knowledge on earlier technology used and latter technology in India.
CEO5: To understand the ability to write poems and communicate by using technological words.

UNIT-I

(a)**UNDER THE BANYAN TREE**-a short story-by ***R.K.Narayan***
Exercises: 1.What Do We Learn from Trees-Discuss (speaking activity by students) 2. Synonyms and Antonyms 2.Tenses-Types 3.Transitive and Intransitive Verbs

UNIT-II

COMMUNICATION SKILLS FOR PORFESSIONALS

(a)Communication –Verbal-Areas of Communication-Suggestions to Improve VerbalCommunication – Importance of Body Language
(b)Non-verbal Communication- Category and Features–Cultural Differences in Non-verbalCommunication – Suggestions to improve Non-verbal Communication.
Exercises: 1. Discuss a Few Interesting Cross Cultural Aspects of Communication (Speaking activity by students) 2.Voice of Verbs 3. Direct and Indirect Speech 4. Modal Verbs

UNIT-III

THE LAST RIDE TOGETHER –a poem- by***Robert Browning***
Exercises: 1.Which is Important in Life-money or Love?-Discuss (Speaking Activity by Students)2.Expansion of Proverbs-(oral and written) 3.Conditional Clauses 4. Note Making 5.Question Tags

UNIT-IV

(a)TECHNOLOGY WITH A HUMAN FACE-a lecture-by***E.F.Schumacher***
(b) DR. APJ. ABDUL KALAM –A Missile Man–*web source*
Exercises: 1.Is Technology a Boon or Bane?-Discuss (Speaking activity by students) 2. Synonyms and Antonyms 3. Idioms 4.Phrasal verbs 5.Subject Verb Agreement 4.Analogy

UNIT-V

WANGARI MATHAAI-a Kenyan Environmental and Political Activist ***-from inspiring lives***Exercises: 1.Have a Discussion Regarding Current Environmental Issues (Speaking activity by students) 2.Synonyms and Antonyms 3.One Word Substitutes 4.Detecting Errors

Course Outcomes:

On successful completion of this course, the students should be able to:

COURSE OUTCOMES		POs related to COs
CO1	Knowledge on behavioral aspects and communicate effectively with others.	PO1,PO10
CO2	Knowledge on Acquiring Entrepreneurship Skills and Writing Skills.	PO,PO9, PO10
CO3	Cultivate knowledge to confidence in one's life skills.	PO1,PO9
CO4	Knowledge in recognizing the need of ability to engage in independent and life-long learning, communicate effectively in English.	PO1,PO10,PO12
CO5	Develop knowledge on Individual, Team work skills and Adaptability skills on the usage of foreign language words.	PO1,PO9

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	-	-	-	-	-	-	-	-	3	-	-
CO2	3	-	-	-	-	-	-	-	2	3	-	-
CO3	3	-	-	-	-	-	-	-	3	-	-	-
CO4	3	-	-	-	-	-	-	-	-	3	-	3
CO5	3	-	-	-	-	-	-	-	3	-	-	-
CO*	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**2.66**	**3**	**-**	**3**

Prescribed Book:
The Text Book Prepared by the Department of English of SITAMS will be issued to Students.

References Books:
1. Business Communication and Soft Skills. K.Srinivasa Krishna and B. Kuberudu, , Excel Books, 2008,New Delhi.
2. English for Technical Communication. K. R. Lakshmi Narayana, Scitech.
3. Spoken English, R. K. Bansal and J. B. Harrison, Edn, Orient Longman, 2009, Mumbai.
4. Speaking English Effectively, Krishna Mohan & NP Singh, 2/e, Macmillan, New Delhi
5. A Practical Course in English Pronunciation, J. Sethi, KamleshSadanand& D.V. Jindal, Prentice-Hall of India Pvt. Ltd., 2004,New Delhi.
6. Murphy's English Grammar by Raymond Murphy.
7. Cambridge English Dictionary for Advanced Learners(with CD).

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I B.TECH II SEM

L	T	P	C
3	1	0	3

16SAH122 **MATHEMATICS – II**

(Common to all Branches)

Course Educational Objectives:

CEO1: To develop skill to analyze appropriate method to find the root of the Algebraic and Transcendental Equations and to develop skill to apply the concept of interpolation for the Prediction of required values

CEO2: To identify important characteristics of higher order ordinary differential equations (HOODE) and develop appropriate method of obtaining solutions of HOODE

CE03: To develop skill to design Sine and Cosine waves with the help of Fourier Series and Transforms.

CEO4: To learn the concepts of z-transformation and inverse z- Transforms and to explore the solving difference equations by using z- transform method.

UNIT-1: MATRICES

Rank - Echelon Form and Normal Form - Solution of Linear System of Homogeneous and Non-Homogeneous Equations - Direct Methods - Gauss Elimination, Gauss Jordan Method - Eigen Values, Eigen Vectors - Properties - Cayley-Hamilton Theorem(without proof) - Inverse and Powers of a Matrix – Diagonalization of a Matrix using Similarity Transformation only.

UNIT – 2: MULTIPLE INTEGRALS

Multiple Integrals: Double and Triple Integrals - Change of Variables - Change of Order of Integration.

UNIT – 3: FOURIER SERIES

Determination of Fourier Coefficients - Fourier Series - Even and Odd Functions - Fourier Series in an Arbitrary Interval - Even and Odd Periodic Continuation - Half-Range Fourier Sine and Cosine Expansions.

UNIT – 4: FOURIER TRANSFORMS

Fourier Integral Theorem(only statement) - Fourier Sine and Cosine Integrals - Fourier Transform - Fourier Sine and Cosine Transforms - Properties - Inverse Transforms - Finite Fourier Transforms.

UNIT –5: Z- TRANSFORMS

Z-transforms - Properties - Damping Rule - Shifting Rule - Initial and Final Value Theorems - Inverse Z-Transform - Convolution Theorem - Solution of Difference Equations by Z-Transforms.

Course Outcomes:

On successful completion of this course, the students should be able to:

COURSE OUTCOMES		Pos related to COs
CO1	Demonstrate knowledge in estimating ranks in solving linear equations through matrix methods, eigen values and eigen vectors and to develop analytical skills in solving problems involving diagnolisation using eigen	PO1, PO2, PO12
CO2	Demonstrate knowledge in evaluating double and triple integrals	PO1, PO2,
CO3	Develop analytical skills in evaluating the properties of functions through Fourier series	PO1, PO2, PO12
CO4	Develop analytical skills in evaluating the properties of functions through Fourier transform	PO1, PO2, PO12
CO5	Demonstrate knowledge in z-transform and inverse z- transform and develop analytical skills in solving problems involving difference equations using z-	PO1, PO2, PO3 PO12

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	3	-	-	-	-	-	-	-	-	-	2
CO2	3	3	-	-	-	-	-	-	-	-	-	-
CO3	3	3	-	-	-	-	-	-	-	-	-	2
CO4	3	3	-	-	-	-	-	-	-	-	-	2
CO5	3	3	3	-	-	-	-	-	-	-	-	2
CO*	**3**	**3**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**2**

Text Books:

1. Mathematical Methods, T.K.V. Iyengar, B.Krishna Gandhi, S. Ranganatham and M.V.S.S.N. Prasad , S. Chand and Company Ltd, 2012, New Delhi.
2. Higher Engineering Mathematics, Dr. B. S. Grewal, 34/e, Khanna Publishers, 1999, Delhi.

Reference Books:

1. Engineering Mathematics–I, T.K.V. Iyengar, B.Krishna Gandhi, S. Ranganatham and M.V.S.S.N. Prasad, S. Chand and Company Ltd, 2012, New Delhi.
2. Engineering Mathematics for JNTU, B.V. Ramana, Tata McGraw Hill Publishers, 2012, New Delhi.
3. Higher Engineering Mathematics, Dr. M. K. VenkataRamana, National Pub & Co, Madras.
4. A Text Book of Engineering Mathematics, N.P.Bali, Laxmipublications(P)Ltd, 2011, New Delhi.
5. Advanced Engineering Mathematics, Erwin Kreyszig, 8/e, Wiley India, 2009, New Delhi.

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I B. Tech II-Semester	**L**	**T**	**P**	**C**
	3	**1**	**0**	**3**

16CSE121 DATA STRUCTURES (Common to CSE, ECE & EEE)

Course Educational Objectives:

CEO1: To provide knowledge on Types of Data Structures.
CEO2: To design Linked List data structures and its applications.
CEO3: To implement Stack and Queue data structures and its applications.
CEO4: To analyze the Searching and Sorting techniques.
CEO5: To implement the Trees data structure.

UNIT -1: INTRODUCTION TO DATA STRUCTURES

Definition- Abstract Data Type- C Classification of Data Structures - Linear and Non Linear- Applications- Review of Arrays - Dynamic Memory Allocation and Deallocation.

UNIT -2: LINKED LISTS

Definition – Structure of Linked List - Singly Linked Lists- Circularly Linked Lists- Doubly Linked Lists – Applications of Linked Lists.

UNIT -3: STACKS AND QUEUES

Stacks: Definition–Structure and Operations of Stack–Array based Implementation–Linked ListImplementation – Applications of Stacks.

Queues: Definition–Structure and Operations of Queue–Array based Implementation–Linked ListImplementation – Double Ended Queues – Applications of Queues.

UNIT-4: SORTING AND SEARCHING TECHNIQUES

Sorting Techniques: Insertion sort - Selection sort - Bubble sort - Quick sort - Merge sort.

Searching Techniques: Linear search - Binary Search.

UNIT-5: TREES

Introduction to Trees - Definition – Basic Terminologies – Binary Tree – Types of Binary Trees – Tree Traversals – Binary Search Tree.

Course Outcomes:

On successful completion of the course, the student will be able to

COURSE OUTCOMES		POs related to COs
CO1	Knowledge on types of Data Structures	PO1, PO2
CO2	Implement the Linked List data structures for storing the data	PO1, PO2, PO3
CO3	Implement the Stack and Queue data structures for processing the data	PO1, PO2, PO4
CO4	Use Searching and Sorting techniques in real time scenarios	PO1, PO2, PO4
CO5	Implement the Tree data structures for managing the data	PO1, PO2, PO3

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	3	-	-	-	-	-	-	-	-	-	-
CO2	2	3	3	-	-	-	-	-	-	-	-	-
CO3	2	3	-	3	-	-	-	-	-	-	-	-
CO4	2	3	-	3	-	-	-	-	-	-	-	-
CO5	2	3	3	-	-	-	-	-	-	-	-	-
CO*	**2.2**	**3**	**3**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

Text Books:

1. Classic Data Structure by D. Samanta, Eastern Economy Edition.
2. Data Structures and Algorithm Analysis in C, Mark Allen Weiss, 2nd Edition, Pearson Education, 1997.

Reference Books:

1. Programming in C and Data Structures, J.R.Hanly, Ashok N. Kamthane and A. AnandaRao, Pearson Education, 2010, Chennai.
2. Programming in C and Data Structures, E.Balaguruswamy,2/e, Tata McGraw Hill, 2012,New Delhi.
3. Data Structures Using C, ReemaThareja, Oxford University Press, 2011.
4. Data Structures and Algorithms ,Aho, Hopcroft and Ullman Pearson Education,1983.

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B.TECH II SEM

L	T	P	C
3	1	0	3

16SAH112 **ENGINEERING PHYSICS**
(Common to all branches)

Course Educational Objectives:

CEO1: To understand the principles and applications optics, Lasers and Optical Fibers in various Streams of Engineering

CEO2: To analyze the structure of crystals by using X-Ray Diffraction Technique and to study properties, productions and applications of ultrasonic

CEO3: To develop ideas & mathematical solutions to Quantum mechanics & Semiconductors

CEO4: To recognize the concepts of Superconductors and classification of magnetic materials

CEO5: To Introduce Nano-materials & their applications in various fields of science and technology

UNIT - 1: PHYSICAL OPTICS, LASERS AND FIBER OPTICS

Physical Optics: Interference in thin films by Reflection Qualitative -Newton's Rings (Qualitative) – Diffraction –Fraunofer Diffraction at single slit-Diffraction Grating.

Lasers: Laser characteristics - Spontaneous and Stimulated Emissions - Population Inversion - SolidState Laser (Ruby Laser) - Gas (He-Ne) Laser - Semiconductor (GaAs) Laser - Applications of Lasers.

Fiber Optics: Structure of optical Fiber - Types of optical Fibers - Numerical Aperture - Fiberopticsin Communications - Applications.

UNIT - 2: CRYSTAL STRUCTURES AND ULTRASONICS

Crystal Structures: Introduction - Space Lattice - Unit Cell - Lattice Parameters - BravisLatticesCrystal Systems - Structures of Simple Cubic - Body Centered Cubic - Face Centered Cubic Crystals - Miller Indices - Bragg's law - X-ray Diffraction - Laue Methods.

Ultrasonics: Introduction - Production of Ultrasonic Waves by Piezoelectric Method - Properties ofUltrasonic Waves - Applications of Ultrasonics.

UNIT - 3: QUANTUM MECHANICS AND SEMI CONDUCTORS

Quantum Mechanics: Matter Waves and Properties -De Broglie's Concept of Matter Waves-OneDimensional Time Independent Schrodinger's Wave Equation - Particle in One Dimensional Potential box.**Semiconductors:** Intrinsic and Extrinsic Semiconductors (Qualitative) - Drift and Diffusion - Einstein's Relation - Hall Effect - Direct and Indirect Band Gap Semiconductors - P-N Junction.

UNIT - 4: MAGNETIC MATERIALS AND SUPERCONDUCTIVITY

Magnetic Materials: Origin of Magnetic Moment of an Atom - Classification of Dia - Para - FerroMagnetic Materials on the basis of Magnetic Moment(Qualitative) - Hysteresis Curve - Soft and Hard Magnetic Materials with Applications.

Superconductivity: General Properties - Meissner effect - Types of Superconductors - BCS Theory -Josephson's effect - Applications of Superconductors.

UNIT - 5: PHYSICS OF NANOMATERIALS

Nano Materials: Introduction to Nanomaterials–Significance of Nanoscale- Surface to Volume Ratio - Synthesis of Nanomaterials - Ball Milling Method - Chemical Vapour Deposition methods –Optical, Thermal, Mechanical and Electrical Properties of Nano Materials - Applications of Nanomaterials.

Course Outcomes

On successful completion of this course, the students should be able to:

COURSE OUTCOMES		POs related to COs
CO1	Acquire the knowledge and applications on Optics, LASERS and Fiber	PO1, PO2
CO2	Identify appropriate method for the production of Ultrasonics and their usage and understanding different crystal structures	PO1, PO2
CO3	Develop skillsto solve complex problem in quantum mechanics and Semiconductors	PO1, PO2, PO3
CO4	Analyze the concepts of Superconductors and magnetic materials and their appropriate applications in the field of Engineering and Technology	PO1, PO2
CO5	Apply the theoretical concepts pertaining to Nanomaterials in various fields engineering and Technology	PO1

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	2	-	-		-	-	-	-	-	-	-
CO2	2	3		-	-	-	-	-	-	-	-	-
CO3	2	2	2	-	-	-	-	-	-	-	-	-
CO4	3	2	-	-	-	-	-	-	-	-	-	-
CO5	3	-	-	-	-	-	-	-	-	-	-	-
CO*	**2.4**	**2.25**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

Text Books:

1. Engineering Physics, M.R. Srinivasan, New Age International, 2011, Chennai.
2. Engineering Physics, K. Thyagarajan, First Edition ,McGraw Hill Publishers, 2014, New Delhi.

Reference Books:

1. Concepts of Modern Physics, AurtherBeiser, 8/e, Tata McGraw Hill Publishers, 2007,New Delhi.
2. Modern Engineering Physics, A.S. Vasudeva, S. Chand & Co., 2012,New Delhi.
3. Materials Science, M. Vijaya and G. Rangarajan, , 1/e ,Tata McGraw Hill Publishers, 2004,New Delhi.
4. Physics,Part I and II ,Halliday and Resnick(Part I 5/e,2002, Part II 5/e,2001),John Wiley & sons (Asia).
5. Engineering Physics, Gaur & Gupta, 7/e, DhanpatiRai Publications, New Delhi,2006.

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I B.TECH II SEM

16SAH113 **ENGINEERING CHEMISTRY**

L	T	P	C
3	1	0	3

(Common to all Branches)

Course Educational Objectives:

CEO1: To learn different purification method and analysis the impurities present in water.
CEO2: To develop skill to describe the mechanism and control of corrosion.
CEO3: To train the students to effectively use the knowledge of polymer science.
CEO4: To learn the concept of refractories and to develop skill to apply the concept of Electrochemistry and fuels

.

UNIT- 1: WATER AND WATER FOR INDUSTRIAL PURPOSE

Water: Sources of Water - Types of Impurities in Water - Hardness of Water - Temporary andPermanent Hardness - Estimation of Hardness by EDTA Method - Analysis of Water - Dissolved Oxygen - Disadvantages of Hard Water - Methods of Treatment of Water for Domestic Purpose - Sterilization - Chlorination -Ozonisation.

Water for industrial purpose: Water for Steam Making - Boiler Troubles - Priming and Foaming - Boiler Corrosion - Scales and Sludge - Caustic Embrittlement - Water Treatment - Internal Treatment

- Colloidal - Phosphate - Calgon - Carbonate - Sodium Aluminate Conditioning of Water - External Treatment - Ion - Exchange Process - Demineralization of Brackish Water – Reverse Osmosis.

UNIT - 2: SCIENCE OF CORROSION

Definition - Types of Corrosion - Dry Corrosion - (Direct Chemical Attack) - Wet Corrosion - Theories of Corrosion And Mechanism - Electro Chemical Theory of Corrosion - Galvanic Corrosion - Concentration Cell Corrosion - Oxygen Absorption Type - Factors Influencing Corrosion - Control of Corrosion - Cathodic Protection - Sacrificial Anode and Impressed Current.

UNIT - 3: POLYMERS

Polymerization Reactions - Basic Concepts - Types of Polymerization - Addition and Condensation Polymerization - Plastics -Thermosetting and Thermoplastics - Composition - Properties - Engineering Uses of Teflon, Bakelite, Nylon and Rubber - Processing of Natural Rubber and Compounding .

Elastomers: Buna S - Buna N - Polyurethane Rubber and Silicone Rubber.

UNIT - 4: PHASE RULE, STRUCTURAL MATERIALS AND REFRACTORIES

Phase Rule: Definition - Terms Involved In Phase Rule - Phase Rule Equation - Phase Diagrams - One Component System (Water System) - Two Component System (Lead- Silver System). **Structural Materials:** Cement - Composition of Portland Cement - Analysis - Setting and Hardeningof Cement (Reactions).

Refractories: Definition - Classification with Examples - Criteria of a Good Refractory Material - Causes For the Failure of Refractory Materials.

UNIT - 5: LUBRICANTS AND ELECTRO CHEMISTRY

Lubricants: Principles and Function of Lubricants - Classification and Properties of Lubricants - Viscosity - Flash and Fire Points - Cloud and Pour Points - Aniline Point - Neutralization Number and Mechanical Strength.

Electro Chemistry: Conductance - Equivalent Conductance - Molar Conductance– ConductometricTitrations - Conductivity Measurements.
Fuel Cells: Hydrogen Oxygen Fuel Cell and Methanol Fuel Cell.

Course Outcomes:

On successful completion of this course, the students should be able to:

	COURSE OUTCOMES	POs related COs
CO1	To understand the fundamentals of water technology and develop analytical skills in determination hardness of water and to acquire awareness to societal	PO1, PO2, PO3
CO2	Acquire the knowledge in corrosion phenomenon and develop skills in the design of methods for control of corrosion	PO1, PO2, PO3
CO3	Acquire knowledge on polymeric materials and to prepare polymeric material for environmental safety and society need.	PO1, PO2, PO3, PO7
CO4	Analyze the effect of cement materials, causes for the failure of refractory materials and understanding of phase rule.	PO1, PO2
CO5	Understand and apply the concept of electrochemistry and analyse the fuels and different types of fuels cells.	PO1, PO2,

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO.1	3	2	1	-	-	-	-	-	-	-	-	-
CO.2	3	2	3	-	-	-	-	-	-	-	-	-
CO.3	3	3	2	-	-	-	3	-	-	-	-	-
CO.4	3	2	-	-	-	-	-	-	-	-	-	-
CO.5	3	2	-	-	-	-	-	-	-	-	-	-
CO*	3	2.2	2	-	-	-	3	-	-	-	-	-

Text Books:

1. Chemistry for Engineers, Prof. K. N. Jayaveera, Dr. G. V. Subba Reddy and Dr. C. Ramachandraiah, 4/e, Tata McGraw Hill Publishers, 2009, New Delhi.
2. Text book of Engineering Chemistry, Jain and Jain, 15/e, DhanpatRai Publishing Company, 2008,New Delhi.
3. Text book of Engineering Chemistry, S. S. Dara18/e,, S. Chand & Co, 2008, New Delhi.

Reference Books:

1. Engineering Chemistry, 5/e, Dr. K. B. Chandrasekhar, Dr. U.N. Dash, Dr. Sujatha Mishra, 5/e, Scitech Publications(India) Pvt. Ltd, 5/e, Hyderabad.
2. Fuel Cells Principles and Applications, B.Viswanath, M. AuliceScibioh, 4/e, Universities press, 2008,Hyderabad.
3. Chemistry of Engineering Materials, C.V.Agarwal, 3/e, Tara Publication, 2008, Varanasi.
4. Physical Chemistry, Glasston& Lewis, 12/e ,Dhanptharai Publishers, 2009, New Delhi.
5. Engineering Chemistry (Vol.1&2), J C Kuriacose and J. Rajaram, 5/e, Tata McGraw Hill Publishers, 2004, New Delhi.

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I B.TECH II SEM	**L**	**T**	**P**	**C**
	0	**0**	**3**	**2**

16SAH115 ENGINEERING PHYSICS AND ENGINEERING CHEMISTRY LAB

(Common to all Branches)

ENGINEERING PHYSICS LAB:

Course Educational Objectives:

CEO1: To make the students to recognize the important of optical phenomenon like Interference and diffraction.
CEO2: To make the students to understand the role of optical fiber parameters and signal losses in communication.
CEO3: To know the importance of energy gap in the study of conductivity and hall effect in semiconductors
CEO4: To understand the applications of B- H curve.
CEO5: To learn the applications of laser in the field of science, technology and in medicine

The following Experiments must be done during Semester:

1. Diffraction Grating - Measurement of Wavelength of given Laser.
2. Determination of Magnetic Field along the Axis of a Current Carrying Circular Coil - Stewart Gees Method.
3. Determination of Numerical Aperture and Acceptance Angle of An Optical Fiber.
4. Determination of Particle Size using A Laser Source.
5. Parallel Fringes – Determination of Thickness of Thin Object using Wedge Method.
6. Newton's Rings – Determination of Radius of Curvature of given Plano Convex Lens.
7. B-H curve – Determination of Hysteresis Loss for a given Magnetic Material.
8. Determination of Energy Band Gap of Semiconductor.

Course Outcomes:

On successful completion of this course, the students should be able to:

COURSE OUTCOMES		**POs related to COs**
CO1	Demonstrate Knowledge on measurement of various physical quantities using optical Methods and fundamentals of magnetic fields.	PO1
CO2	Identify different physical properties of materials like band gap, magnetic field Intensity etc, for engineering and technological applications.	PO2
CO3	Provide valid conclusions on phenomena Interference and Diffraction.	PO4
CO4	Follow ethical values during conducting of Experiments.	PO8
CO5	Work individually or in a team effectively.	PO9
CO6	Communicate verbally and in written form pertaining to results of the Experiments.	PO10
CO7	Learns to perform experiments involving physical Phenomena in future years.	PO12

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	-	-	-	-	-	-	-	-	-	-	-
CO2		3	-	-	-	-	-	-	-	-	-	-
CO3	-	-	-	3	-	-	-	-	-	-	-	-
CO4	-	-	-	-	-	-	-	3	-	-	-	-
CO5	-	-	-	-	-	-	-	-	3	-	-	-
CO6	-	-	-	-	-	-	-	-	-	3	-	-
CO7	-	-	-	-	-	-	-	-	-	-	-	3
CO*	**3**	**3**	**-**	**3**	-	-	-	3	3	**3**	**-**	**3**

ENGINEERING CHEMISTRY LAB:

Course Objectives:

- To Make The Student Acquire Practical Skills in the Wet Chemical and Instrumental Methods for Quantitative Estimation of Hardness, Alkalinity, Metal Ion Content, Corrosion in Metals and Cement Analysis.

The following Experiments must be done during Semester:

1. Preparation of Standard Potassium Dichromate and Estimation of Ferrous Iron.
2. Preparation of Standard Potassium Dichromate and Estimation of Copper by Iodometry.
3. Preparation of Standard EDTA solution and Estimation of Hardness of Water.
4. Preparation of Standard EDTA and Estimation of Copper.
5. Determination of Manganese in Steel and Iron in Cement.
6. Determination of strength of the given Hydrochloric acid against standard sodium hydroxide Solution by Conductometric titration.
7. Determination of viscosity of the given oils through Redwood Viscometer.
8. Estimation of dissolved Oxygen in given Water Sample.
9. Determination of P^H of a given Solution by P^H Meter.
10. Estimation of Alkalinity of Water.
11. Estimation of Acidity.
12. Determination of Corrosion rate and Inhibition Efficiency of an Inhibitor for Mild Steel in Hydrochloric Acid Medium.

On successful completion of this course, the students should be able to:

Course Outcomes		POs related to COs
CO1	Demonstrate Knowledge on measurement of various analysis of water treatment methods	PO1
CO2	Identify the different salt analysis of copper for engineering and technological applications.	PO2
CO3	Provide valid conclusions on phenomena of dissolved oxygen.	PO4
CO4	Follow ethical values during conducting of alkalinity of water samples.	PO8
CO5	Work individually or in a team effectively.	PO9
CO6	Communicate verbally and in written form pertaining to results of the Experiments.	PO10
CO7	Learns to perform experiments involving physical Phenomena in future years.	PO12

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	-	-	-	-	-	-	-	-	-	-	-
CO2		3	-	-	-	-	-	-	-	-	-	-
CO3	-	-	-	3	-	-	-	-	-	-	-	-
CO4	-	-	-	-	-	-	-	3	-	-	-	-
CO5	-	-	-	-	-	-	-	-	3	-	-	-
CO6	-	-	-	-	-	-	-	-	-	3	-	-
CO7	-	-	-	-	-	-	-	-	-	-	-	3
CO*	**3**	**3**	**-**	**3**	-	-	-	3	3	**3**	**-**	**3**

I B. Tech II Semester

L	T	P	C
0	0	3	2

16CSE122 **DATA STRUCTURES LAB**
(Common to CSE,ECE&EEE)

Course Educational Objectives:

CEO1: To provide knowledge on flowchart and algorithm to the given problem
CEO2: To exercise the concepts of linked lists using C programs.
CEO3: To develop the skill of C programs using stacks and Queues.
CEO4: To understand C programs using searching and sorting techniques
CEO5: To exercise the tree traversal concepts in C

EXERCISE 1:
Write a C Program using Dynamic Memory Allocation.

EXERCISE 2:
Write a C Program that uses Functions to Perform the Following Operations on Singly Linked List.
i)Creation ii)Insertion iii)Deletion iv)Traversal

EXERCISE 3:
Write a C Program that uses Functions to Perform the Following Operations on Doubly Linked List.
i)Creation ii)Insertion iii)Deletion iv)Traversal

EXERCISE 4:
Write a C Program that Implement Stack Operations using Arrays.

EXERCISE 5:
Write a C Program that Implement Stack Operations using Linked List.

EXERCISE 6:
Write a C Program that uses Stack Operations to Perform the Following
i) Converting Infix Expression to Postfix Expression.
ii) Evaluating the Postfix Expression.

EXERCISE 7:
Write a C Program that Implement Queue Operations using Arrays.

EXERCISE 8:
Write a C Program that Implement Queue Operations using Linked List.

EXERCISE 9:
Write a C Program that Implement Dequeue Operations using Arrays.

EXERCISE 10:
Write a C Program that use both Recursive And Non Recursive Functions to Perform the Following Searching Operations for a Key Value in a Given List of Integers.
i)Linear Search ii)Binary Search

EXERCISE 11:

Write a C Program that Implements the Following Sorting Methods to Sort a Given List of Integers in Ascending Order.

i)Selection Sort ii)Bubble Sort

EXERCISE 12:

Write a C Program that Implements the Following Sorting Methods to Sort a Given List of Integers in Ascending Order.

i)Quick Sort ii)Merge Sort

EXERCISE 13:

Write a C Program that uses Functions to Perform the Following Binary Tree Traversals

i) Inorder ii)Preorder iii)Postorder

EXERCISE 14:

Write a C Program to Implement the Binary Search Tree.

Course Outcomes:

On Successful completion of this course, the students will able to

	COURSE OUTCOMES	POs related COs
CO1	Design the algorithm and flowchart for the given problem.	PO1, PO2, PO3
CO2	Develop the programs on linked lists	PO1, PO2, PO3
CO3	Analyze the concepts on stacks and queues	PO1, PO2,
CO4	Design the programs on searching and sorting.	PO1, PO2, PO3. PO4
CO5	Understand the concepts of tree traversals.	PO1, PO2
CO6	Following ethical principles in implementing various Data Structures.	PO8
CO7	Doing experiments effectively as an individual and as a member in a group.	PO9
CO8	Communicate verbally and in written form, the understandings about the	PO10
CO9	Continue updating their skill related to various data structures implementation for various application during their life time	PO12

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	2	3	-	-	-	-	-	-	-	-	-
CO2	2	3	3	-	-	-	-	-	-	-	-	-
CO3	3	3	-	-	-	-	-	-	-	-	-	-
CO4	2	3	3	3	-	-	-	-	-	-	-	-
CO5	2	3	-	-	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	3	-	-	-	-
CO7	-	-	-	-	-	-	-	-	3	-	-	-
CO8	-	-	-	-	-	-	-	-	-	3	-	-
CO9	-	-	-	-	-	-	-	-	-	-	-	3
CO*	**2.4**	**2.8**	**3**	**3**	-	-	-	3	3	**3**	-	**3**

Text Books:

1. Data Structures and Algorithm Analysis in C, Mark Allen Weiss, 2nd Edition, Pearson Education, 1997.
2. Programming in C and Data Structures, J.R.Hanly, Ashok N. Kamthane and A. AnandaRao, Pearson Education, 2010, Chennai.

Reference Books:

1. Programming in C and Data Structures, E.Balaguruswamy, 2/e, Tata McGraw Hill, 2012, New Delhi.
2. Data Structures and Algorithm Analysis in C, Mark Allen Weiss, 2nd Edition, Pearson Education, 1997.
3. Data Structures Using C, ReemaThareja, Oxford University Press, 2011.
4. Data Structures and Algorithms, Aho, Hopcroft and Ullman, Pearson Education,1983.

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I B. Tech II Semester **L T P C**

0 0 3 2

16 MEC112 ENGINEERING WORKSHOP AND IT WORKSHOP LAB
(Common to all Branches)

Course Educational Objectives:

CEO1: To provide exposure to the students with hands on experience on various basic engineering practices in civil, mechanical and electrical engineering.

CEO2: To include training on PC Hardware, Internet & World Wide Web and Productivity Tools including Word, Excel and Power Point.

ENGINEERING *WORKSHOP:*

TRADES FOR EXERCISES:

1. **Carpentry:** Two exercise from: Middle T lap joint - Dove tail lap joint - Mortise and tenonjoint from out of 300 x 50 x 35 mm soft wood stock.
2. **Sheet Metal:** Two exercise from: Square tray - Open scoop - Frustum of pyramid from out of22 or 20 gauge G.I. sheet.
3. **Fitting:** Two exercise from: Square joint - V joint - Dove tail joint from out of 50 x 50 x 5mm M.S. flat piece.
4. **House Wiring:** Two exercise from: Two lamps controlled by one switch in series and parallel- One lamp controlled by 2 two way switches (stair case) - Wiring for fluorescent lamp.
5. **Plumbing:** Two exercise from: Basic pipe connections - Mixed pipe material connection - Pipe connections with different joining components.

TRADES FOR DEMONSTRATION:

a. Drilling machine.
b. Lathe machine.
c. Grinding machine.

Course Outcomes (EngineeringWorkshop):

On successful completion of the course, students will be able to

COURSE OUTCOMES		POs related to COs
CO1	Demonstrate the knowledge on differ tools used in carpentry, fitting, sheet metal, basic machining process, house wiring and plumbing sections	PO1
CO2	Analyze the basic pipeline connection using different joining connections	PO2
CO3	Design small components using different materials includes wood, GI sheet and MS plates	PO3
CO4	Apply basic electrical engineering tools on the house wiring practice	PO5
CO5	Follow the ethical principles in while doing the exercises.	PO8
CO6	Do the exercises effectively as an individual and as a team member in a group.	PO9
CO7	Communicate verbally among team members and in written form, the understanding about the trade exercises.	PO10
CO8	Continue updating their skill related to trades.	PO12

CO – PO Mapping

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12
CO1	3	-	-	-	-	-	-	-	-	-	-	-
CO2	-	2	-	-	-	-	-	-	-	-	-	-
CO3	-	-	1	-	-	-	-	-	-	-	-	-
CO4	-	-	-	-	1	-	-	-	-	-	-	-
CO5	-	-	-	-	-	-	-	2	-	-	-	-
CO6	-	-	-	-	-	-	-	-	3	-	-	-
CO7	-	-	-	-	-	-	-	-	-	2	-	-
CO8	-	-	-	-	-	-	-	-	-	-	-	2
CO*	**3**	**2**	**1**		**1**			**2**	**3**	**2**		**2**

Reference: Lab manuals.

IT WORKSHOP*:*

Course Educational Objectives:

CEO1: The Objective of this Course include Training on Pc Hardware, Internet & World Wide Web and Productivity Tools including Word, Excel and Power Point.

CEO2: PC Hardware Introduces the Students to a Personal Computer and its Basic Peripherals, the Process of Assembling a Personal Computer, Installation of System Software Like Ms Windows, Linux and the Required Device Drivers. In Addition Hardware and Software Level Troubleshooting Process, Tips and Tricks would be covered. The Students Should Work on Working PC to Disassemble and Assemble to Working Condition and Install Windows and Linux Operating Systems on the Same PC. Students are Suggested to Work Similar tasks in the Laptop Scenario wherever Possible.

CEO3: Internet & World Wide Web Module introduces the Different ways of Hooking the PC on to the Internet from Home and Workplace and Effectively usage of the Internet. Usage of Web Browsers, Email, Newsgroups and Discussion Forums would be covered. In Addition, Awareness of Cyber Hygiene, i.e., protecting the Personal Computer from Getting Infected with the viruses, Worms and other Cyber-Attacks would be introduced.

CEO4: Productivity Tools Module would enable the Students in Crafting Professional Word Documents, Excel Spread Sheets and Power Point Presentations using the Microsoft Suite of Office Tools.

PC HARDWARE:

WEEK 1: Identify the Peripherals of a Computer, Components in a CPU and its Functions. Draw theBlock Diagram of the CPU along with the Configuration of each Peripheral and Submit to Your Instructor.

WEEK 2: Every Student should Disassemble and Assemble the PC Back To Working Condition. LabInstructors should verify the Work and follow it up with a Viva. Also Students need to go through the Video which shows the Process of Assembling a PC. a Video would be given as Part of the Course Content.

WEEK 3: Every Student should Individually Install MS Windows on the Personal Computer. LabInstructor Should Verify the Installation and Follow it up with a Viva.

WEEK 4: Every Student should install Linux on the Computer. This Computer should have WindowsInstalled. The System should be configured as Dual Boot with both Windows and Linux. Lab Instructors Should Verify the Installation and Follow it up with a Viva.

MS-WORD:

WEEK 5 : Word Orientation: The Mentor Needs to Give an Overview of Microsoft (MS) Office2007: Importance of and MS office 2007 Word as word Processors, Details of the three Tasks and Features that would be Covered in using Word – Accessing Overview of Toolbars- Saving Files - Using help and Resources- Rulers- Format Painter.

TASK 5.1: Using Word to Create Project Certificate. Features to be covered:-Formatting Fonts inWord-Drop Cap in Word- Applying Text Effects- Using Character Spacing-Borders and Colors-Inserting Header and Footer- Using Date and Time Option in Word.

WEEK 6: Creating Project Document: Features to be Covered:-Formatting Styles-Inserting Table-Bullets and Numbering- Changing Text Direction- Cell alignment- Footnote- Hyperlink- Symbols-Spell Check- Track Changes.

WEEK 7: Creating a Newsletter: Features to be Covered:- Table of Content- Newspaper Columns-Images from Files and Clipart- Drawing Toolbar and Word Art- Formatting Images- Textboxes-Paragraphs and Mail Merge in Word.

EXCEL:

WEEK 8: Excel Orientation: The Mentor Needs to tell the Importance of MS Office 2007 Excel as aSpreadsheet Tool- Give The Details of the Two Tasks and Features that would be Covered in each. Using Excel – Accessing- Overview of Toolbars- Saving Excel Files- Using Help and Resources.
Calculating GPA – .Features to be Covered:- Gridlines- Format Cells- Summation- Auto fill-Formatting Text. Cell Referencing- Formulae in Excel – average- std. deviation- Charts- Renaming and Inserting Worksheets- Hyper Linking- Count Function- Sorting.

POWER POINT:

Week 9: Students will be working on Basic Power Point Utilities and Tools which help them CreateBasic Power Point Presentation. Topic Covered during this Week Includes :- PPT Orientation-Slide Layouts- Inserting Text- Word Art- Formatting Text- Bullets and Numbering- Auto Shapes-Lines and Arrows Hyperlinks- Inserting –Images- Clip Art- Audio- Video- Objects- Tables and Charts

Course Outcomes:
On the successful completion of this course, the student should be able to,

COURSE OUTCOMES		POs related to COs
CO1	Acquire knowledge on computer system such as system unit, input devices, and output devices connected to the computer.	PO1
CO2	Analyze the booting process that includes switching on the system, execution of POST routine, then bootstrap loader, and loading of the operating system, and getting it ready for use.	PO2
CO3	Demonstrate the working of the internet that include the use of protocols, domains, IP addresses, URLs, web browsers, web servers, mail-servers, etc.	PO3
CO4	Familiarize with parts of MS Office, To create and save a document, To set page settings, create headers and footers, To use various formatting features such as bold face, italicize, underline, subscript, superscript, line spacing, etc.	PO5
CO5	Follow the ethical principles in implementing the programs	PO8
CO6	Do experiments effectively as an individual and as a team member in a group.	PO9
CO7	Communicate verbally and in written form, the understanding about the experiments and	PO10
CO8	Continue updating their skill related to MS Office, Internet and Computer in future.	PO12

CO – PO Mapping

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	-	-	-	-	-	-	-	-	-	-	-
CO2	-	2	-	-	-	-	-	-	-	-	-	-
CO3	-	-	1	-	-	-	-	-	-	-	-	-
CO4	-	-	-	-	1	-	-	-	-	-	-	-
CO5	-	-	-	-	-	-	-	2	-	-	-	-
CO6	-	-	-	-	-	-	-	-	3	-	-	-
CO7	-	-	-	-	-	-	-	-	-	2	-	-
CO8	-	-	-	-	-	-	-	-	-	-	-	2
CO*	**3**	**2**	**1**	**-**	**1**	**-**	**-**	**2**	**3**	**2**	**-**	**2**

Reference Books:

1. Introduction to Information Technology, ITL Education Solutions limited, Pearson Education
2. Introduction to Computers, Peter Norton, 6/e ,McGraw Hill
3. Upgrading and Repairing, Scott Muller QUE, PC's 18th e ,Pearson Education.
4. Comdex Information Technology course tool kit Vikas Gupta, WILEY Dreamtech
5. IT Essentials PC Hardware and Software Companion Guide Third Edition by David Anfinson and Ken Quamme. – CISCO Press, Pearson.

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II B.TECH I SEM

L	T	P	C
3	1	0	3

16SAH211 MATHEMATICS – III
(Common to all Branches)

Course Educational Objectives:

CEO1: To learn the method of evaluation of numerical integration and to solve ordinary differential equations numerically using numerical methods
CEO2: To learn the concepts of double and triple integrals and compute double and triple integrals
CEO3: To learn partial differential equations and how they can serve as models for physical processes and also master the technique of separation of variables to solve partial differential equation
CEO4: To develop skill to explain the characteristics of scalar and vector valued functions and master these in calculations, provide a physical interpretation of the gradient, divergence, curl and related concepts and carry out differentiation and integration of vector valued functions

UNIT-1: SOLUTION OF ALGEBRAIC AND TRANSCENDENTAL EQUATIONS AND INTERPOLATION
Solution of Algebraic and Transcendental Equations: Introduction - The Bisection Method - TheMethod of False Position - The Iteration Method - Newton-Raphson Method (Single Variable). **Interpolation:** Introduction - Finite Differences - Forward Differences- Backward Differences - Newton's Forward and Backward Difference Formulae for Interpolation - Lagrange's Formula.

UNIT – 2: NUMERICAL DIFFERENTIATION, NUMERICAL INTEGRATION AND NUMERICAL SOLUTION OF ORDINARY DIFFERENTIAL EQUATIONS Numerical Differentiation, Numerical Integration: Trapezoidal rule - Simpson's 1/3 Rule-Simpson's 3/8 Rule. **Numerical Solution of Ordinary Differential Equations:** Solution by Taylor's Series - Picard's Method of Successive Approximations - Euler's Method - Runge-Kutta methods - Predictor-Corrector Method - Milne's Method.

UNIT -3: PARTIAL DIFFERENTIAL EQUATIONS
Formation of Partial Differential Equations by Elimination of Arbitrary Constants and Arbitrary Functions - Method of Separation of Variables.

UNIT - 4: VECTOR DIFFERENTIATION
Introduction to Vector Differentiation, Scalar and Vector Point Functions- Gradient of as Scalar Function - Divergence& Curl of a Vector Function and their Properties.

UNIT - 5: VECTOR INTEGRATION
Line Integral - Potential function - Area, Surface and Volume Integrals - Green's ,Stoke's and Gauss divergence Theorem(excluding their proof) - Verification of Green's, Stoke's and Gauss divergence Theorems.

Course Outcomes:

On successful completion of the course, students will be able to

Course Outcomes		POs related to COs
CO1	Demonstrate knowledge infinding the numerical values to integrals through different mathematical methods and solving ordinary differential equations numerically through various methods and Design novel mathematical methods for solving the ordinary differential equations.	PO1,PO2, PO12
CO2	Demonstrate knowledge inevaluating double and triple integrals	PO1,PO2, PO12
CO3	Develop analytical skills for the problems involving partial differential equations and the methods to solve them	PO1,PO2, PO12
CO4	Demonstrate knowledge in differentiation of vector functions and to provide an understanding of characteristics of scalar and vector valued functions and master these in calculations, provide a physical interpretation of the gradient, divergence, curl and related concepts.	PO1,PO2, PO12
CO5	Demonstrate knowledge in integration of vector functions and to Develop skills in providing solutions for line, surface and volume integrals by vector methods and work done, flux through vector integrations and correlate them with the applications of various integral theorems	PO1,PO2, PO12

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	3	-	-	-	-	-	-	-	-	-	2
CO2	3	3	-	-	-	-	-	-	-	-	-	2
CO3	3	3	-	-	-	-	-	-	-	-	-	2
CO4	3	3	-	-	-	-	-	-	-	-	-	2
CO5	3	3	-	-	-	-	-	-	-	-	-	2
CO*	**3**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**2**

Text Books:

1. Mathematical Methods, T. K. V. Iyengar, B. Krishna Gandhi, S. Ranganatham and
2. M.V.S.S.N. Prasad , S. Chand and Company Publishers, 2012, New Delhi.
3. Higher Engineering Mathematics, Dr. B. S. Grewal, 34/e, Khanna Publishers, 1999, Delhi.
4. Introductory Methods of Numerical Analysis, S SSastry, 4/e, 2005, PHI Publishers.

Reference Books:

1. Engineering Mathematics–I, T.K.V. Iyengar, B.Krishna Gandhi, S. Ranganatham and M.V.S.S.N. Prasad, S. Chand and Company Ltd, 2012, New Delhi.
2. Engineering Mathematics for JNTU, B.V. Ramana, Tata McGraw Hill Publishers, 2012, New Delhi
3. Advanced Engineering Mathematics, Erwin Kreyszig, 8/e, Wiley India, 2009, New Delhi.
4. Numerical Methods for Scientific and Engineering Computations, M K Jain , S R K Iyengar, R K Jain,4/e ,2004.
5. A Text Book of Engineering Mathematics, N.P.Bali, Laxmipublications(P)Ltd, 2011,New Delhi.

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II B. Tech I Semester

L	T	P	C
2	1	0	3

18CSE211

MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE

Course Educational Objectives:

CEO1: To gain the knowledge on connectives and normal forms.
CEO2: To learn the various concepts related to predicate logic.
CEO3: To perform the operations associated with sets, functions, and relations and study the basic properties of lattices.
CEO4: To understand the concept of groups, Abelian groups and group homomorphism and isomorphism.
CEO5: To study the fundamentals of graphs, sub graphs, planar graphs, Hamiltonian graphs, Euler graphs, spanning trees and graph traversals.

UNIT - 1: Mathematical Logic
Statements and Notations - Connectives(Negation, Conjunction , Disjunction, Conditional and Biconditional - Statements Formulas and Truth Tables - Well-Formed Formulas, Tautologies - Equivalence of Formulas - Duality Law - Tautological Implications - Normal Forms(DNF, CNF, PDNF, PCNF) - Theory of Inference for Statement Calculus: Validity using Truth tables - Rules of Inference - Consistency of Premises and Indirect Method of Proof.

UNIT - 2: Predicate Calculus
Predicates - The Statement Function - Variables - Quantifiers - Predicate Formulas - Free and Bound Variables - The Universe of Discourse - Theory of Inference for Predicate Calculus: Valid Formulas and Equivalences - Some Valid Formulas over Finite Universes - Special Valid Formulas Involving Quantifiers.

UNIT -3: Relations & Functions
Relations: Properties of Binary Relations, Equivalence - Closure of Relations - Compatibility and Partial Ordering Relations - Hasse Diagram - Lattices (Basic Concepts).

Functions: Inverse function - Composition of Functions - Recursive Functions - Pigeon Hole Principles and its Applications.

UNIT - 4: Algebraic Structures
Algebraic Systems - Examples and General Properties - Semi Groups - Monoids - Groups and Subgroups - Homomorphism and Isomorphism.

UNIT - 5: Graph Theory
Basic Terminology - Multi Graphs - Weighted Graphs - Digraphs and Relations - Representations of Graphs (Incidence Matrix, Adjacency Matrix) - Operations on Graphs - Isomorphism and Sub Graphs. Paths and Circuits - Graph Traversals(DFS, BFS) - Shortest Paths in Weighted Graphs - Eulerian Paths and Circuits - Hamiltonian Paths and Circuits - Planar Graph - Graph Coloring - Spanning Trees - Minimum Spanning Trees - Kruskal's Algorithm - Prim's Algorithm.

Course outcomes:

On successful completion of this course, the students should be able to:

	Course Outcomes	POs related to COs
CO1	Understand the validity of statements using connectives, tautologies, equivalence, implications and solve the problems using normal forms.	PO1, PO2,PO3
CO2	Solve the problems using statement calculus, predicate calculus and analyze the equivalence of quantified statements.	PO1, PO2, PO3
CO3	Identify and describe various types of relations (Compatibility, Partial ordering and Equivalence elations) and analyze the functions concepts and distinguish different types of functions.	PO1, PO2, PO3, PO4
CO4	Understand the concept of groups, Abelian groups and analyze whether the given set satisfies the properties of group or not.	PO1,PO2
CO5	Design network applications using Prim's and Kruskal's Algorithms and Demonstrate different traversal methods for graphs.	PO1, PO2,PO3,

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	3	3	-	-	-	-	-	-	-	-	-
CO2	3	3	3	-	-	-	-	-	-	-	-	-
CO3	3	3	2	3	-	-	-	-	-	-	-	-
CO4	2	3	-	-	-	-	-	-	-	-	-	-
CO5	2	3	3	3	-	-	-	-	-	-	-	-
CO*	2.6	3	2.75	3	-	-	-	-	-	-	-	-

Text Books:

1. Discrete Mathematical Structures with Applications to Computer Science, J.P. Tremblay and R. Manohar, 27/e, Tata McGraw Hill Publishers, 2006, New Delhi.
2. Elements of Discrete Mathematics – A Computer Oriented Approach, C.L. Liu, D.P. Mohapatra, 3/e, Tata McGraw Hill Publishers, 2008, New Delhi.

Reference Books:

1. Discrete and Combinational Mathematics – An Applied introduction, Ralph. P. Grimaldi, 5/e, Pearson Education, 2008, New Delhi.
2. Discrete Mathematics and its applications,Kenneth H. Rosen, 6/e, Tata McGraw Hill Publishers, New Delhi.
3. Discrete Mathematics for Computer Science, 4/e, 2007, Gary Haggard, John Schlipf, Sue Whitesides, Thomson Pulication, 2008,New Delhi.
4. Discrete Mathematics for ComuterScientists&Mathematicans, Mott,Kandel, Banker, 2/e, Prentice Hall India, 2007, New Delhi.
5. Discrete Mathematics, Lipschutz, Lipson, Schaum's outlines, 2/e, Tata McGraw Hill Publishers, 2006, New Delhi.

II B.Tech I Semester

L	T	P	C
3	1	0	3

16ECE215 BASIC ELECTRONICS ENGINEERING

Course Objectives:

CEO1: To study the basic concepts and characteristics of the electronic diodes.

CEO2: To understand the operation of Rectifiers, Filters and Voltage Regulators as application of PN junction diode.

CEO3: To analyze the transfer characteristics of the BJTs and its biasing methods.

CEO4: To familiarize the students with DC biasing circuits of BJT and FET and analysing bias transistor amplifier circuits.

CEO5: To provide knowledge on Special purpose devices such as LDR, LEDs, inverting and Non inverting amplifiers.

UNIT -1: JUNCTION DIODES AND CHARACTERISTICS

PN Diode Construction and Operation- PN Diode Equation- Volt-Ampere (V-I) Characteristics- Ideal versus Practical Static and Dynamic Resistances- Diode Equivalent Circuits-Break Down Mechanisms in Semiconductor Diodes- Zener Diode Characteristics.

UNIT-2: APPLICATIONS OF PN JUNCTION DIODE

PN Junction as a Rectifier- Half Wave Rectifier- Ripple Factor- Full Wave Rectifier- Bridge Rectifier - Capacitor Filter- Use of Zener Diode as a Regulator- Series and Shunt Regulators- UPS.

UNIT -3: TRANSISTOR CHARECTERISTICS

Transistor construction- BJT Operation- BJT Symbol- Transistor as an Amplifier- Common Emitter- Common Base and Common Collector Configurations and their Characteristics- Self Bias Circuit- Bias Stability.

UNIT -4: FET CHARECTERISTICS

The Junction Field Effect Transistor (Construction, Principle of Operation, Symbol) - Pinch-Off Voltage – Volt-Ampere Characteristics- FET as Voltage Variable Resistor- Comparison between BJT and FET- MOSFET- Basic Concepts- Construction- Modes(depletion & enhancement)- Symbol- Principle of Operation- Characteristics-Self Bias Circuit, Bias Stability**.**

UNIT -5: SPECIAL PURPOSE DEVICES

LDR- LED- Photo Diodes- Photo Transistor - Operational Amplifiers- Ideal Operational Amplifier- Open Loop Operation-Feedback Inverting and Non-Inverting-Differential Amplifier.

Course Outcomes

On successful completion of this course, the students should be able to:

Course Outcomes		POs related to COs
CO1	To provide knowledge and overview of semiconductor materials to illustrate the function of basic electronic devices.	PO1
CO2	To develop skills to design regulated power supply by using the concept of diodes and its applications	PO1,PO2,PO3
CO3	To learn the concept of different transistor configurations and biasing methods.	PO1,PO2
CO4	To understand the basic construction and operation of field effect transistor.	PO1, PO3
CO5	To classify and describe the different semiconductor devices for special applications	PO1, PO2,PO3,PO6

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	-	-	-	-	-	-	-	-	-	-	-
CO2	2	3	1	-	-	-	-	-	-	-	-	-
CO3	2	3	-	-	-	-	-	-	-	-	-	-
CO4	2		1	-	-	-	-	-	-	-	-	-
CO5	3	2	3	-	-	2	-	-	-	-	-	-
CO*	**2.4**	**2.6**	**1.6**	**-**	**-**	**2**	**-**	**-**	**-**	**-**	**-**	**-**

Text Books:

1. Electronic Devices and Circuits, K .Lalkishore, 2nd edition ,BSP, 2005.
2. Linear Integrated Circuits ,D.Roychoudhury, shailB.Jain ,3rd edition, New Age pulishers.

Reference Books:

1. Introductory Circuit Analysis, R.L. Boylestad, 12th edition,PEARSON , 2013.
2. Electronic Devices and Circuits,N.Salivahanan, and N.Suresh Kumar, 3rd Edition,TMH,2012.

II B. Tech I Semester

L	T	P	C
3	1	0	3

16CSE212 ADVANCED DATA STRUCTURES THROUGH C++

Course Educational Objectives:

CEO1: To provide knowledge on different object-oriented programming concepts.
CEO2: To develop skills to analyze the complexity of algorithms and to review the List, Stack and Queue ADTs.
CEO3: To introduce the concepts of dictionaries, Hashing and priority queues.
CEO4: To develop skill to work on advanced trees concept in data structures.
CEO5: To develop skill to apply different pattern matching algorithms and tries concepts.

UNIT-1: C++ CLASS OVERVIEW

Class & Objects- Class Members- Access Control- Constructors and Destructors- Inline Functions- Static Class Members- this pointer- Friend Functions- Dynamic Memory Allocation and De allocation (New and Delete)-Operator Overloading- Function Overloading- Inheritance Basics- Base and Derived Classes- Inheritance Types- Base Class Access Control- Runtime Polymorphism using Virtual Functions- Generic Programming- Function and Class Templates.

UNIT- 2: REVIEW OF BASIC DATA STRUCTURES

Algorithms - Performance analysis- Time Complexity and Space Complexity- Review of Basic Data Structures - The List ADT - Implementation using Template Classes in C++ - Stack ADT - Implementation using Template Classes in C++ - Queue ADT - Implementation using Template Classes in C++.

UNIT -3: DICTIONARIES, HASHING AND PRIORITY QUEUES

Dictionaries - Linear List Representation - Skip List Representation-Hash Table Representation of Dictionary - Hash Functions - Collision Resolution - Separate Chaining- Open Addressing-Linear Probing - Quadratic Probing - Double Hashing - Extendible Hashing - Priority Queues - Realizing a Priority Queue using Heaps- Operations - Insertion, Deletion.

UNIT-4: BALANCED TREES

Binary Search Tree – Operations- Searching, Insertion and Deletion – Implementation using C++ - AVL Trees - Height of an AVL Tree - Operations – Insertion, Deletion and Searching -Red –Black trees Operations – Insertion, Deletion and Searching –B-Trees - Height of a B-Tree –Operations - Insertion, Deletion and Searching.

UNIT-5: PATTERN MATCHING AND TRIES

Pattern Matching Algorithms: Brute Force Algorithm - Boyer Moore Algorithm–Knuth Morris Pratt Algorithm -Applications - **Tries:** Standard Tries - Compressed Tries - Suffix Tries – Applications.

Course Outcomes:
On successful completion of the course the student will be able to,

Course Outcomes		POs related to COs
CO1	Identify and apply the concepts of Object Oriented languages such as C++	PO1, PO2
CO2	Analyze step by step and develop algorithms to solve real world problems, implement the data structures like List, Stack and Queue ADTs	PO1, PO2
CO3	Implement dictionaries, hash functions and priority queues for different applications	PO1, PO4, PO5
CO4	Understand and apply the advanced trees concepts	PO1, PO5
CO5	Identify suitable pattern matching algorithms and Trie techniques for various applications	PO1, PO4

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	3	-	-	-	-	-	-	-	-	-	-
CO2	3	3	-	-	-	-	-	-	-	-	-	-
CO3	3	-	-	3	2	-	-	-	-	-	-	-
CO4	3	-	-	-	2	-	-	-	-	-	-	-
CO5	3	-	-	3	-	-	-	-	-	-	-	-
CO*	**3**	**3**	**-**	**3**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

Text Book:

1. Fundamentals of Data Structures in C++ by Ellis Horowitz, SartajSahni, Dinesh Mehta, Second Edition ,Universities Press.
2. Data structures and Algorithms in C++, Wiley student edition, Michael T.Goodrich, R.Tamassia and Mount, John Wiley and Sons. Replica Press Pvt. Ltd., 2004,Kundli.

Reference Books:

1. Data structures and Algorithms using C++, AnandaRaoAkepogu and RadhikaRajuPalagiri, 1/e, Pearson Education, New Delhi.
2. Data structures and Algorithm Analysis in C++, Mark Allen Weiss, Pearson Education. Ltd., 2/e, 2006,New Delhi,.
3. Data structures and algorithms in C++, Adam Drozdek, Thomson, 3/e,India Edition, 2005.
4. Data structures using C and C++,Langsam, Augenstein and Tanenbaum, 2/e,Prentice Hall Inc., 2002,New Delhi.

II B. TECH – I SEMESTER	L	T	P/D	C
	2	1	0	3

18ECE216 DIGITAL LOGIC DESIGN

Course Educational Objectives:

CEO1: To Provide Knowledge On
- Fundamentals of Digital logic design, Different Types Of Number Systems
- Conversions Of Number Systems, Arithmetic And Logical Operations, Weighted And Non Weighted Codes.
- Differences Between Boolean And Ordinary Algebra and Minimization Of Switching Functions Using Boolean Algebra.

CEO2: To develop skill to minimize switching functions in effective way using K-MAP
CEO3: To develop skill to design combinational logic circuits and realize the design using PLD's.
CEO4: To provide knowledge on memory elements and develop skill to design sequential circuits.
CEO5: To develop the skill to design and analyze finite state machines of different models.

UNIT - 1: NUMBER SYSTEMS & CODES

Review of Number Systems- Binary Arithmetic-Subtraction with r and (r-1)'s Complements-Weighted & Non Weighted Codes. Boolean Algebra : Boolean Theorems-Basic Logic Operations (NOT,OR,AND)-Complement and Dual of Logical Expressions- Universal Gates-EX-OR & EX-NOR Gates- Standard SOP and POS-Minimization of Logic Functions using Theorems.

UNIT - 2: MINIMIZATION OF SWITCHING FUNCTIONS

Minimization of Switching Functions using K-Map upto 5 variables- Minimal SOP and POS Realization-Problem Solving using K-Map for Boolean Functions in SOP and POS Forms.

UNIT - 3: COMBINATIONAL LOGIC CIRCUITS & PLD'S

Combinational Logic Circuits:

Design of Half Adder - Full Adder - Half Subtractor- Full Subtractor- 4-Bit Binary Adder-4-Bit Adder Subtractor- BCD Adder-Carry Look Ahead Adder -Magnitude Comparator – Decoder-Encoder-Multiplexer – De Multiplexer.

PLDS:

PROM – PLA – PAL ,Realization of Switching Functions using PROM - PLA and PAL - Comparison of PROM, PLA, and PAL.

UNIT - 4: SEQUENTIAL CIRCUITS-I

Classification of Sequential Circuits (Synchronous And Asynchronous)-Basic Latches & Flip Flops-SR,D,JK,T –Conversion between Flip Flops- Design of Synchronous and Asynchronous Counters-Design of Shift Registers-Universal Shift Register.

UNIT - 5: SEQUENTIAL CIRCUITS -II

Finite State Machine - Capabilities and Limitations- Analysis of Clocked Sequential Circuits-Design Procedures- Reduction of State Tables and State Assignment-Realization of Circuits Using Various Flip flops - Mealy and Moore State Machines.

Course Outcomes:

On successful completion of the course the student will be able to,

Course Outcomes		POs related to COs
CO1	Demonstrate knowledge on types and conversion of number systems, arithmetic and logical operations of different radix and applying booleanalgebra for switching functions reduction.	PO1, PO2
CO2	Identify the most efficient grouping to minimize the switching functions using k-map.	PO1,PO2
CO3	Design the combinational logic circuits and realize the PLD's for given specifications.	PO1,PO2,PO3
CO4	Understand the knowledge on latches and flip flops and design the sequential logic circuits.	PO1,PO2,PO3
CO5	Analyze and design finite state machines of different models by implementing state tables and state diagrams.	PO1,PO2,PO3,PO4

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	2	-	-	-	-	-	-	-	-	-	-
CO2	3	3	-	-	.-	-	-	-	-	-	-	-
CO3	3	3	3	-	-	-	-	-	-	-	-	-
CO4	3	3	2	-	-	-	-	-	-	-	-	-
CO5	3	3	2	3	-	-	-	-	-	-	-	-
CO*	**3**	**2.8**	**2.3**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

Text Books:

1. Digital Design, Morris Mano, 3/e, Prentice Hall of India, 2006, New Delhi.
2 .Digital Fundamentals, ThomasL.Floyd,10/e, Pearson/Prentice Hall, 2008,New Delhi.

Reference Books:

1. Fundamentals of Logic Design, ,CharlesH.Roth, 5/e, Thomas Publications, 2004, New Delhi.
2. Switching & Finite Automata Theory, ZviKohavi, 2/e, Tata McGraw Hill, New Delhi.

II B. Tech I Semester **L T P C**

3 1 0 3

16CSE213 DESIGN AND ANALYSIS OF ALGORITHMS

Course Educational Objectives:

CEO1: To gain knowledge of time complexity, space complexity and Disjoint sets.
CEO2: Todesign searching and sorting algorithms along with greedy method.
CEO3: To analyzeAsymptotic Runtime Complexity of Algorithms including Formulating Recurrence Relations.
CEO4: To understand the branch and bound algorithms for solving the complex problems.
CEO5: To determine the computational complexity and analyze the approximation algorithms.

UNIT - 1: INTRODUCTION

Algorithm - Pseudo Code for Expressing Algorithms - Performance Analysis- Space Complexity - Time Complexity- Asymptotic Notation - Big Oh Notation - Omega Notation - Theta Notation and Little Oh Notation**. Disjoint Sets:** Disjoint Set Operations - Union and find Algorithms - Spanning Trees - Connected Components and Bi-Connected Components.

UNIT - 2: DIVIDE AND CONQUER

General Method - Applications-Binary Search – Quick Sort - Merge Sort- Strassen's Matrix Multiplication. **Greedy Method:** General Method –Applications- Job Sequencing with Deadlines - 0/1 Knapsack Problem - Minimum Cost Spanning Trees - Single Source Shortest Path Problem.

UNIT - 3: DYNAMIC PROGRAMMING

General Method –Applications-Matrix Chain Multiplication - Optimal Binary Search Trees - 0/1 Knapsack Problem - All Pairs Shortest Path Problem - Travelling Sales Person Problem - Reliability Design Problem.

UNIT - 4: BACKTRACKING

General Method – Applications-N-Queens Problem - Sum of Subsets Problem - Graph Coloring - Hamiltonian Cycles.**Branch And Bound:** General Method - Applications - Travelling Sales Person Problem - 0/1 Knapsack Problem- LC Branch and Bound Solution - FIFO Branch and Bound Solution.

UNIT - 5: NP-HARD AND NP-COMPLETE PROBLEMS

Basic Concepts - Non deterministic algorithms - NP - Hard and NP Complete Classes - Cook's Theorem.

Course Outcomes:

On successful completion of the course the student will be able to,

Course Outcomes		POs related to COs
CO1	To gain knowledge of time complexity, space complexity and Disjoint sets.	PO1, PO2
CO2	To design searching and sorting algorithms along with greedy method.	PO1, PO2, PO3, PO4
CO3	To analyze Asymptotic Runtime Complexity of Algorithms including Formulating Recurrence Relations.	PO1, PO2, PO3, PO4
CO4	To understand the branch and bound algorithms for solving the complex problems.	PO1, PO2, PO3, PO4
CO5	To determine the computational complexity and analyze the approximation algorithms.	PO1, PO2

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	2			-	-	-	-	-	-	-	-
CO2	3	2	2	2	-	-	-	-	-	-	-	-
CO3	3	2	2	2	-	-	-	-	-	-	-	-
CO4	3	2	2	2	-	-	-	-	-	-	-	-
CO5	2	2			-	-	-	-	-	-	-	-
CO*	**2.8**	**2**	**2**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

Text Books:

1. Fundamentals of Computer Algorithms , Ellis Horowitz , SatrajSahni and Rajasekharam , Galgotia publications pvt.Ltd , 2/e , Universities press, 2008.
2. Algorithm Design , Foundations , Analysis and Internet examples, M.T.Goodrich and R.Tomassia , John wiley and sons, 1/e, 2002.

Reference Books:

1. Introduction to Algorithms ,T.H.Cormen - C.E.Leiserson - R.L.Rivest and C.Stein , 2/e , Prentice Hall Inc. Pvt. Ltd./ Pearson Education , 2005.
2. Introduction to Design and Analysis of Algorithms A strategic approach ,R.C.T.Lee - S.S.Tseng - R.C.Chang and T.Tsai , 1/e, McGraw Hill, 2005.
3. Data structures and Algorithm Analysis in C++ , Allen Weiss , 2/e, Pearson education , 2006.
4. Design and Analysis of algorithms ,Aho , Ullman and Hopcroft , 8/e, Pearson education , 2005.

II B. Tech I Semester

L	T	P	C
0	0	3	2

16CSE214 ADVANCED DATA STRUCTURES LAB

Course Educational Objectives:

CEO1: To provide knowledge about the object oriented programming concepts
CEO2: To inculcate skill to investigate the template concepts
CEO3: To develop skill to implement the data structure concepts of stack and queue using array and linked list.
CEO4: To provide knowledge to implement various trees and sorting methods using class template.
CEO5: To develop and implement pattern matching algorithms and its applications

EXERCISE 1:

Write a C++ Program to Illustrate the Following Concepts:

a) Class. b) Constructors.

EXERCISE 2:

Write a C++ Program to Illustrate the Concept of Unary and Binary Operator Overloading.

EXERCISE 3:

Write a C++ Program to Illustrate the Following Concepts:

a) All types of Inheritance. b) Virtual Functions.

EXERCISE 4:

Write a C++ Program to Illustrate the Following Concepts:

a) Function Templates. b) Class Templates. Use Class Templates in the Following Programs

Use Class Templates in the Following Programs
EXERCISE 5:

Write a C++ Programs to Implement the Following using An Array.

a) Stack ADT. b) Queue ADT.

EXERCISE 6:

Write a C++ Programs to Implement the Following using a Singly Linked List.

a) Stack ADT b) Queue ADT

EXERCISE 7:

Write a C++ Programs to Implement the Dequeue (Double Ended Queue) Adt using a Doubly Linked List and An Array.

EXERCISE 8:

Write a C++ Program to Perform the Following Operations:

a) Insert an Element into a Binary Search Tree.

b) Delete an Element from a Binary Search Tree.

c) Search for a Key Element in a Binary Search Tree.

EXERCISE 9:

.Write a C++ Programs that use Non-Recursive Functions to Traverse the given Binary Tree in

a)Preorder b)Inorder c) Postorder

EXERCISE 10:

Write a C++ Programs for Implementing the Following Sorting Methods:

a) Merge Sort . b) Heap Sort.

EXERCISE 11:

Write a C++ Program to Perform the Following Operations

a)Insertion into an AVL-Tree . b) Deletion from an AVL-Tree.

EXERCISE 12:

Write a C++ Program to Implement all the Functions of a Dictionary (Adt) using Hashing.

EXERCISE 13:

Write a C++ Program for Implementing Knuth-Morris- Pratt Pattern Matching Algorithm.

EXERCISE 14:

Write a C++ Program for Implementing Boyer – Moore Patten Matching Algorithm.

Course Outcomes:

On successful completion of the course the student will be able to,

Course Outcomes		**POs related to COs**
CO1	Acquire the knowledge on object oriented programming concepts	PO1
CO2	Identify and design the software using templates	PO2
CO3	Develop solutions for the complex engineering problems using data structure concepts like stack and queue	PO3
CO4	Design and analysis of the trees and sorting methods for different applications	PO4
CO5	Develop the pattern matching algorithms for advanced technologies	PO5
CO6	Follow the ethical principles in implementing the programs	PO8
CO7	Do experiments effectively as an individual and as a team member in a group.	PO9
CO8	Communicate verbally and in written form, the understanding about the experiments.	PO10
CO9	Continue updating their skill related to ADT structures and implementing programs in future.	PO12

CO-PO Mapping

PO / CO	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**
CO1	3	-	-	-	-	-	-	-	-	-	-	-
CO2	-	3	-	-	-	-	-	-	-	-	-	-
CO3	-	-	3	-	-	-	-	-	-	-	-	-
CO4	-	-	-	3	-	-	-	-	-	-	-	-
CO5	-	-	-	-	3	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	3	-	-	-	-
CO7	-	-	-	-	-	-	-	-	2	-	-	-
CO8	-	-	-	-	-	-	-	-	-	2	-	-
CO9	-	-	-	-	-	-	-	-	-	-	-	3
CO*	**3**	**3**	**3**	**3**	**3**	**-**	**-**	**3**	**2**	**2**	**-**	**3**

Text Book:

1. Data Structures and Algorithms in C++, Adam Drozdek, Third Edition, Thomson.
2. C++ Programing, D.S. Malik, Thomson, 3rd Edition, CengageindiaPvt. Ltd. , 2007,Canada.

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES.
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II B. Tech I Semester

L	T	P	C
0	0	3	2

16ECE217 BASIC ELECTRONICS ENGINEERING LAB

Course Educational Objectives:

CEO1: To understand the functionality & specifications of basic electronic passive components.

CEO2: To know the functionality & specifications of electronic active components and special devices.

CEO3: To study the operation of Analog and digital meters which are used for practical experiments

CEO4: To know the practical knowledge of diodes and transistors with their input-output characteristics.

CEO5: To Understand the CRO operation and its measurements.

PART A: ELECTRONIC WORKSHOP PRACTICE

1. Identification, Specifications, Testing of R, L, C Components (Colour Codes), Potentiometers, Coils, Gang Condensers, Relays, Bread Boards.
2. Identification, Specifications and Testing of active devices, Diodes, BJTs, JFETs, LEDs, LCDs, UJT.
3. Study and operation of Ammeters, Voltmeters, Transformers, Analog and Digital Multimeter, Function Generator, Regulated Power Supply and CRO.

PART B: LIST OF EXPERIMENTS

(For Laboratory Examination-Minimum of Six Experiments)

1. P-N Junction Diode Characteristics.
2. Zener Diode Characteristics.
3. Rectifiers (without and with C-filter).
4. BJT Characteristics (CE & CB Configuration).
5. FET Characteristics (CS Configuration).
6. UJT Characteristics.
7. CRO Operation and its Measurements.
8. CE Amplifier.

Equipments required for Laboratory

1. Regulated Power supplies.
2. Analog/Digital Storage Oscilloscopes.
3. Analog/Digital Function Generators.
4. Digital Multimeters.
5. Decade Résistance Boxes/Rheostats.
6. Decade Capacitance Boxes
7. Ammeters (Analog or Digital).
8. Voltmeters (Analog or Digital).
9. Bread Boards.
10. Connecting Wires.
11. CRO Probes etc.

Course Outcomes:

On successful completion of the course the student will be able to,

Course Outcomes		POs related to COs
CO1	Demonstrate knowledge on identification and testing of passive components along with active devices.	PO1
CO2	Analyze the VI characteristics of diodes and obtain the practical observations	PO2
CO3	Design the basic electronic circuits with specifications	PO3
CO4	Analyze the VI characteristics of transistors and FET devices and obtain the practical observations	PO8
CO5	Follow ethical principles on analysis of deferent electronics circuits which is used for project works.	PO9
CO6	Do experiments effectively as an individual and as a member in a group.	PO10
CO7	Communicate verbally and in written form, the understandings about the experiments.	PO12

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	-	-	-	-	-	-	-	-	-	-	-
CO2	-	3	-	-	-	-	-	-	-	-	-	-
CO3	-	-	3	-	-	-	-	-	-	-	-	-
CO4	-	-	-	-	-	-	-	3	-	-	-	-
CO5	-	-	-	-	-	-	-	-	3	-	-	-
CO6	-	-	-	-	-	-	-	-	-	3	-	-
CO7	-	-	-	-	-	-	-	-	-	-	-	3
CO*	**3**	**3**	**3**	**-**	**-**	**-**	**-**	**3**	**3**	**3**	**-**	**3**

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES.
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	L	T	C
II B.Tech –I Semester	**2**	**0**	**0**

16AUD211 **PROFESSIONAL ETHICS**

(Common to all Branches)

(No credits and No examination but attendance will be reckoned)

OBJECTIVE

CEO1: To create an awareness on engineering ethics and human Values
CEO2: To understand social responsibility of an engineer.
CEO3: To appreciate ethic al dilemma while discharging duties in professional life.

UNIT-1: Human Values

Morals-Values and ethics – integrity - work ethic – Honesty- courage – empathy – Self Confidence – Character.

Unit-2: Engineering Ethics

Senses of Engineering Ethics- Varieties of moral issues- Types of inquiry – Moral dilemma – Moral autonomy – Kohlberg's theory – Gilligan's theory – Consensus and Controversy - Models of professional roles - Theories about right action - Self –interest - Customs and religion – Uses of ethical theories- Valuing Time - Co-operation and Commitment

UNIT-3: Engineering as Social Experimentation:

Engineers as Responsible experimenters – Codes of ethics – A balanced outlook on law – The challenger case study.

UNIT-4: Safety Responsibility and Rights

Safety and Risk - Assessment of safety and risk – Risk benefit analysis – The Three Mile Island and Chernobyl Case studies.

UNIT-5: Global Issues

Multinational Corporations – Environmental Ethics - Computer Ethics – Weapons Development – Engineers as Managers – Engineers as expert witness and advisors - Moral leadership.

On successful completion of this course, students should be able to

COURSE OUTCOMES		**POs related to COs**
CO1	Understand the various human values	PO1, PO2, PO7, PO8, PO12
CO2	Analyze usage of engineering ethics	PO1, PO2, PO4, PO6, PO7, PO8, PO12
CO3	Analyze the principles involved in engineering as social experimentation	PO1, PO2, PO4, PO6, PO7, PO8, PO12
CO4	Analyze various principles involved with regard to safety, responsibilities and rights of engineers	PO1, PO2, PO4, PO6, PO7, PO8, PO12
CO5	Analyze the basic principles engaged in study of global issues with regard to engineering ethics	PO1, PO2, PO4, PO6, PO7, PO8, PO12

CO-PO Mapping

CO \ PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	2	-	-	-	-	3	3	-	-	-	3
CO2	3	2	-	2	-	2	3	3	-	-	-	3
CO3	3	2	-	2	-	3	3	3	-	-	-	3
CO4	3	2	-	2	-	3	3	3	-	-	-	3
CO5	3	2	-	2	-	3	3	3	-	-	-	3
CO*	**3**	**2**	**-**	**2**	**-**	**2.75**	**3**	**3**	**-**	**-**	**-**	**3**

Textbooks:

1. A text book on professional ethics and Human Values.1/e 2006,Naagarazan R.S.,New Age International (p)Ltd, Publishers, New Delhi.
2. Professional ethics and Human Values,S.Dinesh Babu, Laxmi Publications(P)Ltd, New Delhi.

Reference Books:

1. Engineering Ethics ,2004,M.Govindarajan, S Natarajan, V.S. Senthil Kumar, Prentice Hall of India,Pvt. Ltd. New Delhi.
2. Engneering Ethics ,2004, CharlesD.Fleddermann,Pearson Education/Prentice-Hall ,New jersey(Indian Reprint now available).
3. Engineering Ethics – Concepts and Cases -2000,CharlesEHarris,Michael S.Prtchard and Michael J Rabins ,Wadsworth Thompson LeaningUnited states (Indian reprint now available).
4. Ethics in Engineering ,Mike Marine and Roland Schinzinger, Tata Mc Graw-hill Education,Pvt Ltd,.Noida.
5. Ethics and the Conduct of Business,2003, John R.Boatright, Pearson Education,New Delhi.
6. Fundamentals of Ethics for Scientists and Engineers, 2001, Edmund G Seebauer and Robert L.Barry,Oxford University Press, Oxford.

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II B.Tech I Semester

L	T	P	C
2	-	-	-

16PAT219 ENGLISH COMMUNICATION SKILLS

Apart from the regular curriculum, to get intact with English Communication, weekly two periods are incorporated in the regular time table of each class to gain the improvement in English Communication Skills.

Category : Employability Enhancement Courses

Course Educational Objectives:

CEO1: To develop the English communication skills

CEO2: To develop self confidence to face the interviews

UNIT-1: Eminent Speakers' TED Talks (Which improves Listening Ability, Use of Body Language, Spoken Accent etc.) PPT (Students are asked to give Power Point Presentations to get rid of stage fear)

UNIT-2: GD (Group Discussion sessions are conducted to improve Analytical Skills) & L-S-R-W (Listening, Speaking, Reading and Writing)

UNIT-3: Mock Interviews are conducted as a Role Play with the peer students to gain knowledge how to face the Interview

UNIT-4: Reading Comprehension Passages are practiced from Hindu Daily News paper to know the newly developed vocabulary used.

UNIT-5: Report writings are taught to improve the writing skills where the students used to write mini projects and main projects.

Course Outcomes:
On successful completion of the course, Students will be able to

Course Outcomes		POs related to COs
CO1	Communicate fluently in English by verbal and oral	**PO9, PO10, PO12**
CO2	Face the interview confidently	**PO9, PO10, PO12**

CO – PO Mapping

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	-	-	-	-	-	-	-	--	2	3	-	3
CO2	-	-	-	-	-	-	-	-	3	3	-	3
CO*	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**2.5**	**3**	**-**	**3**

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES.
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II B.Tech I Semester

L	T	P	C
2	-	-	-

16PAT220 PERSONALITY DEVELOPMENT PROGRAM-I
Category : Employability Enhancement Courses

Course Educational Objectives:
CEO1: To develop the Self-confidence among the Students
CEO2: To enlarge the skill related to personnel for face the interviews

UNIT 1: SELF-CONFIDENCE:
- Factors affecting self-confidence
- Tips for improving self-confidence
- Symptoms of absence of self-confidence

UNIT 2: STRESS MANAGEMENT:
- Stress management for youngsters
- Symptoms of stress
- Way to reduce stress
- Overcoming stress at interviews, at work places

UNIT 3: PREPARING FOR WRITTEN TEST:
- Important areas in quantitative and verbal
- Sample aptitude and reasoning questions

UNIT 4: GROUP DISCUSSION:
- Different roles in G.D
- Types of G.D
- Preparing for G.D
- Contribution in G.D
- Do's and Don'ts in G.D
- Sample G.D topics

UNIT 5: FACING PERSONAL INTERVIEWS:
- Language and Body language preparation
- Common tips for success in interviews
- Do's and Don'ts while answering the questions

Course Outcomes:
On successful completion of the course, Students will be able to

Course Outcomes		POs related to COs
CO1	Develop the Self-confidence among the Students	**PO9, PO10, PO12**
CO2	Expand the skill related to personnel for face the interviews	**PO9, PO10, PO12**

CO – PO Mapping

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	-	-	-	-	-	-	-	--	2	3	-	3
CO2	-	-	-	-	-	-	-	-	3	3	-	3
CO*	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**2.5**	**3**	**-**	**3**

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES.
(AUTONOMOUS)
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

II B. Tech II Semester

L	T	P	C
3	1	0	3

16SAH212 ENVIRONMENTAL SCIENCE
(Common to All Branches)

Course Educational Objectives:

CEO1: Recognize the interconnectedness of multiple factors in environmental challenges and engage constructively with diverse forms of knowledge and experience

CEO2: Identify the multiple scales, actors, and stakes of an issue, recognize and Apply methodological approaches of the social sciences, natural sciences, and humanities.

CEO3: Identify assumptions inherent in arguments and perspectives, evaluate and interpret various forms of evidence, including text, data, and other media about the environment

CEO4: Work productively with those within and beyond the academy on interdisciplinary Collaborative projects

CEO5: Communicate clearly and competently matters of environmental concern and understanding to a variety of audiences in appropriate forms

UNIT–1: INTRODUCTION TO ENVIRONMENTAL SCIENCE AND NATURAL RESOURCES

Introduction: Definition - Scope and Importance of Environment - Need for Public Awareness - Natural Resources: Forest Resources: Use and over-Exploitation - Deforestation - Conservation of Forests.

Mineral Resources: Use and Exploitation - Environmental Effects of Extracting Mineral Resources - Case Studies.

Energy Resources: Conventional Energy Resources - Natural Gas and Nuclear Fuels - Non-Conventional Energy Resources - Solar Energy - Wind Energy - Tidal Energy - Geothermal Energy and Biogas Energy - Use of Alternate Energy Sources - Case Studies.

UNIT –2: ECOSYSTEM AND BIODIVERSITY

Ecosystem: Concept Of An Ecosystem - Structure And Function Of An Ecosystem - Energy Flow In The Ecosystem - Food Chains - Food Webs - Ecological Pyramids - Types - Characteristic Features - Structure and Function of The (A) Forest Ecosystem (B) Grassland Ecosystem (C) Desert Ecosystem (D) Aquatic Ecosystems (Ponds - Streams - Lakes - Rivers - Oceans - Estuaries).

Biodiversity: Introduction to Biodiversity - Genetic - Species and Ecosystem Diversity - Value of Biodiversity: Consumptive Value - Productive Value - Social Value - Ethical Value - Aesthetic and Option Values -Endangered and Endemic Species of India - Conservation of Biodiversity: In-Situ and Ex-Situ Conservation of Biodiversity.

UNIT – 3: POLLUTION AND WASTE MANAGEMENT

Definition - Causes - Effects - Control Measures of Pollution.

Air Pollution: Types of Pollutants - Their Sources and Impacts - Air Pollution Control

Noise Pollution: Impacts of Noise - Permissible Limits of Noise Pollution - Measurement of Noise - Control of Noise Pollution.

Soil Pollution: Causes of Soil Degradation - Excessive Use of Fertilizers - Problems WithPesticideUse - Excess Salt and Water.

Solid Waste Management: Characteristics - Generation - Collection And Transportation Of SolidWastes - Engineered Systems For Solid Waste Management (Reuse, Recycle, Energy Recovery, Treatment And Disposal).

UNIT – 4: SOCIAL ISSUES AND THE ENVIRONMENT

Water Conservation Measures - Rain Water Harvesting and Water Shed Management - Resettlement and Rehabilitation of People - Its Problems and Concerns - Case Studies - Role of Ngo's - Climate Change - Global Warming (Green House Effect) - Ozone Layer Depletion - Acid Rain - Nuclear Accidents.

Sustainable Development: Definition - Objectives - Environmental Dimensions of Sustainable Development

UNIT– 5: ENVIRONMENTAL LEGISLATION AND HUMAN POPULATION

Environmental acts: The Water (Prevention And Control Of Pollution) Act - The Air (Prevention And Control Of Pollution) Act - The Wild Life (Protection) Act - The Forest Conservation Act - The Environmental Protection Act.

Case Studies: Chipko Movement - Narmada BachaoAndolan - Silent Valley Project - Chernobyl Nuclear Disaster - And Bhopal Gas Tragedy

Population Growth: Variation Among Nations - Population Explosion - Value Education - Hiv/Aids - Role of Information Technology in Environment and Human Health - Case Studies.

Field Work

Visit to A Local Area To Document Environmental Assets: River/ Forest/ Grasslands/ Mountains

Visit to Local Polluted Site: Urban/ Rural/ Industrial/ Agriculture

Study of Simple Ecosystems: Pond/ River/ Hill Slope etc.

Course Outcomes:

On successful completion of the course the student will be able to,

SNO	DESCRIPTION	PO(1..12) MAPPING
CO1	Demonstrate knowledge on fundamentals of Environment.andAnalyze the availabity of non-conventional energy resources.	PO1, PO2,PO6, PO8,PO9 PO12
CO2	Identify appropriate types of habitates in the surrounding and analyze the influence of habitats on survivial.	PO1, PO2, PO7,PO8, PO12
CO3	Identify appropriate method of controlling of pollution and design the ecofriendly techniques	PO1, PO2, PO6, PO7, PO8, PO12
CO4	Analyze the effect of climatic changes	PO1, PO2,PO6,PO7
CO5	Understand the population growth and variation- environmental acts	PO1, PO2,PO6PO7, PO8, PO12

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	3	-	-	-	2	3	3	1	-	-	3
CO2	3	3	-	-	-	-	2	1	-	-	-	3
CO3	3	3	-	-	-	3	1	3	-	-	-	3
CO4	3	3	-	-	-	3	3	3	-	-	-	3
CO5	3	3	-	-	-	3	3	3	-	-	-	3
CO*	**3**	**3**	**-**	**-**	**-**	**2.7**	**2.4**	**2.6**	**1**	**-**	**-**	**3**

Text Books:

1. Text book of Environmental Studies, C.P. Kaushik and AnubhaKaushik, 4/e, New Age International (P) Ltd., Publishers, 2012, New Delhi.
2. Text book of Environmental Studies, ErachBharucha, 1/e, University Press (India) Private Ltd., , 2008,Hyderabad.

Reference Books:

1. Environmental Studies-From Crisis to Cure, R. Rajagopalan, 2/e, Oxford University Press , 2012, New Delhi.
2. A Text Book of Environmental science and Technology ,Dr.M.Anji Reddy, 1/e, B.S. Publications, 2008, Hyderabad.
3. Principles of Environmental Science and Engineering, Keerthinarayana and Daniel Yesudiam, 1/e, Hi –Tech Publications , 2005, Chennai.
4. Glimpses of Environment , Dr. KVSG Murali Krishna, 1/e, Environmental Protection Society, 2005, Kakinada, India.
5. Environmental Studies, AninditaBasak , 1/e, Pearson Education, 2009, New Delhi.

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES.
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II B.TECH I SEM

L	T	P	C
3	1	0	3

16SAH222 PROBABILITY AND STATISTICS
(Common to CSE, MEC, CE)

Course Educational Objectives

CEO1: To develop skill to analyze the discrete and continuous data using appropriate Statistical Distributions like Binomial, Poisson, Normal..etc
CEO2: To develop skill to design different graphical representations like pie chart, Bar graph, scatter Diagram, line graph, Regression line etc.,
CEO3: To inculcate skill to investigate different applications of statistical distributions and the Corresponding conclusions required for the analysis of sample data.
CEO4: To develop skill to apply the concept of test of significance using t-test, f-test, chi-square test, ANOVA suitable of the required conclusion.

UNIT - 1: PROBABILITY AND RANDOM VARIABLES

Probability: Sample Space and Events - Probability - The Axioms of Probability - Some ElementaryTheorems - Conditional Probability - Baye's Theorem.
Random Variables: Discrete and Continuous Distributions–Statistical Parameters (Mean, Varianceand Standard Deviation) of Distribution Functions.

UNIT - 2: PROBABILITY DISTRIBUTIONS:

Binomial - Poisson and Normal Distributions - Related Properties.

UNIT - 3: SAMPLING DISTRIBUTION AND ESTIMATION

Sampling Distribution: Populations and Samples - Sampling Distributions of Mean (Known andUnknown) - Proportions - Sums and Differences.
Estimation: Point Estimation - Interval Estimation - Bayesian Estimation.

UNIT - 4: TEST OF HYPOTHESIS AND TEST OF SIGNIFICANCE

Test of Hypothesis: Means - Hypothesis concerning one and Two Means - Type I and Type II Errors- One Tail, Two-Tail Tests.
Test of Significance: Student's T-Test - F-Test - Chi-Square Test of Goodness of Fit.

UNIT - 5: CURVE FITTING & ANNOVA

Curve Fitting: The Method of Least Squares–Linear, Parabola, Exponential and Power Form.
ANNOVA: ANOVA for One-Way and Two-Way Classification Data.

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

Course Outcomes		POs related to COs
CO1	Demonstrate the knowledge on use the probability and Random Variables in the field of engineering	PO1,PO2,PO3, PO12
CO2	Demonstrate the knowledge in probability distributions and develop analytical skills for the problems involving means, probability distributions and standard deviations sampling techniques for decision making in uncertain environments	PO1,PO2,PO3, PO12
CO3	Construct confidence intervals on parameters for a single sample	PO1,PO2,PO3,PO12
CO4	Demonstrate the knowledge in testing of hypotheses and Tests of significance for small and large samples and Develop skills for analyzing the data with suitable tests of significance for practical situations through probability distributions	PO1,PO2,PO3,PO4,PO12
CO5	Demonstrate the knowledge on constructing a curve, or mathematical function, that has the best fit to a series of data points, possibly subject to constraints and develop skills for analyzing to test whether there are any statistically significant	PO1,PO2,PO3,PO4,PO12

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	3	2	-	-	-	-	-	-	-	-	2
CO2	3	3	2	-	-	-	-	-	-	-	-	2
CO3	3	3	2	-	-	-	-	-	-	-	-	2
CO4	3	3	2	2	-	-	-	-	-	-	-	2
CO5	3	3	2	2	-	-	-	-	-	-	-	2
CO*	**3**	**3**	**2**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**2**

Text Books:

1. Fundamentals of Mathematical Statistics, S.C. Gupta, V.K. Kapoor, 10/e, S. Chand and Company Publishers, 2001, New Delhi.
2. Probability and Statistics, T.K.V. Iyengar, B. Krishna Gandhi, S. Ranganatham and M.V.S.S.N. Prasad , S. Chand and Company Publishers, 2012, New Delhi.

Reference Books:

1. Probability and Statistics, V. Ravindranath, T.S.R. Murthy, I.K. International Pvt. Ltd, 2011, New Delhi.
2. Probability and Statistics for Engineers, Johnson A. Richard, Miler &Fruends, 6/e, Pearson Education, 2006, New Delhi.
3. Higher Engineering Mathematics, , Dr. B. S. Grewal, 34/e ,Khanna Publishers, 1999, Delhi.
4. Probability and Statistics for Engineers, Dr. J. Ravichandran,Wiley-India Publishers, 2011, New Delhi.
5. Probability and Statistics for Engineers and Scientists, Ronald E. Walpole, Raymond H. Myers, Sharon L. Myers, Keying Ye, 7/e, Pearson Education Asia, 2002, New Delhi.

II B. Tech II Semester

L	T	P	C
3	1	0	3

16CSE221 THEORY OF COMPUTATION

Course Educational Objectives:

CEO1: Toconstruct finite state machines and the equivalent regular expressions.
CEO2: To prove the equivalence of languages described by finite state machines and regular expressions.
CEO3: To construct pushdown automata and the equivalent context free grammars.
CEO4: To prove the equivalence of languages described by pushdown automata and context free grammars.
CEO5: to prove the equivalence of languages described by Turing machines.

UNIT – 1: FUNDAMENTALS AND FINITE AUTOMATA

Strings - Alphabets and Languages - Finite State Automata – Basic Definitions - Deterministic Finite Automata – Non Deterministic Finite Automata - Equivalence of DFA's And NFA's - Finite Automata with Output – More Machines and Mealy Machines - Minimization of FA - Equivalence Between two FA's - NFA with ε –Moves - Equivalence of NFA's with and without ε –Moves.

UNIT – 2: REGULAR EXPRESSIONS AND REGULAR SETS

Regular Expressions - Regular Languages - Identity Rules for Regular Expressions - Equivalence of Finite Automata and Regular Expressions – Pumping Lemma for Regular Sets – Applications of the Pumping Lemma - Closure Proportions of Regular Sets (Without Proof).

UNIT – 3: REGULAR GRAMMARS AND CONTEXT FREE GRAMMARS

Regular Grammars - Right Linear and Left Linear Grammars - Equivalence of Regular Grammar and Finite Automata - Context Free Grammars - Motivation and Introduction - Definition Derivations - Leftmost Derivation - Rightmost Derivation - Derivation Tree - Ambiguity Simplification of CFG's - Chomsky Normal Form - Greibach Normal Form.

UNIT – 4: PUSH DOWN AUTOMATA

Definitions - Model of PDA – Acceptance by PDA - Design of PDA - Equivalence of PDA's and CFL's - Deterministic PDA - Closure properties of CFL (Without proof).

UNIT – 5: TURING MACHINE

Definition - Model - Language Acceptance - Design of Turing Machine - Computable Functions - Recursively Enumerable Languages - Church's Hypothesis -Types of Turing Machine (Without Proof) -Decidability of Problems -Undecidability of Posts Correspondence Problem - Chomsky Hierarchy of Languages - Grammars and their Machine Recognizers.

Course Outcomes:

On successful completion of the course the student will be able to,

Course Outcomes		POs related to COs
CO1	Demonstrate knowledge on Automata Theory, Analyze and Design of finite automata, and prove equivalence of various finite automata.	PO1, PO2, PO3
CO2	Demonstrate knowledge on Regular Expression, Analyze and design of regular expressions from regular languages, and prove the equivalence of languages described by finite state machines and regular expressions, applying pumping lemma on regular sets.	PO1,PO2, PO3,
CO3	Demonstrate knowledge on context free grammar, Analyze and design of CFG from CFL, simplifications of CFG by applying various Normal forms.	PO1, PO2, PO3
CO4	Analyze and design of PDA and prove the equivalence of languages described by pushdown automata and context free grammars.	PO1, PO2,PO3
CO5	Demonstrate knowledge on Turing Machine, analyze and design of Turing machine.	PO1, PO2, PO3

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	3	3	-	-	-	-	-	-	-	-	-
CO2	2	3	3	-	-	-	-	-	-	-	-	-
CO3	2	3	3	-	-	-	-	-	-	-	-	-
CO4	2	3	3	-	-	-	-	-	-	-	-	-
CO5	2	3	3	-	-	-	-	-	-	-	-	-
CO*	**2.2**	**3**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

Text Books:

1. Introduction to Automata theory languages and Computation, Hopcroft H.E. and Ullman Jeffrey.D, 3/e, Pearson Education, 2006, New Delhi, India.
2. Theory of computer Science, Mishra and Chandrasekaran, 2/e, PHI, 2007, New Delhi, India.

Reference Books:

1. Introduction to Theory of Computation, Sipser, Thomson, 2/e, 2005, Australia.
2. Introduction to Languages and Theory of Computation, John C Martin, 1/e, Tata McGraw Hill Education, 2009, Hyderabad, India.
3. Introduction to Computer Theory, Daniel I.A. Cohen, John Wiley, 2/e, 1997, India.
4. Theory of computation, George Tourlakis**,** John Wiley, 1/e, 2012, India.
5. Theory of Computation, Dexter C. Kozen , 1/e, Springer, 2006, India.

II B.Tech II Semester

L	T	P	C
3	1	0	3

16CSE222 COMPUTER ORGANIZATION

Course Educational Objectives:

CEO 1: To conceptualize the basics of organizational and architectural issues of a digital computer.
CEO 2: To articulate design issues in the development of processor or other components that satisfy design requirements and objectives.
CEO 3: Tostudy various data transfer techniques in digital computer and the design of control unit.
CEO 4: To learn the function of each element of a memory hierarchy and I/O devices.
CEO 5: To develop skill to apply the concept of Pipelining in designing multiprocessor system.

UNIT-1: BASIC STRUCTURE OF COMPUTERS

Computer Types - Functional Units - Basic Operational Concepts - Bus Structures – Software – Performance - Multiprocessors and Multi Computers - Data Representation- Fixed Point Representation - Floating Point Representation - Error Detection Codes.

UNIT-2: CPU DESIGN AND COMPUTER ARITHMETIC

CPU Design: Instruction Cycle - Memory Reference Instructions–Input/output and Interrupt - Addressing Modes - DATA Transfer and Manipulation - Program Control
Computer Arithmetic: Addition and Subtraction - Multiplication Algorithms - Division Algorithms - Floating Point Arithmetic Operations - Decimal Arithmetic Unit.

UNIT-3: REGISTER TRANSFER LANGUAGE AND DESIGN OF CONTROL UNIT

Register Transfer: Register Transfer Language - Register Transfer - Bus and Memory Transfers - Arithmetic Micro operations - Logic Micro Operations - Shift Micro Operations.
Control Unit: Control Memory - Address Sequencing–Micro program Example - Design of ControlUnit.

UNIT- 4: MEMORY AND INPUT/OUTPUT ORGANIZATION

Memory Organization: Memory Hierarchy–Main Memory–Auxiliary Memory–AssociativeMemory – Cache Memory – Virtual Memory.
Input/output Organization: Input-Output Interface - Asynchronous data transfer - Modes ofTransfer - Priority Interrupt - Direct memory Access.

UNIT- 5: PIPELINE AND MULTIPROCESSOR

Pipeline: Parallel Processing–Pipelining - Arithmetic Pipeline - Instruction Pipeline.
Multiprocessor: Characteristics of Multiprocessors - Interconnection Structures–Inter processorArbitration - Inter Processor Communication and Synchronization.

Course Outcomes:

On successful completion of the course the student will be able to,

Course Outcomes		POs related to COs
CO1	Demonstrate the knowledge on fundamentals of organizational and architectural issues of a digital computer	PO1, PO2
CO2	Identify design issues in the development of processor or other components	PO1, PO2, PO3, PO4
CO3	Demonstrate control unit operations and conceptualize various data transfer operation among registers.	PO1, PO3
CO4	Categorize memory organization and explain the function of each element of a memory hierarchy and compare different methods for computer I/O mechanisms.	PO1, PO3, PO5
CO5	Understand and use the concept of Pipelining in various multiprocessor applications.	PO1, PO4, PO5

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	2	-	-	-	-	-	-	-	-	-	-
CO2	2	3	3	3	-	-	-	-	-	-	-	-
CO3	3	-	2	-	-	-	-	-	-	-	-	-
CO4	3	-	3	-	3	-	-	-	-	-	-	-
CO5	2	-	-	2	2	-	-	-	-	-	-	-
CO*	**2.6**	**2.5**	**2.6**	**2.5**	**2.5**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

Text Books:

1. Computer Organization – Carl Hamacher, ZvonksVranesic, SafeaZaky, 5/e, MCG, 2002.
2. Computer Systems Architecture – M.Moris Mano, 3/e, PEA, 2007.

Reference Books:

1. Computer Systems Organization and Architecture- John D. Carpinelli, PEA, 2009
2. Computer Organization and Architecture – William Stallings,6/e, Pearson/PHI.
3. Structured Computer Organization – Andrew S. Tanenbaum, 4/e, PHI/Pearson.
4. Fundamentals or Computer Organization and Design - SivaraamaDandamudi Springer Int. Edition.
5. Computer Architecture a quantitative approach, John L. Hennessy and David A. Patterson, 4th Edition, Elsevier.
6. Computer Architecture: Fundamentals and principles of Computer Design, Joseph D. Dumas II, BS Publication.

II B.Tech II Semester

L	T	P	C
3	1	0	3

16CSE223 DATABASE MANAGEMENT SYSTEMS

Course Educational Objectives:

CEO1: To discuss the basic database concepts, applications, data models, schemas and instances and design Entity Relationship (E-R) model for a database.

CEO 2: To demonstrate the use of integrity constraints, relational algebra operations and relational calculus.

CEO 3: To describe the basics of SQL, construct queries using SQL, SQL functions, trigger and cursor concepts in PL/SQL

CEO 4: Tounderstand reasoning about functional dependency and to make the students to identify the role of normalization in database management systems

CEO 5: To gain knowledge of Transaction, concurrency and recovery strategies of DBMS.

UNIT - 1: DATABASE SYSTEMS AND ENTITY RELATIONSHIP MODELING

Database System Applications - Purpose of Database Systems - View of Data - Database Languages - Database Users and Administrators - Database Architecture - The Entity-Relationship Model - Attributes and Entity Sets - Relationship Sets - Entity-Relationship Diagrams - Extended E-R Features.

UNIT - 2: RELATIONAL DATA MODEL AND LANGUAGE

Introduction to the Relational Model - Integrity Constraints - Fundamental Relational Algebra Operations - Tuple Relational Calculus - Domain Relational Calculus.

UNIT - 3: INTRODUCTION TO SQL

Characteristics of SQL - advantages of SQL - SQL Data types and Literals.-Types of SQL Commands - SQL Operators and their Procedures - Form of Basic SQL Query - Examples of Basic SQL Queries - Introduction to Nested Queries - Views - SQL Functions - Joins - Set Operators in SQL - Database Triggers - Cursors in SQL - PL/SQL.

UNIT - 4: NORMALIZATION

Introduction to Schema Refinement - Properties of Decompositions - Functional Dependencies - Reasoning about Functional Dependencies - Normal Forms - First - Second - Third – BCNF - MVD - Fourth Normal Form.

UNIT - 5: TRANSACTION PROCESSING CONCEPTS AND CONCURRENCY CONTROL TECHNIQUES

Transaction Concept - Transaction State - Implementation of Atomicity and Durability - Serializability - Recoverability - Concurrent Executions - Lock-Based Protocols for Concurrency Control - Time Stamp-Based Protocol for Concurrency Control - Multiple Granularity.

Course Outcomes:

On successful completion of the course the student will be able to,

Course Outcomes		POs related to COs
CO1	Demonstrate knowledge on Data models and Database LanguagesandDesign Entity Relationship model for a database	PO1, PO3
CO2	Analyze the relational database theory, and be able to write relational algebra and relational calculus expressions for queries.	PO1, PO2
CO3	Analyze and evaluate the databases using SQL DML/DDL Commands	PO1, PO2, PO3, PO5
CO4	Analyze databases using normal forms to provide solutions for real time applications.	PO1, PO2
CO5	Understand the properties of transactions in a database system, Analyze concurrency control techniques for handling concurrent transactions and understand recovery of data from failures	PO1, PO3,PO4

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	-	3	-	-	-	-	-	-	-	-	-
CO2	3	3	-	-	-	-	-	-	-	-	-	-
CO3	2	2	3	-	2	-	-	-	-	-	-	-
CO4	2	3	-	-	-	-	-	-	-	-	-	-
CO5	3	-	2	2	-	-	-	-	-	-	-	-
CO*	**2.6**	**2.6**	**2.6**	**2**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

Text Books:

1. Database System Concepts, Korth, Silberschatz, Sudarshan, 5/e, Tata McGrawHill,2006, New York.
2. Database Management Systems, Raghu Ramakrishnan, J. Gehrke, 2/e, Tata McGrawHill, 2000,New York.

Reference Books:

1. Fundamentals of Database Systems, Elmasri, Navathe, 5/e,Pearson Education, 2008,USA.
2. *Database Management Systems*, Peter Rob, A.*AnandaRao*and Carlos Coronel, 5/e, CengageLearning, 2003, USA.
3. SQL, PL/SQL Programming, Ivan Bayross, 2/e, BPB Publications, 2011, New Delhi, India.
4. Introduction to Database Systems, C.J.Date, 8/e, Pearson Education, 2004,USA.
5. Fundamentals of Database Management Systems, M.L. Gillenson, Wiley,1/e, 2006, New Delhi, India.

II B. TECH II-SEMESTER (CSE)

L	T	P	C
3	1	0	3

16CSE224 OBJECT ORIENTED PROGRAMMING THROUGH JAVA

Course Educational Objectives:

CEO1: To study the syntax, semantics and features of Java Programming Language.
CEO2: To understand the principles of packages and inheritance.
CEO3: Todevelop Java application programs using exceptions and interfaces.
CEO4: To gain knowledge on multithreading and applets
CEO5: To create GUI applications & perform event handling.

UNIT – 1: BASICS OF JAVA

History of Java - Java Buzzwords - Overview of Java - Data Types - Variables - Arrays - Operators - Control Statements – Introducing Classes &Objects - Constructors - Methods - Access Control - this Keyword - Garbage Collection - Overloading Methods and Constructors - Parameter Passing - Recursion – Exploring the String Class.

UNIT – 2: INHERITANCE AND PACKAGES:

Inheritance: Basics of Inheritance - Base Class Object - Subclass - Forms of Inheritance - Extension-Limitation - Benefits of Inheritance - Costs of Inheritance - Member Access Rules – Using Super - Using Final - Polymorphism- Method Overriding - Abstract Classes.

Packages: Defining - Creating and Accessing a Package - Understanding CLASSPATH – Importing Packages - Exploring Packages.

UNIT - 3: INTERFACES AND EXCEPTION HANDLING

Interfaces: Differences between Classes and Interfaces - Defining an Interface – Implementing Interface - Applying Interfaces - Variables in Interfaces and Extending Interfaces.

Exception Handling: Concepts of Exception Handling - Benefits of Exception Handling – Exception Hierarchy - Usage of Try - Catch - Throw - Throws and Finally - Built in Exceptions - Creating own Exception Sub Classes - Checked and Unchecked Exceptions.

UNIT – 4: MULTI THREADING AND APPLETS

Multi-Threading: Differences between Multi-Threading and Multitasking - Thread Life Cycle - Creating Threads - Synchronizing Threads.

Applets: Concepts of Applet - Differences between Applet and Application - Life Cycle of an Applet- Types of Applets - Creating Applet - Passing Parameters to Applet.

UNIT - 5: EVENT HANDLING AND AWT AND SWINGS

EVENT HANDLING AND AWT: Events - Event Sources - Event Listeners - Event Classes – DelegationEvent Model - Handling Mouse and Keyboard Events - Adapter Classes - Inner Classes - The AWT Class Hierarchy - AWT Components - Layout Managers - Graphics.

Swings - Introduction - Limitations of AWT - MVC Architecture - Components - Containers - Exploring Swing - JApplet - JFrame and JComponent - JLabel and Imageicon - JTextfield - JButton - Check Boxes - Radio Buttons - JCombobox - JTabbedpane - JScrollpane - Trees - JTable.

Course Outcomes:

On Successful completion of this course student should be able to :

Course Outcomes		POs related to COs
CO1	Understand the basic principles of object oriented programming	PO1, PO2, PO3, PO4, PO5, PO12
CO2	Develop Java programs with the concepts of inheritance and packages	PO1, PO2, PO3, PO4, PO5, PO12
CO3	Build Java applications using exceptions and interfaces	PO1, PO2, PO3, PO4, PO5, PO12
CO4	Use multithreading and applet concepts in developing the object oriented programming	PO1, PO2, PO3, PO5
CO5	Develop the interactive Java programs using event handling and swings	PO1, PO2, PO3, PO5

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	3	3	2	2	-	-	-	-	-	-	2
CO2	3	3	3	3	3	-	-	-	-	-	-	2
CO3	3	3	2	3	3	-	-	-	-	-	-	2
CO4	3	3	2	-	3	-	-	-	-	-	-	-
CO5	3	3	2	-	3	-	-	-	-	-	-	-
CO*	**3**	**3**	**2.4**	**2.6**	**2.8**	**-**	**-**	**-**	**-**	**-**	**-**	**2**

Text Books:

1. Java; The complete reference, Herbert schildt, 7th editon, TMH.
2. Beginning Java2 JDK , Ivor Horton's, 5th Edition, WILEY Dream Tech.

Reference Books:

1. An Introduction to programming and OO design using Java, J.Nino and F.A. Hosch, John wiley& sons.
2. An Introduction to OOP, T. Budd, second edition, Pearson education.
3. Introduction to Java programming ,Y. Daniel Liang, 6 th edition, Pearson education.
4. An introduction to Java programming and object oriented application development, R.A. Johnson-Thomson.
5. Core Java 2, Vol 1, Fundamentals, Cay.S.Horstmann and Gary Cornell, 7 th Edition, Pearson Education.

II B.Tech II Semester

L	T	P	C
0	0	3	2

16CSE225 OBJECT ORIENTED PROGRAMMING LAB

Course Educational Objectives:

CEO1: To gain knowledge on object oriented programming concepts

CEO2: To develop the Java programs by using the concepts of inheritance and packages.

CEO3: To design the variety of technologies and on different platforms.

CEO4: Tounderstand the concepts of event handling in Java platform.

CEO5: To design the application using object oriented programming concepts.

WEEK 1:

a) 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 Discriminate b2 - 4ac is Negative, Display a Message Stating that there are no Real Solutions.

b) 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 Sum 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.

WEEK 2:

a) Write a Java Program that Prompts the User for an Integer and then Prints out all Prime Numbers up to that Integer.

b) Write a Java Program to Multiply Two Given Matrices.

c) Write a Java Program that Reads a Line of Integers, and then Displays each Integer, and the Sum of all the Integers (Use StringTokenizer class of java.util)

WEEK 3:

a) Write a Java Program that Checks whether a Given String is a Palindrome or Not. Ex: MADAM is a Palindrome.

b) Write a Java Program for Sorting a Given List of Names in Ascending Order.

c) Write a Java Program to Make Frequency Count of Words in a Given Text.

WEEK 4:

a) Write a Java Program that:
i) Implements Stack ADT.
ii) Evaluates the Postfix Expression.
b) Write a Java Program for Multilevel Inheritance.

WEEK 5:

a) Write a Java Program to create an abstract class Named Shape that contains an Empty Method named numberOfSides ( ).Provide three classes Named Trapezoid, Triangle and Hexagon such that each one of the classes extends the class Shape. Each one of the classes Contains only the Method numberOfSides ( ) that Shows the Number of Sides in the Given Geometrical Figures.
b) Write a Java Program Which includes class, abstract class and interface.
c) Write a Java Program for Creation of User Defined Package and Accessing the Members Present in Package.

WEEK 6:

a) Write a Java Program for Checked and Unchecked Exceptions.
b) Write a program that reads two numbers from the user to perform integer division into Num1 and Num2 variables. The division of Num1 and Num2 is displayed if they are integers. If Num1 or Num2 were not an integer, the program would throw a NumberFormatException. If Num2 were Zero, the program would throw an ArithmeticException.

WEEK 7:

a) Write a Java Program that creates three threads. First Thread displays "Good Morning" every one second, the Second Thread displays "Hello" every two seconds and the third thread displays "Welcome" every three seconds.
b) Write a Java Program that Correctly Implements Producer Consumer Problem using the Concept of Inter Thread Communication.

WEEK 8:

a) Develop an Applet that Displays a Simple Message.
b) Develop an Applet that Receives an Integer in one Text Field, and Computes its Factorial Value and Returns it in Another Text Field, When The Button Named "Compute" is Clicked.

WEEK 9:

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 10:

a) Write a Java Program for Handling Mouse Events.
b) Write a Java Program for Handling Keyboard Events.

WEEK 11:

Write a Java Program that Creates an User Interface to Perform Integer Divisions. The User Enters Two Numbers in the TextFields, Num1 and Num2. The Division of Num1 and Num2 is Displayed in the Result field when the Divide Button is Clicked. If Num1 or Num2 were not an Integer, the Program would throw a NumberFormatException. If Num2 were Zero, the Program would throw an ArithmeticException Display the Exception in a Message Dialog Box.

WEEK 12:

a) Write a Java Program that Simulates a Traffic Light. The Program Lets the User Select one of Three Lights: red, yellow, or green. When a Radio Button is Selected, the Light is Turned On, and Only One Light can be on at a Time No Light is on when the Program Starts.
b) Write a Java Program that Allows an User to Draw Lines, Rectangles and Ovals.
c) Suppose that a Table Named Table.txt is Stored in a Text File. The First Line in the File is the Header, and the Remaining Lines Correspond to Rows in the Table. the Elements are Separated by Commas. Write a Java Program to Display the Table using Jtable Component.

WEEK 13:

Create Database of at Least 5 Students Information with Columns Roll Number, Name and Marks. Write A Java Program to Retrieve Student Data from Database and Display Total Marks of all the Students When User Press a Button.

Course Outcomes:

On Successful completion of this course student should be able to :

Course Outcomes		POs related to COs
CO1	Acquire the Knowledge on structure and model of the Java programming language.	PO1
CO2	Analyze the complex examples using java programming language.	PO2
CO3	Design solutions for user requirements using software functionality.	PO3
CO4	Investigate on event handling concepts in developing the object oriented programming	PO4
CO5	Develop the data base connectivity to the Java application	PO5
CO6	Follow the ethical principles in implementing the programs	PO8
CO7	Do experiments effectively as an individual and as a team member in a group.	PO9
CO8	Communicate verbally and in written form, the understanding about the experiments.	PO10
CO9	Continue updating their skill related to object oriented concepts and implementing programs in future.	PO12

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	-	-	-	-	-	-	-	-	-	-	-
CO2	-	3	-	-	-	-	-	-	-	-	-	-
CO3	-	-	3	-	-	-	-	-	-	-	-	-
CO4	-	-	-	3	-	-	-	-	-	-	-	-
CO5	-	-	-	-	3	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	3	-	-	-	-
CO7	-	-	-	-	-	-	-	-	3	-	-	-
CO8	-	-	-	-	-	-	-	-	-	3	-	-
CO9	-	-	-	-	-	-	-	-	-	-	-	3
CO*	**3**	**3**	**3**	**3**	**3**	-	-	**3**	**3**	**3**	-	**3**

Text Books:

1. Java How to ProgramH.M.Dietel and P.J.Dietel, , Sixth Edition, Pearson Education/PHI
2. Introduction to Java programming, Y.Daniel Liang, Sixth edition, Pearson Education
3. Big Java, Cay Horstmann, 2nd edition, Wiley Student Edition, Wiley India Private Limited.

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES.
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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

II B.Tech II Semester

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16CSE226 DATABASE MANAGEMENT SYSTEMS LAB

Course Educational Objectives:

CEO1: To gain practical knowledge on creation and alteration of tables, insertion and Querying of data and Analyze and evaluate the databases using SQL DML/DDL commands.
CEO2: To implement a Database Schema for the given Database.
CEO3: To design Simple Database using a Tool and Implement it using SQL.
CEO4: To implement DDL and DML commands in SQL and PL/SQL, ORACLE to manage data in databases.
CEO5: To design PL/SQL programs including procedures, functions, cursors and triggers.

The Following Topics Need to be covered in the Laboratory Sessions:

SQL

Introduction to SQL:

DDL - DML Commands- Basic Data Types- Commands to Create Table- Constraint Definition Commands for Table Handling- Alter Table – Drop Table- Insert - Update – Delete Commands for Record Handling- Select with Operators like Arithmetic - Comparison - Logical Query Expression Operators - Ordering the Records with Order by, Grouping the Records.

SQL Functions:

Date - Numeric - Character – Conversion Functions - Group Functions: avg - max - min - sum -count
Set Operations: Union–Union all - Intersect - Minus **Join concept:** Simple -
Equi - Nonequi - Self - OuterjoinQuery&Subqueries- View Introduction - Create
- Update - and Drop Commands

PL/SQL

Advantages of PL/SQL- Support of SQL - Executing PL/SQL- PL/SQL Character Set & Data Types- Character - Row - rowid - Boolean - Binary integer - Number Variable - Constant
Control structures: Condition–if- Interactive-loop - for–while- Sequential–go to.

Database Triggers

Definition - Syntax - Parts of Triggers- Types of Triggers - Enabling and Disabling Triggers
Cursors - Procedures and Functions- Definition & Implementation.
Note: The Faculty Members are instructed to provide the Necessary Exercises which covers the above Topics

Course Outcomes:

On successful completion of the course the student will be able to,

Course Outcomes		POs related to COs
CO1	Demonstrate practical knowledge on creation and alteration of tables, insertion and Querying of data.	PO1
CO2	Analyze the database schemas for the different types of database	PO2
CO3	Design the databases using SQL DML/DDL Commands	PO3
CO4	Design the complex PL/SQL programs for different problems	PO4
CO5	Use the procedure, function, trigger and cursor concepts in PL/SQL	PO5
CO6	Follow the ethical principles in implementing the programs	PO8
CO7	Do experiments effectively as an individual and as a team member in a group.	PO9
CO8	Communicate verbally and in written form, the understanding about the experiments.	PO10
CO9	Continue updating their skill related to SQL Commands and Queries and implementing programs in future.	PO12

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	-	-	-	-	-	-	-	-	-	-	-
CO2	-	3	-	-	-	-	-	-	-	-	-	-
CO3	-	-	3	-	-	-	-	-	-	-	-	-
CO4	-	-	-	3	-	-	-	-	-	-	-	-
CO5	-	-	-	-	3	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	3	-	-	-	-
CO7	-	-	-	-	-	-	-	-	3	-	-	-
CO8	-	-	-	-	-	-	-	-	-	3	-	-
CO9	-	-	-	-	-	-	-	-	-	-	-	3
CO*	**3**	**3**	**3**	**3**	**3**	**-**	**-**	**3**	**3**	**3**	**-**	**3**

Reference Books:

1. SQL, PL/SQL Programming, Ivan Bayross, 2/e, BPB Publications, 2011, New Delhi, India.

2. Oracle Database 11g: Hands-on SQL and PL/SQL, Satish Ansari, PHI Publishers, 2010.

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II B. TECH II-SEMESTER (CSE)

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16CSE227 ONLINE COMPREHENSIVE EXAM-I

Course Educational Objectives:

CEO1 : To assess the comprehensive knowledge gained in basic courses relevant to the branch of study.

CEO2 : To comprehend the questions asked and answer them with confidence.

On-line Comprehensive Test:

On-line comprehensive test will be conducted at the end of the II year II semester with 100 objective questions (multiple choice questions) for 100 marks on the courses studied in the respective semesters (II year I semester and II year II semester).

Course Outcomes:

On successful completion of the course, students will be able to		POs related to COs
CO1	Understand and comprehend any given problem related to computer science and engineering field.	PO1,PO2,PO3,PO4, PO5,PO6, PO7, PO8, PO9,PO10,PO11,PO12
CO2	The students will be confident in discussing the fundamental aspects of any engineering problem/situation and give answers in dealing with them.	PO1,PO2,PO3,PO4, PO5,PO6, PO7, PO8, PO9,PO10,PO11,PO12

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	3	3	3	3	3	3	3	3	3	3	3
CO2	3	3	3	3	3	3	3	3	3	3	3	3
CO*	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**

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II B.Tech II Semester

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16PAT228 PERSONALITY DEVELOPMENT PROGRAM-II

Category : Employability Enhancement Courses

Course Educational Objectives:
CEO1: To develop the Personality Development Activities among the Students
CEO2: To build up the Positive Attitude to all the students

UNIT 1: PERSONALITY DEVELOPMENT ACTIVITIES (FDA)
- Develop Self-confidence
- Stress management
- Group discussion

UNIT 2: PREPARING FOR WRITTEN TEST:
- Pre-Interview Preparation
- Resume Writing Tips
- Preparing Self-Information
- Gathering Company Details
- Learning Tips

UNIT 3: SWOT ANALYSIS:
- Functions
- SWOT Analysis in Business World
- Analyzing Career With SWOT Analysis

UNIT 4: ATTITUDE:
- Attitude and Personality
- Developing Positive Attitude
- Tips for Attitude Developing

UNIT 5: FACING PERSONAL INTERVIEWS:
- Psychological approach
- Real Time References

Course Outcomes:
On successful completion of the course, Students will be able to

Course Outcomes		POs related to COs
CO1	Expand Personality Development Activities among the Students	**PO9, PO10, PO12**
CO2	Build up the Positive Attitude to all the students	**PO9, PO10, PO12**

CO – PO Mapping

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	-	-	-	-	-	-	-	--	2	3	-	3
CO2	-	-	-	-	-	-	-	-	3	3	-	3
CO*	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**2.5**	**3**	**-**	**3**

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III B. TECH I-SEMESTER (CSE)

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16CSE311 SOFTWARE ENGINEERING

Course Educational Objectives:

The student should be made to:

CEO1: To provide knowledge of basic software engineering methods, practices and their appropriate application.
CEO2: To understand software requirements and the SRS documents.
CEO3: To design components based on different software architectural styles.
CEO4: To understanding of approaches to verification and validation including static analysis, and Reviews.
CEO5: To describe software measurement and software risks.

UNIT – 1 :Introduction to Software Engineering and Process Models

The evolving role of software - Changing nature of software - Legacy software - Software myths - A generic view of process - Software engineering a layered technology - A process framework - The Capability Maturity Model Integration (CMMI) - Process patterns - Process assessment - Personal and team process models

Process Models: The waterfall model - Incremental process models - Evolutionary process models - Specialized process models - The unified process

UNIT – 2 :Software Requirements

Functional and non-functional requirements - User requirements - System requirements - Interface specification - The software requirements document

Requirements Engineering Process: Feasibility studies - Requirements elicitation and analysis - Requirements validation - Requirements management - System models - Context models - Behavioral models - Structured methods

UNIT - 3 : Design Engineering

Design process and design quality - Design concepts - The design model - Creating an architectural design - Software architecture - Data design - Architectural styles and patterns

Modeling Component-Level Design: Designing class based components - Conducting component level design - Object constraint language - Designing conventional components

UNIT - 4 : Testing Strategies

A strategic approach to software testing - Test strategies for conventional software - Validation testing - System testing - The art of debugging - Blackbox and whitebox testing

Product metrics: Software quality - Frame work for product metrics - Metrics for analysis model - Metrics for design model - Metrics for source code - Metrics for testing - Metrics for maintenance

UNIT – 5 :Metrics for Process and Products

Software measurement - Metrics for software quality - Risk management: reactive Vs proactive risk strategies - Software risks - Risk identification - Risk projection - Risk refinement - RMMM - RMMM plan

Quality Management: Quality concepts - Software quality assurance - Software reviews - Formal technical reviews - Statistical software quality assurance - Software reliability - The ISO 9000 quality standards

Course Outcomes:

On successful completion of this course, student will be able to:

Course Outcomes		POs related to COs
CO1	Demonstrate knowledge on fundamentals of software engineering methods and software process models.	PO1, PO2
CO2	Identify software requirements and design SRS document by analyzing the data flows.	PO1, PO3, PO4
CO3	Design class based components and conduct component level design based on architectural styles and patterns.	PO1,PO2, PO3,PO4
CO4	Identify various types of testing and development metrics for various phases of software development.	PO1,PO2, PO4
CO5	Identify the software risks and analyze the quality assurance activities	PO1, PO4

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	2	-	-	-	-	-	-	-	-	-	-
CO2	2	-	3	3	-	-	-	-	-	-	-	-
CO3	2	2	3	2	-	-	-	-	-	-	-	-
CO4	2	2	-	3	-	-	-	-	-	-	-	-
CO5	3	-	-	2	-	-	-	-	-	-	-	-
CO*	**2.4**	**2**	**3**	**2.5**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

Text Books :

1. Software Engineering, A practitioner's Approach, 6/e, Roger S Pressman,2005, Tata McGrawHillInternational Edition.
2. Software Engineering, 7/e, Ian Somerville,2004, Pearson Education.

References:

1. Fundamentals of Software Engineering, 2/e, Rajib Mall, 2005,Prentice Hall Inc.
2. Software Engineering: A Precise Approach, 1/e, PankajJalote, 2010,Wiley India.
3. Software Engineering: A Primer, 1/e, Waman S Jawadekar,2008, Tata McGraw Hill.
4. Software Engineering - Principles and Practices, 1/e, Deepak Jain, Oxford University Press.
5. Software Engineering – A Supporting Processes, 1/e, Richard H. Thayer and Merlin Dorfman, 2005, Wiley.

III B. TECH I-SEMESTER (CSE)

L	T	P	C
3	1	0	3

16CSE312 OPERATING SYSTEMS

Course Educational Objectives:

CEO1: To understand main components of OS, System structures and the operations performed by OS as a resource manager.
CEO2: To Study process concurrency and synchronization.
CEO3: To Analyze the different memory management techniques.
CEO4: To gain knowledge about concepts of input/ output systems and storage management
CEO5: To manage different file systems, protection and security to the systems

UNIT – 1 : Operating Systems Overview

Introduction - What Operating system do - Operating system operations - Process management - Memory management - Storage management - Protection and Security - Distributed Systems - Special purpose systems.

System structures : Operating system services - user operating system interface - System calls - Types of system calls - Operating system design and implementation - Operating system structure - Operating system generation - System boot.

UNIT - 2 : Process Management and Concurrency

Process Management: Process concepts – threads - scheduling-criteria – algorithms and their evaluation - Thread scheduling.

Concurrency : Process synchronization - the critical- section problem - Peterson's Solution - synchronization Hardware – semaphores - classic problems of synchronization - monitors.

UNIT – 3 : Memory Management

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

UNIT – 4 : Principles of deadlock AND Mass-storage structure & I/O systems

Principles of deadlock - system model - deadlock characterization - deadlock prevention - detection and avoidance - recovery form deadlock.

Mass-storage structure - overview of Mass – storage structure - Disk structure - disk attachment - disk scheduling - swap-space management - RAID structure - stable-storage implementation - Tertiary storage structure.

UNIT - 5 : File system Interface

File system Interface- the concept of a file - Access Methods - Directory structure - File system mounting - file sharing – protection - File System implementation - File system structure - file system implementation - directory implementation - allocation methods - free-space management - efficiency and performance.

Protection and Security - Goals of protection - Principles of protection - Access matrix - The security problem - program threats - System and network threats.

Course Outcomes:

Onsuccessful completion of this course, student will be able to:

Course Outcomes		POs related to COs
CO1	Analyze operating system operations ,system design and implementation	PO1, PO2
CO2	Implement Thread scheduling , solutions to synchronize problems	PO1, PO4,
CO3	Apply memory management techniques, virtual memory concepts	PO1,PO3,PO4
CO4	Manage process execution without deadlock, mass storage structure	PO1,PO4
CO5	Understand file system interface, protection and security in System and Network	PO1, PO2, PO4

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	3	-	-	-	-	-	-	-	-	-	-
CO2	2	-	-	3	-	-	-	-	-	-	-	-
CO3	3	-	3	3	-	-	-	-	-	-	-	-
CO4	3	-	-	3	-	-	-	-	-	-	-	-
CO5	2	3	-	3	-	-	-	-	-	-	-	-
CO*	**2.6**	**3**	**3**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

Text Books:

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

References books:

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

III B. TECH I-SEMESTER (CSE) **L T P C**

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SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES.
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16CSE313 COMPUTER NETWORKS

Course Educational Objectives:

CEO1: To provide knowledge on Identify the components required to build different types of networks, understand the OSI and TCP/IP architectures and different data link layer protocols.
CEO2: To be exposed to the required functionality at the Ethernet.
CEO3: Tounderstand the different routing protocols, internet protocols and IP addressing.
CEO4: To learn the use of TCP, UDP protocols.
CEO5: To develop skills to apply the concept of application layer protocols

UNIT – 1 : Fundamentals, Physical Layer and Data Link Layer
Network Hardware - Network software – OSI & TCP/IP References models - Guided transmission media - Communication satellites - The public switched telephone network – Switching - Data link layer design issues - Elementary data link protocols – Stop and Wait Protocol - Sliding window protocol.
UNIT – 2 : The Medium Access Control Sub layer
The channel allocation problem - Multiple access protocols - Ethernet- Ethernet cabling - Manchester encoding - Ethernet MAC sub layer protocol - Switched Ethernet - Fast Ethernet - Wireless LANS - The 802.11 protocol stack - The 802.11 physical layer – The 802.11 MAC sub layer protocol - The 802.11 frame structure.
UNIT - 3 : The Network Layer
Network layer design issues - Routing algorithms (DSDV, RIP, OSPF, DSR) – Congestion control algorithms – Internetworking – Internet Protocols : IPv4 , IPv6 - Addresses.
UNIT - 4 : The Transport Layer
Overview of Transport layer - Elements of transport protocols - The internet transport protocols: UDP and TCP.
UNTI – 5 : The Application Layer
Traditional applications: DNS- Electronic mail (SMTP, POP3, IMAP, MIME) - WWW – HTTP – FTP - Web Services – SNMP

Course Outcomes:
On successful completion of the course the student will be able to,

Course Outcomes		POs related to COs
CO1	Demonstrate knowledge on fundamentals of network components and topologies, Analyze the OSI and TCP/IP stack and the different protocols in Data Link layer.	PO1, PO2
CO2	Classify the Media Access Control Protocols and different Internetworking	PO1, PO2
CO3	Demonstrate various types of routing techniques and design the different routing protocols for wired / wireless.	PO1, PO2, PO3, PO4
CO4	Demonstrate uses of datagram delivery	PO1, PO2, PO3, PO4
CO5	Apply the different strategies Operations of DNS, FTP, HTTP, Email Protocols, SNMP	PO1, PO2, PO3, PO4

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	3	-	-	-	-	-	-	-	-	-	-
CO2	3	3	-	-	-	-	-	-	-	-	-	-
CO3	2	3	3	2	-	-	-	-	-	-	-	-
CO4	2	3	3	2	-	-	-	-	-	-	-	-
CO5	2	3	3	3	-	-	-	-	-	-	-	-
CO*	**2.4**	**3**	**3**	**2.33**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

Text Books :

1. Computer Networks, 4/e, Andrew S. Tanenbaum, 2008,Pearson Education, New Jersey.
2. Data Communications and Networking, 4/e, Behrouz A. Forouzan, 2006,Tata McGraw Hill, New Delhi.

Reference Books:

1. Computer Communications and Networking Technologies,1/e, Michael A.Gallo, William M. Hancock, 2001,Cengage Learning, New Delhi.
2. Computer Networks: Principles, Technologies and Protocols for Network Design,1/e, Natalia Olifer, Victor Olifer, 2006,Wiley India, New Jersey.
3. Computer and Communication Network,1/e, Nader F. Mir, 2007,Pearson Education, New Jersey.
4. Computer Networking: A Top-Down Approach Featuring the Internet, 3/e, James F.Kurose - K.W.Ross,2005, Pearson Education, New Jersey.
5. Data and Computer Communications,1/e, G.S.Hura and M.Singhal,2001, CRC Press, Taylor and Francis Group, FL United States.

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES.
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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

16CSE314 UNIX AND SHELL PROGRAMMING

Course Educational Objectives:

CEO1: To acquire information on UNIX architecture, general purpose utilities, file handling commands, Network commands.
CEO2: To develop the basic skills of UNIX shell, standard streams, redirection, pipes, command execution, quotes, command substitution, Job control, variables,
CEO3: To develop skills to design regular expression feature with Grep, Sed and AWK.
CEO4: To inculcate skill on korn shell features for construct Korn shell programming for the given task.
CEO5: To develop skill to apply various UNIX system calls in designing different UNIX utilities.

UNIT – 1: Introduction to UNIX:

The UNIX Operating System - The UNIX Architecture - Features of UNIX - Internal And External Commands - Command Structure.

General-Purpose Utilities - cal - date - echo - printf - bc - script - passwd - PATH - who - uname - tty - stty - pwd - cd - mkdir - rmdir - od.

Handling Files - The File System - cat - cp - rm - mv - more - file - ls - wc - pg - cmp–comm-diff - gzip - tar - zip - df - du - mount - umount - chmod - The vi editor - security by file Permissions.

Networking Commands - ping - telnet - ftp - finger - arp - rlogin.

UNIT- 2: Introduction to Shells

Unix Session - Standard Streams - Redirection - Pipes - Tee Command - Command Execution - Command-Line Editing - Quotes - Command Substitution - Job Control - Aliases - Variables - Predefined Variables - Options - Shell Environment -Customization**.**

Filters: Introduction - Concatenating files - Display Beginning and End of files - Cut and Paste - Sorting - Translating Characters - Ordering a File - uniq.

UNIT – 3: Regular Expressions

Atoms - operators GREP - Operation - grep Family - searching for File Content.
SED - Scripts - Operation - Addresses - commands - applications - grep and sed.
AWK - Execution - Fields and Records - Scripts - Operations - Patterns - Actions - Associative Arrays - String Functions - String Functions - Mathematical Functions - User – Defined Functions - Using System, commands in awk - Applications - awk and grep - sed and awk.

UNIT - 4: Interactive Korn Shell

Korn Shell Features - Two Special Files - Variables - Output - Input - Exit Status of a Command - eval Command - Environmental Variables - Options - Startup Scripts - Command History - Command Execution Process.
Korn Shell Programming : Basic Script concepts - Expressions - Decisions: Making Selections - Repetition - special Parameters and Variables - changing Positional Parameters - Argument Validation - Debugging Scripts - Script Examples.

UNIT – 5: Interactive C Shell

File Management : File Structures - System Calls for File Management – create - open - close - read - write - lseek - link - symlink - unlink - stat - fstat - lstat - chmod - chown - Directory API – opendir - readdir - closedir - mkdir - rmdir - umask.

Course Outcomes:

On successful completion of the course the student will be able to,

Course Outcomes		POs related to COs
CO1	To acquire information on UNIX architecture, general purpose utilities, file handling commands, Network commands	PO1, PO2
CO2	To develop the basic skills of UNIX shell, standard streams, redirection, pipes, command execution, quotes, command substitution, Job control, variables	PO1, PO2
CO3	To develop skills to design regular expression feature with Grep, Sed and AWK.	PO1, PO2, PO3
CO4	To inculcate skill on korn shell features for construct Korn shell programming for the given task.	PO1, PO2, PO4,PO5
CO5	To develop skill to apply various UNIX system calls in designing different UNIX utilities.	PO1, PO2, PO3, PO4,PO5

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	3	-	-	-	-	-	-	-	-	-	-
CO2	3	2	-	-	-	-	-	-	-	-	-	-
CO3	2	2	3	-	-	-	-	-	-	-	-	-
CO4	2	2	-	3	3	-	-	-	-	-	-	-
CO5	3	2	3	2	3	-	-	-	-	-	-	-
CO*	**2.6**	**2.2**	**2**	**2.5**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

Text Books:

1. Unix and shell Programming,1st Edition ,Behrouz A. Forouzan - Richard F. Gilbery,2003,Cengage Learning India.
2. Unix Concepts and Applications, 4th Edition, Sumitabha Das, 2006, TMH.

References:

1. Unix for programmers and users, 3rd Edition, Graham Glass, King Ables, 2008,Pearson Education.
2. Advanced Unix programming, 2nd Edition, N.B Venkateswarlu, 2010,BS Publications.
Unix Shell programming, 1st Edition, YashwanthKanitkar, 2010, BPB Publisher.

III B. TECH I-SEMESTER (CSE) **L T P C**

3 1 0 3

16ECE329 MICROPROCESSORS AND INTERFACING

Course Educational Objectives:

The student should be made to:

- To understand the architecture of 8086 Microprocessor**.**
- To learn various 8086 Instruction set and Assembler Directives.
- To become skilled in 8086 Assembly Language programming.
- To understand programmable peripheral devices and their Interfacing.

UNIT-1: INTRODUCTION TO 8085 MICROPROCESSOR

Architecture Of 8085 Microprocessor- The 8085 Programming Model- Pin diagram Of 8085-Machine Cycle Status And Control Signals- Addressing Modes- Instruction Classification- Instruction Format-Simple Programs Involving Logical- Branch And Call Instructions.

UNIT-2: INTRODUCTION TO 8086 MICROPROCESSOR

Architecture of 8086 Microprocessor- Special functions of General Purpose register- 8086 flag register and function of 8086 Flags- Addressing modes of 8086- Instruction set of8086- Assembler directives- simple programs- procedures- and macros

UNIT-3: ASSEBLY LANGUAGE PROGRAMMING & TIMING DIAGRAMS

Assembly Language Programs Involving Logical- Branch & Call Instructions- Sorting- Evaluation Of Arithmetic expressions- String Manipulation- Pin Diagram Of 8086-Minimum Mode And Maximum Mode Of Operation- Timing Diagram- Memory interfacing To 8086 (Static RAM&EPROM)- Need For DMA- Interfacing With8237/8257.

UNIT-4: PROGRAMMABLE INTERFACING DEVICES & INTERRUPT STRUCTURE

8255 PPI – Various Modes Of Operation And Interfacing To 8086- Interfacing Keyboard- Displays-8279- Stepper Motor - D/A And A/D Converter Interfacing,Interrupt Structure Of 8086- Vector Interrupt Table- Interrupt Service Routines- Introduction to Dos and Bios interrupts- 8259 PIC Architecture And Interfacing and its importance.

UNIT-5: SERIAL DATA TRANSFER SCHEMES

Serial data transfer schemes- Asynchronous and Synchronous data transfer schemes- 8251 USARTarchitecture and interfacing- TTL to RS 232C and RS232C to TTL conversion- Sample program of serialdata transfer- Introduction to High-speed serial communications standards- USB-features of advanced microprocessors(80286,80386, Pentium)-features of 8051 microcontroller.

Course Outcomes:

On successful completion of the course the student will be able to,

Course Outcomes		POs related to COs
CO1	Explain the 8085 microprocessors internal architecture and its operation within the area of manufacturing and **Apply** knowledge and demonstrate programming proficiency using the various addressing modes and data transfer instructions of the target microprocessors and Interfacing	PO1, PO2, PO3, PO4, PO9
CO2	Explain the 8086 microprocessors internal architecture and its operation within the area of manufacturing and **Apply** knowledge and demonstrate programming proficiency using the various addressing modes and data transfer instructions of the target microprocessors and Interfacing	PO1, PO2, PO3, PO4, PO9
CO3	**Analyze** assembly language programs, select appropriate assemble into machine a cross assembler utility of a microprocessors and Interfacing	PO1, PO2, PO3, PO4, PO9
CO4	**Analyze** assembly language programs, select appropriate assemble into machine a cross assembler utility of a microprocessors and Interfacing	PO1, PO2, PO3, PO4, PO9
CO5	Explain the 8085 microprocessors internal architecture and its operation within the area of manufacturing and **Apply** knowledge and demonstrate programming proficiency using the various addressing modes and data transfer instructions of the	PO1, PO2, PO3, PO4,PO9

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	2	3	2	-	-	-	-	3	-	-	-
CO2	2	2	3	2	-	-	-	-	3	-	-	-
CO3	3	2	3	2	-	-	-	-	3	-	-	-
CO4	2	2	3	2	-	-	-	-	3	-	-	-
CO5	2	2	2	1	-	-	-	-	3	-	-	-
CO*	**2.4**	**2**	**2.8**	**1.8**	**-**	**-**	**-**	**-**	**3**	**-**	**-**	**-**

TEXT BOOKS :

1. Advanced microprocessor and Peripherals ,2ndedition,A,K,Ray and K.M.Bhurchandi, 2000,TMH, New Delhi.
2. Microprocessor architecture, programming and applications with 8085/8080A, 2nd edition, Ramesh S,Goankar, 1996,New age international Publishers, New Delhi.

REFERENCES:

1. Micro Processors &Interfacing , revised 2nd edition, Douglas U, Hall ,2007,TMH, New Delhi.
2. The 8088 and 8086 microprocessors, 1stedition,WalterA,Triebel, Avtar Singh, 2003,PHI,New Delhi.
3. Micro Computer System 8086/8088 Family Architecture, Programming and Design, 2nd Ed, By Liu and GA Gibson, 2000, PHI,New Delhi.
4. The X8086 microprocessor architecture, programming and interfacing, 1st edition, L BDas,2010, Pearson Education India Limited, New Delhi.
5. The 8086 microprocessor programming and interafacing, 1/e,Kenneth J,Ayala,2007, Cenange learning private limited, New Delhi.

III B. TECH I-SEMESTER (CSE) **L T P C**

3 1 0 3

16CSE315 COMPILER DESIGN

Course Educational Objectives:

CEO1: To provide knowledge on list the different stages in the process of compilation and Identify different methods of lexical analysis.
CEO2: To design top-down parsers.
CEO3: To design bottom-up parsers and Identify synthesized and inherited attributes.
CEO4: To learn the use of intermediate code generation and runtime environments and implementation intermediate code generation.
CEO5: To develop skill to apply the concept of optimization and develop algorithms to generate code for a target machine.

UNIT 1 : INTRODUCTION TO COMPILER AND LEXICAL ANALYSIS

Introduction to Compiler - Phases of a compiler - Lexical Analysis : The Role of the Lexical Analyzer - Input Buffering - Specification of Tokens - The Lexical-Analyzer Generator Lex.

UNIT - 2 : Top Down Parsing

Introduction: The Role of the Parser - Context free grammar - Eliminating Ambiguity - Eliminating of Left Recursion and Left Factoring.
Top-Down Parsing: Recursive descent parsing - Non-Recursive Predictive parsing - LL (1) Grammars.

UNIT - 3 : Bottom Up Parsing And Syntax Directed Translation

Bottom-Up Parsing : Shift reduce parsing - LR parsers - Simple LR parser - Canonical LR parser - LALR parser - Using Ambiguous Grammars - The Parser Generator YACC .
Syntax Directed Translation : Syntax directed definition - S-attributed and L - attributed definitions - Construction of syntax trees

UNIT -4 : Intermediate Code Generator And Run Time Environments

Intermediate Code Generation: Intermediate Languages - Boolean expressions - Flow-of-Control Statements - Control- Flow Translation of Boolean Expressions.
Run time Environments : Storage organization - Stack Allocation strategies - Symbol table structure - Symbol attributes and management.

UNIT - 5 : Code Optimization And Code Generation

Code Optimization: Basic Blocks and Flow Graphs - Optimization of Basic Blocks - The principle sources of optimization - Introduction to data flow analysis, DAG.
Code Generation : Issues in the Design of a Code Generator - The Target Language - A Simple Code Generator - Peephole optimization - Register allocation and assignment.

Course Outcomes:

On successful completion of this course, the students should be able to:

Course Outcomes		POs related to COs
CO1	Demonstrate knowledge on fundamentals of compiler phases, Design the Lexical Analyzer and input buffering.	PO1, PO2, PO3
CO2	Design Top-Down Parser	PO1, PO2, PO3, PO4
CO3	Design Bottom-up Parser and Develop syntax directed translation schemes.	PO1, PO2, PO3, PO4
CO4	Demonstrate the ability to write intermediate code for a given high level programming language (preferably C or FORTRAN) and be able to represent the intermediate code as Quadruples, Triples and Indirect Triples	PO1, PO2, PO3, PO4
CO5	Write three address code and identify the basic blocks, draw flow graphs and represent directed Acyclic graphs for the identified basic blocks. They will also be able to write the target optimized code (assembly code) for the given three address code.	PO1, PO2, PO3, PO4, PO5

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	3	3	-	-	-	-	-	-	-	-	-
CO2	3	3	3	2	-	-	-	-	-	-	-	-
CO3	2	3	3	2	-	-	-	-	-	-	-	-
CO4	2	3	3	2	-	-	-	-	-	-	-	-
CO5	2	3	3	3	2	-	-	-	-	-	-	-
CO*	**2.4**	**3**	**3**	**2.25**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

Text Books :

1. Compilers-Principles - Techniques and Tools ,2nd edition , Alfred V. Aho - Monica S.Lam - Ravi Sethi - Jeffrey D. Ullman , 2012,Pearson Education.

Reference Books:

1. Compilers-Principles Techniques and Tools - Low price edition , 2004,Alfred V. Aho - Ravi Sethi - Jeffrey D. Ullman - Pearson Education.
2. Theory of computerscience- Automata Languages and computation , 2nd edition,K.L.P Mishra and N. Chandrashekaran ,2003,PHI.

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III B. TECH I-SEMESTER (CSE)

L	T	P	C
0	0	3	2

16CSE 316 NETWORK SIMULATION LAB

Course Educational Objectives:

CEO1: To understand various network simulator tools and functionalities.
CEO2: To Learn TCL commands.
CEO3: To learn how to create new agent for Communication.
CEO4: To learn how to create new routing protocols for different networks.
CEO5: To analysis the different routing protocols using different tools.

Exercises :

1. Study of Network Simulator Tools.
2. Installation of Network Simulator (NS2).
3. Study of TCL Commands.
4. Write a TCL script to simulate a simple wired network with four nodes.
5. Create a simple TCP scenario with droptail queue mechanism on the gateway.
6. Create a New Agent using C++ and TCL.
7. Create a New protocol for ping using C++ and TCL.
8. Implement Dijkstra's algorithm to compute the Shortest path through a graph.
9. Implement Link state routing algorithm to find the shortest distance using link state packets.
10. Write a program for Trace file Analysis using C++ or awk.
11. Write a TCL script to LAN simulation.
12. Write a TCL script to simulate a simple wireless network with DSDV - DSR and AODV routing protocols.
13. Write a TCL script to Simulation of Black Hole Attack.
14. Comparison of different routing protocols performance using Xgraph and Gnuplot.

Mini Project: Create new routing protocols for routing protocol in MANET.

Course Outcomes:

On Successful completion of this course student will be able to:

Course Outcomes		POs related to COs
CO1	Demonstrate knowledge on various network simulator tools and functionalities.	PO1
CO2	Create different program using TCL commands	PO2
CO3	Demonstrate knowledge on various existing agent and design new agent using TCL and C++ for communication.	PO3
CO4	Demonstrate knowledge on various existing routing protocols and design new routing protocols.	PO4
CO5	Analysis the different routing protocols performance based on number of nodes and speed using different tools.	PO5
CO6	Follow the ethical principles in implementing the programs	PO6
CO7	Do experiments effectively as an individual and as a team member in a group.	PO7
CO8	Communicate verbally and in written form, the understanding about the experiments.	PO8
CO9	Continue updating their skill related to NS2 commands and implementing programs in future.	PO9

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	-	-	-	-	-	-	-	-	-	-	-
CO2	-	3	-	-	-	-	-	-	-	-	-	-
CO3	-	-	3	-	-	-	-	-	-	-	-	-
CO4	-	-	-	3	-	-	-	-	-	-	-	-
CO5	-	-	-	-	3	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	3	-	-	-	-
CO7	-	-	-	-	-	-	-	-	2	-	-	-
CO8	-	-	-	-	-	-	-	-	-	2	-	-
CO9	-	-	-	-	-	-	-	-	-	-	-	3
CO*	**3**	**3**	**3**	**3**	3	-	-	3	2	**2**	**-**	**3**

Reference Books:

1. Introduction to Network Simulator NS2 , 2/e,Issariyakul, Teerawat, Hossain and Ekram,2012,Springer US.

Reference Website:

1. Network Simulator - http://www.jgyan.com/ns2
2. Network Simulator Tutorial - https://www.isi.edu/nsnam/ns/tutorial/

III B. TECH I-SEMESTER (CSE)

L	T	P	C
0	0	3	2

16CSE317 UNIX AND SHELL PROGRAMMING LAB

Course Educational Objectives:

CEO1: To understand the concepts of UNIX environment with vi editor.
CEO2: To gain knowledge on appropriate commands to access the UNIX environment.
CEO3: To experience the shell scripting for developing the solutions for complex problems.
CEO4: To manage the file handling procedures in UNIX environment.
CEO5: To develop the UNIX programs by using system calls.

Week-1

Session-1

a)Log into the system
b)Use vi editor to create a file called myfile.txt which contains some text.
c)correct typing errors during creation.
d)Save the file
e)logout of the system

Session-2

a)Log into the system
b)open the file created in session 1
c)Add some text
d)Change some text
e)Delete some text
f)Save the Changes
g)Logout of the system

Week-2

a)Log into the system
b)Use the cat command to create a file containing the following data. Call it mytable use tabsto separate the fields.

1425 Ravi 15.65
4320 Ramu 26.27
6830 Sita 36.15
1450 Raju 21.86

c)Use the cat command to display the file, mytable.
d)Use the vi command to correct any errors in the file, mytable.
e)Use the sort command to sort the file mytable according to the first field. Call the sorted file mytable
f)Print the file mytable
g)Use the cut and paste commands to swap fields 2 and 3 of mytable. Call it mytable
h)Print the new file, mytable
i)Logout of the system.

Week-3

1) a)Login to the system
b)Use the appropriate command to determine your login shell
c)Use the /etc/passwd file to verify the result of step b.
d)Use the who command and redirect the result to a file called myfile1. Use the more command to see the contents of myfile1.
e)Use the date and who commands in sequence (in one line) such that the output of date will display on the screen and the output of who will be redirected to a file called myfile2. Use the more command to check the contents of myfile2.

2) a) Write a sed command that deletes the first character in each line in a file.
b) Write a sed command that deletes the character before the last character in each line in

a file.

c) Write a sed command that swaps the first and second words in each line in a file.

Week-4

a)Pipe your /etc/passwd file to awk, and print out the home directory of each user.

b)Develop an interactive grep script that asks for a word and a file name and then tells how many lines contain that word.

c)Repeat

d)Part using awk

Week-5

a)Write a shell script that takes a command –line argument and reports on whether it is directory, a file, or something else.

b)Write a shell script that accepts one or more file name as arguments and converts all of them to uppercase, provided they exist in the current directory.

c)Write a shell script that determines the period for which a specified user is working on the system.

Week-6

a)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.

b) Write a shell script that deletes all lines containing a specified word in one or more files supplied as arguments to it.

Week-7

a) Write a shell script that computes the gross salary of a employee according to the following rules:

i)If basic salary is < 1500 then HRA =10% of the basic and DA =90% of the basic.

ii)If basic salary is >=1500 then HRA =Rs500 and DA=98% of the basic

The basic salary is entered interactively through the key board.

b) Write a shell script that accepts two integers as its arguments and computers the value of first number raised to the power of the second number.

Week-8

a) Write an interactive file-handling shell program. Let it offer the user the choice of copying, removing, renaming, or linking files. Once the user has made a choice, have the program ask the user for the necessary information, such as the file name, new name and so on.

b) Write shell script that takes a login name as command – line argument and reports when that person logs in.

c) Write a shell script which receives two file names as arguments. It should check whether the two file contents are same or not. If they are same then second file should be deleted.

Week-9

a) 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.

b) Develop an interactive script that ask for a word and a file name and then tells how many times that word occurred in the file.

c) Write a shell script to perform the following string operations:

i) To extract a sub-string from a given string.

ii) To find the length of a given string.

Week-10

Write a C program that takes one or more file or directory names as command line input and reports the following information on the file:

i)File type

ii)Number of links

iii)Read, write and execute permissions

iv)Time of last access

(Note : Use stat/fstat system calls)

Week-11

Write C programs that simulate the following unix commands: (Use system calls)
a)mv
b)cp

Week-12

Write a C program that simulates ls Command
(Use system calls / directory API)

Course Outcomes:

On successful completion of this course student will be able to:

Course Outcomes		POs related to COs
CO1	Demonstrate knowledge on various commands in UNIX	PO1
CO2	Create different programs using Shell Scripting.	PO2
CO3	Develop file handling mechanisms to access the directory and file structures.	PO3
CO4	Develop and analyze programs for managing the file permissions	PO4
CO5	Use system calls for simulating the different UNIX commands	PO5
CO6	Follow the ethical principles in implementing the programs	PO6
CO7	Do experiments effectively as an individual and as a team member in a group.	PO7
CO8	Communicate verbally and in written form, the understanding about the experiments.	PO8
CO9	Continue updating their skill related to Unix commands and implementing programs in future.	PO9

CO-PO Mapping

CO \ PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	-	-	-	-	-	-	-	-	-	-	-
CO2	-	3	-	-	-	-	-	-	-	-	-	-
CO3	-	-	3	-	-	-	-	-	-	-	-	-
CO4	-	-	-	3	-	-	-	-	-	-	-	-
CO5	-	-	-	-	3	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	3	-	-	-	-
CO7	-	-	-	-	-	-	-	-	3	-	-	-
CO8	-	-	-	-	-	-	-	-	-	2	-	-
CO9	-	-	-	-	-	-	-	-	-	-	-	3
CO*	**3**	**3**	**3**	**3**	**3**	**-**	**-**	3	3	**2**	**-**	**3**

TEXT BOOKS :

1. Introduction to UNIX & SHELL programming, M.G. Venkatesh Murthy, Pearson Education.
2. Unix concepts and applications, Fourth Edition, Sumitabha Das, TMH.
3. Unix for programmers and users, 3rd edition, Gaham Glass & K. Ables, pearson education.
4. Unix and shell Programming –A text book, B.A. Forouzan& R.F. Giberg, Thomson.
5. Beginning shell scripting, E. Foster – Johnson & other, Wile Y- India.

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III B. TECH I-SEMESTER (CSE)

L	T	P	C
2	0	0	0

P&T REASONING AND APTITUDE - I

Course Educational Objectives:

CEO1: To apply quantitative reasoning and mathematical analysis methodologies to understand and solve problems.

REASONING AND APTITUDE

Numbers and fractions – LCM and HCF – Simplification and roots – Averages – Percentages – Ratios and proportions – Profit and loss – Partnership and shares – Simple and compound interest – Series (Verbal) – Coding and decoding – Blood relations – Venn diagrams – Problems on ages – Directions – Assertion and reasoning – Logarithms – Syllogism.

Course Outcomes:
On successful completion of the course, students will be able to:

Course Outcomes		POs related to COs
CO1	Apply the mathematical concepts in real life problem solving methodologies.	PO1, PO2, PO3, PO4, PO5, PO6, PO7, PO8, PO9, PO10,PO11, PO12
CO2	Apply the reasoning knowledge in real life problem solving methodologies.	PO1, PO2, PO3, PO4, PO5, PO6, PO7, PO8, PO9, PO10,PO11, PO12

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	3	3	3	3	3	3	3	3	3	3	3
CO2	3	3	3	3	3	3	3	3	3	3	3	3
CO*	3	3	3	3	3	3	3	3	3	3	3	3

Text Books:

1. Quantitative Aptitude, Dr.R.S.Aggarwal, 2012, S.Chand and Company Ltd, New Delhi.
2. A Modern Approach to Verbal and Non-Verbal Reasoning, Dr.R.S.Aggarwal, 2012, S.Chand and Company Ltd, New Delhi.

Reference Books:

1. Quantitative Aptitude for Competitive Examinations, AbhijitGuha, 14/e, 2010, Tata McGraw Hill Publishers, New Delhi.
2. Course in Mental Ability and Quantitative Aptitude, Edgar Thorpe, 3/e, 2012, Tata McGraw Hill Publishers, New Delhi.

Fast Track Objective Arithmetic, Rajesh Verma, 2012, Arihant Publications, Meerut.

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III B. TECH II-SEMESTER (CSE)	**L**	**T**	**P**	**C**
	3	**1**	**0**	**3**

16CSE321 DATA MINING AND WAREHOUSING

Course Educational Objectives:

The student should be made to:

CEO1: Gain the knowledge aboutthe basics of data mining and data warehousing concepts, data mining functionalities, and Preprocessing concepts.
CEO1: Understand and implement the data warehouse architecture, different data warehouse schemas
CEO1: Analyze and implement the Association Rules for analyzing the Transactional Databases
CEO1: Study and Implement the major Classification and Clustering Algorithms
CEO1: Study the advanced data mining concepts.

UNIT -1:
Introduction: Motivation and Importance of Data Mining - Data Mining - Kind of Data to be mined - Data Mining Functionalities - Kind of patterns to be mined - Classification of Data Mining Systems - Integration of a Data Mining System with a Database or Data Warehouse System - Major Issues in Data Mining.
Data Pre-processing: The need for Preprocessing - Data Cleaning - Data Integration and Transformation - Data Reduction - Data Discretization and Concept Hierarchy Generation.

UNIT -2:
An Overview: Data warehouses and its Characteristics - Data warehouse Architecture and its Components - Extraction - Transformation – Loading - Schema Design - Star and Snow - Flake Schema - Fact Constellation Schema - OLAP Cube - OLAP Operations - OLAP Server Architecture - Data Warehouse Implementation - From Data Warehousing to Data Mining.

UNIT -3:
Association Rules: problems Definition - Frequent Item Set Generation - The APRIORI Principle - Support and Confidence Measures - Association Rule Generation - APRIOIRI Algorithm - The Partition Algorithms - FP - Growth Algorithms - Compact Representation of Frequent Item set - Maximal Frequent Item Set - Closed Frequent Item Sets.
UNIT -4:
Classification: Problem Definition - Evaluation of classifiers - Classification Techniques, Decision Tree - Decision tree Construction - Methods for Expressing attribute test conditions - Measures for Selecting the Best Split - Algorithm for Decision tree Induction - Naive Bayes Classifier - Bayesian Belief Networks – K - Nearest neighbor classification.
Clustering: Clustering Overview - Partitioning Clustering - K-Means and K-Medoids Algorithms - Hierarchical Clustering - Agglomerative Methods and divisive methods - Outlier Detection.

UNIT -5:
Advanced Mining: Multimedia Data Mining - Text Mining - Mining the World Wide Web -Data Mining Applications - Social Impacts of DataMining.

Course Outcomes:
On Successful completion of this course student will be able to :

Course Outcomes		POs related to COs
CO1	Understand the need and applications of Data Warehouse and Data Mining	PO1, PO2
CO2	Design and Implement the data warehouse by using major data warehouse schemas	PO1, PO3
CO3	Implement Association Rules for analyzing Transactional databases	PO1, PO4
CO4	Understand and Implement major Classification And Clustering Algorithms	PO1, PO4
CO5	Apply the Data mining techniques in real time problems.	PO1, PO2, PO4

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	3	-	-	-	-	-	-	-	-	-	-
CO2	3	-	2	-	-	-	-	-	-	-	-	-
CO3	3	-	-	3	-	-	-	-	-	-	-	-
CO4	3	-	-	3	-	-	-	-	-	-	-	-
CO5	3	3	-	3	-	-	-	-	-	-	-	-
CO*	3	3	2	3	-	-	-	-	-	-	-	-

Text books:

1. Data Mining – Concepts and Techniques, 2 Edition, Jiawei Han, MichelineKamber, 2006, Morgan Kaufmann Publishers, Elsevier.

Reference Books:

1. Data Mining Techniques, 3rd Edition ,Arun K Pujari,Universities Press.
2. Data Warehouse Fundamentals, PualrajPonnaiah, Wiley Student Edition.
3. Data Mining, VikaramPudi, P Radha Krishna, Oxford University Press

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16CSE322 WEB TECHNOLOGIES

Course Educational Objectives:

CEO1: To understand how to write a valid HTML document involving a variety of element types, including hyperlinks, images, lists, tables, and forms.
CEO2: To Analyze advanced concepts of HTML5 and use CSS to implement a variety of presentation effects in HTML documents.
CEO3: To develop client-side scripting on web pages to provide interactivity and rapid response to user actions at client side.
CEO4: To understand basics of server side scripting language.
CEO5: To gain knowledge about sending the data from client side to server, creating sessions and interact with database.

UNIT-1:

Introduction: Internet and Web - Introduction to web technologies.
HTML 5: Fundamentals of HTML - Working with text, Organizing text in HTML - Working with links and URLs - Creating tables - Working with images – colors - Canvas and Forms - Interactive elements and Working with Multimedia.

UNIT-2:
Implementing advanced features of HTML5: Creating editable content - Checking spelling mistakes - Exploring custom data attributes - Exploring Client-Side storage - Exploring Drag and drop feature -Exploring Offline web applications - Exploring Web communications - Exploring Cross - Document messaging and Exploring desktop notifications.
CSS: Introduction - CSS selectors - Inserting CSS in an HTML document – Backgrounds - Fonts and Text styles - Creating boxes - Displaying - Positioning and floating elements - Features of CSS3 - Media queries.

UNIT-3:
Javascript: Overview of JavaScript - JavaScript functions – Events - Image maps and animations - JavaScript objects - Working with browser and document objects.
JQuery: Introduction - JQuery selectors - Methods to access HTML attributes – Events - Introduction to AJAX.

UNIT-4:
PHP: Introduction - Data types - Variables - Constants - Expressions - String interpolation - Control structures - Functions – Arrays - Embedding PHP code in web pages - Object Oriented PHP.

UNIT-5:
PHP Web forms: PHP and web forms - Sending form data to a server - Working with cookies and session
PHP with MySQL: Interacting with the database -prepared statement - Database transactions.

Course Outcomes:
After completion of this course student will be able to:

Course Outcomes		POs related to COs
CO1	Create web pages using different elements of HTML	PO1,PO2,PO5
CO2	Apply styles to the HTML elements in web pages using CSS	PO1,PO2,PO3,PO5
CO3	Use client side scripting to make the web pages responsive and interactive.	PO1,PO2,PO3,PO5
CO4	Demonstrate knowledge on basics of server side scripting language: PHP	PO1,PO2,PO3,PO5
CO5	Develop web applications with database interaction	PO1,PO2,PO4,PO5

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	2	-	-	3	-	-	-	-	-	-	-
CO2	2	3	3	-	3	-	-	-	-	-	-	-
CO3	2	3	3	-	3	-	-	-	-	-	-	-
CO4	2	3	3	-	3	-	-	-	-	-	-	-
CO5	3	3	-	2	3	-	-	-	-	-	-	-
CO*	**2.4**	**2.8**	**3**	**2**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

Text books:

1. HTML 5 Black Book: CoversCSS3, JavaScript, XML, XHTML, AJAX, PHP and JQuery, Second Edition, 2016, DreamtechPress,Kogent Learning Solutions Inc.
2. Beginning PHP and MySQL, Fourth Edition,W. Jason Gilmore, 2011,Apress.

Reference Books:

1. The Complete Reference: HTML andCSS, Fifth Edition, Thomas A. Powell, 2010,Tata McGraw Hill.
2. PHP and MySQL, Andrea Tarr, 2012,Willy India,

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16CSE323 ARTIFICIAL INTELLIGENCE

Course Educational Objectives:

The student should be made to:

CEO1: To study the concepts of Artificial Intelligence.
CEO2: To Understandthe search strategies and Problem solving using Artificial Intelligence.
CEO3: Togain insight information about Logical Agents and Reasoning patterns in propositional logic
CEO4: Toanalyze and implement the First Order Logic and Knowledge Representation
CEO5: To study the Uncertain Knowledge and Reasoning and Application of Robotics

UNIT -1: Introduction to Artificial Intelligence, Problems, Problem Spaces and Search
The AI Problems - The underlying assumption - The AI technique - The levels of the model - Criteria of success - Some general references - One final word and beyond - Defining the problem as a State space search - Production systems - Problem characteristics - Production system characteristics - Issues in the design of search programs

UNIT -2: Problem Solving, Un-informed Search Strategies, Informed Search and Exploration
Uninformed search strategies - Avoiding repeated states - Informed (Heuristic) search strategies - Heuristic functions - Local search algorithms and optimization problems - Local search in continuous spaces - Backtracking search for CSPs

UNIT -3: Knowledge and Reasoning
Logical agents – Knowledge based agents - The wumpus world – Logic - Propositional logic - a very simple logic - Reasoning patterns in propositional logic - Effective propositional inference - Agents based on propositional logic

UNIT - 4: First-Order Logic, Inference in First-Order Logic, Knowledge Representation
Representation revisited - Syntax and semantic of first order logic - Using first order logic - Knowledge engineering in first order logic - Propositional vs. First order inference - Ontological engineering - Categories and objects - Actions - Situations and Events - The internet shopping world - Reasoning systems for categories - Reasoning with default information - Truth maintenance systems

UNIT - 5: Uncertain Knowledge and Reasoning, Learning, and Robotics
Uncertainty - Acting under uncertainty - Basic probability notation - The axioms of probability - Baye's rule and its use - Learning from observations - Forms of learning - Inductive learning - Learning decision trees
Robotics: Introduction-Robot hardware - Robotic perception - Planning to move-Robotic software Architectures - Application Domains

Course Outcomes:
On Successful completion of this course the students will be able to:

Course Outcomes		POs related to COs
CO1	Gain the basic Knowledge about AI technique and Production systems	PO1
CO2	Comprehend the Un informed and Informed Search Strategies.	PO1, PO3
CO3	Analyze and Implement Reasoning patterns in propositional logic	PO1, PO2
CO4	Formulate the Knowledge Representation using First Order Logic	PO1, PO2
CO5	Apply the Robotics for Solving Real world Problems	PO1, PO2, PO4

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	-	-	-	-	-	-	-	-	-	-	-
CO2	3	-	3	-	-	-	-	-	-	-	-	-
CO3	3	2	-	-	-	-	-	-	-	-	-	-
CO4	3	3	-	-	-	-	-	-	-	-	-	-
CO5	3	3	-	3	-	-	-	-	-	-	-	-
CO*	**3**	**2.8**	**3**	**2**	**-**	-	**-**	**-**	**-**	**-**	**-**	**-**

Text Books:

1. Artificial Intelligence A Modern Approach, 2/e, Stuart Russell and Peter Norvig, 2003, Pearson Education, New Delhi, India.
2. Artificial Intelligence, 3/e, Elaine Rich, Kevin Knight and Shiva Shankar B Nair, 2004, Tata McGraw Hill, Hyderabad, India.

Reference Books:

1. Artificial Intelligence Structures and Strategies for Complex Problem Solving, 5/e, George F. Luther, 2005, Pearson Education, New Delhi, India.
2. Introduction to Artificial Intelligence, 1/e, Eugene Charniak and Drew McDermott, 1985,Pearson Education, New Delhi, India.
3. Artificial Intelligence: The Basics, 1/e, Kevin Warwick, 2012, Wearset ltd, Boldon.
4. Introduction to Artificial Intelligence, 2/e, Philip C. Jackson, 1985, Dover Publications, New York, USA.
5. Our Final Invention: Artificial Intelligence and the End of the Human Era, 1/e, James Barrat, 2013,Thomas Dunne Books, New York, USA.

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16CSE324 OBJECT ORIENTED ANALYSIS AND DESIGN

Course Educational objectives:

CEO1: To study the importance and basics of Object Oriented modeling.
CEO2: To Study the notations of Unified Modeling Language.
CEO3: To identify, analyze, and model structural and behavioral concepts of the system.
CEO4: To model the event driven state of object and transform them into implementation specific layouts.
CEO5: To analyze and design solutions to problems using object oriented approach

UNIT -1:Introduction To OOM
Elements of Object Model - Classes and Objects - Nature of object - Relationships among objects - Nature of a Class - Relationship among Classes - Interplay of Classes and Objects - Importance of Proper Classification - Identifying Classes and Objects - Key abstractions and Mechanisms.

UNIT -2: Introduction ToUml
Why we model - Conceptual model of UML - Architecture - Classes - Relationships - Common Mechanisms - Class diagrams - Object diagrams.

UNIT -3: Structural And Behavioral Modeling
Advance Classes - Advanced Relationships - Interfaces - Types &Roles - Packages - Interactions - Usecases - Usecase diagrams.

UNIT -4: Advanced Behavioral And Architectural Modeling
Activity diagrams - Events and Signals - Statechart diagrams - Components and Component diagrams - Deployment and Deployment diagrams.

UNIT -5:Case Studies
Analysis and Design of Library management system - Online Railway reservation system using object oriented approach-Banking application-ATM System.

Course Outcomes:
On Successful completion of this course the students will be able to:

Course Outcomes		POs related to COs
CO1	To study the importance and basics of Object Oriented modeling.	PO1
CO2	To Study the notations of Unified Modeling Language.	PO1, PO3
CO3	To identify, analyze, and model structural and behavioral concepts of the system.	PO1, PO2
CO4	To model the event driven state of object and transform them into implementation specific layouts.	PO1, PO4
CO5	To analyze and design solutions to problems using object oriented approach.	PO1, PO2, PO4

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	-	-	-	-	-	-	-	-	-	-	-
CO2	3	-	2	-	-	-	-	-	-	-	-	-
CO3	3	3	-	-	-	-	-	-	-	-	-	-
CO4	3	-	-	2	-	-	-	-	-	-	-	-
CO5	3	3	-	3	-	-	-	-	-	-	-	-
CO*	3	3	2	2.5	-	-	-	-	-	-	-	-

Text Books:

1. Object- Oriented Analysis and Design with Applications, 2/e, Grady Booch, 2007,Pearson Education, New Delhi, India.
2. The Unified Modeling Language User Guide, 2/e, Grady Booch, James Rumbaugh and Ivar Jacobson, 2005,Pearson Education, New Delhi, India.

Reference Books:

1. Fundamentals of Object Oriented Design in UML, 1/e, Meilir Page, Jones, 1999,Pearson Education, India.
2. Modeling Software Systems Using UML2, 1/e, Pascal Roques, 2010,WILEYDreamtech India Pvt. Ltd.
3. Object Oriented Analysis & Design,1/e, AtulKahate, 2004,TheMcGrawHill Companies, Hyderabad, India.
4. Practical Object Oriented Design with UML, 2/e, Mark Priestley, 2005,TATA McGraw Hill, Hyderabad, India.
5. Object-Oriented Analysis and Design with Applications 3/e, Grady Booch, Robert A. Maksimchuk, Michael W. Engle, Bobbi J. Young, Jim Conallen, Kelli A. Houston,2007,Pearson Education, India.

III B. TECH II-SEMESTER (CSE)

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16CSE325A COMPUTER GRAPHICS AND MULTIMEDIA (CORE ELECTIVE-I)

Course Educational Objectives:

The student should be made to:

CEO1: To acquire knowledge about graphics hardware devices and software used and Design algorithms to generate points, lines, and polygons.
CEO2:To analyze Transformations for 2-D & 3D Objects.
CEO3:To understand Viewing transformations in 2D & 3D Objects and Clipping algorithms for 2-D & 3D Objects
CEO4: To gain insight information about appropriate techniques and tools for surface detection and rendering methods.
CEO5: To gain Knowledge in Multimedia applications and their compression methods

Unit-1: Introduction and Output Primitives
Overview of graphics systems - Video display devices - Raster scan systems - Random scan systems - Input devices - Points and lines - Line drawing algorithms - Mid point circle and ellipse algorithms - Scan line polygon fill algorithm - Boundary fill and flood fill algorithms

Unit-2: 2-D and 3-D Geometrical Transforms
2D Translation - Rotation - Scaling - Matrix representations and homogeneous coordinates - Composite transforms - Reflection and shear transformations - Transformations between coordinate systems - 3D Translation - Rotation – Scaling - Reflection and shear transformations - Composite transformations

Unit-3: 2-Dimensional Viewing
The viewing pipeline - Viewing coordinate reference frame - Window to view-port coordinate transformation - 2-D viewing functions - Cohen Sutherland - Liang - Polygon Clipping-Sutherland Hodgeman polygon clipping algorithm, Weiler - Atherton Polygon Clipping Algorithm - Curve Clipping - Text Clipping - Exterior Clipping

Unit-4: Visible Surface Detection Methods & Introduction to Multimedia
Classification of visible surface detection algorithms - Back face detection - Depth buffer method - A buffer method - Scan line method - Depth sorting method - BSP-tree method - Area sub-division and Octree methods - Ray Casting Method - Introduction to Multimedia - Graphics and Image Data Representations - Color Models in Image and Vide

Unit-5: Multimedia Compression Algorithms
Multimedia Data Compression –Lossless Compression Algorithms-Run Length coding-VLC-Shanno –fano Algorithm- Huffman Coding-Adaptive Huffman Coding-Dictionary Based Coding-Image Compression Standards- JPEG Standard- MPEG Video Coding I MPEG-1.

Course Outcomes:
On successful completion of the course the student will be able to,

Course Outcomes		POs related to COs
CO1	Apply design algorithms to generate different objects.	PO1, PO2
CO2	Develop two dimensional transformations and design three dimensional graphics	PO1, PO2, PO4
CO3	Use viewing and clipping techniques to graphics	PO1, PO2, PO3, PO5
CO4	Perform Illumination ,color models and visible detection methods to graphics	PO1, PO2, PO4
CO5	Design animation sequences and implementing various compression techniques in multimedia	PO1, PO2

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	3	-	-	-	-	-	-	-	-	-	-
CO2	3	3	-	3	-	-	-	-	-	-	-	-
CO3	3	3	3	-	3	-	-	-	-	-	-	-
CO4	3	3	-	3	-	-	-	-	-	-	-	-
CO5	3	3	-	-	-	-	-	-	-	-	-	-
CO*	**3**	**3**	**3**	**3**	**3**	-	-	-	-	-	-	-

Text Books:

1. Computer Graphics *C version*, 2/e, Donald Hearn and M.Pauline Baker, 1997,Pearson Education, New Delhi, India.
2. Fundamentals of Multimedia, 5/e, Ze-NIan Li, Mark S. Drew,2009, Pearson Education, New Delhi, India.

Reference Books:

1. Computer Graphics, 2/e, Donald Hearn and M.Pauline Baker, 1994,PHI/Pearson Education, New Delhi, India.
2. Computer Graphics Principles & Practice in C, 2/e, Foley, VanDam, Feiner and Hughes, 1995,Pearson Education, New Delhi, India.
3. Computer Graphics, 2/e, Zhigand Xiang, Roy Plastock, Schaum's outlines, 1998,Tata McGraw Hill, Hyderabad, India.
4. Computer Graphics, 3/e, Steven Harrington, 1987,TMH, New Delhi, India.
5. Interactive Computer Graphics: A Top-Down Approach with Shader-Based OpenGL 1/e, Edward Angel, Addison Wesley Longman, 2011,New York, USA.
6. Fundamentals of Computer Graphics,3/e, Peter Shirley, Michael Ashikhmin and Steve Marschner, 2009,New York, USA.

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16CSE325B PRINCIPLES OF PROGRAMMING LANGUAGES (CORE ELECTIVE-I)

Course Educational objectives:

CEO1: To gain knowledge about programming paradigms, principles and techniques involved in design and implementation of modern programming languages.
CEO2: To describe syntax and semantics of programming languages.
CEO3: To analyze and explain behavior of simple programs in imperative languages using concepts such as binding, scope, control structures, subprograms and parameter passing mechanisms.
CEO4: To analyze the concepts of ADT and object oriented programming for large scale software development.
CEO5: To understand the concurrency control and exception handling mechanisms..

UNIT - 1: Preliminaries
Reasons for studying concepts of programming languages - Programming domains - Language evaluation criteria - Influences on language design - Language categories - Language design tradeoffs - Implementation methods - Programming environments

UNIT - 2: Describing Syntax and Semantics, Names, Bindings, Type Checking, and Scopes
Introduction - General problem of describing syntax - Formal methods of describing syntax - Attribute grammars - Describing the meanings of programs - Names - Variables - The concept of binding - Type checking - Strong typing - Type compatibility - Scope - Scope and life time - Referencing environments - Named constants

UNIT - 3: Data Types, Expressions, Assignment Statements, Control Structures
Introduction - Primitive data types - Character string types - User defined ordinal types - Array types - Arithmetic expressions - Overloaded operators - Type conversions - Relational and boolean expressions - Short circuit evaluation - Assignment statements - Mixed mode assignment - Selection statements - Iterative statements - Unconditional branching - Guarded commands

UNIT - 4: Subprograms, Abstract Data Types and Encapsulation Constructs
Introduction - Fundamentals of subprograms - Design issues for subprograms - Local referencing environments - Parameter passing methods - Parameters that are subprogram names - Overloaded subprograms - Generic subprograms - Design issues for functions - User defined overloaded operators -Coroutines - The concept of abstraction - Introduction to data abstraction - Design issues for abstract data types - Language examples - Parameterized abstract data types - Encapsulation constructs - Naming encapsulations

UNIT -5: Concurrency, Case Study:Java
Why concurrency - Programs and processes - Problems with concurrency - Process interactions - Concurency primitives - Concurrent control abstractions - Object oriented programing - Key concepts - Pragmatics - Case study: Java

Course Outcomes:
On successful completion of the course the student will be able to,

COURSE OUTCOMES		POs related to COs
CO1	Understand the need and applicability of the Programming Languages	PO1, PO2
CO2	Understand and Implement the syntaxes and semantics of the Programming languages	PO1, PO2, PO4
CO3	Comprehend the uses of data types, Expressions, Assignment Statements and control Structures	PO1, PO2, PO3, PO5
CO4	Analyze the usage of sub programs ,ADTs and Encapsulation Constructs	PO1, PO2, PO4
CO5	Knowledge about concurrency in different Programming languages	PO1, PO2

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	3	-	-	-	-	-	-	-	-	-	-
CO2	2	3		3	-	-	-	-	-	-	-	-
CO3	3	3	3		2	-	-	-	-	-	-	-
CO4	3	3	-	3	-	-	-	-	-	-	-	-
CO5	2	3		-	-	-	-	-	-	-	-	-
CO*	**2.6**	**3**	**3**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

Text Books:

1. Concepts of Programming Languages, 8/e , Robert W. Sebesta, Pearson Education, 2008.
2. Programming Language Design Concepts, 1/e, D. A. Watt, Wiley Dreamtech, rp - 2007.

Reference Books:

1. Programming Languages, 2/e, A.B. Tucker, R.E. Noonan, Tata McGraw Hill,2002.
2. Programming Languages, 2/e , K. C.Louden, Thomson, 2003.
3. LISP, 3/e, Patric Henry Winston and Paul Horn, Pearson Education, 2000.
4. Programming in Prolog, 5/e , W.F. Clocksin and C.S.Mellish, Springer,2001.
5. Programming Python, 3/e ,M.Lutz and O'reilly, SPD, rp - 2007.
6. Core Python Programming, 3/e , Chun, Pearson Education, 2007.
7. Guide to Programming with Python, 2/e, Michael Dawson, Thomson, 2008.

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3	1	0	3

16CSE 325C SOFTWARE TESTING METHODOLOGIES (CORE ELECTIVE-I)

Course Educational Objectives:

CEO1: To understand different testing levels on software models.

CEO2: To Identify structured and unstructured flow graphs and representing path and regular expressions

CEO3: To create control flow graphs from programs and specifying the requirements of complicated transaction flow.

CEO4: To model logic based testing with decision tables and state graphs.

CEO5: To Analyze the testing tools like JMeter or Win Runner.

UNIT-1: Introduction:

Purpose of testing – Dichotomies - model for testing - consequences of bugs - taxonomy of bugs.

Flow graphs and Path testing: Basic concepts of path testing – predicates - path predicates and achievable paths - path sensitizing - path instrumentation.

UNIT-2: Paths, Path products and Regular expressions

Path Products & Path Expression - Reduction Procedure - Applications - Regular expressions & Flow anomaly detection.

UNIT-3:

Transaction Flow Testing:-transaction flows - transaction flow testing techniques.
Dataflow testing: Basics of dataflow testing - strategies in dataflow testing.
Domain Testing:-domains and paths - Nice & ugly domains - domain testing.

UNIT-4:

Logic Based Testing: overview - decision tables - path expressions - kv charts -
State, State Graphs and Transition testing: state graphs - good & bad state graphs - state testing.

UNIT-5: Testing tools:

Winrunner - Loadrunner – Test director –Jmeter

Course Outcomes:

On successful completion of the course the student will be able to,

COURSE OUTCOMES		POs related to COs
CO1	Identify the various bugs and correcting them after knowing the consequences of the bug.	PO1, PO2
CO2	Perform functional testing using control flow and transaction flow graphs	PO1, PO2, PO3
CO3	Design the path expression and reduce them very well when needed.	PO1, PO2, PO3
CO4	Test logic or an application and identifying the nice and ugly domains.	PO1, PO2, PO3, PO4
CO5	Use appropriate software testing tools, techniques and methods for even more effective systems during both the test planning and test execution	PO1, PO2, PO3, PO5, PO9

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	3	-	-	-	-	-	-	-	-	-	-
CO2	2	3	3	-	-	-	-	-	-	-	-	-
CO3	2	3	3	-	-	-	-	-	-	-	-	-
CO4	2	3	3	3	-	-	-	-	-	-	-	-
CO5	2	3	3	-	3	-	-	-	3	-	-	-
CO*	**2.2**	**3**	**3**	**3**	**3**	**-**	**-**	**-**	**3**	**-**	**-**	**-**

Text Books:

1. "Software Testing Techniques", 2/e, 1990, BarisBeizer, Dreamtech, New Delhi, India.
2. "Software Testing Tools", 2/e, 2004, Dr.K.V.K.K.Prasad ,Dreamtech, New Delhi, India.

Reference Books:

1. "The craft of software testing", 2/e, 1995, BrianMarick, Pearson Education, New Delhi, India.
2. "Software Testing Techniques", 1/e, 2008 SPD (Oreille), New Delhi, India.
3. "Software Testing in the Real World", 1/e, 2008, Edward Kit, Pearson Education, New Delhi, India.
4. "Effective methods of Software Testing", 3/e, 2000, Perry, John Wiley, India.
5. "Art of Software Testing", 3/e, 2011, Meyers, John Wiley, India.

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L	T	P	C
3	1	0	3

16CSE325D NETWORK PROGRAMMING (CORE ELECTIVE-I)

Course Educational Objectives:

CEO1: To study the overview of UNIX operating systemand TCP/IP protocols
CEO2: To analyze the concepts of Sockets and Elementary TCP Sockets
CEO3: To understand TCP Client server Models
CEO4: Togain knowledge about socket programming and usage of TCP and UDP sockets
CEO5: To manage how to build network applications with Advanced sockets

UNIT 1:INTRODUCTION

Overview of UNIX OS - Environment of a UNIX – Inter Process Communication (PIPE, FIFO, Message Queues, Semaphores and Shared Memory) - overview of TCP/IP protocols

UNIT 2:ELEMENTARY TCP SOCKETS

Introduction to Sockets – Socket address Structures – Byte ordering functions –Byte Manipulation Functions- inet_aton - inet_addr and inet_ntoa functions - inet_pton and inet_ntop functions - sock_ntop and related functions - readn - written and readline functions.

Elementary TCP Sockets – socket – connect – bind – listen – accept – read – write - close functions – Iterative Server – Concurrent Server

UNIT 3:TCP Client-Server Example

Introduction- TCP Echo Server and TCP Echo Client – Posix Signal handling – Handling SIGCHLD Signals-Wait and Waitpid functions- connection Abort before accept returns-Termination of Server process- Crashing of Server host - Crashing and rebooting of server host- Shutdown of server host – I/O multiplexing – I/O Models – select function – shutdown function – TCP echo Server (with multiplexing) – poll function – TCP echo Client (with Multiplexing)

UNIT 4: SOCKET OPTIONS, ELEMENTARY UDP SOCKETS

Socket options – getsocketopt and setsocketopt functions – generic socket options – IP socketoptions – ICMP socket options – TCP socket options – Elementary UDP sockets –recvfrom and sendtofuctions- UDP echo Server – UDP echo Client – Lost datagrams.

Elementary name and Address Conversion: Domain name system – gethostbyname function – Ipv6 support in DNS – gethostbyadr function –getservbyname and getservbyport functions.

UNIT 5: ADVANCED SOCKETS

Ipv4 and Ipv6 interoperability – IPv4 client - IPv6 Server-IPv6 Client - IPv4 Server.

Raw sockets – raw socket creation – raw socket output – raw socket input – ping program – trace route program.

Course Outcomes:

On successful Completion of this course, students will be able to:

Course Outcomes		POs related to COs
CO1	Understand Inter process communication and TCP/IP protocols	PO1, PO2
CO2	Gain Knowledge on Elementary TCP sockets	PO1, PO2
CO3	Analyze different TCP client-server models	PO1, PO2, PO3, PO4
CO4	Work with different Socket options and elementary UDP sockets	PO1, PO2, PO3, PO4
CO5	Build different network applications in Advanced sockets	PO1, PO2, PO3, PO4

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	3	-	-	-	-	-	-	-	-	-	-
CO2	3	3	-	-	-	-	-	-	-	-	-	-
CO3	3	3	3	3	-	-	-	-	-	-	-	-
CO4	3	3	3	3	-	-	-	-	-	-	-	-
CO5	3	3	3	3	-	-	-	-	-	-	-	-
CO*	**3**	**3**	**3**	**3**	-	-	-	-	-	-	-	-

Text Books:

1. Unix Network Programming – The Sockets Networking API, 3 rd edition, W. Richard Stevens, B. Fenner, A.M. Rudoff, 2004,Pearson.
2. Unix Network Programming-Interprocess communication, Vol-2, 2nd edition,W. Richard Stevens, Pentice Hall.

Reference Books:

1. TCP/IP Illustrated Volumes 1,W. Richard Stevens, 1994, Published by Addison-Wesley.
2. UNIX Network Programming, The Sockets Networking API, Volumes 1,W Richard Stevens, Bill Fenner, Andrew M. Rudoff, Addison-Wesley

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16OSAH321 **LASERS AND FIBER OPTICS**
(OPEN ELECTIVE - I)

L	T	P	C
3	1	0	3

Course Educational Objectives:

CEO1: To acquire knowledge on fundamentals of LASERS
CEO2: To study the working of different types of LASERS
CEO3: To develop knowledge on applications of LASERS in various fields
CEO4: To gain knowledge in fundamentals of Optical fiber, construction, types and attenuations
CEO5: To develop knowledge on applications of Optical fibers in various fields

Unit- I
LASERS INTRODUCTION: Introduction to Lasers, Properties of lasers, Spontaneous Emission , Stimulated Absorption and stimulated Emission ,Population Inversion, Conditions to achieve population inversion, Different pumping mechanisms, Einstein Coefficients.

Unit – II
TYPES OF LASERS: Ruby Laser, Helium – Neon Laser, Semi Conductor Laser, Dye Laser

Unit – III
APPLICATIONS OF LASERS: Holography, Laser Fusion reaction , Light wave Communication using Lasers(Block Diagram), Stimulated Raman Effect, lasers in Industry-Laser Welding, Hole drilling, Laser Cutting, Lasers in Medicine.

Unit – IV
OPTICAL FIBERS : Introduction to Optical fibers, Principle of Optical fiber, Construction of Fiber, Propagation of Light through the fibers, Fiber Types-Step Index and graded Index Fibers, Attenuation in Fibers, Dispersion-

Unit – V
APPLICATION OF FIBERS : Fiber optic Communication System(Block Diagram), Pressure Sensor, Liquid Level Sensor, Fiber optic Endoscope, Optical Fibers in Computer Networks(Block Diagram).

On successful completion of the course the student will be able to,

Course Outcomes		POs related to COs
CO1	Acquire the basic knowledge on LASERS	PO1, PO12
CO2	Identify different types of LASERS	PO1, PO12
CO3	Develops knowledge on different applications of LASERS	PO1, PO12
CO4	Acquire the basic knowledge on Optical Fibers	PO1,PO12
CO5	Develops knowledge on different applications of Optical Fibers	PO1,PO12

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	-	-	-	-	-	-	-	-	-	-	1
CO2	3	-	-	-	-	-	-	-	-	-	-	1
CO3	3	-	-	-	-	-	-	-	-	-	-	1
CO4	3	-	-	-	-	-	-	-	-	-	-	1
CO5	3	-	-	-	-	-	-	-	-	-	-	1
CO*	3	-	-	-	-	-	-	-	-	-	-	**1**

Reference Books:

1 .Lasers Theory and Applications By K.Thyagarajan and A.K.Ghatak: Macmillan India Limited, New Delhi.,
2.Lasers And non-Linear Opics, second edition,By BBLaud. NewAge International(P) limited,Publishers,New Delhi,
3. An Introduction to Fiber Optic Systems ,Second Edition,By John Powers,Richard D Irwin, a Times Mirror Higher education,Inc Company,USA,

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L	T	P	C
3	1	0	3

16OSAH322 **ADVANCED MATHEMATICS (OPEN ELECTIVE - I)**
(Common to all Branches)

Course Educational Objectives:

CE01: The course is designed to equip the students with the necessary mathematical skills and techniques that are essential for an engineering course.

CEO2: To provide knowledge on

- Numerical methods to find a root of an equation
- Analyzing the consistency, stability and convergence of a numerical scheme.
- Number of numerical methods for solving integral equations.
- The relations ship between differential and integral equations, and how to change from one to another.

CEO3: To learn different iterative methods which can be used to solve algebraic and transcendental equations. .

CEO4: To understand, Integral Equations ,Integral Equations come from real life physical problems

CEO5: To explore the practical Knowledge, for each type of PDEs (hyperbolic, parabolic and elliptic), what kind of numerical methods are best suited for and the reasons behind these choices

CEO6: To Learn the principles for designing numerical schemes for PDEs, in particular, finite difference schemes.

CEO7: To learn Differential Equations and Partial Differential Equations that can be transformed into Integral and integro- differential equations

Unit-1 Solutions Of Algebraic And Transcendental Equations:

Introduction -Secant Method Or Chord Method -Newton Raphson Extended Formula: Chebyshev Method – Horner's Method - Muller's Method

Unit-2 Partial differential equations:

Introduction – Formation of partial differential equations – solution of a partial differential –equations solvable by direct integration – linear equation of first order- non linear equation of first order – Charpit's method – homogenous linear equations with constant coefficient – Rules of finding complementary function – rules of finding particular integral – working procedure to solve homogeneous linear equations of any order.

Unit-3 Numrical solution of partial differential equations:

Introduction-Solution of Laplace equation, Solution of poisons equation, solution of heat equation(crank-Nicolson method) -Solution of wave equation

Unit- 4 Numerical Solution of Matrix Computation :

Algebraic Equations – Numerical Solution -Matrix Computation: Iterative Methods - Jacobi Method - Gauss-Seidel Method – Successive Over Relaxation method

Unit-5 Integral Equations

Introduction- Definition- conversion of a linear Differential equation to an Integral equation and vice versa- conversion of boundary value problem into integral equation using Green's function – Solution of an integral equation – Abel's Integral equation.

Course Outcomes:

After the completion of this course, a successful student is able to

Course Outcomes		POs related to COs
CO1	Acquireknowledge in necessity and techniques of advanced mathematical methods, to develop analytical and designing skills in mathematical models through numerial techniques.	PO1,PO2
CO2	Demonstrateknowledge in Partial differential equations of higher order, mathematical modelling through partial differential equations,	PO1,PO2,
CO3	Demonstrateknowledge in Numrical solution of partial differential equations.Develop analytical and numerical skillsin solving Partial Differential Equations	PO1,PO2,P03
CO4	Acquire knowledge in Numerical Solution of Matrix Computation. Develop designingand analytical skills in applications of Advanced Numerical Techniques for solving system of equations by matrix computations.	PO1,PO2
CO5	Acquire knowledge in solving Integral equation and developdesigningand analyticalskill in conversion of boundary value problem into integral equation	PO1,PO2,PO3 PO4

CO – PO Mapping

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	-	-	-	-	-	-	-	-	-	-
CO2	3	2	-	-	-	-	-	-	-	-	-	-
CO3	2	3	2	-	-	-	-	-	-	-	-	-
CO4	3	2	-	-	-	-	-	-	-	-	-	-
CO5	2	3	2	2	-	-	-	-	-	-	-	-
CO*	**2.6**	**2.4**	**2**	**2**	-	-	-	-	-	-	-	-

Text Books:

1. Numerical Methods for Scientific and Engineering. Computation , M.K. Jain, S.R.K. Iyengar R.K. Jain, New Age international Publishers.
2. Higher Engineering Mathematics - Dr.B.S.Grewal - Khanna Publishers

References:

1. Mathematical Methods – Pal – Oxford.
2. Introduction to Numerical Analysis – S.S. SastryPh - I
3. Mathematical Methods, S.K.V.S. Sri Ramachary, M. BhujangaRao, P.B. BhaskarRao& P.S. Subramanyam, BS Publications.
4. "Linear Integral Equations ,Theory and Technique ", 1st ed.,Ram P .Kanwal, Academic press, New York,1971.
5. "Numerical Methods of Engineers" by D V Griffiths and I M Smith

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L	T	P	C
3	1	0	3

16OSAH323 MATHEMATICAL MODELLING (OPEN ELECTIVE - I)
(Common to all Branches)

Course Educational Objectives:

CE01: The course is designed to equip the students with the necessary mathematical skills and techniques thatare essential for an engineering course.

CEO2: To provide knowledge on

- Mathematical modelling through trigonometry
- Designing mathematical models through Ordinary differential equations
- Mathematical modelling through Linear Programming
- Designing mathematical models through Difference equations
- Partial differential equations based mathematical models

CEO3: To learn the needand techniquesof mathematical modelling, to design mathematical models through trigonometry.

CEO4: To understand, familiarize the knowledge of the significance of ordinary differential equations based mathematical models through linear growth and decay models, compartment models and geometrical problems.

CEO5: To explore the practical utility of mathematical models through linear programming including transportation and assignment models.

CEO6: To learn the concepts of linear difference equations with constant coefficients and understand some simple models through difference equations

CEO7: To learn the concepts of Partial differential equations and its nature. To explore the knowledge on practical utility of mathematical models through mass balance equations and momentum balance equations

UNIT-I Mathematical Modelling: Need, Techniques, Classifications And Simple Illustrations

The Technique of Mathematical Modelling - Classification of Mathematical Models - Some Characteristics of Mathematical Models - Mathematical Modelling Through Trigonometry, Calculus - Limitations of Mathematical Modelling

UNIT-2 Mathematical Modelling Through Ordinary Differential Equations of First Order

Mathematical Modelling Through Differential Equations – Linear Growth and Decay Models - Compartment Models - Mathematical Modelling in Dynamics Through Ordinary Differential Equations of First Order - Mathematical Modelling of Geometrical Problems Through Ordinary Differential Equations of First Order

UNIT-3 Mathematical Modelling Through Linear Programming

Mathematical Modelling through Linear Programming - Graphical Method - Simplex Method - Transportation and Assignment Models

UNIT-4 Mathematical Modelling through Difference Equations

The Need for Mathematical Modeling Through Difference Equations: Some Simple Models - Basic Theory of Linear Difference Equations with Constant Coefficients - Solution by Z-transformation - Mathematical Modeling Through Difference Equations in Probability Theory

UNIT-5 Mathematical Modelling Through Partial Differential Equations

Mass-Balance Equations: The First Method of Getting PDE Models - Momentum-Balance Equations: The Second Method of Obtaining PDE Models - Nature of Partial Differential Equations

Course Outcomes:

After the completion of this course, a successful student is able to

	Course Outcomes	POs related to COs
CO1	Acquire knowledge in necessity and techniques of mathematical modelling, to develop analytical and designing skills in mathematical models through trigonometry.	PO1,PO2
CO2	Demonstrate knowledge in Ordinary differential equations of first order, mathematical modelling through differential equations, Linear growth and decay modelsand Develop analytical skills in modelling geometrical problems through Ordinary differential equations of first order	PO1,PO2
CO3	Demonstrate knowledge in Linear programming and various techniques including Graphical method and Simplex method. Develop analytical and designing skillsin modelling and solving Transportation and assignment models	PO1,PO2, P03
CO4	Acquire knowledge in difference equations, theory of difference equations with constant coefficients. Develop designing and analytical skills in modelling and solving mathematical models difference equations in probability theory.	PO1,PO2
CO5	Acquire knowledge in partial differential equations and develop designing and analytical skills in modeling and solving mathematical models through Mass-Balance equations and Momentum-Balance equations	PO1,PO2, PO3 PO4

CO – PO Mapping

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	-	-	-	-	-	-	-	-	-	-
CO2	3	2	-	-	-	-	-	-	-	-	-	-
CO3	2	3	2	-	-	-	-	-	-	-	-	-
CO4	3	2	-	-	-	-	-	-	-	-	-	-
CO5	2	3	2	2	-	-	-	-	-	-	-	-
CO*	2.6	2.4	2	2	-	-	-	-	-	-	-	-

Text Books:

1. Mathematical Modelling, J.N. Kapur, New Age International (P) Limited Publishers, New Delhi
2. Advanced Engineering Mathematics, Kreysig, , John Wiley, NewYork, 1999.

Reference Books:

1. Principles of Mathematical Modelling (2004)-Clive L. Dyne, Elsevier Publication
2. Mathematical Modelling – A case study approach , R Illner, C Sean Bohun, S McCollum, T van Roode, AMS publication, 2005
3. Mathematical Modelling , D N P Murthy, N W Page, E Y Rodin, Pergamon Press,1990
4. OR Theory & Applications, J.K. Sharma , Mac Milian India Ltd., 1998
5. Mathematical Modelling(A Comprehensive Introduction), Gerhard Dangelmayr and Michael Kirby, Prentice Hall,New Jersey

III B.Tech II Semester

L	T	P	C
3	1	0	3

16OMEC321 INDUSTRIAL ROBOTICS (OPEN ELECTIVE - I)

Course Educational Objectives:

CEO1: To understand the basic concepts associated with the design and functioning of robots.
CEO2: To know the robot drive systems and design of internal grippers and external grippers
CEO3: To study about the sensors used in robots and its applications .
CEO4: To learn about analyzing robot kinematics and robot programming.
CEO5: To study about the Implementation of robots in industries and Safety considerations.

UNIT – 1: FUNDAMENTALS OF ROBOT

Definition – Robot anatomy – Co-ordinate systems, work envelope, types and classification – Specifications – Pitch, yaw, roll, joint notations, speed of motion, pay load – Robot parts and functions – Need for robots – Different applications.

UNIT – 2:

Pneumatic drives – Hydraulic drives – Mechanical drives – Electrical drives – D.C. servo motors, stepper motor, A.C. servo motors – Salient features, applications and comparison of drives end effectors – Grippers – Mechanical grippers, pneumatic and hydraulic grippers, magnetic grippers, vacuum grippers, two fingered and three fingered grippers, internal grippers and external grippers, selection and design considerations.

UNIT – 3: ROBOT SENSORS AND MACHINE VISION

Requirements of a sensor, principles and applications of the following types of sensors – Position of sensors (piezo electric sensor, LVDT, resolvers, optical encoders, pneumatic position sensors), range sensors (triangulation principle, structured, lighting approach, time of flight range finders, laser range meters), proximity sensors (inductive, Hall effect, capacitive, ultrasonic and optical proximity sensors), touch sensors, (binary sensors, analog sensors), wrist sensors, compliance sensors, slip sensors. camera, frame grabber, sensing and digitizing image data – Signal conversion, image storage and lighting techniques - Image processing and analysis – Data reduction – Edge detection, segmentation feature extraction and object recognition – Algorithms – Applications – Inspection, identification, visual serving and navigation.

UNIT – 4: ROBOT KINEMATICS AND ROBOT PROGRAMMING

Robot Kinematics: Forward kinematics, inverse kinematics and differences –Forward kinematics and reverse kinematics of manipulators with two, three degrees of freedom (in 2 dimensional), four degrees of freedom (in 3 dimensional) – Deviations and problems. **Robot Programming:** Teach pendant programming –Lead through programming– Robot programming languages – VAL programming – Motion commands, sensor commands, end effecter commands, and simple programs.

UNIT – 5: IMPLEMENTATION, ROBOT ECONOMICSAND APPLICATIONS

Implementation and Robot Economics:RGV, AGV – Implementation of robots in industries – Various steps – Safety considerations for robot operations – Economic analysis of robots – Pay back method – EUAC method – Rate of return method.**Applications:**Material transfer – Material

handling – Loading and unloading - Processing - Spot and continuous arc welding and spray painting – Assembly and inspection.

Course Outcomes:

On successful completion of the course, Students will be able to

Course Outcomes		POs related to COs
CO1	Understand the basic concepts associated with the design and functioning of robots.	PO1,PO2,PO3
CO2	Demonstrate the robot drive systems and design of internal grippers and external grippers	PO1,PO2,PO3
CO3	Explain the basic concepts associated with the sensors used in robots and its applications .	PO1,PO2,
CO4	Understand about analyzing robot kinematics and robot programming.	PO1, PO2, PO3
CO5	Explain the implementation of robots in industries and Safety considerations in workplace	PO1, PO2, PO6

CO – PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO.1	3	3	2	-	-	-	-	-	-	-	-	-
CO.2	3	2	1	-	-	-	-	-	-	-	-	-
CO.3	3	2		-	-	-	-	-	-	-	-	-
CO.4	3	2	2	-	-	-	-	-	-	-	-	
CO.5	3	1	-	-	-	1	-	-	-	-	-	
CO*	**3**	**2**	**1.7**	-	-	**1**	-	-	-	-	-	-

Text Books:

1. Industrial Robotics-Technology, Programming and Applications, M.P.Groover, 2001, McGraw-Hill.
2. Robotics Control, Sensing, Vision and Intelligence, Fu.K.S. Gonzalz.R.C., and Lee C.S.G., 1987, McGraw-Hill Book Co.

Reference Books:

1. Fundamentals of Robotics Analysis and Control, C Robert J Schilling, 2009, Pearson Education.
2. Introduction to Robotics Mechanics and Education, Craig J.J., 2008.
3. Robotics Technology and Flexible Automation, Deb S.R. and Deb S., 2010, McGraw Hill Education.
4. The Robotics Primer, Maja J Mataric, 2009, Universities Press.
5. Foundation of Robotics: Analysis and Control, Yoshikawa, 2004, Prentice Hall of India.

III B.Tech II Semester

L	T	P	C
3	1	0	3

16OMEC322 OPTIMIZATION TECHNIQUES (OPEN ELECTIVE - I)

Course Educational Objectives:

CEO1: To introduce the fundamental concepts of optimization techniques and linear programming.

CEO2: To provide the concepts of various transportation models and network models

CEO3: To understand the importance and solution of inventory and queuing models

CEO4: To solve the problem related to decision theory

CEO5: To provide knowledge on classical and modern methods of constrained and unconstrained problems in both single and multivariable

UNIT – 1: OPTIMIZATION TECHNIQUE AND LINEAR PROGRAMMING

Optimization Technique: Introduction – Single variable optimization – Multivariable optimization with no constraints – Multivariable optimization with equality constraints – Multivariable optimization with inequality constraints – Convex programming problem.**Linear Programming**: The phase of an operation research study – Linear programming – Graphical method – Simplex algorithm – Duality formulation – Sensitivity analysis.

UNIT – 2: TRANSPORTATION MODELS AND NETWORK MODELS

Transportation assignment models –Traveling salesman problem – Networks models – Shortest route – Minimal spanning tree – Maximum flow models –Project network – CPM and PERT networks – Critical path scheduling – Sequencing models.

UNIT – 3: INVENTORY MODELS AND QUEUEING MODELS

Inventory Models: Inventory models – Economic order quantity models – Quantity discount models – Stochastic inventory models – Multi product models – Inventory control models in practice. **Queueing Models:** Queueing models – Queueing systems and structures – Notation parameter – Single server and multi server models – Poisson input – Exponential service – Constant rate service – Infinite population – Simulation.

UNIT – 4: DECISION MODELS

Decision models – Game theory – Two person zero sum game – Graphic solution – Property of dominance – Algebraic solution – Replacement models – Items that deteriorate with time – When money value changes – Items that fail completely – Individual replacement and group replacement.

UNIT – 5: CLASSICAL OPTIMIZATION TECHNIQUES

Unconstrained problems – Unconstrained algorithms –Karush-Kuhn-Tucker (KKT) conditions – Quadratic programming. **Nontraditional Optimization Techniques:** Genetic algorithms –Simulated annealing – Neural network based optimization – Optimization of fuzzy systems.

Course Outcomes:

On successful completion of the course, Students will be able to

	Curse Outcomes	POs related to COs
CO1	Illustrate the fundamental concepts of optimization techniques and linear programming.	PO1,PO2,PO3
CO2	Explain the concepts of various transportation models and network models	PO1,PO3,PO4
CO3	Understand the importance and solution of inventory and queuing models	PO1,PO2,PO3
CO4	Provide solution for the problem related to decision theory	PO1, PO2,PO3, PO4
CO5	Express the knowledge on classical and modern methods of constrained and unconstrained problems in both single and multivariable	PO1, PO2, PO5

CO – PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO.1	3	3	2	-	-	-	-	-	-	-	-	-
CO.2	3		2	1	-	-	-	-	-	-	-	-
CO.3	3	2	2	-	-	-	-	-	-	-	-	-
CO.4	3	2	2	2	-	-	-	-	-	-	-	
CO.5	3	1	-	-	1	-	-	-	-	-	-	
CO*	**3**	**2**	**2**	1.5	1	-	-	-	-	-	-	-

Text Books:

1. Operation Research, H.A. Taha, 2002, Prentice Hall of India.
2. Engineering Optimization: Theory and Practice Singiresu S. Rao, A Wiley, 3/e, Interscience Publication.

Reference Books:

1. Operations Research, Paneer Selvam, 2002, Prentice Hall of India.
2. Quantitative Methods for Business, Anderson, 8/e, 2002, Thomson Learning.
3. Operations Research Applications and Algorithms, Wayne.L.Winston, 4/e, 2007, Thomson learning.
4. Quantitative Techniques in Management, Vohra, 2002, Tata Mc Graw Hill.
5. Operations Research Theory and Applications, J.K.Sharma, 3/e, 2007, Macmillan India.

III B.Tech II Semester

L	T	P	C
3	1	0	3

16OMEC323 MECHATRONICS (OPEN ELECTIVE - I)

Course Educational Objectives:

- **CEO1**: To understand the fundamentals of Mechatronics, Control Systems, Transducers and Sensors
- **CEO2**: To know the functions of Mechanical, Electrical, Hydraulic, and Pneumatic Actuators in mechatronics systems
- **CEO3**: To demonstrate the Basic system models and Controller used in Mechatronic systems
- **CEO4**: To understand the applications of microprocessors and programmable logic controller in Mechatronic system
- **CEO5**: To recognize the elements of Robotic system in mechatronics Engineering

UNIT – 1: MECHATRONICS, SENSORS AND TRANSDUCERS

Introduction to mechatronics systems. **Control systems:** Open loop, closed loop, automatic control, block diagram, pneumatic control and hydraulic control systems. **Transducers:** Terminology and mechanism – Classifications: Resistance, variable inductance, capacitive, piezoelectric, Hall effect and photoelectric transducers – Strain gauge (theory only). **Sensors:** Proximity, light and pneumatic sensors – Load cells – Digital optical encoders – Selection of sensors.

UNIT – 2: ACTUATION SYSTEMS

Mechanical Actuator: Types – Gear drive, belt drive, chain drive and bearings. **Electrical Actuator:** Types – Mechanical and solid state switches – Construction and working principle of stepper motor and servo motor. **Hydraulic Actuators:** Hydraulic systems – Pumps – Regulator – Valves – Linear and rotary actuator. **Pneumatic Actuators:** Pneumatic systems – Valves – Linear and rotary actuator.

UNIT – 3: SYSTEM MODELS AND CONTROLLERS

System Models: Basic system models – Mechanical system buildings – Electrical system buildings – Fluid system buildings – Thermal system buildings – Rotational-translational systems – Electro mechanical systems – Hydraulic mechanical systems.**Controller:** Control modes – Two step mode – Proportional mode – Derivative mode – Integral mode – PID controllers – Digital controllers – Adaptive control systems.

UNIT – 4: MICROPROCESSORS AND PROGRAMMABLE LOGIC CONTROLLER

Microprocessors: Introduction – Pin configuration – Architecture of 8085 – Addressing modes – Instruction set, timing diagram of 8085. **Data Acquisition:** Data acquisition systems – Analog-to-digital conversion (ADC) – Digital-to-analog conversion (DAC). **Programmable Logic Controller:** Introduction – Architecture – Input / output processing – Programming with timers, counters and internal relays – Data handling – Selection of PLC.

UNIT – 5: MECHATRONIC SYSTEMS

Robotic Systems: Definition – Laws of robotics – Types of industrial robotics – Robotic systems – Classification – End effectors – Robot sensors (touch, position, force, proximity and range sensors) – Robot control system – Robot drives – Industrial robots – Applications. **Mechatronics Systems:** Design process – Embedded systems –Design process of engine management system,

automatic camera, automatic washing machine, pick and place robot, automatic car park barrier, wireless surveillance balloon and uninterruptible power supply.

Course Outcomes:

On successful completion of the course, Students will be able to

Course Outcomes		POs related to COs
CO1	Understand the fundamentals of Mechatronics, Control Systems, Transducers and Sensors	PO1,PO2, PO4
CO2	Illustrate the functions of Mechanical, Electrical, Hydraulic, Pneumatic Actuators in mechatronics systems	PO1,PO2,PO3, PO4
CO3	demonstrate the Basic system models and Controller used in Mechatronic systems	PO1,PO2,PO4
CO4	Understand the applications of microprocessors and programmable logic controller in mechatronic system	PO1, PO2, PO4
CO5	Recognize the elements of Robotic system in mechatronics Engineering	PO1, PO2, PO5

CO – PO MAPPING

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	3	-	2	-	-	-	-	-	-	-	-
CO2	3	2	2	2	-	-	-	-	-	-	-	-
CO3	3	2	-	2	-	-	-	-	-	-	-	-
CO4	3	2	-	2	-	-	-	-	-	-	-	
CO5	3	1	-	-	1	-	-	-	-	-	-	
CO*	**3**	**2**	**2**	2	1	-	-	-	-	-	-	-

Text Books:

1. A Textbook of Mechatronics, Rajput. R.K, 2007, S. Chand and Co.
2. Mechatronics, Bolton,W, 2/e, 2003, Pearson education.

Reference Books:

1. Mechatronics Systems Design, Devadas Shetty and Richard A. Kolk, 2010, Cengage Learning.
2. Mechatronics Integrated Technologies for Intelligent Machines, Smaili.A and Mrad.F, 2007, Oxford University Press.
3. Mechatronics Principles, Concepts and Applications, NitaigourPremchandMahalik, 2015, McGraw Hill Education.
4. Introduction to Mechatronics and Measurement Systems, Michael B. Histand and David G. Alciatore, 2000, McGraw-Hill International Editions.
5. Understanding Electro-Mechanical Engineering: An Introduction to Mechatronics, Lawrence J. Kamm, 2000, Prentice Hall of India Pvt., Ltd.

III B.Tech II Semester

L	T	P	C
3	1	0	3

16OCIV321 CONSTRUCTION EQUIPMENT, PLANNING AND MANAGEMENT

(OPEN ELECTIVE – I)

Course Educational Objectives:

CEO1: To learn basics of construction management

CEO2: To learn various equipment and financial aspects involved in construction project management

CEO3: To develop ability to analyze and develop network diagrams for better monitoring of the project

UNIT – 1: FUNDAMENTALS OF CONSTRUCTION TECHNOLOGY

Fundamentals of Construction Technology: Definitions and discussion – Construction activities – Construction processes – Construction works – Construction estimating – Construction schedule – Productivity and mechanized construction – Construction documents – Construction records – Quality – Safety – Codes and regulations. **Preparatory Work and Implementation:** Site layout – Infrastructure development – Construction methods – Construction materials – Deployment of construction equipment – Prefabrication in construction – False work and temporary works.

UNIT – 2: EARTHWORK AND CONSTRUCTION EQUIPMENT

Earthwork: Classification of soils – Project site – Development – Setting out – Mechanized excavation – Groundwater control – Trenchless (no-dig) technology – Grading – Dredging. **Construction Equipment:** Introduction to construction equipment: their contribution and importance inconstruction industry classification of construction equipment – Earth moving equipment – Excavation equipment – Hauling equipment – Earth-compaction equipment – Hoisting equipment – Concreting plant and equipment – Selection of equipment – Task consideration – Cost consideration – Factors affecting the selection – Factors affecting cost owning and operating the equipment – Equipment maintenance.

UNIT – 3: PROJECT MANAGEMENT

Project Management: Introduction – Project planning – Scheduling – Controlling – Role of decision in project management – Techniques for analyzing alternatives operation research – Methods of planning and programming problems – Development of bar chart – Illustrative examples – Shortcomings of bar charts and remedial measures – Milestone charts – Development of PERT net work problems. **Elements of Network and Development of Network:** Introduction – Event – Activity – Dummy – Network rules – Graphical guidelines for network – Common partial situations in network – Numbering the events – Cycles problems – Planning for network construction – Modes of network construction – Steps in development of network – Work breakdown structure – Hierarchies – Illustrative examples – Problems.

UNIT – 4: PERT

Time Estimates and Time Computations: Introduction – Uncertainties: Use of PERT – Time estimates – Frequency distribution – Mean, variance and standard deviation – Probability distribution – Beta distribution – Expected time Problems – Earliest expected time – Formulation for TE - Latest allowable occurrence time – Formulation for TL - Combined tabular computations for TE and TL problems.

UNIT – 5: CPM

Network Analysis: Introduction - Slack – Critical path – Illustrative examples – Probability of meeting scheduled date Problems – CPM : process – CPM : Networks –Activity time estimate – Earliest event time – Latest allowable occurrence time – Combined tabular computations for TE and TL – Start and finish times of activity – Float – Critical activities and critical path – Illustrative examples Problems.

Course Outcomes:

On successful completion of the course, students will be able to

Course Outcomes		POs related to COs
CO1	Describe fundamentals of construction technology and preparatory works	PO1, PO6, PO7
CO2	List various construction equipment and explain associate factors in	PO1, PSO2
CO3	Analyze and develop network diagrams	PO1, PO2, PO3, PO11
CO4	Apply PERT and compute required parameters	PO1, PO2, PO3, PO11
CO5	Analyze network diagrams using CPM	PO1, PO2, PO11

CO – PO MAPPING

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	-	-	-	-	2	1	-	-	-	-	-
CO2	2	-	-	-	-	-	-	-	-	-	-	-
CO3	2	2	2	-	-	-	-	-	-	-	3	-
CO4	2	2	2	-	-	-	-	-	-	-	3	-
CO5	2	2	-	-	-	-	-	-	-	-	3	-
CO*	2	2	2	-	-	2	1	-	-	-	3	-

Text Books:

1. Construction Technology, SubirK.Sarkar and SubhajitSaraswati, Oxford Higher Education Univ.Press, Delhi.
2. Project Planning and Control with PERT and CPM, Dr.Punmia, B.C, Khandelwal, K.K., Lakshmi Publications New Delhi.
3. Construction Project Management, Jha, Pearson publications, New Delhi.

Reference Books:

1. Optimal Design of Water Distribution Networks, Bhave, P.R., 2003, Narosa Publishing house.
2. Operations Research, SankarIyer, P., TMH Pubilications, New Delhi.
3. Operations Research, Ramanathan, N., TMH Pubilications, New Delhi.
4. Total Project Management, The Indian Context, Joy, P.K., Mac Millan Publishers India Limited.
5. Construction Planning, Equipment and Methods, Robert L.Peurifoy, Mcgraw Hill publishing company.

III B.Tech II Semester

L	T	P	C
3	1	0	3

16OCIV322 REMOTE SENSING AND GIS (OPEN ELECTIVE – I)

Course Educational Objectives:

CEO1: To know the basics, importance, analysis and applications of RS and GIS
CEO2: To study the various types of operating systems of RS and GIS
CEO3: To know the applications of RS and GIS

UNIT – 1: EMR AND ITS INTERACTION WITH ATMOSPHERE AND EARTH MATERIAL

Definition of remote sensing and its components – Electromagnetic spectrum – Wavelength regions important to remote sensing – Wave theory, particle theory, Stefan-Boltzman and Wein's displacement law – Atmospheric scattering, absorption – Atmospheric windows – Spectral signature concepts – Typical spectral reflective characteristics of water, vegetation and soil.

UNIT – 2: PLATFORMS AND SENSORS

Types of platforms – Orbit types, sun-synchronous and geosynchronous – Passive and active sensors – Resolution concept – Pay load description of important earth resources and meteorological satellites – Airborne and space borne TIR and microwave sensors.

UNIT – 3: IMAGE INTERPRETATION AND ANALYSIS

Types of data products – Types of image interpretation – Basic elements of image interpretation – Visual interpretation keys – Digital image processing – Pre-processing – Image enhancement techniques – Multispectral image classification – Supervised and unsupervised.

UNIT – 4: GEOGRAPHIC INFORMATION SYSTEM

Introduction – Maps – Definitions – Map projections – Types of map projections – Map analysis – GIS definition – Basic components of GIS – Standard GIS softwares – Data type – Spatial and non-spatial (attribute) data – Measurement scales – Data Base Management Systems (DBMS).

UNIT – 5: DATA ENTRY, STORAGE AND ANALYSIS

Data models – Vector and raster data – Data compression – Data input by digitization and scanning – Attribute data analysis – Integrated data analysis – Modeling in GIS highway alignment studies – Land information system.

Course Outcomes:

On successful completion of the course, students will be able to

Course Outcomes		POs related to COs
CO1	List various theories associated with remote sensing and spectral reflective characteristics	PO1
CO2	Discuss various types of platforms and sensors used in remote sensing applications	PO1
CO3	Know various data interpretation techniques and perform basic analysis	PO1, PO2
CO4	Explain basic features and components of GIS	PO1
CO5	Analyze the data for GIS	PO1, PO2, PO5

CO – PO MAPPING

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	-	-	-	-	-	-	-	-	-	-	-
CO2	2	-	-	-	-	-	-	-	-	-	-	-
CO3	2	2	-	-	-	-	-	-	-	-	-	-
CO4	2	-	-	-	-	-	-	-	-	-	-	-
CO5	2	2	-	-	3	-	-	-	-	-	-	-
CO*	2	2	-	-	3	-	-	-	-	-	-	-

Text Books:

1. Remote Sensing and Image Interpretation, Lillesand,T.M., Kiefer, R.W. and J.W.Chipman, 5/e, 2004, John Willey and Sons Asia Pvt. Ltd., New Delhi.
2. Textbook of Remote Sensing and Geographical Information System, Anji Reddy, M. 2/e, 2001, BS Publications, Hyderabad.

Reference Books:

1. Concepts and Techniques of Geographic Information Systems,Lo. C.P.andA.K.W.Yeung, 2002, Prentice Hall of India Pvt. Ltd., New Delhi.
2. Principles of GIS, Peter A.Burrough, Rachael A. McDonnell, 2000, Oxford University Press.
3. An Introduction to GIS, Ian Heywood, 2000, Pearson Education Asia.

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III B.Tech II Semester

L	T	P	C
3	1	0	3

16OCIV323 GREEN BUILDINGS AND ENERGY CONSERVATION

(OPEN ELECTIVE – I)

Course Educational Objectives:

CEO1: Explore alternate building materials for sustainability

CEO2: Learn mechanism of thermal flow in buildings

CEO3: Learn various governing codes and guidelines for the green buildings

UNIT – 1: GREEN BUILDING CONCEPTS

Orientation – Introduction to bioclimatic architecture, sustainability in building science functional planning – Elements of building design and drawing, regulations and bylaws –Traditional Vs vernacular architecture – Climate zones, design charts, sun path diagram, solar angles, indices of thermal comfort, vernacular buildings in different climate zones.

UNIT – 2: CLIMATE RESPONSIVE SCIENTIFIC PROCESS OF DESIGN

Introduction, various steps, site planning , plan form building envelope landform, topography, vegetation, water bodies; orientation, S/V ratio, P/A ratio, walls, fenestration, roof and floors active Vs passive, passive solar architecture.

UNIT – 3: THERMAL FLOW IN BUILDINGS

Calculation of thermal conductance, heat flow through different building elements; various software ventilation and day lighting – Design and placement of openings – Water management in buildings techniques to recycle, reuse and harvest water.

UNIT – 4: GREEN BUILDING MATERIALS AND CONSTRUCTION

Material properties, energy efficiency using various materials, emerging new materials construction techniques – Techniques for roof, wall and foundations.

UNIT – 5: ECONOMY OF GREEN BUILDING

Cost of building, operation and maintenance – Green building rating system, evaluation criteria of LEED, TERI GRIHA case studies, case studies in different climate zones.

Course Outcomes:

On successful completion of the course, students will be able to

Course Outcomes		POs related to COs
CO1	Explain the basic features of green buildings	PO1, PO6, PO7
CO2	Describe various architectural features of green buildings	PO1, PO6, PO7
CO3	Analyze thermal flow in buildings and compute basic computations relevant to thermal flow	PO1, PO2, PO6, PO7
CO4	Name various green building materials and describe their basic properties	PO1, PO6, PO7, PSO2
CO5	Explain economy aspects of green buildings and Analyze case studies	PO1, PO2, PO6, PO7, PO9

CO – PO MAPPING

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	-	-	-	-	2	3	-	-	-	-	-
CO2	2	-	-	-	-	2	3	-	-	-	-	-
CO3	2	2	-	-	-	2	3	-	-	-	-	-
CO4	2	-	-	-	-	2	3	-	-	-	-	-
CO5	2	2	-	-	-	2	2	-	2	-	-	-
CO*	2	2	-	-	-	2	2	-	2	-	-	-

Text books:

1. Climate Responsive Architecture, A Design Handbook For Energy Efficient Buildings, Krishnan, A., Baker, N., Yannas, S., and Szokolay, S., Eds., 2001, Tata McGraw–Hill Publishing Company, New Delhi.
2. Sustainable building design manual (Vol.II), TERI & ICAEN (InstitutCataladEnergia), 2004, The Energy and Resources Institute (TERI) Press, New Delhi.

Reference Books:

1. Bureau of Indian Standards, SP:41, Handbook on Functional Requirements of Buildings (Other Than Industrial Buildings) 1/e rp,1995, Bureau of Indian Standards, New Delhi.
2. Indian Green Building Council, LEED-India, 2011, LEED 2011 for India- Green building Rating system, abridged reference guide for new construction and major renovations (LEED India NC). Hyderabad: Indian Green Building Council.
3. Manual of Tropical Housing and Building, Koenigsberger, O., ingersoll, T. G., Mayhew, A., &Skozolay, S. V., 2011, Universities Press, Hyderabad.
4. Building Design and Drawing, Prabhu, Balagopal T S, K Vincent Paul, and C Vijayan, 2008, Calicut:Spades Publishers.

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B.TECH III-II SEM (E.E.E)

L	T	P	C
3	1	0	3

16OEEE321 POWER PLANT INSTRUMENTATION (OPEN ELECTIVE – I)

Course objectives:

CEO1: To provide an overview of different methods of power generation with a particular stress on thermal power generation.
CEO2: To bring out the various measurements involved in power generation plants.
CEO3: To provide knowledge about the different types of devices used for analysis.
CEO4: To inpart knowledge about the different types of controls and control loops.
CEO5: To familiarize the student with the methods of monitoring different parameters like speed, vibration of turbines and their control.

UNIT-I OVERVIEW OF POWER GENERATION

Brief survey of methods of power generation – Hydro, thermal, nuclear, solar and wind power – Importance of instrumentation in power generation – Thermal power plants – Block diagram – Details of boiler processes - UP&I diagram of boiler – Cogeneration.

UNIT-II MEASUREMENTS IN POWER PLANTS

Electrical measurements – Current, voltage, power, frequency, power factor etc. – Non electrical parameters – Flow of feed water, fuel, air and steam with correction factor for temperature – Steam pressure and steam temperature – Drum level measurement – Radiation detector – Smoke density measurement – Dust monitor.

UNIT-III ANALYSERS IN POWER PLANTS

Flue gas oxygen analyser – Analysis of impurities in feed water and steam – Dissolved oxygen analyser – Chromatography – pH meter – Fuel analyser – Pollution monitoring instruments.

UNIT-I V CONTROL LOOPS IN BOILER

Combustion control – Air/fuel ratio control – Furnace draft control – Drum level control – Main steam and reheat steam temperature control – Super heater control – Air temperature – Deaerator control – Distributed control system in power plants – Interlocks in boiler operation.

UNIT-V TURBINE – MONITORING AND CONTROL

Speed, vibration, shell temperature monitoring and control – Steam pressure control – Lubricant oil temperature control – Cooling system.

Course Outcomes:

On successful completion of course, student will be able to

	Course Outcomes	POs related to COs
CO1	Understand the basics of Power plant and power generation	PO1
CO2	Analyze the design of Analyzers and control loops used in power plant	PO1, PO2
CO3	Detailed study of the P&I diagram of various power plant.	PO1, PO2
CO4	Acquire knowledge on Pollution monitoring instruments	PO1
CO5	Know the distributed control system in power plants	PO1

.

CO – PO MAPPING

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	-	-	-	-	-	-	-	-	-	-	-
CO2	3	2	-	-	-	-	-	-	-	-	-	-
CO3	2	3	-	-	-	-	-	-	-	-	-	-
CO4	3	-	-	-	-	-	-	-	-	-	-	-
CO5	3	-	-	-	-	-	-	-	-	-	-	-
CO*	2.8	2.5	-	-	-	-	-	-	-	-	-	-

TEXT BOOKS

1. Sam G. Dukelow, 'The Control of Boilers', Instrument Society of America, 1991.
2. P.K. Nag, 'Power Plant Engineering', Tata McGraw Hill, 2001.

REFERENCE BOOKS

1. S.M. Elonka and A.L. Kohal, 'Standard Boiler Operations', Tata McGraw Hill, New Delhi,1994.
2. R.K.Jain, 'Mechanical and Industrial Measurements', Khanna Publishers, New Delhi, 1995.
3. E.Al. Wakil, 'Power Plant Engineering', Tata McGraw Hill, 1984

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B.TECH III-II SEM (E.E.E)

L	T	P	C
3	1	0	3

16OEEE322 NEURAL NETWORKS AND FUZZY LOGIC
(OPEN ELECTIVE – I)

Course objectives:

CEO1: To understand the fundamental theory and concepts of neural networks, neuro modeling, several neural network paradigms and its applications.

CEO2: To understand the concepts of fuzzy sets, knowledge representation using fuzzy rules, approximate reasoning.

CEO3: To know about fuzzy inference systems, and fuzzy logic control and other machine intelligence applications of fuzzy logic.

CEO4: To understand the basics of an evolutionary computing paradigm known as genetic algorithms

CEO5: To know application of genetic algorithms for engineering optimization problems.

UNIT-I ARTIFICIAL NEURAL NETWORKS

Introduction - biological neuron - artificial neuron - basic concepts of neural networks - basic models of ANN connections - Mc-Culloch-pitts model - characteristics of ANN.Artificial neuron model - operations of artificial neuron - types of neuron activation function - ANN Architectures - classification taxonomy of ANN- Connectivity - neural dynamics(Activation and Synaptic) - learning strategy (supervised - unsupervised - reinforcement) - learning rules - types of application.

UNIT-II SUPERVISED LEARNING NETWORKS

Perceptron network - perceptron learning rule - Architecture - perceptron training algorithm - ADALINE - MADALINE

UNIT-III FEEDBACK NEURAL NETWORKS

Back propagation network - BP Learning rule - input layer computation - hidden layer computation - output layer computations - radial basis function.

UNIT-IV ASSOCIATIVE MEMORY NETWORK

Training algorithm for pattern association - Auto associative memory network - Hetero associative memory network - BAM - Hopfield network.

UNIT-V FUZZY LOGIC

Introduction to classical sets – properties - operations and relations; fuzzy sets - member ship - uncertainty - operations - properties - fuzzy relations - cardinalities - membership functions.
Fuzzification - member ship value assignment - development of rule base and decision making system - Defuzzification to crisp sets - Defuzzification methods.

Course Outcomes:

On successful completion of course, student will be able to

Course Outcomes		POs related to COs
CO1	Understand importance of soft computing.	PO1, PO2
CO2	Understand different soft computing techniques like, Fuzzy Logic, Neural Networks and their combination.	PO1, PO2
CO3	Implement algorithms based on soft computing.	PO1
CO4	Apply soft computing techniques to solve engineering or real life problem.	PO1
CO5	Know the concepts of Fuzzy Logic.	PO1, PO2

CO – PO MAPPING

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	-	-	-	-	-	-	-	-	-	-
CO2	3	2	-	-	-	-	-	-	-	-	-	-
CO3	3	-	-	-	-	-	-	-	-	-	-	-
CO4	3	-	-	-	-	-	-	-	-	-	-	-
CO5	3	2	-	-	-	-	-	-	-	-	-	-
CO*	3	2	-	-	-	-	-	-	-	-	-	-

TEXT BOOKS:

1. Introduction to Artificial Neural systems,2/e -2012 , jacek M Zurada-west publishing company USA
2. Neural networks - fuzzy logic - genetic algorithms: synthesis and applications ,1/e -2003, rajasekharan and pai -PHI publications-new Delhi.

REFERENCE BOOKS:

1. Principles of- soft computing ,2/e, S. N. Sivanandam and S.N.Deepa - Wiley india pvt ltd-new Delhi.
2. Nueral Networks and Learning Machines ,3/e,2009,Simon Haykin Phi Learning -new delhi.
3. Soft Computing & Intelligent Systems ,1/e,2007,Madan M Gupta ,Naresh K Sinha ,Elsevier India Pvt Ltd -new delhi.

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B.TECH III-II SEM (E.E.E)

L	T	P	C
3	1	0	3

16OEEE323 SENSORS AND INSTRUMENTATION
(OPEN ELECTIVE – I)

Course objectives:

CEO1: To understand operation of sensors and transducers
CEO2: To gain knowledge in pressure and flow measurement using sensors
CEO3: To gain knowledge in displacement and velocity measurement using sensors
CEO4: To understand how electrical sensors are used to measure non-electrical quantities
CEO5: To understand about photoelectric phenomenon, photoelectric transducers, Photo-voltaic transducers

UNIT I MEASUREMENT, INSTRUMENTATION AND CALIBRATION

Introduction, classification of transducers, performance characteristics-static and dynamic characteristics. Errors in measurement- Gross errors, Systematic errors, Statistical analysis of random errors, calibration and standards- process of calibration, classification for standards, standards for calibration.

UNIT- II PASSIVE ELECTRICAL TRANSDUCER-I

Introduction, Resistive transducers- resistance thermometers, hot wire resistance transducers, Resistive displacement transducer, Resistive strain transducer, resistive pressure transducer, resistive optical radiation transducers.

UNIT- III PASSIVE ELECTRICAL TRANSDUCER-II

Inductive transducers- Inductive thickness transducers, Inductive displacement transducers, Movable core-type Inductive transducers, eddy current type Inductive transducers. Capacitive transducers- Capacitive thickness transducers, capacitive displacement transducers, capacitive moisture transducers.

UNIT- IV ACTIVE ELECTRICAL TRANSDUCERS-I

Introduction, thermoelectric transducers, thermoelectric phenomenon, common thermocouple systems, piezoelectric transducers, piezoelectric phenomenon piezoelectric materials, piezoelectric force transducers, piezoelectric strain, piezoelectric torque transducers, piezoelectric pressure transducers, piezoelectric acceleration transducers.Magnetostrictive transducers- Magnetostrictive force transducers, Magnetostrictive acceleration transducers, Magnetostrictive torsion transducers, Hall Effect transducers, and application of Hall transducer.

UNIT- V ACTIVE ELECTRICAL TRANSDUCERS-II

Electromechanical transducers-Tachometers, variable reluctance tachometers Electrodynamic vibration transducers, Electromagnetic pressure electromagnetic flow meter. Photoelectric transducers- photoelectric phenomenon, photoelectric transducers, Photo-voltaic transducers, Photo emissive transducers.

Course Outcomes:
On successful completion of course, student will be able to

Course Outcomes		POs related to COs
CO1	Acquire knowledge on Temperature measurement sensors.	PO1, PO2
CO2	Know the concepts of Pressure and flow measurement	PO1, PO2
CO3	Understand Displacement and velocity measurement	PO1, PO2
CO4	Gain knowledge on electrical passive transducers.	PO1, PO2
CO5	Understand using electrical active transducers.	PO1, PO2

CO – PO MAPPING

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	-	-	-	-	-	-	-	-	-	-
CO2	3	2	-	-	-	-	-	-	-	-	-	-
CO3	2	3	-	-	-	-	-	-	-	-	-	-
CO4	2	3	-	-	-	-	-	-	-	-	-	-
CO5	2	3	-	-	-	-	-	-	-	-	-	-
CO*	2.4	2.6	-	-	-	-	-	-	-	-	-	-

TEXT BOOKS:

1. Transducers and Instrumentation – D.V.S. Murthy, 2nd Edn, PHI Ltd, 2010.

REFERENCE BOOKS:

1. Measurement Systems: Applications and Design – Ernest O. Doebelin, 5th Edn,TMH, 2004.

2. Peter Elgar ,"Sensors for Measurement and Control", Addison- Wesley Longman Ltd, 1998

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III Year B.Tech II semester

L	T	P	C
3	1	0	3

16OECE321 MACHINE VISION SYSTEM (OPEN ELECTIVE I)

CEO1: To introduce theory, applications and techniques of machine vision to students
CEO2: Provide the students with an understanding of the problems involved in the development of machine vision systems.
CEO3: Introduces the "low-level" algorithms of image processing that are necessary for the "mid-level" vision or feature extraction.
CEO4: To describe and analyze the pattern recognition, and 3D analysis and modeling of objects and scenes.
CEO5: lay emphasis on the practical integration of machine vision systems, and the related applications in real time.

UNIT 1: INTRODUCTION
Human vision – Machine vision and Computer vision – Benefits of machine vision – Block diagram and function of machine vision system implementation of industrial machine vision system – Physics of Light – Interactions of light – Refraction at a spherical surface – Thin Lens Equation

UNIT 2: IMAGE ACQUISITION
Scene constraints – Lighting parameters – Lighting sources, Selection – Lighting Techniques – Types and Selection – Machine Vision Lenses and Optical Filters, Specifications and Selection – Imaging Sensors – CCD and CMOS, Specifications – Interface Architectures – Analog and Digital Cameras – Digital Camera Interfaces – Camera Computer Interfaces, Specifications and Selection – Geometrical Image formation models – Camera Calibration

UNIT 3: IMAGE PROCESSING
Machine Vision Software – Fundamentals of Digital Image – Image Acquisition Modes – Image Processing in Spatial and Frequency Domain – Point Operation, Thresholding, Grayscale Stretching – Neighborhood Operations, Image Smoothing and Sharpening – Edge Detection – Binary Morphology – Colour image processing.

UNIT 4: IMAGE ANALYSIS
Feature extraction – Region Features, Shape and Size features – Texture Analysis – Template Matching and Classification – 3D Machine Vision Techniques – Decision Making.

UNIT 5: MACHINE VISION APPLICATIONS
Machine vision applications in manufacturing, electronics, printing, pharmaceutical, textile, applications in non-visible spectrum, metrology and gauging, OCR and OCV, vision guided robotics – Field and Service Applications – Agricultural, and Bio medical field, augmented reality,surveillance, bio-metrics.

Course Outcomes:
On successful completion of the course the student will be able to

Course Outcomes		POs related to COs
CO1	Formulate the concepts of machine vision system and its applications	PO1, PO2
CO2	Determine the geometrical image formation model and analyze the lighting effects for image acquisition	PO1,PO2, PO3
CO3	Demonstrate various the image acquisition and processing techniques in spatial and frequency domain	PO1, PO2,PO3
CO4	Analyze the digital image for feature extraction and 3D vision techniques for decision making.	PO1, PO2,PO3, PO4
CO5	Apply machine vision concepts and visual sensing technologies in real time applications	PO1, PO2, PO3,PO4

CO – PO Mapping

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	-	-	-	-	-	-	-	-	-	-
CO2	3	3	2	-	-	-	-	-	-	-	-	-
CO3	2	3	2	-	-	-	-	-	-	-	-	-
CO4	3	3	2	2	-	-	-	-	-	-	-	-
CO5	2	3	2	2	-	-	-	-	-	-	-	-
CO*	2.6	2.8	2	2	-	-	-	-	-	-	-	-

TEXT BOOKS:

1. Alexander Hornberg, “Handbook of Machine Vision”, First Edition, Wiley VCH, 2006.
2. Davis E.R., “Machine Vision Theory, Algorithms and Practicalities,” Elsevier, 2005.

REFERENCE BOOKS:

1. Nello Zuech, “Understanding and Applying Machine Vision”, Marcel Decker, 2000.
2. Emanuele Trucco, Alessandro Verri, “Introductory Techniques For 3D Computer Vision”, first Edition.
3. Rafael C.Gonzales, Richard.E.Woods, “Digital Image Processing Using MATLAB”, Mc. Graw Hill Education, 2014.

III Year B.Tech II semester

16OECE322 MEMS and MICROSYSTEMS (Open Elective I)

L	T	P	C
3	1	0	3

OBJECTIVES:

CEO1: To provide knowledge of semiconductors and solid mechanics to fabricate MEMS devices.
CEO2: To educate on the rudiments of Micro actuators, micro accelerometers.
CEO3: To introduce various Materials of Mems and Microsystems.
CEO4: To provide knowledge on deposition of Epitoxy & etching
CEO5: To provide knowledge on Process design, Mechanical desing , Computer aided design.

UNIT-1: Overview of MEMS and Microsystems
MEMS and Microsystems. Typical MEMS and Microsystems Products. Evolution of Microfabrication. Microsystems and Microelectronics. The Multidisciplinary Nature of Microsystems Design and Manufacture. Microsystems and Miniaturization. Application of Microsystems in Automotive Industry. Application of Microsystems in Other Industries Introduction. Microsensors. Microactuation. MEMS with Microactuators. Microaccelerometers. Microfluidics.. Markets for Microsystems.

UNIT-2: Working Principles of Microsystems
Introduction. Microsensors. Microactuation. MEMS with Microactuators. Microaccelerometers. Microfluidics.

UNIT-3: Materials for MEMS and Microsystems
Introduction. Substrates and Wafers. Active Substrate Materials. Silicon as a Substrate Material. Silicon Compounds. Silicon Piezoresistors. Gallium Arsenide. Quartz. Piezoelectric Crystals.Polymers.Packaging Materials.

UNIT-4: Microsystems Fabrication Processes
Introduction. Photolithography. Ion Implantation. Diffusion. Oxidation. Chemical Vapor Deposition. Physical Vapor Deposition - Sputtering. Deposition by Epitaxy. Etching. Summary of Microfabrication.

UNIT -5: Microsystem Design
Introduction. Design Considerations. Process Design. Mechanical Design. Mechanical Design Using Finite Element Method. Design of Silicon Die of a Micropressure Sensor. Design of Microfluidics Network Systems. Computer-Aided Design.

Course Outcomes:

On successful completion of the course the student will be able to

Course Outcomes		POs related to COs
CO1	Be familiar with the important concepts applicable to MEMS, their fabrication.	PO1, PO2
CO2	Be fluent with the design, working principles of micro systems	PO1, PO2, PO3
CO3	To educate on the rudiments of materials of Mems and micro systems	PO1, PO2, PO4
CO4	To introduce the fabrication concepts of micro systems and Etching.	PO1, PO2,PO4
CO5	Apply the MEMS for different applications including process desing and Mechanical design	PO1,PO2,PO3

CO – PO Mapping

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	-	-	-	-	-	-	-	-	-	-
CO2	3	2	2	-	-	-	-	-	-	-	-	-
CO3	2	3	-	2	-	-	-	-	-	-	-	-
CO4	3	3	-	2	-	-	-	-	-	-	-	-
CO5	2	3	2	-	-	-	-	-	-	-	-	-
CO*	2.6	2.6	2	2	-	-	-	-	-	-	-	-

TEXT BOOKS

1. MEMS and MICROSYSTEMS Design and Manufacture-Tai-Ran Hsu-Tata McGraw-Hill Edition 2012.
2. Design and Manufacturing of Active Microsystems (Microtechnology and MEMS) Paperback – Import, 21 Mar 2014 by Stephanus Büttgenbach , Arne Burisch Jürgen Hesselbach
3. Radioisotope Thin-Film Powered Microsystems (MEMS Reference Shelf) Paperback – Import, 7 Nov 2012 by Rajesh Duggirala , Amit Lal , Shankar Radhakrishnan

REFERENCES

1. Francis E.H. Tay and Choong .W.O, “Micro fluidics and Bio mems application”, IEEE Press New York, 1997.
2. Trimmer William S., Ed., “Micromechanics and MEMS”, IEEE Press New York, 1997.
3. Maluf, Nadim, “An introduction to Micro electro mechanical Systems Engineering”, AR Tech house, Boston 2000.
4. Julian W.Gardner, Vijay K.Varadan, Osama O. Awadel Karim, “Micro sensors MEMS and Smart Devices”, John Wiby & sons Ltd., 2001.

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES.
(AUTONOMOUS)
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

IIIYear B.Tech II semester

L	T	P	C
3	1	0	3

16OECE323 FOUNDATION OF NANO-ELECTRONICS (Open Elective I)

Course Objectives:

CEO1: To learn and understand basic concepts of Tunneling and applications
CEO2: To know the techniques of Tunneling Microscope, Double Barrier Tunneling .
CEO3: To gain knowledge about Resolution Enhancement, Electron Lithography, micro machining.
CEO4: To acquire knowledge on Mems Devices , working principles and thermo electricity.
CEO5: TOobtain knowledge on FET, SET structures, Nano wire concepts.

UNIT-1: INTRODUCTION TO TUNNELING

Tunnel junction and applications of tunneling, Tunneling Through a Potential Barrier, Metal-Insulator, Metal-Semiconductor, and Metal-Insulator-Metal Junctions, Coulomb Blockade, Tunnel Junctions, Tunnel Junction Excited by a Current Source.

UNIT-2: TUNNELING DEVICES

Field Emission, Gate—Oxide Tunneling and Hot Electron Effects in nano MOSFETs, Theory of Scanning Tunneling Microscope, Double Barrier Tunneling and the Resonant Tunneling Diode.

UNIT-3: LITHOGRAPHY TECHNIQUES

Introduction to lithography- Contact, proximity printing and Projection Printing, Resolution Enhancement techniques, Positive and negative photoresists, Electron Lithography, Projection Printing. Lithography based on Surface Instabilities: Wetting, De-wetting, Adhesion, Limitations, Resolution and Achievable / line widths, Lift off process, Bulk Micro machining.

UNIT-4: MEMS DEVICES

Introduction to MEMS and NEMS, working principles, micro sensors, micro actuation- thermal actuation, piezoelectric actuation and electrostatic actuation–micro gripers, motors, valves, pumps, accelerometers, fluidics and capillary electrophoresis, active and passive micro fluidic devices, Pizoresistivity, Pizoelectricity and thermoelectricity.

UNIT-5: NANOELECTRONIC DEVICES

Scaling of physical systems – Geometric scaling & Electrical system scaling. The Single-Electron Transistor: The Single- Electron Transistor Single-Electron Transistor Logic, Other SET and FET Structures, Carbon Nanotube Transistors (FETs and SETs), Semiconductor Nanowire FETs and SETs, Molecular SETs and Molecular Electronics.

Course Outcomes:

On successful completion of the course the student will be able to

Course Outcomes		POs related to COs
CO1	To understand and analyze the fundamental physics of nano electronics	PO1
CO2	Describe deep insight techniques of Tunneling Microscope, Double Barrier Tunneling	PO1,PO2
CO3	Discuss various Properties of Resolution Enhancement, Electron Lithography, micro machining	PO1,PO2
CO4	Familiarize with concepts of MEMS devices	PO1
CO5	Acquire the knowledge on FET, SET and Molecular Electronics	PO1,PO2,PO4

CO – PO Mapping

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	-	-	-	-	-	-	-	-	-	-	-
CO2	3	2	-	-	-	-	-	-	-	-	-	-
CO3	3	1	-	-	-	-	-	-	-	-	-	-
CO4	3	-	-	-	-	-	-	-	-	-	-	-
CO5	3	2	-	1	-	-	-	-	-	-	-	-
CO*	3	1.6	-	1	-	-	-	-	-	-	-	-

TEXT BOOK:

1. Stephen D. Senturia, “Microsystem Design, Springer Verlag”, 2001.
2. Marc Madou, “Fundamentals of microfabrication & Nano Technology”, Taylor and Francis, 2011.
3. T. Fukada & W.Mens, “Micro Mechanical system Principle & Technology”, Elsevier, 1998.
4. Julian W.Gardnes, Vijay K. Varda, “Micro sensors MEMS & Smart Devices”, 2001.

Reference Books:

1. Nano Terchnology and Nano Electronics – Materials, devices and measurement Techniques by WR Fahrner – Springer.
2. Nano: The Essentials – Understanding Nano Scinece and Nanotechnology by T.Pradeep; Tata Mc.Graw Hill.
3. Nanoelectronics and Nanosystems – From Transistor to Molecular and Quantum Devices by Karl Goser, Peter Glosekotter, Jan Dienstuhl
4. Quantum-Based Electronic Devices and Systems by M. Dutta and M.A. Stroscio, World Scientific.
5. Micro sensors MEMS& Smart Devices, Julian W.Gardnes, Vijay K. Varda, 2001

III B. TECH II-SEMESTER (CSE)

L	T	P	C
3	1	0	3

16CSE326 DATA MINING AND CASE TOOLS LAB

Course Educational Objectives:

The student should be made to:

CEO1: Build a data warehouse and query it using open source tools like Pentaho Data Integration and Pentaho Business Analytics.

CEO2: Learn data mining tasks using a data mining toolkit

CEO3: Understand the data sets and data pre-processing, Association Rules, Classification and Clustering.

CEO4: Understand various UML Concepts using Rationalrose Software

CEO5: To develop a mini-project by applying the UML Concepts

Data Mining Task 1: Credit Risk Assessment Description: The business of banks is making loans. Assessing the credit worthiness of an applicant is of crucial importance. You have to develop a system to help a loan officer decide whether the credit of a customer is good, or bad. A bank's business rules regarding loans must consider two opposing factors. On the one hand, a bank wants to make as many loans as possible. Interest on these loans is the banks profit source. On the other hand, a bank cannot afford to make too many bad loans. Too many bad loans could lead to the collapse of the bank. The bank's loan policy must involve a compromise: not too strict, and not too lenient. To do the assignment, you first and foremost need some knowledge about the world of credit. You can acquire such knowledge in a number of ways.

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

The German Credit Data:

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

- DM stands for Deutsche Mark, the unit of currency, worth about 90 cents Canadian (but looks and acts like a quarter).
- Owns_telephone. German phone rates are much higher than in Canada so fewer people own telephones.
- foreign_worker. There are millions of these in Germany (many from Turrkey). It is very hard to get German citizenship if you were not born of German parents.
- There are 20 attributes used in judging a loan applicant. The goal is the classify the applicant into one of two categories, good or bad.

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

1. List all the categorical (or nominal) attributes and the real-valued attributes seperately.

2. What attributes do you think might be crucial in making the credit assessment ? Come up with some simple rules in plain English using your selected attributes.

3. One type of model that you can create is a Decision Tree - train a Decision Tree using the complete dataset as the training data. Report the model obtained after training.

4. Suppose you use your above model trained on the complete dataset, and classify credit good/bad for each of the examples in the dataset. What % of examples can you classify correctly? (This is also called testing on the training set) Why do you think you cannot get 100 % training accuracy?

5. Is testing on the training set as you did above a good idea? Why or Why not ?

6. One approach for solving the problem encountered in the previous question is using cross-validation? Describe what is cross-validation briefly. Train a Decision Tree again using cross-validation and report your results. Does your accuracy increase/decrease? Why?

7. Check to see if the data shows a bias against "foreign workers" (attribute 20), or "personal-status" (attribute 9). One way to do this (perhaps rather simple minded) is to remove these attributes from the dataset and see if the decision tree created in those cases is significantly different from the full dataset case which you have already done. To remove an attribute you can use the preprocess tab in Weka's GUI Explorer. Did removing these attributes have any significant effect? Discuss.

8. Another question might be, do you really need to input so many attributes to get good results? Maybe only a few would do. For example, you could try just having attributes 2, 3, 5, 7, 10, 17 (and 21, the class attribute (naturally)). Try out some combinations. (You had removed two attributes in problem 7. Remember to reload the arff data file to get all the attributes initially before you start selecting the ones you want.)

9. sometimes, the cost of rejecting an applicant who actually has a good credit (case 1) might be higher than accepting an applicant who has bad credit (case 2). Instead of counting the misclassifications equally in both cases, give a higher cost to the first case (say cost 5) and lower cost to the second case. You can do this by using a cost matrix in Weka. Train your Decision Tree again and report the Decision Tree and cross-validation results. Are they significantly different from results obtained in problem 6 (using equal cost)?

10. Do you think it is a good idea to prefer simple decision trees instead of having long complex decision trees? How does the complexity of a Decision Tree relate to the bias of the model?

11. You can make your Decision Trees simpler by pruning the nodes. One approach is to use Reduced Error Pruning - Explain this idea briefly. Try reduced error pruning for training your Decision Trees using cross-validation (you can do this in Weka) and report the Decision Tree you obtain? Also, report your accuracy using the pruned model. Does your accuracy increase?

12. How can you convert a Decision Trees into "if-then-else rules". Make up your own small Decision Tree consisting of 2-3 levels and convert it into a set of rules. There also exist different classifiers that

output the model in the form of rules - one such classifier in Weka is rules. PART, train this model and report the set of rules obtained. Sometimes just one attribute can be good enough in making the decision, yes, just one ! Can you predict what attribute that might be in this dataset? OneR classifier uses a single attribute to make decisions (it chooses the attribute based on minimum error). Report the rule obtained by training a one R classifier. Rank the performance of j48, PART and oneR.

Task Resources:

- Andrew Moore's Data Mining Tutorials (See tutorials on Decision Trees and Cross Validation)
- Decision Trees (Source: Tan, MSU)
- Tom Mitchell's book slides (See slides on Concept Learning and Decision Trees)
- Weka resources:
- Introduction to Weka (html version) (download ppt version)
- Download Weka
- Weka Tutorial
- ARFF format
- Using Weka from command line

Case Tools:

Suggested domains for Mini-project:

1. ATM System
2. Library Management System
3. Passport automation system.
4. Hospital Management System
5. College Management System
6. On-line Examination System
7. E-ticketing
8. Recruitment system
9. Conference Management System
10. BPO Management System

Suggested Software Tools:

ArgoUML, Eclipse IDE, Visual Paradigm, Visual case and Rational Suite

Course Outcomes:

On Successful Completion of this Course the Students will be able to

Course Outcomes		POs related to COs
CO1	Create a Data Warehouse and perform data accessing	PO1
CO2	Perform Data Preprocessing such as data cleaning, Transformation and Reduction	PO2
CO3	Analyze the data sets by using Association Rules, Classification and Clustering Techniques.	PO3
CO4	Design different models for solving the problems	PO4
CO5	Develop the mini projects using CASE Tools	PO5
CO6	Follow the ethical principles in implementing the models	PO8
CO7	Do experiments effectively as an individual and as a team member in a group.	PO9
CO8	Communicate verbally and in written form, the understanding about the experiments.	PO10
CO9	Continue updating their skill related to data mining and data warehousing	PO12

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CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	-	-	-	-	-	-	-	-	-	-	-
CO2	-	3	-	-	-	-	-	-	-	-	-	-
CO3	-	-	3	-	-	-	-	-	-	-	-	-
CO4	-	-	-	3	-	-	-	-	-	-	-	-
CO5	-	-	-	-	3	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	3	-	-	-	-
CO7	-	-	-	-	-	-	-	-	2	-	-	-
CO8	-	-	-	-	-	-	-	-	-	3	-	-
CO9	-	-	-	-	-	-	-	-	-	-	-	3
CO*	**3**	**3**	**3**	**3**	3	-	-	3	2	**3**	**-**	**3**

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES.
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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

III B. TECH II-SEMESTER (CSE)

L	T	P	C
3	1	0	3

16CSE327 WEB TECHNOLOGIES LAB

Course Educational Objectives:

The Students Should be made to

CEO1: To design web pages consisting of hyperlinks, tables, images, multimedia content and input forms.

CEO2: To develop web pages with different styles to the HTML elements using CSS.

CEO3: To make use of java scripts to make the web pages responsive and validate the user input.

CEO4: To gain knowledge on PHP scripts using the concepts of functions, arrays and OOP.

CEO5: To develop PHP scripts that can interact with MYSQL databases.

Exercise 1:

Design web pages using html5 which includes the following:

a) Formatting Text
b) Organizing Text
c) Using Links and URLs
d) Tables

Exercise 2:

Design web pages using html5 which includes the following:

a) Images
b) Colors
c) Canvas

Exercise 3:

Create a registration form covering all the input types in the form tag.

Exercise 4:

Create a web page embedding audio and video files using html 5.

Exercise 5:

Design a web page using CSS which includes the following:

a) Backgrounds and Colors
b) Fonts and Text
c) Creating Boxes and Columns
d) Displaying, Positioning and Floating an Element

Exercise 6:

Write a javascript to validate the appropriate fields in the registration form of Exercise 3.

Exercise 7:

Write javascript to work with the following:

a) Window Object
b) Navigator Object
c) Document Object

Exercise 8:

Write JQuery to work with the following:

a) Selectors
b) HTML Attributes
c) Events

Exercise 8:

Write PHP scripts covering the following:

a) Functions
b) Arrays
c) Object Oriented Concepts

Exercise 9:

a) Write a PHP program to read user name and favorite color from the HTML form. Display the name of the user in green color and set user's favorite color as a background for the web page.

b) Write a PHP code to read the username and password entered in the Login form and authenticate with the values available in cookies. If user enters a valid username and password, welcome the user by username otherwise display a message stating that, entered details are invalid.

Exercise 10:

Write a PHP code to read user details entered through the registration form (Exercise 3) and store the details in the MySQL database.

Exercise 11:

Create a table which should contain at least the following fields: username, password, insert the details of the 3 or 4 users who register with the web site by using registration form. Authenticate the user when he submits the login form using the user name and password from the database.

Course Outcomes		POs related to COs
CO1	Demonstrate knowledge on web page design elements	PO1
CO2	Analyze the client side scripting and server side scripting for connectivity	PO2
CO3	Develop the web applications based on the real time requirements	PO3
CO4	Design and analyze the client-server applications using web technologies.	PO4
CO5	Use modern tools to design enterprise web applications.	PO5
CO6	Follow the ethical principles in designing the web applications	PO8
CO7	Do experiments effectively as an individual and as a team member in a group.	PO9
CO8	Communicate verbally and in written form, the understanding about the experiments.	PO10
CO9	Continue updating their skill related to web technologies	PO12

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	-	-	-	-	-	-	-	-	-	-	-
CO2	-	3	-	-	-	-	-	-	-	-	-	-
CO3	-	-	3	-	-	-	-	-	-	-	-	-
CO4	-	-	-	3	-	-	-	-	-	-	-	-
CO5	-	-	-	-	3	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	3	-	-	-	-
CO7	-	-	-	-	-	-	-	-	2	-	-	-
CO8	-	-	-	-	-	-	-	-	-	2	-	-
CO9	-	-	-	-	-	-	-	-	-	-	-	3
CO*	**3**	**3**	**3**	**3**	**3**	**-**	**-**	**3**	**2**	**2**	**-**	**3**

Reference Books:

1. Kogent Learning Solutions Inc, HTML 5 Black Book: Covers CSS3, JavaScript, XML, XHTML, AJAX, PHP and JQuery, Dreamtech Press, Second Edition, 2016.
2. W. Jason Gilmore, Beginning PHP and MySQL, APress, Fourth Edition, 2011.
3. SnigBahumik, Bootstrap Essentials, PACKT Publishing, 2015. (e-book).

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III B. TECH II-SEMESTER (CSE)

L	T	P	C
2	0	0	1

16CSE328 ONLINE COMPREHENSIVE EXAM-II

Course Educational Objectives:

CEO1 : To assess the comprehensive knowledge gained in basic courses relevant to the branch of study.

CEO2 : To comprehend the questions asked and answer them with confidence.

On-line Comprehensive Test:

On-line comprehensive test will be conducted at the end of the II year II semester with 100 objective questions (multiple choice questions) for 100 marks on the courses studied in the respective semesters (II year I semester and II year II semester).

Course Outcomes:
On successful completion of the course, students will be able to

Course Outcomes		POs related to COs
CO1	Understand and comprehend any given problem related to computer science and engineering field.	PO1,PO2,PO3,PO4, PO5,PO6, PO7, PO8, PO9,PO10,PO11,PO12
CO2	The students will be confident in discussing the fundamental aspects of any engineering problem/situation and give answers in dealing with them.	PO1,PO2,PO3,PO4, PO5,PO6, PO7, PO8, PO9,PO10,PO11,PO12

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	3	3	3	3	3	3	3	3	3	3	3
CO2	3	3	3	3	3	3	3	3	3	3	3	3
CO*	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**

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III B. TECH II-SEMESTER (CSE)

L	T	P	C
2	0	0	0

P&T REASONING AND APTITUDE - II

Course Educational Objectives:

CEO1: To apply quantitative reasoning and mathematical analysis methodologies to understand and solve problems.

REASONING AND APTITUDE

Time and work – Pipes and cistern – Time, distance and speed – Problems on trains – Boats and streams – Allegations / mixture – Permutations and combinations – Probability – Logarithms – Analogy – Classifications – Completion of incomplete patterns – Area, surface area and volume – Heights and distances – Calendars' based problems – Clocks – Data interpretation (tabulation- line graphs, bar graphs, pie charts) – Data sufficiency.

Course Outcomes:
On successful completion of the course, students will be able to

Course Outcomes		POs related to COs
CO1	Apply the mathematical concepts in real life problem solving methodologies.	PO1, PO2, PO3, PO4, PO5, PO6, PO7, PO8, PO9, PO10,PO11, PO12
CO2	Apply the reasoning knowledge in real life problem solving methodologies.	PO1, PO2, PO3, PO4, PO5, PO6, PO7, PO8, PO9, PO10,PO11, PO12

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	3	3	3	3	3	3	3	3	3	3	3
CO2	3	3	3	3	3	3	3	3	3	3	3	3
CO*	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**

Text Books:

1. Quantitative Aptitude, Dr.R.S.Aggarwal, 2012, S.Chand and Company Ltd, New Delhi.
2. A Modern Approach to Verbal and Non-Verbal Reasoning, Dr.R.S.Aggarwal, 2012, S.Chand and Company Ltd, New Delhi.

Reference Books:

1. Quantitative Aptitude for Competitive Examinations, AbhijitGuha, 14/e, 2010, Tata McGraw Hill Publishers, New Delhi.
2. Course in Mental Ability and Quantitative Aptitude, Edgar Thorpe, 3/e, 2012, Tata McGraw Hill Publishers, New Delhi.Fast Track Objective Arithmetic, Rajesh Verma, 2012, Arihant Publications, Meerut

IV B. TECH I-SEMESTER (CSE)	L	T	P	C
	3	1	0	3

16CSE411 CRYPTOGRAPHY AND NETWORK SECURITY

Course Educational Objectives:

CEO1: To understand basics of Cryptography and Network Security. Identify computer and network security threats, classify the threats and develop a security model to prevent, detect and recover from the attacks.
CEO2: Encrypt and decrypt messages using block ciphers, sign and verify messages using well known signature generation and verification algorithms.
CEO3: Analyze existing authentication and key agreement protocols; identify the weaknesses of these protocols.
CEO4: Download and install an e-mail and file security software, PGP, and efficiently use the code to encrypt and sign messages.
CEO5: Develop SSL or Firewall based solutions against security threats, employ access control techniques.

UNIT - 1: Classical Encryption Techniques

Security attacks - Security services and mechanisms - A model for Network Security - Classical encryption techniques - Symmetric cipher model - Substitution techniques - Caesar Cipher - Mono alphabetic Cipher - Play fair Cipher - Hill Cipher - Transposition techniques.

UNIT - 2: Block Ciphers- Data Encryption Standards and Public Key Cryptography

Simplified DES - Block Cipher Principles - DES – AES - Block Cipher Design Principles - Block Cipher modes of Operation - Public Key Cryptography - Principles of Public Key Cryptosystems - The RSA Algorithm -Diffie Hellman Key Exchange.

UNIT - 3: Message Authentication Codes - Hash Functions And Digital Signatures

Message Authentication Requirements - Message Authentication Functions - Message Authentication Codes - Hash Functions - Security of Hash Functions and MACs - Hash algorithms – SHA – HMAC - Digital Signatures -Digital Signature Standard(DSS) - Authentication applications – Kerberos - X.509 Authentication Service

UNIT - 4: Electronic Mail and IP Security

Pretty good privacy - S/MIME - IPsec overview – architecture - Authentication Header and Encapsulating security pay load - combining security associates.

UNIT - 5: Web Security-Intruders-Firewalls

Web security considerations - Secure socket layer and transport layer security - Secure electronic transaction - Intruders - Intrusion detection - Password management - Firewall design and principles - Trusted systems.

Course Outcomes:

On successful completion of this course the students should be able to:

Course Outcomes		POs related to COs
CO1	Demonstrate the basic knowledge of Cryptography and Network Security, Identify network security threats, classify the threats and develop a security model to prevent, detect and recover from the attacks and encrypt and decrypt messages.	PO1, PO2, PO3, PO4
CO2	Demonstrate, analyze and develop the key generation algorithm and Investigate the sign and verify messages using well known signature generation and verification algorithms.	PO1, PO2, PO3, PO4
CO3	Demonstrate the knowledge on authentication and key management protocol and analyze the existing authentication and key agreement protocols.	PO1, PO2, PO3, PO4
CO4	Demonstrate the PGP and e-mail security and applying e-mail and file security.	PO1, PO2, PO3, PO5
CO5	Develop SSL/Firewall.	PO1, PO2, PO3, PO4

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	2	3	3	2	-	-	-	-	-	-	-	-
CO2	3	3	3	3	-	-	-	-	-	-	-	-
CO3	3	3	2	3	-	-	-	-	-	-	-	-
CO4	2	3	2	-	1	-	-	-	-	-	-	-
CO5	2	3	3	2	2	-	-	-	-	-	-	-
CO*	**2.4**	**3**	**2.6**	**2.5**	**1.5**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

Text Books:

1. Cryptography and Network Security: Principles and Practices,4/e, William Stallings Low Price Edition, 2008, Pearson Education.
2. Network Security and Cryptography, 1/e, Bernard Menezes, 2010,Thomson Press Ltd,USA.

Reference Books:

1. Principles and Practices of Information Security,4/e, Michal E. Whitman and Herbert J. Mattord, 2012,CengageLearning, New Delhi.
2. Network Security Essentials (Applications and Standards), 4/e, William Stallings Pearson Education.
3. Hack Proofing your network , 2/e ,Ryan Russell, Dan Kaminsky, Rain Forest Puppy, Joe Grand, David Ahmad, Hal Flynn IdoDubrawsky, Steve W.Manzuik and Ryan Permeh,wileyDreamtech, 2002.
4. Fundamentals of Network Security, 1/e, Eric Maiwald (Dreamtech press) ,2008.
5. Network Security - Private Communication in a Public World,2/e, Charlie Kaufman, Radia Perlman and Mike Speciner,2002, Pearson/PHI.

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IV B. TECH I-SEMESTER (CSE)	**L**	**T**	**P**	**C**
	3	**1**	**0**	**3**

16CSE412 BIG DATA ANALYTICS

Course Educational Objectives:

CEO1: To familiar with theconcept, sources, characteristics and challenge of big data platform.
CEO2: To apply the skills to manage Hadoop and HDFS.
CEO3: Togain knowledge on developing the Map Reduce application.
CEO4: To know how to work with Pig and Hive.
CEO5: To understand the concepts of HBASE, Zookeeper andSqoop

UNIT – 1: Introduction To Big Data
Introduction to Big Data platform- What is Big Data? Big Data Sources-Acquisition-Nuts and Bolts of Big data-Features of Big Data-Security - Compliance - auditing and protection-Evolution of Big Data-Best practices for Big Data Analytics-Big Data characteristics- Volume - Veracity - Velocity - Variety- Structure of Big Data- Exploring the opportunities with Big Data.

UNIT - 2: Hadoop
Introduction to Hadoop-Data Storage and Analysis- Comparison with Other Systems - A brief history of Hadoop - Apache Hadoop and The Hadoop Ecosystem - The Hadoop Distributed File System - The Design of HDFS-HDFS concepts - The Command Line Interface- Hadoop File systems- The Java Interface - Data Flow - parallel copying with distcp-Hadoop Archives - Hadoop I/O - Data Integrity-Compression-Serialization- File Based Data Structures.

UNIT – 3: Map Reduce Programming
Developing a Map Reduce Application - How Map Reduce Works - Anatomy of a Map Reduce Job run-Failures-Job Scheduling-Shuffle and Sort - Map Reduce Types and Formats - Map Reduce Features.

UNIT – 4: Working With Pig and Hive
Installing and running pig- An Example- Comparison with Databases- Pig Latinscripts-User defined functions-Data processing Operators-Pig in Practice.
Installing Hive-Running Hive-Comparison with Traditional Databases – HiveQL – Tables-Querying Data.

UNIT – 5: Hbase- Zookeeper - Sqoop
HBasics – Concepts – Example-HBase Versus RDBMS-Praxis – Zookeeper-Installing and Running Zookeeper – Example-Zookeeper Services-Building applications with Zookeeper - Introduction to Sqoop-Database Imports-Working with Imported data-Importing large objects-performing exports.
Case Study - Apache Oozie and Apache Flume.

Course Outcomes:
On successful completion of this course the students should be able to:

	Course Outcomes	POs related to COs
CO1	Understand the concept and challenge of big data and why existing technology is inadequate to analyze the big data.	PO1, PO2
CO2	ManageHadoop data storage and file system.	PO1, PO2, PO4
CO3	Design the application using Map Reduce programming	PO1, PO2, PO3
CO4	Perform operations on Pig and Hive	PO1, PO2, PO3, PO5
CO5	Analyze the concepts of HBASE, Zookeeper andSqoop	PO1, PO2, PO3, PO4, PO5

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	3	-	-	-	-	-	-	-	-	-	-
CO2	3	3	-	3	-	-	-	-	-	-	-	-
CO3	3	3	3	-	-	-	-	-	-	-	-	-
CO4	3	3	3	-	3	-	-	-	-	-	-	-
CO5	3	3	3	3	3	-	-	-	-	-	-	-
CO*	**3**	**3**	**3**	**3**	**3**	-	-	-	-	-	-	-

Text Books:

1. Hadoop- the definitive guide, Tom White,O'Relly Media, 2010.
2. Big Data for Dummies, Hurwitz, Alan Nugent, Dr. Fern Halper, Marcia Kaufman, John Wiley & Sons , 2012

Reference Books:

1. Taming the Big Data Tidal Wave: Finding Opportunities in Huge Data Streams with Advanced Analytics,Bill Franks, John Wiley &Sons, 2012.
2. Big Data Analytics: Turning big Data in to Big Money, Frank J Ohlhorst, Wiley and SAS Business series, 2012

IV B. TECH I-SEMESTER (CSE)

L	T	P	C
3	1	0	3

16CSE413 MOBILE APPLICATION DEVELOPMENT

Course Educational Objectives:

CEO1: To learn the characteristics of mobile applications.
CEO2: To gain knowledge about the intricacies of UI required by mobile applications.
CEO3: To study about the design aspects of mobile application.
CEO4: To identify the different options in designing the mobile application
CEO5: To evaluate the techniques for the installation of mobile applications and delivery via various channels.

UNIT- 1: Java Review & Introduction and Installation of Android Tools

Java Review - OOPs Concepts - Method Overriding - Android Overview - History - Android Versions - Android Flavors -Android Stack – Linux - Native Layer -Dalvik Virtual Machine - Application Framework – Applications - Installation and Use of Android Tools - Installing JDK - Installing the Android SDK - Anatomy of an Android Project - Drawable Resources - Steps in Building Projects in Android - Android Emulator

UNIT– 2: User Interface Android Building Blocksand User Interface

XML Introduction - Need of XML for Android User Interface – Creating user interface using XML – Drag and Drop methods - Overview of Android Building Blocks: Activities - Activity Life Cycle – Methods in Activity Life Cycle. Services - Services Life Cycle –Intents - Types – Creation - Content Providers - Application Context - Android User Interface - Types and creation - Views and Layout - The Status Activity Layout - The Status Activity Java Class - Logging Messages in Android - Threading in Android – Examples using Threading

UNIT– 3: Application Design Fragments- Intents- Action Bar- Services and Content Providers

Fragments: Definition – Types - Fragment Life cycle – Creating a Fragment in android - Dynamically Adding Fragments - Example. Intents: Definition – Usage of Intends – Creation of Indents with example program - Action Bar - Preferences and Action Bar - Shared Preferences - Updating Status Fragment- Android File systems - Content Providers - Overview – Role of Content Providers - Databases on Android - SQLite - Status Contract Class - Update Refresh Service - Content Provider Example Program

UNIT– 4: Lists- Adapters and Broadcast Receivers

Lists and Adapters – Types of Adapters – Example using Adapters - Loading the Data - Custom Logic via View Binder - Details View.

Menus: Types and Creation - Broadcast Receivers: About Broadcast Receivers –Broadcasting Intends and their related API - Boot Receiver - Alarms and system services – Examples on alarms and services.

UNIT– 5: Applications Widgets- Networking- Web Overview- Interaction and Sensors

App Widgets: Content Providers through Widgets - Networking and Web Overview: HTTP API - Apache HTTP Client - Http URL Connection - Networking in Background using AsyncTask and AsyncTask Loader Classes.

Interaction and Animation: Live Wallpaper and Handlers - Sensors: Sensor API in Android - Motion Sensor - Position Sensor- Environmental Sensor- Sensor Values- Sensor Manager Class - Sensor

Class - Sensor Event class - Sensor Event Listener interface - Compass Accelerometer and orientation Sensors - Sensor Examples

Course Outcomes:

On successful completion of this course the students should be able to:

Course Outcomes		POs related to COs
CO1	Recollect the essential concepts of java and get familiar with android basics and installation.	PO1, PO2
CO2	Create User Interfaces with various Layouts and views using android building blocks.	PO1, PO2, PO4
CO3	Write programs on fragments - intents	PO1, PO2, PO3
CO4	Use the applicability of lists based on adapters and broadcast receivers.	PO1, PO2, PO3, PO5
CO5	Develop widgets - wall paper and sensor programs for android application development	PO1, PO2, PO3,

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	3	-	-	-	-	-	-	-	-	-	-
CO2	3	3	-	3	-	-	-	-	-	-	-	-
CO3	3	3	3	-	-	-	-	-	-	-	-	-
CO4	3	3	3	-	3	-	-	-	-	-	-	-
CO5	3	3	3	-	-	-	-	-	-	-	-	-
CO*	**3**	**3**	**3**	**3**	**3**	-	-	-	-	-	-	-

Text books:

1. Learning Android, Marko Gargenta& Masumi Nakamura, O'Reilly - II Edition
2. Android Programming for Beginners, John Horton, PACKT publishers

Reference Books:

1. Android application Development, Black Book,PradeepKothari,Dreamtech
2. Head First Android Development: A Brain-Friendly Guide, 2/e, Dawn Griffiths and David Griffiths, O'Reilly.
3. Android System Programming, Roger Ye, PACKT publishers
4. Programming Android, ZigurdMednieks,LairdDornin,G.BlakeMeike& Masumi Nakamura, O'Reilly
5. Android Application Development All in One for Dummies,2nd Edition, Barry Burd, Wiley.

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IV B. TECH I-SEMESTER (CSE)	**L**	**T**	**P**	**C**
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16CSE414A SOFTWARE PROJECT MANAGEMENT (CORE ELECTIVE-II)

Course Educational Objectives:

CEO1: To Understand the fundamental principles of Software Project management & will also have good knowledge of responsibilities of project manager and how to handle these.
CEO2: To present basic knowledge in conventional and modern software project management principles.
CEO3: To identify the steps of project planning, management, quality assurance and their relationships.
CEO4: To develop their skills for tracking, controlling software deliverables with in schedule and budget.
CEO5: To identify and develop the good knowledge of the issues and challenges faced while doing thesoftware project.

UNIT 1: Understand the Basics
Manage your people – Managing project culture – Managing good people – Making good people-better – Leading good people – Implement your process – Putting a process in place – implementing a process – Adopting an agile process – Assessing a process – Leverage your tools – Choosing tools – Training to use tools – Leveraging tools – Use your measurements – Selecting measurements – Planning measurement – Leveraging measurement.

UNIT 2: Conventional and Modern Software Management
Principles of conventional software engineering - Principles of modern software management - Transitioning to an iterative process - Life cycle phases - Engineering and production stages - Inception phases - Elaboration phases - Construction phases - Transition phases.

UNIT 3: Artifacts of the Process and Model based Software Architectures
The artifact sets - Management artifacts - Engineering artifacts - Programmatic artifacts – Model based software architectures - A management perspective and technical perspective - Workflows of the process - Software process workflows - Iteration workflows - Checkpoints of the process – Major milestones - Minor milestones - Periodic status assessments.

UNIT 4: **Iterative process planning- Project Organizations and Responsibilities**
Work break down structures - Planning guidelines – The cost and schedule estimating process – The iteration planning process - Pragmatic planning -Line of business organizations - Project organizations - Evolution of organizations – Process automation - Automation building blocks - The project environment.

UNIT 5: Project Control and Process Instrumentation
The seven core metrics - Management indicators - Quality indicators - Life cycle expectations - pragmatic software metrics - Metrics automation - Tailoring the process - Process discriminates-Example.

Course Outcomes:

On successful completion of this course, the students should be able to:

COURSE OUTCOMES		POs related to COS
CO1	Implement a project to manage project schedule, expenses and resources of application.	PO1, PO2, PO3, PO4
CO2	Identify the resources required for a project and to produce a work plan and resource schedule.	PO1, PO2
CO3	Design and develop project plans to address real-world management challenges.	PO1, PO2, PO3
CO4	Aware of project management theories, tools, techniques and methods to manage the software projects at each stage of software development life cycle.	PO1, PO2, PO3, PO4
CO5	Understand modern software project management principles as a member and leader in a team to manage the projects.	PO1, PO2

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	3	3	3	-	-	-	-	-	-	-	-
CO2	3	3	-	-	-	-	-	-	-	-	-	-
CO3	3	3	3	-	-	-	-	-	-	-	-	-
CO4	3	3	3	3	2	-	-	-	-	-	-	-
CO5	2	2	-	-	-	-	-	-	-	-	-	-
CO*	**2.8**	**2.8**	**3**	**3**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

Text Books:

1. Software Project Management, 1/e, Walker Rayce, 1998, PEA, New Delhi.
2. Software Project Management, 2/e, Henrey, 2009, Pearson Education, New Delhi.

Reference Books:

1. Software Engineering Project Management, 2/e,Richard H. Thayer, 1997, IEEE Computer Society, US.
2. Software Engineering and Management, 2/e, Shere K. D 1998, PHI, New Delhi.
3. Software Project Management: A Concise Study, 2/e, S. A. Kelkar ,2009 , PHI, New Delhi.
4. Software Project Management, 5/e, Hughes Cotterell, 2011,TMH, India.
5. Software Project Management, 1/e,Mohapatra S 2011, Penguin Books Ltd, London, UK.

IV B. TECH I-SEMESTER (CSE)

L	T	P	C
3	1	0	3

16CSE414B ADVANCED COMPUTER ARCHITECTURE (CORE ELECTIVE-II)

Course Educational Objectives:

CEO1: To gain knowledge on different types of modern and high performance computers.
CEO2: To describe the types of Memory and the Processor Performance Principles.
CEO3: To understand the designs of Multiprocessor and Multi computer Architectures.
CEO4: To know the principles of Vector Processors and Multi-threading concepts.
CEO5: To analyze Instruction Level Parallelism in Parallel computers.

UNIT – 1: Parallel Computer Models - Program and Networks Properties

The state of computing - Multiprocessors and multi computers- Multi vector and SIMD computers - PRAM and VLSI models - Architectural development tracks - Conditions of parallelism - Program partitioning and scheduling - Program flow mechanisms - System interconnect architectures

UNIT – 2: Principles of Scalable Performance- Processors and Memory Hierarchy

Performance metrics and measures - Parallel processing applications - Speedup performance laws - Scalability analysis and approaches - Advanced processor technology - Superscalar and vector processors - Memory hierarchy technology

UNIT – 3: Bus- Cache - Shared Memory - Multiprocessors and Multicomputer

Bus systems - Cache memory organizations - Shared memory organizations - Pipelining and super scalar techniques - Linear pipeline processors - Nonlinear pipeline processors - Instruction pipeline design - Arithmetic pipeline design - Multiprocessor system interconnects - cache coherence and synchronization mechanisms - Three generations of multicomputers - Message passing mechanisms

UNIT – 4: Multi Vector and SIMD Computers

Vector processing principles - Multi vector multiprocessors - Compound vector processing - SIMD Computer organizations - Scalable multithreaded and dataflow architectures - Latency hiding techniques - Principles of multithreading - Fine grain multi computers - Scalable and multithreaded architectures - Dataflow and hybrid architectures

UNIT – 5: Instruction Level Parallelism and its Dynamic Exploitation

Concepts and challenges – Overcoming data hazards with dynamic scheduling - Dynamic scheduling – Reducing branch costs with dynamic hardware prediction – High performance instruction delivery – Advantages of ILP with multiple issue – Hardware based speculation – Limitations of ILP

Course Outcomes:

On successful completion of this course, the students should be able to:

Course Outcomes		POs related to COs
CO1	Have knowledge on different types of Parallel computers.	PO1, PO2
CO2	Understand the Basic Concepts Used in Advanced Computers.	PO1, PO2, PO4
CO3	Understand the designs of Super Computer Architectures.	PO1, PO2, PO3
CO4	Analyze how computer performance can increase using Vector Processors and Multi-threading concepts.	PO1, PO2, PO3
CO5	Analyze the Instruction Level Parallelism in Parallel computers to increase speed.	PO1, PO2, PO3

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	3	-	-	-	-	-	-	-	-	-	-
CO2	3	3	-	3	-	-	-	-	-	-	-	-
CO3	3	3	3	-	-	-	-	-	-	-	-	-
CO4	3	3	3	-	-	-	-	-	-	-	-	-
CO5	3	3	3	-	-	-	-	-	-	-	-	-
CO*	**3**	**3**	**3**	**3**	-	-	-	-	-	-	-	-

Text Books:

1. Advanced Computer Architecture, 2/e, Kai Hwang and Jotwani, 2010, McGraw-Hill Publications,India.
2. Computer Architecture A quantitative approach, 3/e, John L.Hennessy and David A. Patterson, Morgan Kufmann (An Imprint of Elsevier) , Massachusetts, 2003, US.

Reference Books:

1. Advanced Computer Architecture, 1/e,D.Sima, T.Fountain, P.Kacsuk, 2010, Pearson Education, New Delhi.
2. Advanced Computer Architecture, 1/e, R.C.Dubey, 2010, Chand& Co Ltd,New Delhi, India.
3. Computer Architecture and Parallel Processing, 1/e,Hwang and Briggs, 1986, TMH, India.
4. Advanced Computer Architecture, 1/e, Amith Kumar Mishra, S K Kataria and Sons, 2012, New Delhi, India.
5. Advanced Computer Architectures. 1/e, Sajjan G. Shiva , 2005, CRC Press , US

IV B. TECH I-SEMESTER (CSE)	L	T	P	C
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16CSE414C SOFT COMPUTING (CORE ELECTIVE-II)

Course Educational Objectives:

CEO 1: To learn the Basics of Artificial Neural Networks and Learning Algorithms.
CEO 2: To Understand appropriate learning rules for each of the architectures and learn several neural network paradigms.
CEO 3: To introduce the fuzzy logic concepts, fuzzy principles and relations.
CEO 4: To studyfuzzy arithmetic and fuzzy logic with their day to day applications.
CEO 5: To learn the Genetic Algorithm and its applications to soft computing.

UNIT - 1: Introduction to Artificial Neural Networks (ANN)

Introduction - Fundamental concept - Basic models of ANN - Terminologies of ANN – MCCullochpitts neuron - Linear separability - Hebb network - Supervised learning network - Perception networks - Adaptive linear neuron - Back propagation network

UNIT - 2: Associative Memory Networks

Training algorithms for pattern association - Auto associative memory network – BAM - Hopfield networks - Unsupervised learning network - Fixed weight competitive nets - Kohonenself organizing feature maps - Learning vector quantization - Counter propagation network - Adaptive Resonance theory network

UNIT – 3: Introduction to Fuzzy Logic

Classical sets - Fuzzy sets - Classical relations and fuzzy relations - Cartesian product of relations - Classical relation - Fuzzy relations - Tolerance and equivalence relations - Membership functions - Features of the membership function – Fuzzification - Methods of membership value assignments

UNIT – 4: Defuzzification

Lambda cuts for fuzzy set (alpha cuts) - Lamda cuts for fuzzy relations - Defuzzification methods - Fuzzy arithmetic and fuzzy measures -Fuzzy rule base and approximate reasoning

UNIT - 5: Genetic Algorithm and Applications

Introduction - Biological background - Traditional optimization and search techniques - Genetic algorithm and search space - Terminologies in genetic algorithm - General genetic algorithm - Operators in genetic algorithm - Problem solving using genetic algorithm.

Advanced applications: Printed character recognization - Inverse kinematics problems - Automobile MPG prediction - Genetic algorithms in game playing

Course Outcomes:

On successful completion of the course the student will be able to,

	Course Outcomes	POs related to COs
CO1	To understand the fundamental theory and concepts of neural networks, Identify different neural network architectures, algorithms, applications and their limitations	PO1, PO2
CO2	Understand appropriate learning rules for each of the architectures and learn several neural network paradigms and its applications	PO1, PO2, PO3, PO4
CO3	Comprehend the fuzzy logic and the concept of fuzziness involved in various systems and fuzzy set theory	PO1, PO2
CO4	Understand the concepts of fuzzy sets, knowledge representation using fuzzy rules, approximate reasoning, fuzzy inference systems, and fuzzy logic	PO1, PO3, PO5
CO5	List the facts and outline the different process carried out in Genetic Algorithms and their applications.	PO1, PO2, PO4, PO5

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	3	-	-	-	-	-	-	-	-	-	-
CO2	3	3	3	3	-	-	-	-	-	-	-	-
CO3	3	3	-	-	-	-	-	-	-	-	-	-
CO4	3	3	-	-	3	-	-	-	-	-	-	-
CO5	3	3	-	3	3	-	-	-	-	-	-	-
CO*	**3**	**3**	**3**	**3**	**3**	-	-	-	-	-	-	-

Text Books:

1. Principles of Soft Computing, 1/e , S.N. Sivanandam and S.N. Deepa, 2007 Wiley India Ltd, First Indian Edition, India.
2. Neuro-Fuzzy and Soft Computing, 1/e, Jyh-Shing Roger Jang, Chuen, Tsai Sun, EijiMizutani,2003, Prentice-Hall of India,India.

Reference Books:

1. Neural Networks Algorithms Applications, and Programming Techniques, James A. Freeman and David M. Skapura, 2003, PearsonEdition, India.
2. Fuzzy Sets and Fuzzy Logic-Theory and Applications, George J. Klir and Bo Yuan, 1995, Prentice Hall, India.
3. Artificial Intelligence and Soft Computing, AmitKonar, 2000, CRC Press, First Edition, India.
4. Neural Networks: A Comprehensive Foundation, 2/e, Simon Haykin, 2008, Pearson Education, New Delhi, India.
5. Soft Computing and Intelligent System Design, 1/e,Fakhreddine O. Karry Clarence de Silva2009, Pearson Education, New Delhi, India.

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IV B. TECH I-SEMESTER (CSE)	**L**	**T**	**P**	**C**
	3	**1**	**0**	**3**

16CSE414D SYSTEM MODELING AND SIMULATION (CORE ELECTIVE-II)

Course Educational Outcomes:
CEO1: To gain knowledge about the system and principles used for modelling.
CEO2: To understand different random number generation techniques for evaluating the system.
CEO3: To analyze numerical computation techniques for continuous and discrete models.
CEO4: To study System Dynamics and Probability Concepts in Simulation.
CEO5: To perform Discrete System Simulation for real time scenarios

UNIT – 1: Introduction to Simulation and System Models
The concepts of a system - System environment - Stochastic activities - Continuous and discrete systems - System modelling - Types of models - Static and dynamic physical models - Static and dynamic mathematical models - Principles used in modelling - Advantages and disadvantages of simulation - Areas of application - Systems and system environment - Discrete event system simulation - Steps in a simulation study

UNIT – 2: Random Numbers
Random number generation - Properties of random numbers - Generation of pseudo random numbers - Techniques of generating random numbers - Linear congruential method - Tests for random numbers - Random variate generation - Inverse transform technique - Exponential distribution - Uniform distribution - Weibull distribution - Empirical continuous distribution – Direct transformation for normal distribution – Convolution method - Erlang distribution - Acceptance-rejection technique

UNIT – 3: System Simulation and Continuous System Simulation
Types of system simulation - Monte carlo method - Comparison of simulation and analytical methods - Numerical computation techniques for continuous and discrete models - Distributed lag models - Cobweb model - Continuous system models - Analog and hybrid computers - Digital analog simulators - Continuous system simulation languages - Hybrid simulation - Real time simulations

UNIT – 4: System Dynamics and Probability Concepts in Simulation
Exponential growth and decay models - Logistic curves - Generalization of growth models - System dynamics diagrams - Multi segment models - Representation of time delays - Discrete and continuous probability functions - Continuous uniformly distributed random numbers

UNIT – 5: Arrival Patterns and Discrete System Simulation
Poisson arrival patterns - Exponential distribution - Hyper exponential distribution - Service times – The normal distribution - Queuing disciplines – Measures of queues – Discrete events – Representation of time – Generation of arrival patterns – Simulation of a telephone system – Delayed calls – Simulation programming tasks – Gathering statistics – Counters and summary statistics – Measuring utilization and occupancy – Recording distribution and transit times – Discrete simulation languages

Course Outcomes:

On successful completion of this course, the students should be able to:

	Course Outcomes	POs related to COs
CO1	Acquire the knowledge about system and principles used for modelling.	PO1, PO2
CO2	Use random number generation techniques to solve the issues in system.	PO1, PO2, PO5
CO3	Analyze the hybrid and real time simulations using continuous system simulation.	PO1, PO2
CO4	Understand the System Dynamics and Probability Concepts in Simulation.	PO1, PO2, PO4
CO5	Develop the simulation for real time scenarios	PO1, PO2, PO3, PO4, PO5

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	3	-	-	-	-	-	-	-	-	-	-
CO2	3	3	-	-	3	-	-	-	-	-	-	-
CO3	3	3	-	-	-	-	-	-	-	-	-	-
CO4	3	3	-	3	-	-	-	-	-	-	-	-
CO5	3	3	3	3	3	-	-	-	-	-	-	-
CO*	**3**	**3**	**3**	**3**	**3**	-	-	-	-	-	-	-

Text Books:

1. System simulation, 2/e, GeoffreyGorden, 2006,Prentice Hall of India, New Delhi,India.
2. Discrete Event System Simulation, 2/e, Jerry Banks,John Carson, Barry L.Nelson and David Nicol -2000, Prentice Hall Inc, New Delhi , India.

Reference Books:

1. Simulation Modelling, 1/e,Seila ,Cengage Learning,2003, New Delhi, India.
2. Simulation Modelling and Analysis, 3/e, Law, 2000 McGraw-Hill, Hyderabad, India.
3. System Simulation with Digital Computer, 2/e, Deo, 1983 PHI, NewDelhi, India.
4. Simulation Modelling Methods, 1/e, Harrington, 2000,McGraw-Hill, Hyderabad, India.
5. System Modelling and Simulation, 1/e, Severance,2001,WileyPublications,New Delhi, India.

IV B. Tech I-Semester

T	P	C
4	0	3

16CSE 415A CLOUD COMPUTING (ELECTIVE-I)

Course Educational Objectives:

CEO1: To provide knowledge on different types of Computing Systems and types of Cloud Computing Basics.
CEO2: To describe the different services of cloud
CEO3: To describe the Privacy and security aspects of cloud.
CEO4: To know common standards for Cloud
CEO5: To develop skill to setup our own private cloud and to Know various applications of Cloud.

UNIT – 1: Introductory concepts and overview

Distributed systems - High performance cluster computing - Grid computing - Virtualization - Meaning of the terms cloud and cloud computing - cloud based service offerings - Grid computing versus Cloud computing - Benefits of cloud model - limitations - legal issues - Key characteristics of cloud computing - Challenges for the cloud - Public cloud – Private cloud – Hybrid cloud.

UNIT – 2: Cloud Web Services, Building cloud Networks

Infrastructure as a service - Platform-as-a-service - Software-as-a-Service - Building cloud networks - Evolution from the MSP model to cloud computing and software-as-a-Service - The cloud data center - SOA as step toward cloud computing - Basic approach to a data center based SOA

UNIT – 3: Federation, Presence, Identity, Privacy and Security in the cloud

Federation in the cloud - Presence in the cloud - Privacy and its relation to cloud based information system - Security in the Cloud - Cloud security challenges - Software-as-a-Service security

UNIT – 4: Common Standards in Cloud Computing - End user access to cloud computing

The open cloud consortium - The distributed management task force - Standards for application developers - Standards for messaging - Standards for security - YouTube - Zimbra - Facebook - Zoho - DimDim collaboration - Smartphone - Mobile operating systems for smart phones - Mobile platform virtualization - Future trends.

UNIT – 5: Case Study

Case studies:1 - Amazon EC2 - Amazon simple DB - Amazon S3 - Amazon cloud front.

Case studies:2 - Google App Engine - Google web tool kit - Microsoft Azure Services platform - Microsoft dynamic CRM

Case studies:3 - Setting up your own private cloud using open source tools.

Course Outcomes:

On successful completion of this course, the students should be able to:

COURSE OUTCOMES		POs related to COs
CO1	Demonstrate Different types of Computing Systems, Cloud Computing Basics, Types of Cloud Computing.	PO1, PO2
CO2	Understand the different services of cloud.	PO1, PO2
CO3	Understand the Privacy and security aspects of cloud.	PO1, PO2, PO8
CO4	Demonstrate knowledge on common standards for Cloud	PO1, PO6
CO5	Develop skill to setup our own private cloud and to Know various applications of Cloud.	PO1, PO2, PO3, PO5

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	3	-	-	-	-	-	-	-	-	-	-
CO2	3	3	-	-	-	-	-	-	-	-	-	-
CO3	3	-	-	-	-	-	-	3	-	-	-	-
CO4	3	-	-	-	-	2	-	-	-	-	-	-
CO5	**3**	3	3	-	**2**	-	-	-	**2**	-	-	3
CO*	**3**	**3**	**3**	-	**2**	**2**	-	**3**	**2**	-	-	**3**

Text Books:

1. Cloud Computing implementation- management and security, 1/e, John W. Rittinghouse, James F. Ransome ,2009, CRC Press, Taylor & Francis group, US.
2. Cloud Computing: A practical approach, 1/e, Anthony T.velte, TobyJ.velte Robert Elsenpeter– 2009, Tata McGraw Hill edition, India.

Reference Books:

1. Cloud Computing: Principles and Paradigms , 1/e, RajkumarBuyya, James Broberg and AndrzejGoscinski, 2013, Wiley Pvt. Ltd, India.
2. Cloud Computing: Concepts, Technology& Architecture, 1/e , Thomas Erl, Ricardo Puttini and ZaighamMahmood, 2013, PH, New Delhi.
3. Cloud Application Architectures,1/e, George Reese, 2009 Oreillypublishers, California.
4. Cloud Computing and SOA convergence in your enterprise, 1/e, David S. Linthicum, Addison, Wesley, Boston, 2010,US.
5. Cloud Computing: SaaS -PaaS - IaaS- Virtualization- Business Models- Mobile, Security and More, 1/e, Kris Jamsa, Jones& Bartlett Learning, Massachusetts, 2013, US.

IV B. TECH I-SEMESTER (CSE)

L	T	P	C
3	1	0	3

16CSE415B MACHINE LEARNING (CORE ELECTIVE-III)

Course Educational Objectives:

CEO1: To learn the key algorithms and theory that forms the core of machine learning.
CEO2: To understand Appropriate Problem for decision tree algorithm.
CEO3:To learn Sample Complexity and Over fitting
CEO4:To learn Instance-based Techniques
CEO5: To understand Genetic Algorithms

UNIT – 1: Introduction and Concept Learning
An illustrative learning task- Different Approaches to Machine Learning - What is known from algorithms/ Theory - Experiment – Biology – Psychology - **Concept Learning:** Version spaces-Inductive bias-Active queries- Mistake bound/ PAC model basic results. Overview of Issues regarding data sources- success criteria.

UNIT – 2: Decision Tree Learning
Minimum Description Length Principle - Occam's razor - Learning with active queries Neural Network Learning: Perceptions and gradient descent back propagation.

UNIT – 3: Sample Complexity and Over fitting
Errors in estimating means - Cross Validation and jackknifing VC dimension - Irrelevant features: Multiplicative rules for weight tuning - Bayesian Approaches: The basics Expectation Maximization - Hidden Markov Models.

U**NIT – 4: Instance-based Techniques**
Lazy Vs Eager generalisation. K nearest neighbour- case - based reasoning.

UNIT – 5: Genetic Algorithms
Different search methods for induction –Explanation based Learning: using prior knowledge to reduce sample complexity.

Course Outcomes:

On successful completion of this course, the student will able to

Course Outcomes		POs related to COs
CO1	Formulate machine learning problems corresponding to different applications	PO1, PO2
CO2	Understand decision tree learning and neural network learning	PO1, PO2
CO3	Analyze Bayesian theory, to solve real life problems	PO1, PO2, PO3, PO4
CO4	Demonstrate K nearest algorithm for generalization of objects in learning	PO1, PO2, PO3, PO4
CO5	Analyze the sample complexity with prior knowledge of genetic algorithms	PO1, PO2, PO3, PO4

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	3	-	-	-	-	-	-	-	-	-	-
CO2	3	3	-	-	-	-	-	-	-	-	-	-
CO3	3	3	3	3	-	-	-	-	-	-	-	-
CO4	3	3	3	3	-	-	-	-	-	-	-	-
CO5	3	3	3	3	-	-	-	-	-	-	-	-
CO*	3	3	3	3	-	-	-	-	-	-	-	-

Text Books

1. Tom Michel- Machine Learning. McGraw Hill. 1997
2. Trevor Hus tie- RobertTibshirani& Jerome Friedman. The Elements of Statically Learning - Springer Veriag 2001

Reference Books

1. Machine Learning Methods en the Environmental Science- Neural Network - William W Hsieh Cambridge University Press.
2. Rbchard o Duda - Peter E. Hart and David G. Stork - & pattern Classification - .John Wiley & Sons Inc - 2001
3. Chris Bishop - Neural Network for - Pattern Recognition - Oxford University Press. 1995

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

IV B. TECH I-SEMESTER (CSE)

L	T	P	C
3	1	0	3

16CSE415C DISTRIBUTED SYSTEMS (CORE ELECTIVE-III)

Course Educational Objectives:

CEO1: To understand basics of distributed systems, Networking, Inter process communication.
CEO2: To create an awareness of Distributed Objects and Remote Invocation.
CEO3: To gain the knowledge about the concepts related to Distributed Systems like Name Services and Concurrency Control.
CEO4: To analyze the key issues related to Distributed Transactions.
CEO5: Tomanage the distributed transactions in real time databases.

UNIT – 1: Characterization of Distributed Systems and System Models

Introduction - Examples of distributed systems - Resource sharing and the web - Challenges - Architectural and fundamental models.
Networking and internetworking: Types of Network – Network Principles.
Inter process communication: The API for the Internet Protocols – External Data Representation and Marshalling – Client Server Communication – Group Communication.

UNIT – 2: Distributed objects and Remote Invocation

Introduction - Communication between distributed objects – Remote procedure call - Events and notifications.
Operating System Support: OS layer - Protection - Processes and Threads - Communication and invocation - Operating system architecture.

UNIT – 3: Name Services

Introduction - Name services and the domain name system - Directory services - Case study of the global name service - Case study of the X.500 directory service

UNIT – 4: **Concurrency Control**

Introduction - Transactions - Nested transactions - Locks - Optimistic concurrency control - Timestamp ordering - Comparison of methods for concurrency control - Mutual Exclusion.

UNIT – 5: Distributed Transactions

Introduction – Flat and Nested distributed transactions - Atomic commit protocols – Concurrency control – Distributed Deadlocks – Transaction Recovery – Transactions with Replicated data.

Course Outcomes:

On successful completion of this course, the students should be able to:

Course Outcomes		POs related to COs
CO1	Distinguish characteristics of distributes systems.	PO1, PO2
CO2	Gain knowledge about howthe Distributed objects are used for remote invocation	PO1, PO2
CO3	Analyze the directory services in distributed systems.	PO1, PO2, PO3, PO4
CO4	Manage the concurrency control in distributed systems.	PO1, PO2, PO3, PO5
CO5	Implement distributed transactions in real time data bases.	PO1, PO2, PO3, PO4

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	3	-	-	-	-	-	-	-	-	-	-
CO2	3	3	-	-	-	-	-	-	-	-	-	-
CO3	3	3	3	3	-	-	-	-	-	-	-	-
CO4	3	3	3	3	-	-	-	-	-	-	-	-
CO5	3	3	3	3	-	-	-	-	-	-	-	-
CO*	3	3	3	3	-	-	-	-	-	-	-	-

Text Books:

1. Distributed Systems Concepts and Design, 5/e,GCoulouris, J Dollimore and T Kindberg , 2011, Pearson Education, New Delhi.
2. Distributed Systems,2/e, S.Ghosh, Chapman and Hall/CRC, Taylor & Francis Group, 2010, US.

Reference Books:

1. Distributed Computing, 2/e, S.Mahajan and S.Shah, 2013, Oxford University Press, US.
2. Distributed Operating Systems Concepts and Design, 1/e, PradeepK.Sinha, 1998, PHI, New Delhi.
3. Advanced Concepts in Operating Systems, 1/e, M Singhal, N G Shivarathri, 2001 Tata McGraw, Hill Edition, India.
4. Reliable Distributed Systems, 1/e ,K.P.Birman, Springer , 2005, New York.
5. Distributed Systems: Principles and Paradigms, 2/e, A.S. Tanenbaum and M.V. Steen, 2008 Pearson Education, New York.
6. Distributed Operating Systems and Algorithm Analysis, 5/e, R.Chow, T.Johnson,2009Pearson, New Delhi.
7. Distributed Operating Systems, 1/e, A.S.Tanenbaum, 2009, Pearson Education, New Delhi.

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IV B. TECH I-SEMESTER (CSE)	**L**	**T**	**P**	**C**
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16CSE415D NETWORK MANAGEMENT SYSTEMS (CORE ELECTIVE-III)

Course Educational Objectives:

CEO1: To understand the principles of network management, different standards and protocols used in managing complex networks.
CEO2: To understand the Network Management concepts and practical issues related To SNMPv1.
CEO3: To analyze the Remote network monitoring by using new mechanisms.
CEO4: To demonstrate the working procedure of SNMPv2 for protocol operations.
CEO5: To study various cryptographic algorithms and messaging protocols using SNMPv3.

UNIT – 1: Data Communications and Network Management Overview

Analogy of telephone network management – Data and telecommunication network – Distributed computing environments – TCP/ IP based networks - Communications protocols and standards - Case histories of networking and management - Network management: Goals – Organization - Functions - Network and system management

UNIT – 2: SNMPv1

SNMP network management concepts – Background – Basic concepts - SNMP management information – Structure of management information – Practical issues – Standard MIBs – MIB II – Ethernet interface MIB

UNIT – 3: RMON

Remote network monitoring: statistics collection – Basic concepts – Statistics group – History group – Host group – Host TopN group – Matrix group – Token ring extensions to RMON – Remote network monitoring: alarms and filters – Alarm group – Filter group – Packet capture group – Event group – RMON2 – Overview – Protocol directory group – Protocol distribution group – Address map group – RMON2 host groups – RMON2 matrix groups – User history collection group – Probe configuration group – Extensions to RMON1 for RMON2 devices

UNIT – 4: SNMPv2

Management Information – Background – Structure of management information – Protocol – Protocol operations – Transport mappings – Coexistence with SNMPv1 – MIBS and conformance – SNMPv2 management information base – Conformance statements – Evolution of the interfaces group of MIB II

UNIT – 5: SNMPv3

Cryptographic algorithms – Conventional encryption with DES – The MD5 secure hash function – The SHA 1 secure hash function – Message authentication with HMAC – SNMPv3 architecture – SNMPv3 applications – MIBs for SNMPv3 – applications- Message processing and user based security model – View based access control model

Course Outcomes:

On successful completion of this course, the students should be able to:

Course Outcomes		POs related to COs
CO1	Acquire the knowledge about network management standards (OSI and TCP/IP)	PO1, PO2
CO2	Manage various network management protocols and the skills to use them in monitoring a network	PO1, PO2
CO3	Analyze the challenges faced by Network managers in remote network monitoring.	PO1, PO4
CO4	Evaluate various commercial network management systems and open network management systems.	PO1, PO2, PO4
CO5	Analyze and interpret the data provided by the network management systems for message processing and security	PO1, PO2, PO3, PO4,

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	3	-	-	-	-	-	-	-	-	-	-
CO2	3	3	-	-	-	-	-	-	-	-	-	-
CO3	3	-	-	3	-	-	-	-	-	-	-	-
CO4	3	3	-	3	-	-	-	-	-	-	-	-
CO5	3	3	3	3	-	-	-	-	-	-	-	-
CO*	3	3	3	3	-	-	-	-	-	-	-	-

Text Books:

1. Network Management Principles and Practice, 1/e, Mani Subramanian, Addison Wesley, December, 1999, New York, USA.
2. SNMP SNMPv2 SNMPv3 and RMON 1 and 2, 3/e,William Stallings, Addison Wesley, 2006 New York, USA.

References Books:

1. Practical Guide to SNMPv3 and Network Management, 1/e, David Zeltserman, May 1999 Prentice Hall, New Delhi, India.
2. Network Security and Management, 3/e, Brijendra Singh, 2012, PHI, New Delhi, India.
3. Network management, 1/e, Morris–2010, Pearson Education, New Delhi, India.
4. Principles of Network System Administration, 2/e, Mark Burges, Wiley Dreamtech, December 2003, India.
5. Distributed Network Management, 1/e,Paul, John Wiley Dreamtech ,September 1994, India.

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IV B.Tech I-Semester

L	T	P	C
3	1	0	3

16OSAH411 APPLICATIONS OF GRAPH THEORY (Open Elective – II)
(Common to all Branches)

Course Educational Objectives:

CE01: The course is designed to equip the students with the necessary mathematical skills and techniques thatare essential for an engineering course.

CEO2: To provide knowledge on

- Graph Theory, Graph coloring
- Matrix Representation of Graphs
- Graph Based Electrical Networks
- Applications in Operations Research

CEO3: To learn the representation of graphs and understanding the Graph Isomorphism, Sub graph-Vertex degrees, Walk, Paths, Cycles-graph connection, Bipartite graphs, Trees

CEO4: To understand the Chromatic number, partitioning, Matching, covering and four colorproblem and to familiarize the knowledge of graph theory

CEO5: To understand the matrix representation of graphs, designing incidence matrix, Adjacency matrix and circuit matrix

CEO6: To identify the important graph based real time applications of electrical networks such as PLC Networks with Independent sources, LOOP circuits

CEO7: To explore the use of graphs in various applications in Operations Research such as Shortest Path between Two Points, The Travelling Salesman and Chinese Postman Problems

UNIT – 1: Graph Theory Introduction

Graph and simple graphs (Complete graphs, Complement of graph)-graph isomorphim–Sub graph-vertex degrees, walk, paths, cycles-graph connection and components-Bipartite graphs- Trees – cut edges- cut vertices-Blocks

UNIT – 2: Colouring and Directed graphs

Chromatic number-chromatic- partitioning- chromatic polynomial-Matching-covering-four color problem Directed graphs types of directed graphs-digraphs and binary realtions –directed paths and connectedness

UNIT – 3: Matrix Representation of graphs

Introduction - Adjency matrix -Applications of Adjancy matrix-sufficient condition for isomorphism of graphs-power of an adjacency matrix-Adjacency matrix of a digraph-incidence matrix-circuit matrix-cut set matrix.

UNIT – 4: Electrical Network analysis

Introduction - Kirchhoff's current and Voltage laws-Loop currents and Node Voltages- PLC Networks with Independent sources: Nodal analysis , Loop analysis .

UNIT – 5: Applications in Operation research

Introduction- Shortest Route Problems: Shortest Path between Two Points-The shortest path Problem: General case . The Travelling Salesman and Chinese Postman Problems Reduction Based Methods for solving TSP- The Chinese Postman Problem and Matching.

Course Outcomes:

On successful completion of this course, the students should be able to:

	Course Outcomes	POs related to COs
CO1	Demonstrateknowledge in reading and writing rigorous mathematical proofs involving introductory aspects of graphs and develop analytical skills in solving graph theoretic problems	PO1,PO2
CO2	Demonstrateknowledge in chromatic number, partitioning, matching, graph coloring, directed graphsand Develop analytical skills in solving problems involving graph coloring, partitioning and directed graphs	PO1,PO2
CO3	Demonstrateknowledge in matrix representation of graphs, designing incidencematrix, Adjacency matrix and circuit matrixand explore analytical skills in solving problems involving adjacency matrix and incidence matrix	PO1,PO2,P 03
CO4	Demonstrate knowledge in significant real time applications of electrical networks such as PLC Networks Independent sources, explore analytical skills in solving practical problems involving using graph theory conceptsand Develop skills in designing Mathematical models for real time electrical networks.	PO1,PO2
CO5	Demonstrate knowledge in significant practical applications of graphs in Operations Research, explore analytical skills in solving practical problems involving using graph theory concepts and Develop skills in designing Mathematical models for real time applications including shortest path problem, Travelling Salesman problem, and The Chinese Postman Problem.	PO1,PO2,P O3 PO4

CO – PO Mapping

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	-	-	-	-	-	-	-	-	-	-
CO2	3	2	-	-	-	-	-	-	-	-	-	-
CO3	2	3	2	-	-	-	-	-	-	-	-	-
CO4	3	2	-	-	-	-	-	-	-	-	-	-
CO5	2	3	2	2	-	-	-	-	-	-	-	-
CO*	2.6	2.4	2	2	-	-	-	-	-	-	-	-

Text Books:

1. Discrete mathematical structures with applications to computer science. J.P.Trimblay and R.Manohar , 27/e, Tata Mc Graw Hill Publications , 2006, New Delhi.
2. Graph Theory with applications to engineering and computer Science, Narasingh Deo, 25/e, Printice – Hall of India Private Limited, 2003, New Delhi

References:

1. Clark J. And Holton D.A., " A first look at Graph theory", Allied Publishers, 199
2. R.B.Bapat , Graphs and Matrices, Springer, London Dordrecht Heidelberg, New York, 2010 .
3. Gary Haggard John Schlipf, Sue Whitesides, Discrete Mathematics for Computer Science, 4/e, 2007, Thomson Publication, 2008, New Delhi.
4. S.D Sharma , Kedar Nath Ram Nath Operation Research & Co, Meerut . 2007.
5. J.A.Bonday and U.S.R. Murty, Graph Theory with application (2nd Edition), North Holland, 1976 .

IV B.Tech I-Semester

16OSAH412 INTRODUCTION TO NANOSCIENCE AND NANOTECHNOLOGY
(OPEN ELECTIVE – II)

L	T	P	C
3	1	0	3

Course Educational Objectives:

CEO1: To Understand the basic scientific concepts of Nanoscience, and various types of Nanomaterials

CEO2: To study various methods of synthesising Nanomaterials

CEO3: To identify different characterisation techniques for Nanomaterials

CEO4: To Understand the properties of Nanomaterials and the applications of Nanomaterials in various fields

CEO5: To study various carbon Nanomaterials

UNIT-I : Introduction to Nano Science: Definition of NanoScale,-Significance of Nanoscale– Surface to Volume Ratio-Quantum Confinement-Types of Nanomaterials-Zero.One,Two and Three Dimentional Nano materials.

UNIT-II : Preparation Of Nanomaterials: Top-Down approach- Bottom-Up Approach- Sol gel Method-Physical Vapour Deposition – Chemical Vapour Deposition- Plasma Arching-Ball milling-Electro-Chemical Deposition.

UNIT-III : Characterization of Nanomaterials: Surface Characterization- SEM,FFSEM ,AFM.Structural Characterization, XRD,UV-VIS,FTIR,TEM.

UNIT-IV: Properties And Applications Of Nano materials:
Physical and Chemical Properties: Mechanical properties-Electrical properties-Thermal properties-Magnetic properties- Applications in material science, biology and medicine, surface science, energy and environment.

UNIT-V : Carbon Nanomaterials: Nanowires and Nanotubes- Different Types of Carbon Nanotubes -Single walled Carbon Nanotubes- Multiwalled Nanotubes- Fabrication of Caron Nanotubes using Plasma Arching Method- Graphene- Fullerences.

On successful completion of the course the student will be able to,

Course Outcomes		POs related to COs
CO1	Acquire the basic knowledge on Nanoscience, and various types of Nanomaterials .	PO1, PO12
CO2	Identify appropriate method for the preparation of Nanomaterials	PO1, PO12
CO3	Develops skill to characterize Nanomaterials by various techniques	PO1, PO4,PO12
CO4	Analyze the different properties of Nanomaterials and identify their applications in various fields	PO1,PO12
CO5	Develop Knowledge on carbon Nanomaterials	PO1,PO12

CO-Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	-	-	-	-	-	-	-	-	-	-	1
CO2	3	-	-	-	-	-	-	-	-	-	-	1
CO3	3	-	-	2	-	-	-	-	-	-	-	1
CO4	3	-	-	-	-	-	-	-	-	-	-	1
CO5	3	-	-	-	-	-	-	-	-	-	-	1
CO*	3	-	-	2	-	-	-	-	-	-	-	**1**

Text Books:

1. Engineering Physics, 2011, M.R. Srinivasan, New Age International, Chennai.
2. Engineering Physics, First Edition 2014, K. Thyagarajan, Mc Graw Hill Publishers, New Delhi.

Reference Books:

1. Nanotechnology- A Gentle Introduction to the Next Big Idea. 2003,Dorling Kindersely (India .Pvt), New Delhi.
2. Nano- The Essentials(Understanding nano Science and Nanotechnology),2010,Tata MaGraw-Hill Publications

IV B.Tech I-Semester

16OSAH413 ENTREPRENEURSHIP DEVELOPMENT(Open Elective – II)

L	T	P	C
3	1	0	3

Course Educational Objectives:

CEO1: To understand the concepts of entrepreneurship and role of government in the promotion of entrepreneur

CEO2: To understand idea generation, intellectual property rights, financing of enterprises and Government grants & subsidies

CEO3: To elucidate the process of project planning and report preparation

CEO4: To understand the scope and objectives of micro and small enterprises and their promotional measures

CEO5: To understand rural entrepreneurship and evaluation of entrepreneurship development programmes

UNIT - 1: Nature of Entrepreneurship:
Meaning and Concepts, Intrapreneurship -Entrepreneur's competencies, attitudes, Qualities, functions - Types of Entrepreneurs - Barriers to Entrepreneurship - Entrepreneurial scenario in India and Abroad - Forms of Entrepreneurship - Small business, Types of ownership - Role of Government in the promotion of Entrepreneur.

UNIT - 2: Promotion & Financial aspects of the entrepreneurship:
Idea generation - Intellectual property rights – Financing of Enterprises - Government grants & subsidies.

UNIT - 3: Project Planning and Feasibility Studies:
The concept of Project - Project life cycle - Project Planning - Feasibility- Project proposal & Report preparation.

UNIT - 4: Micro and Small Enterprises:
Meaning and Definitions – Micro and Macro Units – Essentials, Features and Characteristics – Relationship between Micro and Macro Enterprises – Rational behind Micro and Small Enterprises – Scope and Objectives of Micro and Small Enterprises – Enterprise and Society – Role of Micro Enterprises in Economic Development – Package for Promotion of Micro and Small-Scale Enterprises – Problems of Micro and Small Enterprises.

UNIT - 5: Rural Entrepreneurship and EDPs:
Need - Rural Industrialization- Role of NGOs- Organizing EDPs-Need, objectives, Evaluation of EDPs.

On successful completion of the course the students will be able to,

Course Outcomes		POs related to COs
CO1	Learn entrepreneurship and role of government in the promotion of entrepreneurship	PO3, PO7, PO12
CO2	Understand an idea generation, intellectual property rights, financing of enterprises and Government grants & subsidies	PO3, PO6, PO7, PO8, PO11, PO12
CO3	Prepare project report to start a business	PO10, PO11, PO12
CO4	Choose a particular form of enterprise	PO9, PO12
CO5	Start rural entrepreneurship and learn the importance of entrepreneurship development programmes	PO9, PO12

CO – PO Mapping

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	-	-	2	-	-	-	3	-	-	-	-	1
CO2	-	-	2	-	-	3	3	2	-	-	3	1
CO3	-	-	-	-	-	-	-	-	-	2	3	1
CO4	-	-	-	-	-	-	-	-	2	-	-	1
CO5	-	-	-	-	-	-	-	-	2	-	-	1
CO*	-	-	2	-	-	3	3	2	2	2	3	1

Text Books

1. The Dynamics of Entrepreneurial Development and Management, 6/e, 2010, Vasanth Desai, Himalaya Publishing House, Mumbai.
2. Entrepreneurial Development, 4/e, 2012, S.S. Khanka, S.Chand and Company Limited, New Delhi.

References

1. Fundamentals of Entrepreneurship, 2/e, 2011, H.Nandan, PHI publications, New Delhi.
2. Entrepreneurship, 2/e, 2011, Rajeev Roy, Oxford University Press, New Delhi.
3. Entrepreneurship, 6/e, 2010, Robert D Hirsrich, Michael P Peters, Dean A Shepherd, TMH, New Delhi.
4. Entrepreneurship Management- text and cases, 1/e, 2010, Bholanath Dutta, Excel Books, New Delhi.

IV B.Tech I Semester

L	T	P	C
3	1	0	3

16OMEC411 QUALITY CONTROL AND RELIABILITY ENGINEERING
(Open Elective – II)

Course Educational Objectives:

CEO1: To understand basic TQM Principles adopted in statistical process control engineering.
CEO2: To estimate the quality control of a product by using control charts and Process capability.
CEO3: To know the techniques involved in the acceptance sampling and procedure
CEO4: To learn the concepts of Reliability engineering and Failure data analysis.
CEO5: To understand the fundamental principles of reliability estimation and product development.

UNIT – 1: TQM PRINCIPLES AND STATISTICAL PROCESS CONTROL

Introduction – Need for quality – Definition of quality – Dimensions of manufacturing and service quality – Basic concepts of TQM – Definition of TQM – TQM frame work – Contributions of Deming – Leadership – Strategic quality planning – Quality cost – Quality statements – Customer focus, customer orientation, customer satisfaction, customer complaints and customer retention – Employee involvement – Motivation – Empowerment – Team and teamwork – Recognition and reward – Performance appraisal – Seven SPC tools – Histogram, check sheets, Ishikawa diagrams, pareto, scatter diagrams, control charts and flow chart.

UNIT – 2: QUALITY CONTROL

Control chart for attributes – Control chart for non-conforming – p chart and np chart – Control chart for nonconformities – C and U charts, Control chart for variables – X chart, R chart and σ chart – State of control and process out of control identification in charts, pattern study and process capability studies - Concepts in six sigma.

UNIT – 3: ACCEPTANCE SAMPLING

Lot by lot sampling – Types – Probability of acceptance in single, double, multiple sampling techniques – OC curves – Producer's risk and consumer's risk – AQL, LTPD, AOQL concepts – Standard sampling plans for AQL and LTPD – Uses of standard sampling plans.

UNIT – 4: RELIABILITY CONCEPTS

Reliability engineering – Fundamentals – Failure data analysis, mean failure rate, mortality curve concept of burn – In period, useful life and wear out phase of a system, mean time to failure, mean time between failure, hazard rate – Failure density and conditional reliability –Maintainability and availability – Simple problems.

UNIT – 5: RELIABLITY ESTIMATION

System reliability – Series, parallel and mixed configurations, reliability improvements techniques use of pareto analysis – Design for reliability – Redundancy unit and standby redundancy – Fault tree analysis – Optimization in reliability – Product design – Product analysis – Product development – Product life cycles.

Course Outcomes:

On successful completion of the course, Students will be able to

	Course Outcomes	POs related to COs
CO1	Understand basic TQM Principles adopted in statistical process control engineering	PO1,PO2, PO3
CO2	Demonstrate the quality control of a product by using control charts and Process capability.	PO1,PO2,PO3, PO4
CO3	Understand the techniques involved in the acceptance sampling and procedure	PO1,PO2,PO4
CO4	Explain the concepts of reliability engineering and failure data analysis.	PO1, PO2, PO4
CO5	Understand the fundamental principles of reliability estimation and product development	PO1, PO2, PO3, PO5

CO – PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO.1	3	3	2	-	-	-	-	-	-	-	-	-
CO.2	3	2	2	2	-	-	-	-	-	-	-	-
CO.3	3	2	-	2	-	-	-	-	-	-	-	-
CO.4	3	2	-	2	-	-	-	-	-	-	-	
CO.5	3	1	2	-	2	-	-	-	-	-	-	
CO*	**3**	**2**	**2**	2	2	-	-	-	-	-	-	-

Text Books:

1. Quality Control, Besterfield D.H., 8/e, 2009, Prentice Hall.
2. Reliability Engineering, Srinath. L.S., 4/e, 2005, Affiliated East west press.

Reference Books:

1. Statistical Quality Control, Monohar Mahajan, 2001, Dhanpat Rai &and Sons.
2. Practical Reliability Engineering, Connor, P.D.T.O., 2008, Wiley India.
3. Introduction to Statistical quality control, Douglas.C. Montgomery, 7/e, 2012, John Wiley.
4. Reliability Engineering, Kailash C. Kapur and Michael Pecht, 2014, John Wiley.
5. Statistical Process Control, John.S. Oakland. 5/e, 2005, Elsevier.

Codes/Tables: Use of approved statistical control table permitted in the examination.

IV B.Tech I Semester

L	T	P	C
3	1	0	3

16OMEC412 INDUSTRIAL ENGINEERING AND PSYCHOLOGY (Open Elective – II)

Course Educational Objectives:

CEO1: To understand basic concepts of management and contributions of management gurus.
CEO2: To recognize the types of organizations and plant layout
CEO3: To know the techniques involved in the Work study in industry perspective.
CEO4: To learn the concepts of production planning and control in an industry.
CEO5: To learn the fundamental concepts of industrial psychology and personnel management.

UNIT – 1: CONCEPTS OF MANAGEMENT

Management: Administration – Organization – Importance and characteristics – Managerial skills – Differences between polices, goal and objectives – Scientific management – Management contribution of FW Taylor, Henry Foyal and Gilberth – Principles of management – Process of management – Functions of management – Levels and types management – Management chart – Management development – Project management – Management information system – Industrial ownership – Responsibilities of supervisor/foreman – Leadership concepts and qualities.

UNIT – 2: ORGANIZATIONS AND PLANT LAYOUT

Organization: Concept, importance, characteristics, elements and process of organization – organization theory – Principle of organization – Organization structure and chart – Types of organization – Committees – Project and matrix organization – Departmentation – Authority and delegation – Group dynamics – Organizational change, conflict and development – Managerial leadership and Communication system. **Plant Layout:** Types of layout – Flow pattern – Storage space – Plant layout procedure – Consideration in building design – Production and productivity.

UNIT – 3: WORK STUDY

Definition and need – Advantages and objectives – Method study – Process chart symbols – Flow process chart – Flow diagram – String diagram – Multiple activity chart – Operation analysis – Principles of motion economy – Design of work place – Therbligs – SIMO chart – Time study – Standard data – Analytical estimating – PMTS – Ergonomics.

UNIT – 4: PRODUCTION PLANNING AND CONTROL

Introduction – Continuous and intermittent production – Job, open and closed job shop – One time large projects – Forecasting – Process planning – Economical batch quantity – Tool control – Loading – Scheduling – Control of production – Dispatching – Routing – Progress control – Flow control – Line of balance.

UNIT – 5: INDUSTRIAL PSYCHOLOGY AND PERSONNEL MANAGEMENT

Industrial Psychology: Definition and concept – Aim, scope and objectives – Individual and group – Group dynamics – Hertzberg's two factor theory of motivation - Maslow's hierarchy of human needs – Theory of X and Y – Hawthorne experiment – Morale – Motivation – Working and environmental condition – Industrial fatigue. **Personnel Management:** Definition and concept – Objectives and principles of personnel – Recruitment and selection – Training – Safety and welfare –measures – Housekeeping – Communication – Promotion, lay-off, transfer and discharge.

Course Outcomes:

On successful completion of the course, Students will be able to

Course Outcomes		POs related to COs
CO1	Demonstrate the basic concepts of management and contributions of management gurus	PO6, PO12
CO2	Recognize the types of organizations and plant layout	PO1,PO6,PO7
CO3	Understand the techniques involved in the Work study in industry perspective.	PO1,PO2,PO5
CO4	Explain the concepts of production planning and control in an industry.	PO1, PO2, PO4
CO5	Understand the fundamental concepts of industrial psychology and personnel management	PO6, PO8, PO9, PO12

CO – PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	-	-	-	-	-	3	-	-	-	-	-	**2**
CO2	3	-	-	-	-	3	**2**	-	-	-	-	-
CO3	2	2	-	-	2	-	-	-	-	-	-	-
CO4	3	3	-	2	-	-	-	-	-	-	-	-
CO5	-	-	-	-	-	3		1	**2**	-	-	2
CO*	**2.6**	**2.5**	**-**	2	2	**2**	**2**	1	2	-	-	**2**

Text Books:

1. Industrial Engineering and Management, O.P. Khanna, 17/e, 2010, Dhanpat Rai Publishing Company (P) Ltd., New Delhi.
2. Manufacturing Organization and Management, Amrine, 2/e, 2004, Pearson Education, New Delhi.

Reference Books:

1. Industrial Engineering and Organization Management, S.K.Sharma, Savita Sharma, 1/e, 2011, S.K.Kataria and Sons Publications, New Delhi.
2. Industrial Engineering and Management, RaviShankar, 2/e, 2009, Galgotia Publications, New Delhi.
3. Production and Operations Management, PanneerSelvam, 3/e, 2012, Pearson Education, New Delhi.
4. Motion and Time Study: Design and Measurement of work, Ralph M Barnes, 7/e, 2009, Wiley India Pvt, Ltd., New Delhi.
5. Operations Management, Chase, Jacobs, Aquilano, 10/e, 2003, Tata McGraw-Hill Education Pvt. Ltd., Noida.

IVB.Tech I Semester

L	T	P	C
3	1	0	3

16OMEC413 POWER GENERATION TECHNOLOGIES (Open Elective – II)

Course Educational Objectives:

CEO1: To understand working principles of steam power plant & working circuits of the plant .
CEO2: To recognize plant layout of Hydro electric, Diesel and Gas turbine power plants
CEO3: To know the safety measures & environmental aspects of nuclear power plant
CEO4: To learn the concepts of all types of renewable energy power plants.
CEO5: To learn the economics of power generation

UNIT – 1: STEAM POWER PLANTS

Plant layout – Working of different circuits – Types of coal – Properties of coal – Coal handling system – Ash handling system – Feed water treatment – Stages of combustion – Pulverized coal firing system – Cyclone furnace – Fluidized bed combustion system – Cooling towers and heat rejection.

UNIT – 2: HYDRO ELECTRIC, DIESEL AND GAS TURBINE POWER PLANTS

Hydro Electric Power Plants: Energy scenario – Global and national – Essential elements and classification of hydro power plants – Typical layout and associated components – Selection of turbines – Pumped storage plants. **Diesel and Gas Turbine Power Plants**: Layout and functioning – Environmental impact and control.

UNIT – 3: NUCLEAR POWER PLANTS

Layout and subsystems – Fuels and nuclear reactions – Boiling water reactor, pressurized water reactor, fast breeder reactor, gas cooled and liquid metal cooled reactors – Working and comparison – Safety measures – Environmental aspects.

UNIT– 4: RENEWABLE ENERGY POWER PLANTS

Solar power plants – Photovoltaic and thermal – Wind energy – Horizontal and vertical axis wind turbine (HAWT & VAWT) – Geo thermal– Tidal energy – Ocean thermal – Biogas – Fuel cell, thermoelectric and thermionic generation.

UNIT – 5: ECONOMICS OF POWER GENERATION

Load and load duration curves – Electricity billing – Costing of electrical energy – Tariff structures – Economics of power plant – Fixed and variable cost – Payback period – Net present value, internal rate of return – Emission calculation and carbon credit.

Course Outcomes:

On successful completion of the course, Students will be able to

Course Outcomes		Pos related to Cos
CO1	Understand working principles of steam power plant & working circuits of the plant	PO1, PO2
CO2	Recognize plant layout of Hydro electric, Diesel and Gas turbine power plants	PO1,PO2,PO3
CO3	Explain the safety measures & environmental aspects of nuclear power plant	PO1,PO6,PO7
CO4	Discover the concepts of all types of renewable energy power plants.	PO1, PO4, PO5
CO5	Learn the economics of power generation	PO1, PO6

CO – PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO.1	3	2	-	-	-	-	-	-	-	-	-	-
CO.2	3	2	2	-	-	-	-	-	-	-	-	-
CO.3	3	-	-	-	-	2	**2**	-	-	-	-	-
CO.4	3	-	-	2	2	-	-	-	-	-	-	
CO.5	3	-	-	2	2	-	-	-	-	-	-	
CO*	**3**	**2**	**2**	2	2	**2**	**2**	-	-	-	-	-

Text books:

1. Power Plant Engineering, P.K.Nag, 4/e, 2015, McGraw-Hill Education Pvt. Ltd., New Delhi.
2. A Course in Power Plant Engineering, Arora and S. Domkundwar, 6/e, 2012, Dhanpat Rai Publishing Company (P) Ltd., New Delhi.

Reference books:

1. Text of Power Plant Engineering, P.C.Sharma, 9/e, 2013, S.K.Kataria and Sons Publications, New Delhi.
2. A Text Book of Power Plant Engineering, Rajput. R.K., 4/e, 2012, Laxmi Publications (P) Ltd., New Delhi.
3. Power Plant Engineering, K.K.Ramalingam, 1/e, 2010, Scitech Publishers, Chennai.
4. Power Plant Engineering, Nagpal G. R., n/e, 2004, Khanna Publisher, New Delhi.
5. Introduction to Power Plant Technology, G.D.Rai, 3/e, 2012, Khanna Publishers, New Delhi.

IV B.Tech I Semester **L T P C**

3 1 0 3

16OCIV411 TRANSPORT AND ENVIRONMENT (Open Elective – II)

Course Educational Objectives:

CEO1: To impart knowledge on different concepts of Environmental Impact Assessment.
CEO2: To learn the EIA methodologies and the criterion for selection of EIA methods.
CEO3: To identify impact of air, water and land due to developmental activities
CEO 4: To know the procedures for environmental audit and some case studies.

UNIT – 1: INTRODUCTION

Environmental inventory, environmental assessment, environmental impact assessment (EIA), environmental impact of transportation projects, need for EIA, EIA guidelines for transportation project, historical development.

UNIT – 2: METHODOLOGIES

Elements of EIA – Screening and scoping – Methods of impact analysis – Applications – appropriate methodology.

UNIT – 3: ENVIRONMENTAL IMPACT, PREDICTION AND ASSESSMENT

Prediction and assessment of impact of transportation project at various stages on water, air, noise, land acquisition and resettlement, socio economic impact, indigenous people, aesthetics, health and safety, energy studies, IRC guidelines.

UNIT – 4: ENVIRONMENTAL MITIGATION AND MANAGEMENT PLAN

Mitigation of the impact on natural and man-made environment, health, water, land, noise, air, public participation, environmental management plan, energy conservation, methods to reduce global warming.

UNIT – 5: EIA CASE STUDIES

EIA case studies on highway, railway, airways and waterways projects.

Course Outcomes:

On successful completion of the course, students will be able to

Course Outcomes		Pos related to Cos
CO1	Understand the basic concept of EIA	PO1
CO2	Analyse and Select the appropriate EIA methodology	PO1
CO3	Learn the impact of soil ,air and water due to developmental activities and	PO1,PO3
CO4	Understand environmental audit procedure	PO1, PO3,PO6,
CO5	Analyze case studies and Apply concepts of EIA	PO1, PO2,

CO – PO Mapping

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	-	-	-	-	-	-	-	-	-	-	-
CO2	2	-	-	-	-	-	-	-	-	-	-	-
CO3	2	-	2	-	-	-	-	-	-	-	-	-
CO4	2	-	2	-	-	2	-	-	-	-	-	-
CO5	2	2	-	-	-	-	-	-	-	-	-	-
CO*	2	2	2	-	-	2	-	-	-	-	-	-

Text Books:

1. Environmental Impact Assessment, Canter, L.R., 1996, McGraw Hill, New Delhi.
2. Indian Road Congress (IRC), Environmental Impact of Highway Projects, IRC, 1998, Delhi.
3. Elements of Environmental Science and Engineering, P. Meenakshi, 2006, Prentice Hall of India, New Delhi.
4. Introduction to Environmental Science and Management, Thirumurthy A.M., 2005,Shroff Publishers, Bombay.

Reference Books:

1. John G.Rau and David, C.Hooten, Environmental Impact Analysis Handbook, McGraw Hill Book Company, 1995.
2. James H.Banks, Introduction to Transportation Engineering, McGraw Hill Book Company, 2000.
3. A Handbook on Roads and Environment, World Bank, Vol.I and II, 1997, Washington DC.
4. International Encyclopedia of Ecology and Environment – EIA, Indian Institute of Ecology and Environment, PriyaRanjanTrivedi, 1998, New Delhi, Hyderabad: Indian Green Building Council.

IV B.Tech I Semester

L	T	P	C
3	1	0	3

16OCIV412 DISASTER MANAGEMENT (Open Elective – II)

Course Educational Objectives:

CEO1: Learn various hazards and vulnerabilities in India

CEO2: Lear scientific approach to manage disasters

CEO3: Understand various disaster mitigation and management plans in India

UNIT – 1: INTRODUCTION TO DISASTERS

Definition: Disaster, hazard, vulnerability, resilience, risks – Disasters: types of disasters – Earthquake, landslide, flood, drought, fire etc – Classification, causes, impacts including social, economic, political, environmental, health, psychosocial, etc. – Differential impacts in terms of caste, class, gender, age, location, disability – Global trends in disasters: urban disasters, pandemics, complex emergencies, climate change – Dos and don'ts during various types of disasters.

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UNIT – 2: APPROACHES TO DISASTER RISK REDUCTION (DRR)

Disaster cycle – Phases, culture of safety, prevention, mitigation and preparedness community based DRR, structural – Nonstructural measures, roles and responsibilities of community, panchayat raj institutions/urban local bodies (PRIs/ULBs), states, centre, and other stakeholders – Institutional processes and framework at state and central level – State disaster management authority (SDMA) – Early warning system – Advisories from appropriate agencies.

UNIT – 3: INTER-RELATIONSHIP BETWEEN DISASTERS AND DEVELOPMENT

Factors affecting vulnerabilities, differential impacts, impact of development projects such as dams, embankments, changes in land use etc. – Climate change adaptation – IPCC scenario and scenarios in the context of India – Relevance of indigenous knowledge, appropriate technology and local resources.

UNIT – 4: DISASTER RISK MANAGEMENT IN INDIA

Hazard and vulnerability profile of India, components of disaster relief: water, food, sanitation, shelter, health, waste management, institutional arrangements (mitigation, response and preparedness, disaster management act and policy – Other related policies, plans, programmes and legislation – Role of GIS and information technology components in preparedness, risk assessment, response and recovery phases of disaster – Disaster damage assessment.

UNIT – 5: DISASTER MANAGEMENT: APPLICATIONS, CASE STUDIES AND FIELDWORKS

Landslide hazard zonation: case studies, earthquake vulnerability assessment of buildings and infrastructure: case studies, drought assessment: case studies, coastal flooding: storm surge assessment, floods: fluvial and pluvial flooding: case studies; forest fire: case studies, man made disasters: case studies, space based inputs for disaster mitigation and management and field works related to disaster management.

Course Outcomes:

On successful completion of the course, students will be able to

Course Outcomes		POs related to COs
CO1	Describe basic features of disasters and classify them	PO1, PO7
CO2	Explain scientific approach to disaster risk reduction	PO1, PO7
CO3	Express the relation between the disaster and development	PO1, PO7
CO4	Describe disaster mitigation plan in India	PO1, PO7
CO5	Analyze case studies related to disaster and draw conclusions	PO1, PO2, PO7, PSO2

CO – PO Mapping

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	-	-	-	-	-	2	-	-	-	-	-
CO2	2	-	-	-	-	-	2	-	-	-	-	-
CO3	2	-	-	-	-	-	2	-	-	-	-	-
CO4	2	-	-	-	-	-	2	-	-	-	-	-
CO5	2	2	-	-	-	-	2	-	-	-	-	-
CO*	2	2	-	-	-	-	2	-	-	-	-	-

Text Books:

1. Disaster Management, Singhal J.P. 2010, Laxmi Publications, ISBN-10: 9380386427 ISBN-13: 978-9380386423
2. Disaster Science and Management, Tushar Bhattacharya, 2012, McGraw Hill India Education Pvt. Ltd., ISBN-10: 1259007367, ISBN-13: 978-1259007361

Reference Books:

1. Govt. of India: Disaster Management Act, Government of India, 2005, New Delhi.
2. Government of India, National Disaster Management Policy, 2009.
3. Environmental Knowledge for Disaster Risk Management, NIDM, Gupta Anil K, Sreeja S. Nair. 2011, New Delhi.
4. Vulnerable India: A Geographical Study of Disasters, KapurAnu 2010, IIAS and Sage Publishers, New Delhi.

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IV B.Tech I Semester

L	T	P	C
3	1	0	3

16OCIV413 AIR POLLUTION AND CONTROL ENGINEERING (Open Elective – II)

Course Educational Objectives:

CEO 1: To provides the knowledgeabout the various sources of Airpollution and Its effects on humanbeings , Vegetation and Materials.

CEO 2: To Analyse various the air pollutant dispersion models

CEO 3: To provideknowledgeaboutcontrolmethods and details of control equipments

CEO 4: To demonstrateVarious sources of Noisepolltion and controlmeasures

UNIT – 1: INTRODUCTION

Structure and composition of atmosphere – Definition, scope and scales of air pollution – Sources and classification of air pollutants and their effect on human health, vegetation, animals, property, aesthetic value and visibility – Ambient air quality and emission standards – Ambient and stack sampling and analysis of particulate and gaseous pollutants.

UNIT – 2: METEOROLOGY

Effects of meteorology on air pollution – Fundamentals, atmospheric stability, inversion, wind profiles and stack plume patterns – Atmospheric diffusion theories – Dispersion models, plume rise.

UNIT – 3: CONTROL OF PARTICULATE CONTAMINANTS

Factors affecting selection of control equipment – Gas particle interaction – Working principle, design and performance equations of gravity separators, centrifugal separators fabric filters, particulate scrubbers, electrostatic precipitators – Operational considerations.

UNIT – 4: CONTROL OF GASEOUS CONTAMINANTS

Factors affecting selection of control equipment – Working principle, design and performance equations of absorption, adsorption, condensation, incineration, bio scrubbers, bio filters – Process control and monitoring – Operational considerations.

UNIT – 5: INDOOR AIR QUALITY MANAGEMENT

Sources types and control of indoor air pollutants, sick building syndrome types – Radon pollution and its control – Sources and effects of noise pollution – Measurement – Standards – Control and preventive measures

Course Outcomes:

On successful completion of the course, students will be able to

Course Outcomes		POs related to COs
CO1	Identify the major sources of air pollution and understand their effects on health and environment.	PO1, PO7
CO2	Evaluate the dispersion of air pollutants in the atmosphere and to develop air quality models	PO2, PO3
CO3	Design the control techniques for particulate and gaseous emissions	PO1, PO3
CO4	Understand the standards of air quality and legal framework	PO1, PO6
CO5	Identify the major sources of noise pollution, effects and control measures	PO1, P07

CO – PO Mapping

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	-	-	-	-	-	3	-	-	-	-	-
CO2	2	2	-	-	-	-	-	-	-	-	-	-
CO3	2	-	2	-	-	-	-	-	-	-	-	-
CO4	2	-	-	-	-	2	-	-	-	-	-	-
CO5	2	-	-	-	-	-	3	-	-	-	-	-
CO*	2	2	2	-	-	2	3	-	-	-	-	-

Text Books:

1. Air Pollution Control Engineering, Lawrence K. Wang, Norman C. Pareira, Yung Tse Hung, 2004, Tokyo.
2. Air Pollution and Control Technologies, Anjaneyulu. Y, 2002, Allied Publishers (P) Ltd., India.

Reference Books:

1. Air Pollution, David H.F. Liu, Bela G. Liptak, 2000, Lweis Publishers.
2. Air Pollution (Vol.I – Vol.VIII), Arthur C.Stern, 2006, Academic Press.
3. Air Pollution Engineering Manual, Wayne T.Davis, 2000, John Wiley & Sons, Inc.
4. Air Pollution Control Engineering, Noel de Nevers, 1995, Mc Graw Hill, New York.

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IV B.TECH IV-I SEM (E.E.E) **L T P C**

3 1 0 3

16OEEE411 ENERGY AUDITING & DEMAND SIDE MANAGEMENT
(Open Elective – II)

Course Educational Objectives:

CEO1: To know auditing, conservation of energy
CEO2: To know about various energy efficient motors and ratings
CEO3: To know about various lighting systems for conservation of energy
CEO4: To know methods of improving power factor
CEO5: To know about demand side management

UNIT - I INTRODUCTION
Energy situation – world and India, energy consumption, conservation, Energy audit- definitions, concept, types of audit, energy index, cost index, pie charts, Sankey diagrams, load profiles, Energy conservation schemes-audit procedure.

UNIT - II 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 - III POWER FACTOR IMPROVEMENT & LIGHTING AND ENERGY INSTRUMENTS
Power factor – methods of improvement, location of capacitors, Pf with non linear loads, effect of harmonics on p.f., p.f motor controllers.-synchronous condencers.Good lighting system design and practice, lighting control ,lighting energy audit - Energy Instruments- watt meter, data loggers, thermocouples, pyrometers, lux meters, tong testers

UNIT – IV ENERGY ECONOMIC ANALYSIS
The time value of money concept, developing cash flow models, payback analysis, depreciation, taxes and tax credit – numerical problems.

UNIT – V DEMAND SIDE MANAGEMENT
Introduction to DSM, concept of DSM, benefits of DSM, different techniques of DSM – time of day pricing, multi-utility power exchange model, time of day models for planning. Load management, load priority technique, peak clipping, peak shifting, valley filling, strategic conservation.

Course Outcomes:

On successful completion of the course, student will be able to

Course Outcomes		POs related to COs
CO1	Student can perform auditing of various energy consuming loads	PO1, PO2
CO2	Implement and find location of capacitor ratings	PO1, PO2, PO3
CO3	Evaluate Energy Economics in power systems.	PO1, PO2, PO4
CO4	Analyze good lighting system design and practice	PO1, PO2, PO4
CO5	Can implement demand side management	PO1, PO2

CO – PO Mapping

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	-	-	-	-	-	-	-	-	-	-
CO2	3	2	3	-	-	-	-	-	-	-	-	-
CO3	2	3	-	2	-	-	-	-	-	-	-	-
CO4	3	3	-	2	-	-	-	-	-	-	-	-
CO5	3	2	-	-	-	-	-	-	-	-	-	-
CO*	2.8	2.4	3	2	-	-	-	-	-	-	-	-

TEXT BOOK:

1. Industrial Energy Management Systems, Arry C. White, Philip S. Schmidt, David R. Brown, Hemisphere Publishing Corporation, New York.
2. Fundamentals of Energy Engineering - Albert Thumann, Prentice Hall Inc, Englewood Cliffs, New Jersey.
3. Electrical Power distribution, A S. Pabla, TMH, 5th edition, 2004
4. Demand Side Management, Jyothi Prakash, TMH Publishers.

REFERENCES:

1. Energy management by W.R. Murphy & G. Mckay Butter worth, Heinemann publications.
2. Energy management by Paul o‘ Callaghan, Mc-graw Hill Book company-1st edition, 1998
3. Energy efficient electric motors by John .C. Andreas, Marcel Dekker Inc Ltd-2nd edition, 1995-
4. Energy management hand book by W.C.Turner, John wiley and sons
5. Energy management and good lighting practice : fuel efficiency-booklet12-EEO

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B.TECH III-I SEM (E.E.E)

L	T	P	C
3	1	0	3

16OEEE412 FUNDAMENTALS OF ELECTRICAL ESTIMATION AND COSTING

(Open Elective – II)

Course Educational Objectives:

CEO1: To know estimating and costing aspects of all electrical equipment
CEO2: To know about design and estimation of wiring.
CEO3: To know about design of overhead and underground distribution lines.
CEO4: To know about different types of substations
CEO5: To know about design of illuminations.

UNIT-I DESIGN CONSIDERATIONS OF ELECTRICAL INSTALLATIONS:
Electric Supply System, Three phase four wire distribution system, Protection of Electric Installation against over load, short circuit and Earth fault, Earthing, General requirements of electrical installations, testing of installations, Indian Electricity rules, Neutral and Earth wire, Types of loads, Systems of wiring, Service connections, Service Mains, Sub-Circuits, Location of Outlets, Location of Control Switches, Location of Main Board and Distribution board, Guide lines for Installation of Fittings, Load Assessment, Permissible voltage drops and sizes of wires, estimating and costing of Electric installations. Load calculation and selection of cables for single phase and three phase system.

UNIT —II ELECTRICAL INSTALLATION FOR DIFFERENT TYPES OF BUILDINGS AND SMALL INDUSTRIES:
Electrical installations for residential buildings -estimating and costing of material, Electrical installations for commercial buildings, Electrical installations for small industries-street lighting estimation ,cables for domestic applications.

UNIT—III OVERHEAD AND UNDERGROUND TRANSMISSION AND DISTRIBUTION LINES:
Introduction, Supports for transmission lines, Distribution lines — Materials used, Underground cables, Mechanical Design of overhead lines, Design of underground cables.

UNIT-IV SUBSTATIONS:
Introduction, Types of substations, Outdoor substation — Pole mounted type, Indoor substations — Floor mounted type.

UNIT-V DESIGN OF ILLUMINATION SCHEMES:
Introduction, Terminology in illumination, laws of illumination, various types of light sources, Practical lighting schemes.

Course Outcomes:

On successful completion of course, student will be able to

Course Outcomes		POs related to COs
CO1	perform estimating and costing of all electrical equipment	PO1
CO2	Design and estimation of wiring.	PO1, PO2
CO3	Design of overhead and underground distribution lines	PO1
CO4	Know the different types of Outdoor substation.	PO1
CO5	Understand the Illumination Schemes.	PO1

CO – PO Mapping

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	-	-	-	-	-	-	-	-	-	-	-
CO2	3	2	-	-	-	-	-	-	-	-	-	-
CO3	3	-	-	-	-	-	-	-	-	-	-	-
CO4	3	-	-	-	-	-	-	-	-	-	-	-
CO5	3	-	-	-	-	-	-	-	-	-	-	-
CO*	3	2	-	-	-	-	-	-	-	-	-	-

TEXT BOOKS

1. Electrical Design Estimating and Costing, K. B. Raina, S. K. BhattAcharya, New Age International Publisher.
2. Design of Electrical Installations, Er. V. K. Jam, Er. Amitabh Bajaj, University Science Press.
3. Electricity Pricing Engineering Principles and Methodologies, Lawrence J. Vogt, P. E., CRC Press.

REFERENCE BOOKS

1. Code of practice for Electrical wiring installations,(System voltage not exceeding 650 volts), Indian Standard Institution, IS: 732-1983.
2. Guide for Electrical layout in residential buildings, Indian Standard Institution, IS: 4648-1968.
3. Electrical Installation buildings Indian Standard Institution, IS: 2032.
4. Code of Practice for selection, Installation of Maintenance of fuse (voltage not exceeding 650V), Indian Standard Institution, IS: 3106- 1966.
5. Code of Practice for earthling, Indian Standard Institution, lS:3043- 1966.

IV B.TECH III-I SEM (E.E.E)

L	T	P	C
3	1	0	3

16OEEE413 FUNDAMENTALS OF ELECTRICAL POWER UTILIZATION
(Open Elective – II)

Course Educational Objectives:

CEO1: To comprehend the different issues related to heating, welding
CEO2: To know about illuminations.
CEO3: To know about types of drives used in traction and techniques for braking system implementation
CEO4: To know about electrical drives
CEO5: To provide the students the fundamental concepts of electrolytic process

UNIT - 1: ELECTRIC HEATING AND WELDING

Electric Heating- Advantages and methods of electric heating - Resistance heating - Arc heating - Induction heating and dielectric heating - Infrared or radiant heating. Electric Welding- Definition of welding - Welding process - Resistance and arc welding – electric welding equipment, comparison between AC and DC welding.safty precautions' during welding.

UNIT - 2: ILLUMINATION

Introduction - Terms used in illumination -Laws of illumination - Polar curves - Photometry - Sources of light - Lamps: Incandescent lamps - Discharge lamps - SV and MV lamps - Lighting schemes- Requirement of good lighting scheme –Types and design of lighting schemes - calculation of illumination- Illumination standards for domestic ,industrial and sports complexes -Numerical problems.

UNIT - 3: ELECTRIC TRACTION-I

Introduction- Systems of electric traction - Comparison between A.C. and D.C. traction - Special features of traction motor- Methods of electric braking- Rheostat braking and regenerative braking - Speed-time curves for different services – Trapezoidal and quadrilateral speed time curves - Numerical problems.

UNIT - 4: ELECTRIC DRIVES

Introduction - Type of electric drives - Selection of electrical drives - Types of industrial loads - Continuous - Intermittent and variable loads - Starting and running characteristics - Speed control of motors - Size and rating of motors - Temperature rise - Load equalization - Motors for particular application.

UNIT - 5: ELECTROLYTIC PROCESS

Electrolysis, Faradays laws, application of Electrolysis, power supply for Electrolysis-VFD drives for different applications-soft starters for different applications- starters for different loads.

Course Outcomes:

On successful completion of course, student will be able to

Course Outcomes		POs related to COs
CO1	Articulate different types of Electric Heating, welding and Illumination	PO1
CO2	Design Electric Traction	PO1, PO2
CO3	Discuss mechanics of Train movement.	PO1
CO4	Plot trapezoidal and quadrilateral speed time curves.	PO1,PO2
CO5	Discuss specific energy consumption.	PO1,

CO – PO Mapping

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	-	-	-	-	-	-	-	-	-	-	-
CO2	3	2	-	-	-	-	-	-	-	-	-	-
CO3	3	-	-	-	-	-	-	-	-	-	-	-
CO4	3	2	-	-	-	-	-	-	-	-	-	-
CO5	3	-	-	-	-	-	-	-	-	-	-	-
CO*	3	2	-	-	-	-	-	-	-	-	-	-

TEXT BOOKS:

1. Utilization of Electrical Energy , 1/e 2007 ,Open Shaw Taylor , Orient Longman- Hyderabad.

2. Utilization of Electric power , 1/e 2006 ,R K Rajput , Lakshmi Publications – New Delhi.

REFERENCE BOOKS:

1. Utilization of Electric power and Electric traction , 10 /e 2009 J B Gupta , S K kataria and sons Publications – New Delhi.
2. Utilization of Electrical Energy ,1/e 2010 ,Tarlok Singh, S. K. Kataria and Sons - New Delhi.
3. Generation & Utilization of Electrical Energy , 1/e 2010,S. Sivanagaraju, M. Balasubba Reddy and D. Srilatha , Dorling Kindersly.Pvt Ltd – UP, INDIA.
4. Generation Distribution & Utilization of Electrical Energy ,3/e 2012 , C. L. Wadhwa , New Age Publications ,New Delhi.

IV Year B.Tech I semester	L	T	P	C
	3	1	0	3

16OECE411 MEDICAL ELECTRONICS (Open Elective II)

Course Educational objectives:

CEO:1 To gain knowledge and analyze the various Measurement such as ECG, EEG and trouble shooting.

CEO:2 To understand the trasnducers for Bio medical , featuers applicable for Bio medical instrumentation.

CEO:3 To study about the various signal conditioning and recording devices, Bio telemetry.

CEO:4 To gain knowledge about equipment used for physical medicine and the various recently developed diagnostic and therapeutic techniques.

CEO:5 To Know the recent trends in digital filtering and data reduction techniques.

UNIT 1: INTRODUCTION

Cell structure – electrode – electrolyte interface, electrode potential, resting and action potential electrodes for their measurement, ECG, EEG, EMG – machine description – methods of measurement – three equipment failures and trouble shooting.

UNIT 2: TRANSDUCERS FOR BIO-MEDICAL INSTRUMENTATION

Basic transducer principles Types – source of bioelectric potentials – resistive, inductive, capacitive, fiber-optic, photoelectric and chemical transducers – their description and feature applicable for biomedical instrumentation – Bio & Nano sensors & application

UNIT 3: SIGNAL CONDITIONING, RECORDING AND DISPLAY

Input isolation, DC amplifier, power amplifier, and differential amplifier – feedback, op-Ampelectrometer amplifier, carrier Amplifier – instrument power supply. Oscillagraphic – galvanometric - X-Y, magnetic recorder, storage oscilloscopes – electron microscope – PMMC writing systems – Telemetry principles – Bio telemetry.

UNIT 4: MEDICAL SUPPORT

Electrocardiograph measurements – blood pressure measurement: by ultrasonic method – plethysonography – blood flow measurement by electromagnetic flow meter cardiac output measurement by dilution method – phonocardiography – vector cardiography. Heart lung machine – artificial ventilator – Anesthetic machine – Basic ideas of CT scanner – MRI and ultrasonic scanner – Bio-telemetry – laser equipment and application – cardiac pacemaker – DC– defibrillator patient safety - electrical shock hazards. Centralized patent monitoring system.

UNIT 5: BIO-MEDICAL DIAGNOSTIC INSTRUMENTATION

Introduction – computers in medicine – basis of signal conversion and digital filtering data reduction technique – time and frequency domain technique – ECG Analysis.

Course outcomes:
On successful completion of the course the student will be able to

Course Outcomes		POs related to COs
CO1	Distinguish and analyze the various physiological parameters and its recording methods, signal characteristics.	PO1,PO2
CO2	Describe the transducers and their description along with the feature applicable for Bio medical.	PO1,PO2
CO3	Analyze function of telemetry and Bio telemetry principles.	PO1,PO2, PO4
CO4	Demonstrate knowledge about equipment used for physical medicine and the various recently developed diagnostic and therapeutic techniques.	PO1,PO2, PO5
CO5	Extend knowledge on time and frequency domain techniques and analysis.	PO1,PO2

CO – PO Mapping

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	-	-	-	-	-	-	-	-	-	-
CO2	3	2	-	-	-	-	-	-	-	-	-	-
CO3	2	3	-	2	-	-	-	-	-	-	-	-
CO4	3	2	-	-	2	-	-	-	-	-	-	-
CO5	2	3	-	-	-	-	-	-	-	-	-	-
CO*	2.6	2.4	-	2	2	-	-	-	-	-	-	-

Text Books:

1. Siamak Najarian " Mechatronics in Medicine – A Bio medical engg approach" , McGraw – Hill Education , 2011
2. Cromwell, Weibell and Pfeiffer, "Biomedical Instrumentation and Measurements", 2nd Edition, Printice Hall of india , 1999
3. Khandpur, R.S., "Handbook of Biomedical Instrumentation", TMH, 1989.

Reference Books:

1. Arumugam M., "Bio Medical Instrumentation", Anuradha agencies Pub., 2002.
2. Geddes L.A., and Baker, L.E., "Principles of Applied Bio-medical Instrumentation", 3rd Edition,John Wiley and Sons, 1995.
3. Tompkins W.J., "Biomedical Digital Signal Processing", Prentice Hall of India, 1998

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IV B.Tech I semester

L	T	P	C
3	1	0	3

16OECE412 FUNDAMENTALS OF EMBEDDED SYSTEMS (Open Elective II)

Course Educational Objectives:

CE01: To provide a basic knowledge like characteristics, classification and Application areas of Embedded systems.

CE02: Students learn the Architecture, Memory Interfacing and Interrupt Structures of 8051.

CE03: By learning instruction sets we can write the Assembly Language Programs and get knowledge in Interfacing techniques.

CE04: Students will learn the Real time operating systems.

CE05: To learn Communication and Interfacing Techniques and its buses.

UNIT 1:INTRODUCTION

History of Embedded Systems- Major Application Areas of Embedded Systems- Purpose of Embedded Systems- Core of the Embedded System- Sensors and Actuators- Embedded Firmware.

UNIT 2:THE 8051 ARCHITECTURE

Introduction- 8051 Micro controller Hardware- Register set of 8051-Input/Output Ports and Circuits- External Memory- memory and I/O interfacing of 8051Counter and Timers- Serial data Input/Output- Interrupt structure of 8051.

UNIT 3:BASIC ASSEMBLY LANGUAGE PROGRAMMING CONCEPTS

The Assembly Language Programming Process- Programming Tools and Techniques- Programming the 8051. Data Transfer and Logical Instructions. Arithmetic Operations- Decimal Arithmetic. Jump and Call Instructions.

APPLICATIONS: Interfacing with Keyboards- Displays- D/A and A/D Conversions- Multiple Interrupts

UNIT 4 :REAL-TIME OPERATING SYSTEMS (RTOS):

Operating System Basics- Types of Operating Systems- Tasks- Process and Threads-Multiprocessing and Multitasking- Task Scheduling- Threads- Processes and Scheduling: Putting them Altogether- Task Communication- Task Synchronization- Device Drivers- How to Choose an RTOS.

UNIT 5: COMMUNICATION INTERFACE AND COMMUNICATION BUSES.

Communication interface- (Board level communication interfaces- Product level communication interfaces) - - Timing -and Counting Devices- Watchdog Timer- Real Time Clock- Networked Embedded Systems- Serial Bus Communication Protocols- Parallel Bus Device Protocols- Parallel Communication Network Using ISA- PCI- PCI-X and Advanced Buses.

Course Outcomes:

On successful completion of course, student will be able to:

Course Outcomes		POs related to COs
CO1	Understanding and designing of embedded systems	PO1, PO2
CO2	Learning the Architecture and its functions	PO1,PO2
CO3	Knowledge to write the programs in Assembly Language programs	PO1, PO2, PO3, PO4
CO4	Knowledge in real time operating systems	PO1, PO2,PO4,PO5
CO5	Understanding the transmissions through different types of buses	PO1, PO2,PO4

CO – PO Mapping

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	-	-	-	-	-	-	-	-	-	-
CO2	3	2	-	-	-	-	-	-	-	-	-	-
CO3	2	3	2	2	-	-	-	-	-	-	-	-
CO4	3	2	-	3	2	-	-	-	-	-	-	-
CO5	2	3	-	2	-	-	-	-	-	-	-	-
CO*	2.6	2.4	2	2.3	2	-	-	-	-	-	-	-

TEXT BOOKS:

1. Introduction to Embedded System-2nd edition- 2003-Shibu KV- Mc-Graw Hill -New Delhi.
2. The 8051 Microcontroller-3rd Edition-2007- Kenneth J.Ayala- Thomson Delmar Learning-New Delhi.
3. Embedded system architecture- programming and design-sixthreprint- 2005- Rajkamal-TMH- New Delhi.

REFERENCES :

1. Micro Controllers(theory and applications)seventh reprint-2005-Ajay V Deshmukhi- TMH-New Delhi.
2. An Embedded Software Primer- fifth impression- 2007- David E. Simon- Pearson Education private limited- New Delhi.
3. Microcontrollers architecture- programming and design- 1st edtion- 2007- Raj kamal- Pearson Education- New Delhi.
4. Embedded System Design- Frank Vahid- Tony Givargis- John Wiley-TMH- New delhi.
5. The 8051 microcontroller and embedded systems- 2nd editon- 2002- Muhammad ali mazdi-Janice Gillispie Mazidi- pearson edition private limited- New Delhi.

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IV Year B.Tech I semester

L	T	P	C
3	1	0	3

16OECE413 DATA COMMUNICATION AND NETWORKS (Open Elective-II)

Course Educational Objectives:

CEO1: Build an understanding of the fundamental concepts of computer networking.
CEO2: Familiarize the student with the basic taxonomy and terminology of the computer networking area.
CEO3: Introduce the student to advanced networking concepts, preparing the student for entry Advanced courses in computer networking.
CEO4: Allow the student to gain expertise in some specific areas of networking such as the design and maintenance of individual networks.
CEO5: Obtain the knowledge about recent web based protocols.

UNIT – I

Introduction: Network Topologies, Protocols & Standards, Layered Architecture LAN, WAN, MAN. OSI Reference Model, TCP/IP Reference Model, Guided and Unguided Media.

UNIT – II

Data Link Layer: Design Issues, Framing – Error Control – Flow Control, Error Detection and Correction, Elementary Data Link Protocols, Sliding Window Protocols, ARQ schemes, HDLC. PPP. Ethernet- IEEE 802.3,4,5 Protocols, Wireless LAN- The 802.11 Architecture and Protocol Stack-The 802.11 Physical Layer-The802.11 MAC Sublayer Protocol-The 805.11 Frame Structure-Services

UNIT – III

The Medium Access Control Sublayer-The Channel Allocation Problem-Static Channel Allocation-Assumptions for Dynamic Channel Allocation, Multiple Access Protocols-Aloha-CSMA Protocols-Collision-Free Protocols,
Need for Internetworking, Design Issues, Addressing, Internet Protocol (IPv4/IPv6), Virtual Circuit and Datagram Networks, Routing Algorithms, Congestion Control Algorithms.

UNIT – IV

Transport layer: UDP, TCP, Congestion Control mechanisms, QOS, Techniques to improve QOS

UNIT – V

Application Layer: Cryptography, DNS, Electronic Mail, FTP, HTTP, SNMP, DHCP

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

Course Outcomes		POs related to COs
CO1	Independently understand basic computer network technology	PO1, PO2
CO2	Understand and explain Data Communications System and its	PO1, PO2,PO4
CO3	Analysis the different types of network topologies and protocols. And Enumerate the layers of the OSI model and TCP/IP. Explain the function(s) of each layer	PO1, PO2,PO3,
CO4	Identify the different types of network devices and their functions within a	PO1, PO2,PO4
CO5	Familiarity with the basic protocols of computer networks, and how they can be used to assist in network design and implementation.	PO1,PO2

CO – PO Mapping

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	-	-	-	-	-	-	-	-	-	-
CO2	3	2		2	-	-	-	-	-	-	-	-
CO3	2	3	2	-	-	-	-	-	-	-	-	-
CO4	3	2	-	3	-	-	-	-	-	-	-	-
CO5	2	3	-	-	-	-	-	-	-	-	-	-
CO*	2.6	2.4	2	2.5	-	-	-	-	-	-	-	-

TEXT BOOKS:

4. Computer Networks, Tanenbaum and David J Wetherall, 5th Edition, Pearson Edu, 2010
5. Computer Networks: A Top Down Approach, Behrouz A. Forouzan, Firouz Mosharraf, McGraw Hill Education.

REFERENCE BOOKS:

1. Larry L. Peterson and Bruce S. Davie, “Computer Networks - A Systems Approach” (5th ed), Morgan Kaufmann/ Elsevier, 2011
2. William Stallings, “Data & Computer Communication”, Pearson Education India, 10th Edition, 2014.
3. James F. Kurose, Keith W. Ross, “Computer Networking: A Top–Down Approach Featuring the Internet”, Pearson Education,6th Edition, 2013.

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IV B. TECH I-SEMESTER (CSE)	**L**	**T**	**P**	**C**
	0	**0**	**3**	**2**

16CSE416 BIG DATA ANALYTICS LAB

Course Educational Objectives:

CEO1: To provide an overview of an exciting growing field of Big Data analytics.

CEO2: To introduce the tools required to manage and analyze big data like Hadoop, MapReduce.

CEO3: To teach the fundamental techniques and principles in achieving big data analytics with scalability and streaming capability.

CEO4: To enable students to have skills that will help them to solve complex real-world problems in for decision support.

CEO5: To gain knowledge on PIG Latin and HIVE.

Task 1:

a) Understanding the Hortonworks Sandbox for Hadoop.
b) Installing Hortonworks Sandbox – VMware Player on Windows

Task 2:

Understanding and Working with basic HDFS operations such as:

- starting HDFS,
- Listing files in HDFS.
- Adding files and directories.
- Retrieving files.
- Deleting files.
- Shutting down the HDFS.

Task 3:

Understanding and Working with Ambari for provision, manage and monitor a Hadoop cluster, and also to integrate Hadoop with the existing enterprise infrastructure.

Task 4:

Write a java map-reduce program for counting the number of occurrences of each word in a text file.

Task 5:

Write a java map-reduce program for mines healthcare data and perform various analysis on healthcare dataset.

Task 6:

Working with PIG Latin scripts in Script mode and Grunt shell.

Task 7:

Write Pig Latin scripts to illustrate Load, Store, Describe, Dump operators

Task 8:

Write Pig Latin scripts to illustrate Group, Co-group, Join, Filter, Union, and Split Operators.

Task 9:

Develop a Map-reduce programming with Hive to create, alter, and drop databases, tables, views, functions, and indexes.

Task 10:

Illustrate unstructured data into NoSQL data and perform various operations

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Course Outcomes:

After the successful completion of this course, the students should be able to:

Course Outcomes		POs related to COs
CO1	Acquire the knowledge of big data systems and identify the main sources of Big Data in the real world.	PO1
CO2	Analyze the frameworks like Hadoop to efficiently store retrieve and process Big Data for Analytics.	PO2
CO3	Develop the several Data Intensive tasks using the Map Reduce Paradigm	PO3
CO4	Investigate on novel algorithms for Clustering Classifying and finding associations in Big Data	PO4
CO5	Design and implement successful Recommendation engines for enterprises.	PO5
CO6	Follow the ethical principles in implementing the big data concepts	PO8
CO7	Do experiments effectively as an individual and as a team member in a group.	PO9
CO8	Communicate verbally and in written form, the understanding about the experiments.	PO10
CO9	Continue updating their skill related big data and implement the concepts in future	PO12

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	-	-	-	-	-	-	-	-	-	-	-
CO2	-	3	-	-	-	-	-	-	-	-	-	-
CO3	-	-	3	-	-	-	-	-	-	-	-	-
CO4	-	-	-	3	-	-	-	-	-	-	-	-
CO5	-	-	-	-	3	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	3	-	-	-	-
CO7	-	-	-	-	-	-	-	-	3	-	-	-
CO8	-	-	-	-	-	-	-	-	-	3	-	-
CO9	-	-	-	-	-	-	-	-	-	-	-	3
CO*	**3**	**3**	**3**	**3**	3	-	-	3	3	**3**	**-**	**3**

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IV B. TECH I-SEMESTER (CSE)	**L**	**T**	**P**	**C**
	3	**1**	**0**	**3**

16CSE417 MOBILE APPLICATION DEVELOPMENT LAB

Course Educational Objectives:

CEO1: Toknow the components and structure of mobile application development frameworks for Android and windows OS based mobiles.
CEO2: To understand how to work with various mobile application development frameworks.
CEO3: To learn the basic and important design concepts and issues of development of mobile applications.
CEO4: To understand the capabilities and limitations of mobile devices.
CEO5: To develop the data base connectivity to the android platform.

LIST OF EXPERIMENTS

1. Study of Android Installation
2. Study of Tools for Developing Mobile Applications.
3. Develop an android application to display a simple text in the emulator
4. Develop an android application to display the internal keyboard in the emulator
5. i. Write an android program to display a message in the toast
   ii. Write an android program to input a text through a text and the same must be displayed in the toast when a button is clicked on the screen
6. i. Develop an application to perform 5 arithmetic operations: Addition - Subtraction - Multiplication - Division and Modulo operation with necessary user interface creation
   ii. Develop an android application to process a student mark list by creating proper UI using the necessary controls
7. Write an android application to create a calculator
8. Create an android UI that consists of Different Departments of a company namely Production- Finance - Marketing and HR. If the user clicks on any department it should show details of that department. Use indents.
9. Design an android application to display a list of items on the android screen. If the user clicks any one of the list items a dialogue box should show that the user has clicked that particular item (Use array adopters)
10. Develop an android application to show some categories such as education - entertainment - health - provisions etc. - If the user clicks on any one of the items it should show the sub categories of the category and if is again clicked it should the details of those items. (Use indents and lists)
11. i. Design an android application to create a service that shows the service is running in the background in the form of a toast
    ii. Develop an android application to create an alarm using the concept of service
12. Develop an android application to demonstrate the concept of Fragments in Android
13. Develop an android application to demonstrate the database connectivity with the SQLite database to post and retrieve data through the User Interface
    (Example: Student mark list processing- Email Registration and Login - Products and sales)

Course Outcomes:

After the successful completion of this course, the students should be able to:

Course Outcomes		POs related to COs
CO1	Acquire knowledge on applications using GUI components and Mobile application development framework.	PO1
CO2	Analyze the basics of graphical primitives and databases.	PO2
CO3	Design the applications using multi-threading.	PO3
CO4	Use the Fragments concepts to design the android application.	PO4
CO5	Familiarize the database connectivity with the SQLite database to post and retrieve data through the User Interface	PO5
CO6	Follow the ethical principles in implementing the big data concepts	PO8
CO7	Do experiments effectively as an individual and as a team member in a group.	PO9
CO8	Communicate verbally and in written form, the understanding about the experiments.	PO10
CO9	Continue updating their skill related big data and implement the concepts in future	PO12

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	-	-	-	-	-	-	-	-	-	-	-
CO2	-	3	-	-	-	-	-	-	-	-	-	-
CO3	-	-	3	-	-	-	-	-	-	-	-	-
CO4	-	-	-	3	-	-	-	-	-	-	-	-
CO5	-	-	-	-	3	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	3	-	-	-	-
CO7	-	-	-	-	-	-	-	-	3	-	-	-
CO8	-	-	-	-	-	-	-	-	-	3	-	-
CO9	-	-	-	-	-	-	-	-	-	-	-	3
CO*	**3**	**3**	**3**	**3**	3	-	-	3	3	**3**	**-**	**3**

REFERENCES:

1. Android Developer Fundamentals Course, Learn to develop Android Applications, Practical Workbook, Developed by Google Developer Training Team
2. Android Developer Fundamentals Course, Learn to develop Android Applications, Concept Reference, Developed by Google Developer Training Team
3. Android System Programming, Roger Ye, PACKT publishers
4. Programming Android, ZigurdMednieks, Laird Dornin, G.BlakeMeike& Masumi Nakamura, O'Reilly
5. Android application Development-Black Book, Pradeep Kothari, Dreamtech
6. Android Programming, 3rd Edition, The Big Nerd Ranch Guide, Bill Philips, Christ Stewart, Kristin Mariscano, Big Nerd Ranch publishers
7. Android Programming for Beginners, John Horton, PACKT publishers

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IV B. TECH II-SEMESTER (CSE)	**L**	**T**	**P**	**C**
	3	**1**	**0**	**3**

16CSE 421 INTERNET OF THINGS

Course Educational Objectives:
CEO1: To understand the fundamentals of Internet of Things.
CEO2: To learn about basis of IOT protocols.
CEO3: To learn about Building state of the art architecture in IoT.
CEO4: To learn use of Devices, Gateways and Data Management in IoT.
CEO5: To build a small low cost embedded system using Raspberry Pi and ARDUINO, to apply the concept of Internet of Things in the real world scenario.

UNIT I: Introduction ToIoT
Introduction to Internet of Things –Definition and Characteristics of IoT, Physical Design of IOT- IoT Protocols -Logical Design of IoT - IoT communication models - IoT Communication APIs - IoT enabled Technologies- Wireless Sensor Networks - Cloud Computing - Big data analytics - Communication protocols - Embedded Systems.

UNIT II:IoT and M2M
The Vision-Introduction - From M2M to IoT - M2M towards IoT-the global context - A use case example - Differing Characteristics.**A Market Perspective**– Introduction - Some Definitions - M2M Value Chains - IoT Value Chains - An emerging industrial structure for IoT - The international driven global value chain and global information monopolies.

UNIT III: IoT Architecture
M2M high-level ETSI architecture - IETF architecture for IoT - OGC architecture - IoT reference model - Domain model - information model - functional model - communication model - IoT reference architecture.

UNIT IV: M2M and IoT Technology Fundamentals
Devices and gateways - Local and wide area networking - Data management - Business processes in IoT - Everything as a Service(XaaS) - M2M and IoT Analytics - Knowledge Management -IMC-AESOP: from the Web of Things to the Cloud of Things.

UNIT V: Building IoT with RASPBERRY PI & ARDUINO
Building IOT with RASPERRY PI- IoT Systems - Logical Design using Python – IoT Physical Devices & Endpoints - IoT Device -Building blocks - Pi - Raspberry Pi Interfaces -Programming Raspberry Pi with Python - Other IoT Platforms – Arduino.
Case study: Phase-1: Automation of Present Commercial Buildings – Phase-2:Automation of Future Commercial Buildings

Course Outcomes:

After the successful completion of this course, the students should be able to:

	Course Outcomes	POs related to COs
CO1	Demonstrate knowledge on fundamentals of Internet of Things and its functionalities.	PO1, PO2
CO2	Analyze various protocols for IoT	PO1, PO2
CO3	Demonstrate knowledge on Building state of the art architecture in IoT.	PO1, PO2, PO3, PO4
CO4	Demonstrate knowledge on Use of Devices, Gateways and Data Management in IoT.	PO1, PO2, PO3, PO4
CO5	Deploy an IoT application and connect to the cloud using Raspberry Pi & ARDUINO and apply the concept of Internet of Things in the real world scenario.	PO1, PO2, PO3, PO4, PO5

CO – PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	2		-	-	-	-	-	-	-	-	-
CO2	3	3	-	-	-	-	-	-	-	-	-	-
CO3	2	2	3	3	-	-	-	-	-	-	-	-
CO4	2	2	3	3	-	-	-	-	-	-	-	-
CO5	3	3	2	2	3	-	-	-	-	-	-	-
CO*	2.6	2.4	2.6	2	3	-	-	-	-	-	-	-

Text Books:

1. Internet of Things – A hands-on approach, ArshdeepBahga, Vijay Madisetti, 2015, Universities Press.
2. From Machine-to-Machine to the Internet of Things: Introduction to a New Age of Intelligence**,** 1st Edition, Jan Holler, VlasiosTsiatsis, Catherine Mulligan, Stefan Avesand, StamatisKarnouskos, David Boyle, 2014, Academic Press.

References:

1. Internet of Things (A Hands-on-Approach), 1stEdition, Vijay Madisetti and ArshdeepBahga, 2014,VPT.
2. Rethinking the Internet of Things: A Scalable Approach to Connecting Everything, 1st Edition, Francis daCosta, Apress Publications, 2013
3. Architecting the Internet of Things, Bernd Scholz-Reiter, Florian Michahelles, ISBN 978-3842-19156-5, Springer.
4. The Internet of Things Key Applications and Protocols, Olivier Hersent, David Boswarthick, Omar Elloumi, ISBN 978-1-119-99435-0, Wiley Publications.
5. The Internet of Things in the Cloud: A Middleware Perspective, HonboZhou , 2012, CRC Press .

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IV B. TECH II-SEMESTER (CSE)

L	T	P	C
3	1	0	3

16MBA 214 BUSINESS MANAGEMENT

UNIT - 1: Business Economics:
Nature and scope of business economics - **Demand analysis**: Demand Determinants, Law of Demand - **Elasticity of demand:** Types, Measurement and Significance of Elasticity of Demand

UNIT - 2: Production and Cost Analysis :
Production Function - Laws of returns to scale – Meaning of Cost – Cost Concepts – Cost Function- Cost Output Relationship in Short run and Long run – Break-even Analysis: Meaning, Assumptions, Graphical Representation of BEA, Determination of BEP, Margin of Safety Make or Buy Decision (Simple Problems)

Unit – 3: Management and Business Organisations:
Management:Nature, Significance and Functions of Management.
Features of Business, Types of Business Organizations: Sole Proprietorship, Partnership, Joint Stock Company, and Public enterprises.

Unit – 4: HR and Marketing Management:

Introduction to HR, Functions of HR Manager (Manpower Planning Recruitment, Selection, Training & Development, Performance Appraisal), Grievances handling and negotiations
Marketing**:** Functions of Marketing- Marketing Mix- Pricing methods- Promotional practices and Channels of distribution - Product Life Cycle - Basic concepts of Advertising-Marketing Research - e-Marketing - Marketing through social media, pricing strategies in internet era.

Unit – 5: Contemporary Issues in Management:
Basic Concepts of MIS and ERP – Total Quality Management (TQM) – Six Sigma – Business Process Re-engineering – Just-In-Time (JIT) – Business Process Outsourcing (BPO) – Knowledge Process Outsourcing (KPO)

On successful completion of this course, students should be able to

COURSE OUTCOMES		POs related to COs
CO1	Understand the business economics	PO3, PO5, PO7
CO2	Understand the production and cost analysis and apply the break-even analysis	PO2, PO4, PO5
CO3	Understand the management and various types of business organisations	PO7
CO4	Understand human resource and marketing management and apply techniques to measure the performance	PO5
CO5	know the contemporary issues in management and apply techniques	PO1, PO5, PO7, PO9, PO12

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	-	-	2	-	2	-	2	-	-	-	-	-
CO2	-	2	-	2	2	-		-	-	-	-	-
CO3	-	-	-	-		-	2	-	-	-	-	-
CO4	-	-	-	-	2	-		-	-	-	-	-
CO5	-	1	-	-	2	-	2	-	2	-	-	2
CO*	-	1.5	2	2	2	-	2	-	2	-	-	2

Text Books:

1. Managerial Economics and Financial Analysis, 4/e, 2011, Dr.A.R.Aryasri, TMH, New Delhi.
2. Management Science, 1/e, 2009, Dr. G. SreenivasaRao, High tech Publishers, Hyderabad.
3. Management Science, 3/e, 2008, A.R.Aryasri, TMH, New Delhi.
4. Introduction to Management Science, 1/e, 2011, P.Vijaykumar, Cengage Learning India, New Delhi

Reference Books:

1. Managerial Economics, Analysis, Problems and Cases, 17/e, 2011, P.L.Mehta, Sultan Chand & Sons, New Delhi.
2. Marketing Management, 4/e, 2010, RajanSaxena, TMH, New Delhi.
3. Personnel and Human Resource Management, 2009, SubbaRao, HPIL.

IV B. TECH II-SEMESTER (CSE)	L	T	P	C
	3	1	0	3

16CSE422A DISTRIBUTED DATABASES (CORE ELECTIVE-IV)

Course Educational Objectives:

CEO1: To gain knowledge on distributed and central data bases.
CEO2: To introduce basic principles and implementation techniques of distributed database systems.
CEO3: To manage the distributed transactions using concurrency control techniques.
CEO4: To understand the concepts of concurrency control and deadlock.
CEO5: To study the basic concepts of reliability control mechanisms.

UNIT – 1: Distributed versus Centralized Databases

Features of distributed versus centralized databases - Principles of distributed databases - Levels of distribution transparency - Reference architecture for distributed databases - Types of data fragmentation - Integrity constraints in distributed databases

UNIT – 2: Translation of Global Queries to Fragment Queries

Translation of global queries to fragment queries - Equivalence transformations for queries - Transforming global queries into fragment queries - Distributed grouping and aggregate function evaluation - Parametric queries - Optimization of access strategies - A framework for query optimization - Join queries - General queries

UNIT – 3: Management of Distributed Transactions

The management of distributed transactions - A framework for transaction management - Supporting atomicity of distributed transactions - Concurrency control for distributed transactions - Architectural aspects of distributed transactions

UNIT – 4: Distributed Concurrency Control

Locking based concurrency control algorithm - Time based concurrency control algorithm – Optimistic concurrency control algorithm - Deadlock management

UNIT – 5: Reliability Control

Reliability - Basic concepts – Non blocking commitment protocols - Reliability and concurrency control - Determining a consistent view of the network - Detection and resolution of inconsistency - Checkpoints and cold restart - Distributed database administration - Catalog management in distributed databases - Authorization and protection

Course Outcomes:

On successful completion of the course the student will be able to,

COURSE OUTCOMES		POs related to COs
CO1	Get familiar with the currently available models, technologies for and approaches to building distributed database systems and services.	PO1, PO2
CO2	Apply practical skills in the use of Query models and approaches to be able to select appropriate methods for a particular case.	PO1, PO3, PO4
CO3	Manage the distributed transactions in the real time data.	PO1, PO2
CO4	Understand the lock based concurrency control algorithms.	PO1, PO2
CO5	Demonstrate the reliability control mechanisms for Detection and resolution of inconsistency.	PO1, PO2, PO4

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	2	-	-	-	-	-	-	-	-	-	-
CO2	3	-	2	2	-	-	-	-	-	-	-	-
CO3	3	2	-	-	-	-	-	-	-	-	-	-
CO4	3	2	-	-	-	-	-	-	-	-	-	-
CO5	3	2	-	2	-	-	-	-	-	-	-	-
CO*	**3**	**2**	**2**	**2**	-	-	-	-	-	-	-	-

Text Books:

1. Distributed Database Principles & Systems, 2/e, Stefano Ceri, Giuseppe Pelagatti, 2008, McGrawHill, Hyderabad, India.
2. Principles of Distributed Database Systems, 2/e, M.TamerOzsu, Patrick Valduriez, 2011,Pearson Education, New Delhi, India.

Reference Books:

1. Distributed Database Management Systems: A Practical Approach, 1/e, Saeed K. Rahimi, Frank S. Haug, 2010,Wiley Publications, New Delhi, India.
2. Distributed Database Systems, 1/e, Chhanda Ray, 2012, Pearson Education, New Delhi, India.
3. Distributed Database Systems, 1/e, David Bell, Jane Grimson, Addison Wesley, 1992, New York, Usa.
4. Distributed Databases, Cooperative Processing, and Networking, 1/e, ShakuAtre, 1992, McGrawHill, Hyderabad, India.
5. Distributed Systems: Vol. II: Distributed Data Base Systems, 1/e, Wesley W. Chu, Artechm, 1986, Print on Demand, New York, USA.

IV B. Tech II Semester

L	T	P	C
3	1	0	3

16CSE422B WIRELESS COMMUNICATION NETWORKS (CORE ELECTIVE-IV)

Course Educational Objectives:

CEO1: To study about Wireless networks, protocol stack and standards.
CEO2: To study about fundamentals of 3G Services, its protocols and applications.
CEO3: To develop skill about various transport layer protocols.
CEO4: To give knowledge about advanced wireless networks and LTE.
CEO5: To learn various challenges and applications of 4G and 5G networks.

UNIT-1: Wireless LAN

Introduction-WLAN technologies: Infrared - UHF narrowband - spread spectrum -IEEE802.11: System architecture - protocol architecture - physical layer - MAC layer - 802.11b - 802.11a – Hiper LAN: WATM – BRAN - HiperLAN2 – Bluetooth: Architecture - Radio Layer - Baseband layer - Link manager Protocol - security – IEEE802.16-WIMAX: Physical layer – MAC - Spectrum allocation for WIMAX

UNIT- 2: Mobile Network Layer

Introduction – Mobile IP: IP packet delivery - Agent discovery - tunneling and encapsulation - IPV6-Network layer in the internet- Mobile IP session initiation protocol – mobile ad-hoc network: Routing - Destination Sequence distance vector - Dynamic source routing

UNIT -3: Mobile Transport Layer

TCP enhancements for wireless protocols – Traditional TCP: Congestion control - fast retransmit/fast recovery - Implications of mobility – Classical TCP improvements: Indirect TCP - Snooping TCP - Mobile TCP - Time out freezing,- Selective retransmission - Transaction oriented TCP – TCP over 3G wireless networks.

UNIT-4: Advanced Wireless Networks

Ad-hoc networks - Routing in MANETs- Wireless sensor networks - MAC protocols for wireless sensor networks - Routing in sensor networks - LTE network architecture and protocol.

UNIT-5: 4G and 5G Networks

Introduction – 4G vision – 4G features and challenges – Applications of 4G – 4G Technologies: Multicarrier Modulation - Smart antenna techniques - OFDM-MIMO systems - Adaptive Modulation and coding with time slot scheduler - Cognitive Radio - 5G vision – 5G features and challenges – Applications of 5G

Course Outcomes:

On successful completion of the course the student will be able to,

Course Outcomes		POs related to COs
CO1	Identify the components required to build different types of wireless networks	PO1, PO2
CO2	Understand the latest 3G/4G and WiMAX networks and its architecture.	PO1, PO4
CO3	Understand mobile transport layer and its applications	PO1, PO2
CO4	Design and implement wireless network environment for any application using latest wireless protocols and standards	PO1, PO3
CO5	Implement different type of applications for smart phones and mobile devices with latest network strategies.	PO1, PO5

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	2	-	-	-	-	-	-	-	-	-	-
CO2	3	-	-	2	-	-	-	-	-	-	-	-
CO3	3	2	-	-	-	-	-	-	-	-	-	-
CO4	3		**3**	-	-	-	-	-	-	-	-	-
CO5	3	-	-	2	-	-	-	-	-	-	-	-
CO*	**3**	**2**	**3**	**2**	-	-	-	-	-	-	-	-

Text Book:

1. Mobile Communications, Second Edition, JochenSchiller ,2012, Pearson Education.
2. Introduction to Wireless and Mobile Systems, 3rd edition, Dharma PrakashAgrawal and Qing-An ZengTomson, 2010, (ISBN-13: 978-1-4390-6205-0; ISBN-10: 1-4390-6205-6).
3. Wireless Communications and networking, First Edition, Vijay Garg , Elsevier 2007.

Reference Books:

1. 3G Evolution HSPA and LTE for Mobile Broadband, Second Edition, Erik Dahlman, Stefan Parkvall, Johan Skold and Per Beming,2008, Academic Press.
2. Wireless Networking, First Edition, Anurag Kumar, D.Manjunath, Joy kuri, 2011, Elsevier.
3. Modern Wireless Communications, First Edition, Simon Haykin , Michael Moher, David Koilpillai, 2013,Pearson Education.
4. Routing in the Internet, Christian Huitema, 1995 (ISBN: 0-13-132192-7), Prentice Hall.

IV B. TECH II-SEMESTER (CSE)

L	T	P	C
3	1	0	3

16CSE422C INTERNETWORKING WITH TCP/IP (CORE ELECTIVE-IV)

Course Educational Objectives:

CEO1: To study the standards of TCP / IP protocol and addressing types.
CEO2: To understand various protocols like ARP, RARP, UDP, ICMP, IGMP.
CEO3: To gain knowledge on TCP and UDP protocols.
CEO4: To learn about the TELNET and SSH- TELNET.
CEO5: To experience the IPv6 version in the network.

UNIT – 1: OSI Model and TCP/IP Protocol Suite

TCP/IP protocol suite - Addressing- Internet protocol version 4 (IPv4) - Datagrams - Fragmentation - Options - Checksum - IPv4 addresses - Introduction - Classful addressing - Classless addressing - Special addresses - NAT

UNIT – 2: Address Resolution Protocol (ARP)

Address mapping - The ARP protocol - ATMARP - ARP package - Internet control message protocol Version 4 - Introduction - Messages - Debugging tools - ICMP package - Unicast routing protocols (RIP, OSPE and BGP) - Introduction - Intra and inter domain routing - Distance vector routing - RIP - Link state routing - OSPF - Path vector routing - BGP

UNIT – 3: User Datagram Protocol (UDP)

Introduction - User datagram - UDP services - UDP applications - UDP package - Transmission control protocol (TCP) - TCP services - TCP features - Segment - A TCP connection-Windows in TCP - Flow control - Error control - Congestion control - TCP timers - Options - TCP package

UNIT – 4: Remote Login

TELNET and SSH- TELNET - Secure shell (SSH) - File transfer - FTP - TFTP

UNIT – 5: Internet Protocol Version 6

Introduction - Advantages of IPv6 - IPv6 addressing format - IPv6 header - IPv6 extension headers - ICMPv6

Course Outcomes:
On successful completion of the course the student will be able to,

COURSE OUTCOMES		POs related to COs
CO1	Independently understand basic computer network technology.	PO1, PO2
CO2	Understand and explain ARP, RARP, UDP, ICMP, IGMP protocols.	PO1, PO4
CO3	Identify the differences between TCP and UDP.	PO1, PO2
CO4	Understand and building the skills of sub netting and routing mechanisms.	PO1, PO2, PO3
CO5	Familiar with IPv6 protocol in communication networks.	PO1, PO2

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	3	-	-	-	-	-	-	-	-	-	-
CO2	3	-	-	2	-	-	-	-	-	-	-	-
CO3	3	3	-	-	-	-	-	-	-	-	-	-
CO4	2	2	2	-	-	-	-	-	-	-	-	-
CO5	3	3	-	-	-	-	-	-	-	-	-	-
CO*	**2.8**	**2.75**	**2.0**	**2.0**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

Text Books:

1. TCP/IP Protocol Suite, 4/e, BehrouzA.Forouzan, April 2009, Tata McGrawHill, Hyderabad, India.
2. Introduction to Data Communications and Networking, 3/e, Wayne Tomasi, May 1998, Pearson Education, New Delhi, India.

References Books:

1. Internetworking with TCP/IP, 2/e, Douglas E. Comer, Stevens, 2006, PHI, New Delhi, India.
2. TCP/IP Network Administration, 3/e, Craig Hunt, O'Reilly, August 1992, New Delhi, India.
3. TCP/IP Illustrated, Volume 1: The Protocols, 2/e, Kevin R. Fall, W. Richard Stevens, 2011, Pearson Education, New Delhi, India.
4. The TCP/IP Guide:A Comprehensive, Illustrated Internet Protocols Reference, 1/e, Charles M. Kozierok, William Pollock, 2005, San Francisco, Usa.
5. TCP/IP Sockets in C: Practical Guide for Programmers, 1/e, Michael J. Donahoo, Kenneth L. Calvert, Morgan Kaufmann, 2001, San Francisco, Usa.

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IV B. TECH II-SEMESTER (CSE)

L	T	P	C
3	1	0	3

16CSE422D MOBILE COMPUTING (CORE ELECTIVE-IV)

Course Objectives:
CEO1: To describe the basic concepts and principles in mobile computing.
CEO2: To understand the concepts of wireless networks and application software.
CEO3: To explain the structure and components for Mobile IP and Mobility Management.
CEO4: To analyze the different transaction models in mobile data management.
CEO5: To describe the important issues and concerns on security and privacy.

UNIT -1: Introduction
Wireless and Mobile Computing Architecture – Limitations of wireless and mobile communication – Wireless Telecommunication Networks: Digital cellular Systems - TDMA - CDMA – Wireless Networking Techniques – Mobility Bandwidth Tradeoffs – Portable Information Appliances.

UNIT- 2: Emerging Wireless Network Standards
3 G Wireless Networks – State of Industry – Mobility support Software – End User Client Application – Mobility Middleware –Middleware for Application Development - Adaptation and Agents - Service Discovery Middleware – Finding Needed Services - Interoperability and Standardization.

UNIT -3: Mobile Networking
Virtual IP Protocols - Loose Source Routing Protocols - Mobile IP – CDPD – GPRS – UMTS Security and Authentication – Quality of Service – Mobile Access to the World Wide Web.

UNIT -4: Mobile Data Management
Mobile Transactions - Reporting and Co Transactions –Kangaroo Transaction Model – Clustering Model –Isolation only transaction – 2 Tier Transaction Model – Semantic based nomadic transaction processing.

UNIT -5: Mobile Computing Models
Client Server model – Client/Proxy/Server Model – Disconnected Operation Model – Mobile Agent Model – Thin Client Model – Tools: Java – Brew - Windows CE – WAP – Sybian - and EPOC.
Course Outcomes:
On successful completion of the course the student will be able to,

Course Outcomes		POs related to COs
CO1	Apply the fundamental design paradigms and technologies to mobile computing applications.	PO1, PO2, PO3
CO2	Understand the concepts of wireless networks and application software.	PO1, PO2
CO3	Use the skill to demonstrate the virtual IP and mobile IP.	PO1, PO2, PO4
CO4	Understand the mobile transactions for data management.	PO1, PO2,
CO5	Familiar with computing models such as Java – Brew - Windows CE – WAP – Sybian - and EPOC	PO1, PO2, PO5

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	3	3	-	-	-	-	-	-	-	-	-
CO2	3	2	-		-	-	-	-	-	-	-	-
CO3	3	3	-	3	-	-	-	-	-	-	-	-
CO4	2	2	-	-	-	-	-	-	-	-	-	-
CO5	3	3	-	-	3	-	-	-	-	-	-	-
CO*	**2.8**	**2.75**	**3.0**	**3.0**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

Text Books:

1. Mobile Computing Principles, Reza B Fat and Roy.T. Fielding, 2005.Cambridge University Press.
2. Anytime, Anywhere Computing, Mobile Computing Concepts and Technology, Abdelsalam A Helal, Richard Brice, Bert Haskel, MarekRusinkiewicz, Jeffery L Caster andDarellWoelk, 2000. Springer International Series in Engineering and Computer Science.

Reference Books:

1. Fundamentals of Mobile and Pervasive Computing, Golden Richard, Frank Adelstein, Sandeep KS Gupta, Golden Richard and Loren Schwiebert, 2005, McGraw-Hill ,Professional Publishing.
2.Principles of Mobile Computing, UweHansmann, LotharMerk, Martin S. Nicklons and Thomas Stober,2003, Springer.

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IV B. TECH II-SEMESTER (CSE)

L	T	P	C
3	1	0	3

16CSE423A DESIGN PATTERNS (CORE ELECTIVE-V)

Course Educational Objectives:

CEO1: Tounderstand the concepts of Design patterns to solve the design problems.
CEO2: Toanalyze and Apply the Knowledge of Design Patterns to develop a Document Editor.
CEO3: Tostudy the creational patterns for developing the model.
CEO4: To Evaluate the structural patterns.
CEO5: To Manage the operational and extension patterns.

UNIT 1: Introduction
What is a design pattern - Design patterns in small talk MVC - Describing design patterns - Catalog of design patterns - Organizing the catalog – How design patterns solve design problems – How to select a design pattern – How to use a design pattern

UNIT 2: A Case Study: Designing a Document Editor
Design problems - Document structure - Formatting - Embellishing the user interface - Supporting multiple look and feel standards - Supporting multiple window systems - User operations - Spelling checking and hyphenation

UNIT 3: Creational Patterns
Abstract factory - Builder – Factory method - Prototype - Singleton

UNIT 4: Structural Patterns
Adapter - Bridge - Composite - Decorator - Façade – Flyweight - Proxy

UNIT 5: Operational and Extension Patterns
Introducing operations - Template method - State - Strategy - Command – Interpreter - Iterator - Visitor - Mediator - Memento – Observer

Course Outcomes:

On successful completion of this course, the students should be able to:

COURSE OUTCOMES		POs related to COs
CO1	Describe solutions to programming problems using design patterns.	PO1, PO2
CO2	Develop and maintain programs using common design patterns and Frameworks.	PO1, PO2
CO3	Identify and implement appropriate solutions to recurring programming problems by consulting technical documentation and specifications, including design pattern catalogs and existing source code.	PO1, PO2, PO3, PO4
CO4	Evaluate the advantages and disadvantages of using design pattern variants.	PO1, PO2, PO3, PO4
CO5	Implement the design patterns such as Creational patterns (Singleton, Factory, Abstract Factory), Structural patterns (Adapter, Composite, Façade), Behavioral patterns (Iterator, Observer), etc.	PO1, PO2, PO3, PO4

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	2	-	-	-	-	-	-	-	-	-	-
CO2	3	2	-	-	-	-	-	-	-	-	-	-
CO3	3	3	2	2	-	-	-	-	-	-	-	-
CO4	3	2	2	2	-	-	-	-	-	-	-	-
CO5	3	3	2	2	-	-	-	-	-	-	-	-
CO*	**3**	**2.4**	**2**	**2**	-	**-**	**-**	**-**	**-**	**-**	**-**	**-**

Text Books:

1. Design Patterns: Elements of Reusable Object Oriented Software, 1/e, Gamma, Belm, Johnson, 2008,Pearson Education, New Delhi, India.
2. Design patterns in java: Software Patterns Series, 1/e, Steven John Metsker, William C. Wake, 2006, Pearson Education, New Delhi.

References Books:

1. Java Design Patterns, 1/e, Cooper, 2000, Pearson Education, New Delhi, India.
2. Object Oriented Design and Patterns, 2/e, Horstmann, Wiley, 2012, Wiley India Pvt Ltd India.
3. Object Oriented Systems Development, 1/e, Ali Bahrami, 1999, McGrawHill, Hyderabad, India.
4. Applying UML Patterns, 3/e, Larman, 2008, Pearson Education, New Delhi, India.
5. Programming in the Large with Design Patterns, 3/e, Eddie Burris, 2012, Pretty Print Press, Leawood Kansas, Usa.
6. Head First Design Patterns, 3/e, Eric Freeman, Oreilly, 2004,SPD, Motilal UK Books, New Delhi, India.

IV B. TECH II-SEMESTER (CSE)	L	T	P	C
	3	1	0	3

16CSE423B HUMAN COMPUTER INTERACTION (CORE ELECTIVE-V)

Course Educational Objectives:

CEO1: To provide knowledge on principles, characteristics, tools and devices of Human Computer Interaction
CEO2: To design appropriate user interface for desktop and web applications
CEO3: To conduct investigations on User requirements to provide an effective user interface
CEO4: To utilize user interface mock-up tools and input, output and pointing devices for designing user interfaces.
CEO5: To apply Contextual knowledge to develop interfaces for differently abled people.

UNIT – 1: Introduction

Importance of user interface - Definition - Importance of good design - Benefits of good design - A brief history of the human computer interface - The graphical user interface - Popularity of graphics - The concept of direct manipulation - Graphical systems - Characteristics – Web user Interface –the popularity of the web - Characteristics of a web interface - Principles of user interface design

UNIT – 2: Design Process

Human interaction with computers - Importance of human characteristics in design - Human consideration in design - Human interaction speeds - Understanding business functions

UNIT – 3: Screen Designing

Interface design goals - Screen meaning and purpose - Organizing screen elements - Ordering of screen data and content - Screen navigation and flow - Visually pleasing composition - Amount of information - Focus and emphasis - Presenting information simply and meaningfully – Reading browsing and searching on the web - Statistical graphics - Technological consideration in interface design

UNIT – 4: Windows and its Components

Menus - Navigation schemes - Selection of devices based controls – Selection of screen based controls - Text and messages - Icons and images - Multimedia - Colors - Choosing colors

UNIT – 5: Software Tools and Interaction Devices

Software tools - Specification methods - Interface building tools - Interaction devices - Keyboard and function keys - Pointing devices - Speech recognition digitization and generation - Image and video displays – Printers.

Course Outcomes:

On successful completion of this course, the students should be able to:

Course Outcomes		POs related to COs
CO1	Demonstrate knowledge on principles, characteristics, tools and devices of Human Computer Interaction.	PO1, PO2
CO2	Analyze the user requirements, technological and physical characteristics of users for better interface design. CO3. Design appropriate user interface for desktop and web applications.	PO1, PO2, PO3, PO5
CO3	Conduct investigations on User requirements to provide an effective user interface.	PO1, PO2, PO3, PO4, PO5
CO4	Utilize user interface mock-up tools and input, output and pointing devices for designing user interfaces.	PO1, PO2, PO4
CO5	Apply Contextual knowledge to develop interfaces for differently abled people.	PO1, PO4

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	2	-	-	-	-	-	-	-	-	-	-
CO2	3	2	3	-	3	-	-	-	-	-	-	-
CO3	3	3	2	2	3	-	-	-	-	-	-	-
CO4	3	2		2	-	-	-	-	-	-	-	-
CO5	3			2	-	-	-	-	-	-	-	-
CO*	**3**	**2.25**	**2.5**	**2**	3	**-**	**-**	**-**	**-**	**-**	**-**	**-**

Text Books:

1. The essential guide to user interface design, 3/e, Wilbert O Galitz, 2007, Wiley Dreamtech, New Delhi, India.
2. Designing the user interface, 3/e, Ben Shneidermann, 2004, Pearson Education, New Delhi, India.

Reference Books:

1. Human Computer Interaction, 3/e, Alan Dix, Janet Fincay, GreGoryd, Abowd, Russell Bealg, 2004,Pearson Education, New Delhi, India.
2. Interaction Design, 3/e, Preece, Rogers, Sharps, 2011, Wiley Dreamtech, New Delhi, India.
3. User Interface Design, 1/e, SorenLauesen, 2005, Pearson Education, New Delhi, India.
4. Human Computer Interaction: An Empirical Research Perspective, 1/e, I.ScottMacKenzie, Morgan Kaufmann, 2013, San Francisco, Usa.
5. Human Computer Interaction Handbook: Fundamentals, Evolving Technologies, and Emerging Applications, 3/e, Julie A. Jacko, 2012, CRC Press, Boca Raton, Usa.

IV B. TECH II-SEMESTER (CSE)

L	T	P	C
3	1	0	3

16CSE423C INFORMATION RETRIEVAL SYSTEMS (CORE ELECTIVE-V)

Course Educational Objectives:

CEO1: To learn the different models for information storage and retrieval.
CEO2: To understand about the various retrieval utilities.
CEO3: To learn about indexing and querying in information retrieval systems.
CEO4: To expose the students to the notions of Query processing and duplicate document detection.
CEO5: To learn about various Information retrieval approaches in Web based application.

UNIT 1: **Introduction, Retrieval Strategies**
Vector space model - Probabilistic retrieval strategies: Simple term weights - Non binary independence model - Language Models.

UNIT 2: **Retrieval Utilities-1**
Relevance feedback – Clustering - N-grams - Regression analysis - Thesauri.

UNIT 3: Retrieval Utilities-2
Semantic networks - Parsing Cross-Language Information Retrieval: Introduction - Crossing the language barrier.

UNIT 4: Efficiency
Inverted index - Query processing - Signature files - Duplicate document detection.

UNIT 5: Integrating Structured Data and Text
A Historical progression - Information retrieval as a relational application - Semi-structured search using a relational schema
Distributed information Retrieval: A Theoretical model of distributed retrieval Web search.

Course Outcomes:

On successful completion of this course, the students should be able to:

Course Outcomes		POs related to COs
CO1	Possess the ability to store and retrieve textual documents using appropriate models	PO1, PO2
CO2	Ability to use the various retrieval utilities for improving search	PO1, PO2, PO3, PO4
CO3	Understand of indexing and compressing documents to improve space and time efficiency	PO1, PO2, PO3, PO4
CO4	Possess the skill to formulate Query processing and detecting duplicate document	PO1, PO2,PO4
CO5	Understanding the theoretical model and implementing the various information retrieval approaches in web based approach	PO1, PO3,PO4

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	2	-	-	-	-	-	-	-	-	-	-
CO2	3	2	3	3		-	-	-	-	-	-	-
CO3	3	3	2	2		-	-	-	-	-	-	-
CO4	3	2		2	-	-	-	-	-	-	-	-
CO5	3		3	2	-	-	-	-	-	-	-	-
CO*	**3**	**2.25**	**2.3**	**1.8**		**-**	**-**	**-**	**-**	**-**	**-**	**-**

Text Books:

1. Information Retrieval —Algorithms and Heuristics, 2 Edition, David A. Grossman, OphirFrieder,2004,Springer (Distributed by Universities Press)

Reference Books:

1. Information Storage and Retrieval Systems, Gerald J Kowaiski, Mark T Maybury, 2000,Springer.
2. Mining the Web : Discovering Knowledge from Hypertext Data, SoumenChakrabarti,2002, Morgan-Kaufrnann Publishers.
3. An Introduction to Information Retrieval, Christopher D. Manning, PrabhakarRaghavan, HinñchSchütze ,2009,Cambridge University Press, Cambridge, England.

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES.
(AUTONOMOUS)
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

IV B. TECH II-SEMESTER (CSE)

L	T	P	C
3	1	0	3

16CSE423D SERVICE ORIENTED ARCHITECTURE (CORE ELECTIVE-V)

Course Educational Objectives:

CEO1: To Understandthe basic concepts of SOA, comparison with existing architectures and principles of service orientation.

CEO2: To learn about web services, messaging with SOAP and different layers of SOA and to learn about advanced concepts such as Orchestration.

CEO3: To learn about web services and Contemporary SOA

CEO4: To Study About Web Services Security And Advanced Messaging.

CEO5: To Understand the Service Oriented Business Process Design.

UNIT – 1: Introduction and Evolution of SOA

Fundamental SOA - Common characteristics of contemporary SOA – Common tangible benefits of SOA – Common pitfalls of adopting SOA - SOA timeline (from XML to web services to SOA) - The continuing evolution of SOA (standards organizations and contributing vendors) - The roots of SOA (comparing SOA to past architectures)

UNIT – 2: Principles of Service- Orientation and Service Layers

Services-orientation and the enterprise - Anatomy of a service-oriented architecture - Common principles of service-orientation - Service orientation and object orientation - Service layer abstraction Application service layer - Business service layer - Orchestration service layer

UNIT – 3: Web Services and Contemporary SOA

The web services framework - Services (as web services) - Service descriptions (with WSDL) - Messaging (with SOAP) – Message exchange patterns - Service activity - Coordination - Atomic transactions - Business activities - Orchestration - Choreography

UNIT – 4: Web Services Security and Advanced Messaging

Message level security - Data level security - XML Encryption - XML Signature - Reliable Messaging - Notification - WS - Eventing - WS - Notification

UNIT – 5: Business Process Design

WS - BPEL language basics - WS - Coordination overview – Service Oriented Business Process Design (a step-by-step process) - WS - Addressing language basics - WS - Reliable messaging language basics

Course Outcomes:

On successful completion of this course, the students should be able to:

Course Outcomes		POs related to COs
CO1	Gained Knowledge on concepts of SOA and comparison with older architectures and principles of service orientation.	PO1
CO2	Understood the Principles of Service- Orientation and Service Layers	PO1, PO2, PO3,PO4
CO3	Gained knowledge on different Web Services and Contemporary SOA	PO1, PO2, PO3
CO4	Understood the concepts of Web Services Security and Advanced Messaging	PO1, PO3
CO5	Gained knowledge to Analyze complex business process critically in identifying appropriate service model logic.	PO1, PO2,PO3,PO4

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3		-	-	-	-	-	-	-	-	-	-
CO2	3	2	3	3	-	-	-	-	-	-	-	-
CO3	3	3	2	-	-	-	-	-	-	-	-	-
CO4	3	-	3		-	-	-	-	-	-	-	-
CO5	3	3	3	2	-	-	-	-	-	-	-	-
CO*	**3**	**2.6**	**2.75**	**2.5**		**-**	**-**	**-**	**-**	**-**	**-**	**-**

Text Books:

1. Service-Oriented Architecture Concepts and Technology and Design, 1/e, ThomasErl,2006, Pearson Education, New Delhi, India.
2. Understanding SOA with Web Services, 1/e, Eric Newcomer, Greg Lomow, December 2004, Pearson Education, New Delhi, India.

References Books:

1. Service-Oriented Architecture (SOA): A Planning and Implementation Guide for Business and Technology, 1/e, Eric A. Marks, Michael Bell, 2006, Wiley Publication, New Delhi, India.
2. Developing Enterprise Web Services An Architect's Guide, 2/e, SandeepChatterjee, James Webber, 2004, Pearson Education, New Delhi, India.
3. Service-Oriented Architecture (SOA) Compass: Business Value, Planning, and Enterprise Roadmap, 1/e, Norbert Bieberstein, Sanjay Bose, Marc Fiammante, Keith Jones, Rawn Shah, 2005, IBM Press, New Delhi, India.
4. SOA in Practice: The Art of Distributed System Design(Theory in Practice), 1/e, Nicolai M. Josuttis, O'Reilly, 2007, New York, Usa.
5. IT Architecture and Middleware Strategies for Building Large Integrated Systems, 1/e, Chris Britton, Addison Wesley, 2000, New Delhi, India

IV B. TECH II-SEMESTER (CSE)

L	T	P	C
18	0	0	10

16CSE424 PROJECT WORK

Course Educational Objectives:

CEO1: To develop the ability to undertake problem identification, formulation and solution.

CEO2: To ddemonstrate the ability to engage in design and to execute designs to an appropriate professional standard.

CEO3: To develop the capacity to undertake lifelong learning.

CEO4: To develop the ability to communicate effectively, not only with engineers but also with the community at large.

CEO5: To develop an understanding of the social, cultural, global and environmental responsibilities of the professional Engineer, and the principles of sustainable design and development

PROJECT WORK

The aim of the project work is to deepen comprehension of principles by applying them to a new problem which may be the design / fabrication / analysis for a specific application, a research project with a focus on an application needed by the industry / society, a computer project, a management project or a design and analysis project. A project topic must be selected by the students in consultation with their guides. To train the students in preparing project reports, facing reviews and viva voce examination. The progress of the project is evaluated based on a minimum of three reviews. The review committee may be constituted by the Head of the Department. A project report is required at the end of the semester. The project work is evaluated jointly by external and internal examiners constituted by the Head of the Department based on oral presentation and the project report.

On successful completion of this course, the students should be able to:

Course Outcomes		POs related to COs
CO1	Acquire the ability to make links across different areas of knowledge and to generate, develop and evaluate ideas and information so as to apply these skills to the project task.	PO1, PO2, PO3, PO4, PO5, PO6, PO7
CO2	Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.	PO8
CO3	Acquire the skills to communicate effectively and to present ideas clearly and coherently to specific audience in both the written and oral forms.	PO10
CO4	Aquire collaborative skills through working in a team to achieve common goals.	PO9,PO11
CO5	learn on their own, reflect on their learning and take appropriate actions to improve it.	PO12

CO-PO Mapping

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	3	3	3	3	3	3	-	-	-	-	-
CO2	-	-	-	-	-	-	-	3	-	-	-	-
CO3	-	-	-	-	-	-	-	-	-	3	-	-
CO4	-	-	-	-	-	-	-	-	3	-	3	-
CO5	-	-	-	-	-	-	-	-	-	-	-	3
CO*	**3**	**3**	**3**	**3**	3	3	3	3	3	**3**	**3**	**3**