RAJEEV GANDHI MEMORIAL
COLLEGE OF ENGINEERING AND TECHNOLOGY

AUTONOMOUS
NANDYAL-518501, KURNOOL DIST., A.P., INDIA

COMPUTER SCIENCE AND ENGINEERING

ESTD: 1995

B.TECH SYLLABUS
2015

Applicable for students admitted into B.Tech (Regular) from 2015-16

REGULATIONS, COURSE STRUCTURE & DETAILED SYLLABUS

RAJEEV GANDHI MEMORIAL COLLEGE OF ENGINEERING AND TECHNOLOGY

Autonomous

COMPUTER SCIENCE AND ENGINEERING
(Affiliated to J.N.T.U.A, Anantapuramu)

ACADEMIC REGULATIONS, COURSE STRUCTURE AND DETAILED SYLLABI

B.Tech. (Regular) from 2015-16 and B.Tech. (Lateral Entry Scheme) from 2016-17

For pursuing four year Bachelor Degree Program (under graduate) of study in Engineering (B.Tech.), Two year Master (post graduate) Degree of study in Engineering (M.Tech.), Two year Master (post graduate) degree of study in Business Administration (MBA), Three-year Master (post graduate) Degree of study in Computer Applications (MCA) offered by Rajeev Gandhi Memorial College of Engineering and Technology, Nandyal -518501 under Autonomous status and herein referred to as RGMCET (Autonomous):

All the rules specified herein approved by the Academic Council will be in force and applicable to students admitted from the Academic Year 2015-16 onwards. Any reference to "Institute" or "College" in these rules and regulations shall stand for Rajeev Gandhi Memorial College of Engineering and Technology (Autonomous).

All the rules and regulations, specified hereafter shall be read as a whole for the purpose of interpretation. As and when a doubt arises, the interpretation of the Chairman, Academic Council is final. As per the requirements of statutory bodies, the Principal, Rajeev Gandhi Memorial College of Engineering and Technology shall be the Chairman, Academic Council.

The candidate seeking admission into the first year of study of four year B.Tech degree programme should have:

i) Passed either Intermediate Public Examination (IPE) conducted by the Board of Intermediate Education, Andhra Pradesh with Mathematics, Physics and Chemistry as optional subjects (or any equivalent examination certified by Board of Intermediate Examinations) or a Diploma in Engineering in the relevant branch conducted by the Board of Technical Education, Andhra Pradesh (or any equivalent examination certified by State Board of Technical Education) for admission.

ii) Secured a rank in the EAMCET examination conducted by AP State Council for Higher Education (APSCHE) for allotment of a seat by the Convener, EAMCET, for admission.

Admission Procedure:

As per the norms of A.P. State Council of Higher Education (APSCHE), Government of Andhra Pradesh, admissions are made to the first year of Four year B.Tech. Degree program as follows:-

a) As per the norms of Government of Andhra Pradesh, A-Category (based on the rank obtained in EAMCET) seats will be filled by the Convener, EAMCET.

b) As per the norms of Government of Andhra Pradesh, B-Category seats will be filled by the management.

Admission to the Second year of Four year B.Tech. Degree Program in Engineering:

i) Candidates qualified in ECET and admitted by the Convener, ECET, in such cases for admission, when needed permission from the statutory bodies is to be obtained.

ii) 20% of the sanctioned strength in each program of study (of RGMCET) shall be filled by the Convener, ECET as lateral entry.

List of Programs offered

1. B.Tech – Regular (& Lateral Entry)
2. M.Tech – Regular
3. MBA – Regular
4. MCA – Regular

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Academic Regulations for 2015 B. Tech. (Regular)

(Effective for the students admitted into the I year from the Academic Year 2015-2016)

The B.Tech.be conferred by the Jawaharlal Nehru Technological University Anantapur, Anantapuramu students who are admitted to the program and fulfill all the requirements for the award of the Degree as specified below:

1.0 Award of B.Tech. Degree

1.1 The student will be declared eligible for the award of the B. Tech. degree if he fulfils the following academic regulations:

1.2 Pursued a course of study for not less than prescribed course work duration and not more than double the prescribed course work duration.

1.3 Registered for 200 credits and secured a minimum of 194credits with compulsory subjects as listed in Table-1 below.

Table 1: Compulsory Subjects

S.No	SUBJECT PARTICULARS
1	All the first year subjects
2	All practical subjects
3	All Skill Development Courses/ value added courses
4	Mini project
5	Seminar
6	Comprehensive viva - voce
7	Project work
8.	Extra Academic Activities(EAA)

2.0 Forfeit of seat

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

3.0 Courses of study

The following courses of study are offered at present as specializations for the B.Tech. Course:

1. **Civil Engineering**
2. **Computer Science and Engineering**
3. **Electrical and Electronics Engineering**
4. **Electronics and Communication Engineering**
5. **Information Technology**
6. **Mechanical Engineering**

and any other course as approved by the authorities of the University from time to time.

Table 2: Credits

Subject	Semester			
	Periods/ Week	Credits	Internal Marks	External Marks
Theory	3+1*	03	30	70
Practical/Mini project	03	02	25	50
Drawing	03	03	30	70
Skill Development Courses/Value Added Course	1+2*	01**	100 (30 IM + 70 EM)	
EAA (Extra Academic Activities)	02	01	00	00
Seminar		01	50	
Comprehensive Viva-voce		02		50
Project		08	50	100

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**[Skill Development Courses / value Added Course credits will not be considered for the award of division. However all these courses have to be cleared through internal evaluation by scoring minimum of 40%marks.EAA courses will not have any marks. The credits obtained in Skill development courses and EAA will be taken in to account for the award of degree.]

4.0 Distribution and Weight age of Marks

4.1 The performance of the student in each semester shall be evaluated subject –wise with a maximum of 100 marks for theory and 75 marks for practical subject. In addition, mini-project, comprehensive viva, seminar shall be evaluated for 50 marks each and the project work shall be evaluated for 150 marks.

4.2 For theory subjects the distribution shall be 30 marks for Internal Evaluation (25 marks for internal test and 05 marks for assignments or field work/group task) and 70 marks for the End-Examination.

4.3 During the semester there shall be 2 tests for theory subjects. In each Internal test there shall be one compulsory (short answers) question and 3 descriptive questions are to be answered. The duration of internal test will be for 2hours. First test to be conducted in 3 units and second test to be conducted in the remaining 3 units of each subject. For awarding of 25Internal marks the performance of the student in two Internal examinations conducted one in the middle of the semester and the other towards the end of the semester giving a weight age of 0.75 for the better score and 0.25 for the other score will be considered. There shall be two assignments in each subject (problem based/ field work/group task) for award of 05 marks so that internal component (marks) will be 30 marks (25 marks for internal test+05 marks for assignments / field work/group task).

Table 3: Units for Internal Tests

Semester
3 Units First Internal test
3 Units Second Internal test

4.4 In the case of Skill Development Courses, two Internal examinations shall be conducted one in the middle of the semester and the other at the end of the semester for 30 marks and the marks scored by the student in these exams with a weight age of 0.75 for better score and 0.25 for the other score will be awarded as Internal marks for 30. For the remaining 70 marks an end examination will be conducted along with other theory examinations. However skill development courses/Value added courses, end examination will be evaluated internally.

4.5 No makeup test for internal examination or assignments/group tasks will be conducted in any subject or practical. The student, who is absent for any test shall be deemed to have scored zero in that test.

4.6 Elective subjects will commence from 3rd year second semester onwards. Out of the electives offered in 3-2 semester, one elective will be MOOC/Elective offered by the department. Any student who is interested can opt for the MOOC (Self Study) / Elective offered by the department and acquires the required credits. Even if the student opts MOOC, he has to write two internal tests besides the end examination conducted by the institute like other subjects. However, he has to obtain the certificate from the organization in which he has registered. Any MOOC selected by the student should be of more than 45 hours duration and also from the reputed organization. Attendance of the student who has opted for MOOC will be taken from the remaining subjects and labs only in that semester while finalizing the attendance for fulfilling the minimum requirements of attendance for promotion to next semester. Attendance will not be recorded for MOOC.

4.7 Gap Year – Concept of student Entrepreneur in Residence shall be introduced and outstanding students who wish to pursue entrepreneurship are allowed to take a break of one year at any time after I/II/III year to pursue entrepreneurship full time. This period may be extended to two years at the most and these two years would not be counted for the time for the maximum time for graduation. An evaluation

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committee shall be constituted with to evaluate the proposal submitted by the student and committee shall decide on permitting the student for having the Gap Year. The committee consists of Principal as Chairman and all HODs as members.

4.8 In the electives offered in 4-1 semester, one elective will be open elective offered by the other department (inter - department). Student has to select one subject among the offered list of open elective subjects. Student has to clear the subject as per norms to get the required credits. At least 40students should register for any open elective; otherwise that open elective will not be offered.

4.9 Out of the electives offered in 4-2 semester again one elective will be based on MOOC (Self Study)/Elective offered by the department and the student has to acquire the required credits to clear the subject as specified in 4.9.

4.10 The institute would like to offer Minor as optional feature of the B.Tech program aimed at providing additional learning opportunities for academically motivated and bright students. In order to earn a Minor, a student has to earn a minimum of 20 extra credits. For this in addition to the regular subjects, a student has to pursue Four subjects from 3-1 semester onwards. The Minor is indicated by separate CGPA and is reflected in the degree certificate as for example, B.Tech in ECE with Minor in Artificial Intelligence. Each department shall offer at least one Minor. The student has to select the subjects which are not studied in their regular course and student should have cleared all the subjects up to and including 2-1 semester with above 8.5 CGPA (For SC/ST students CGPA 8.0) without any backlog subjects are eligible for registering Minor. GPA and CGPA of 8.0 has to be maintained in the subsequent semesters without any backlog subjects in order to keep Minor discipline registration active else Minor discipline registration will be cancelled. The breakup of the credits are 4 subjects which carry 16 credits @4 credits for subject and project work carries 4 credits. The evaluation pattern of subjects and project work will be similar to the methods followed in regular course evaluation. Separate course / class work and time table will be arranged for various Minor discipline programmes. Attendance regulations for these Minor discipline programmes will be as per regular courses. Not more than two subjects are allowed for registration in any semester.

4.11 Extra - Academic Activity (EAA)

Each of the following activities carries one credit and every student is required to register for two activities during second year of study which is mandatory.
a) *NSS/NCC*
b) *Games and Sports*
c) *Yoga/Meditation*
d) *Extension Activities*
e) *Literary/ Cultural Activities*

Any other which may be offered in future

The activities shall be carried out in the allotted hours. The activities will be monitored by the respective faculty in charge, senior faculty member of the department and the HOD. Grades will be awarded on the basis of participation, attendance, performance and behavior. Grades shall be entered in the marks statement as GOOD, SATISFACTORY and UNSATISFACTORY and shall not be counted towards CGPA calculation. If any student gets an Unsatisfactory Grade, he/she has to repeat the activity in the immediate subsequent year.

5.0 Question Paper Pattern

5.1 Each Internal Test question paper shall contain 5 questions, of which the First question is compulsory and three questions are to be answered from the remaining four. Compulsory question carries 10 marks (It contains 5 questions of two marks - no choice in first question). The remaining 3 questions carry 5 marks each. Each question shall have a,b,c. parts.

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5.2 The End Examination question paper will have 7 questions and students have to answer5 questions. However, the first question is compulsory and it consists of 7 short answer questions, each carrying 2 marks. The next 4 questions are to be answered from the remaining 6 questions and each carries 14 marks. Each 14 marks question shall have a, b, c ..parts.

5.3 For practical subjects, there shall be a continuous evaluation during the semester for 25 internal marks and End Examination carries 50 marks. Of the 25 marks for Internal, 20 marks shall be awarded for day-to-day work and 5 marks to be awarded by conducting an internal laboratory test. The End Examination shall be conducted by the teacher concerned and an external Examiner from other institutions.

5.4 For the subject having design and/or drawing, (such as Engineering Graphics, Machine Drawing etc.) and estimation, the distribution shall be 30 marks for Internal evaluation (15marks for day-to-day work and 5 marks for Internal tests and 10 marks for assignments) and 70 marks for End Examination. There shall be two internal tests in a Semester and the better of the two shall be considered for the award of marks for internal tests.

5.5 The Engineering drawing, wherever offered is to be treated as a theory subject. Evaluation method adopted for theory subjects shall be followed here as well.

5.6 There shall be mini-Project, in collaboration with an industry(wherever possible) of their specialization, to be taken up during the vacation(data collection, components etc.) after III year II Semester examination and implementation/simulation shall be carried out in IV year first semester during lab classes. Implementation or fabrication/simulation of mini project will be treated as laboratory. However, the mini project and its report shall be evaluated in IV year I Semester. The mini project shall be submitted in report form and should be presented before the committee, which shall be evaluated for 50 marks. The committee consists of an external Examiner, Head of the Department, the supervisor of mini project and a senior faculty member of the Department. There shall be 25 internal marks for mini project which will be awarded based on the performance and involvement of the student during mini project period.

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

5.8 There shall be a comprehensive viva voce examination at the end of IV year II semester for 50 marks which shall be conducted by HOD, senior faculty and external Examiner from other institute.

5.9 The project topic should be approved by Internal Department Committee (IDC). Out of total 150 marks for the project work, 50 marks shall be for Internal Evaluation and 100 marks for the End Semester Examination. The evaluation of project work shall be conducted at the end of the IV year II semester. The project viva voce examination will be conducted by the committee consisting of an external Examiner from other institute, Head of the Department and the supervisor of the project. The Internal evaluation for 50 marks shall be on the basis of two seminars given by each student on the topic of the project. The Internal evaluation of the project work for 50 marks shall be conducted by the committee consisting of head of the Department or his nominee, senior faculty member and the supervisor of project.

5.10 For all practical /mini project/main project/comprehensive viva-voce etc the HOD of the concerned dept shall submit a panel of 4 external examiners from different institutes and one will be selected by the Chief Superintendent of the Examination for conducting of end examination.

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Table4: Distribution of weight ages for examination and evaluation

Sl. No.	Nature of subject	Marks	Type of examination and mode of assessment		Scheme of Examination
1	Theory	70	End Examination Double Evaluation (Internal + External evaluation)		End Examination in theory subjects will be for 70 marks.
		30	25	Internal Examinations (Internal evaluation)	These 25 marks are awarded to the students based on the performance in two (semester) Internal examinations with a weight age of 0.75 for better score and 0.25 for the other score.
			05	Assignments/Field work/group task (Internal evaluation)	Average of two assignments/Field work/group task in a semester each evaluated for 05 marks.
2	Practical	50	End lab examination (External evaluation)		This End Examination in practical subjects will be for a maximum of 50 marks.
		25	20	Internal evaluation	Day-to-day performance in lab experiments and record
			05	Internal evaluation	Internal lab examination at the end of year/semester
3	Mini Project	50	End Examination (External evaluation)		This End Examination in miniproject will be for a maximum of 50 marks.
		25	Internal evaluation		Day-to-day performance in executing mini project.
4	Seminar	50	Internal evaluation		Based on the performance in two seminars during semester
5	Comprehensive Viva	50	External evaluation		This end viva voce examinations in all the subjects for 50 marks
6	Project work	100	External evaluation		This end viva voce in project work for 100 marks
		50	Internal evaluation		These 50 marks will be based on the performance of the student in the project reviews apart from attendance and regularity
7	Skill Development Courses/ Value Added Course/ Mock interviews and Group Discussion	30	Internal evaluation		These 30 marks are awarded to the students based on the performance of two Internal examinations with a weight age of 0.75 for better score and 0.25 for the other score.
		70	Internal Evaluation		Based on the performance in the end examination.
8	EAA	00	Internal evaluation		Based on performance and committee report.

6.0 Attendance Requirements:

6.1 The student shall be eligible to appear for End examinations of the semester if he acquires a minimum of 75% of attendance in aggregate of all the subjects of that semester.

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

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6.3 The student will not be promoted to the next semester unless he satisfies the attendance requirement of the present semester. They may seek re-admission for that semester when offered next.

6.4 **Shortage of Attendance below 65% in aggregate shall in <u>NO</u> case be condoned.**

6.5 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.

6.6 The stipulated fee shall be payable towards condonation of shortage of attendance.

6.7 **The attendance in each subject will be recorded in the Marks memo.**

7.0 Minimum Academic Requirements:

The following academic requirements have to be satisfied in addition to the attendance requirements mentioned in item No.6.0.

7.1 The student shall be deemed to have satisfied the minimum academic requirements and earned the credits allotted to each theory or practical or design or drawing subject or Skill Development Coursesor project if he secures not less than 35% of marks in the End Examination and he has to score minimum of 40% marks from Internal and external exam marks put together to clear the subject.

7.2 The student shall be promoted from II to III year only if he fulfils the academic requirement of securing a minimum of 51credits out of 102credits from all the exams conducted up to and including II year II semester regular examinations irrespective of whether the candidate takes the examination or not.

7.3 The student shall be promoted from third year to fourth year only if he fulfils the academic requirements of securing minimum of 76 credits out of 152credits from all the exams conducted up to and including III year II semester regular examinations ,whether the candidate takes the examinations or not.

Table 5: Promotion rules

Promotion from	Total credits to register	Minimum credits to obtain for promotion
II yr to III yr	102	51
III yr to IV yr	152	76

7.4 The student shall register and put up minimum attendance in all 200 credits and earn a minimum of 194credits.Marks obtained in the best186credits(excluding the credits obtained in Skill Development Courses/VAC/Mock interviews and GD and EAA) shall be considered for the calculation of percentage of marks.

7.5 Students who fail to earn 194 credits as indicated in the course structure including compulsory subjects as indicated in Table-1 within eight academic years from the year of their admission shall forfeit their seat in B.Tech. course and their admission shall stand cancelled.

8.0 Course pattern:

8.1 The entire course of study is of four academic years. Each academic year consists of two semesters

8.2 The student is eligible to appear for the End Examination in a subject, but absent at it or has failed in the End Examination may appear for that subject at the supplementary examination.

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Table: 6: Course pattern

Year	Semester	No. of Subjects		No. of Skill Development Courses	Number of Labs		Total credits	
		CE/ME/CSE	ECE/EEE/IT		CE/ME/CSE	ECE/EEE/IT		
First year	First	06 {ENG-I, M-I, EP, MEC,CP, CORE-1}	06 {ENG-I M-I, ED, CP, EP, CORE-I}	00	EC lab, CP lab, EWS, ELCS	EP Lab, CP lab, ITWS, Core1 lab	6X3=18 4X2=08	26
	Second	06 { Eng-II M-II, SSP/MP, DS,ED, CORE-II}	06 { Eng-II M-II, SSP, MEC,DS, CORE-II}	00	EP lab, DS Lab, ITWS Core-II lab	EC lab, DS lab, EWS, Core-II Lab	6X3=18 4X2=08	26
Second year	First	06		01	Subjects SDC/VAC Labs		6X3=18 1X1=01 3x2=06	25
	Second	06		01	Subjects SDC/VAC Labs		6X3=18 1X1=01 3X2=06	25
Third year	First	06		01	Subjects SDC/VAC Labs		6X3=18 1X1=01 3X2=06	25
	Second	04+01 Elective 01-MOOC/Elective		01	Subjects Elective MOOC/Elective SDC/VAC Labs		4X3=12 1X3=03 1X3=03 1X1=01 3x2=06	25
Fourth year	First	05+Open Elective		01	Subjects Open Elective Mock Interviews and GD Labs Mini project		5X3=15 1X3=03 1X1=01 2X2=03 1X2=03	25
	Second	01+Elective+ MOOC/Elective		01	Subjects Elective MOOC/Elective SDC/VAC Seminar Comprehensive Viva Project Viva EAA		1X3=03 1X3=03 1X3=03 1X1=01 1X1=01 1X2=02 1X8=08 2X1=02	23
						Grand total		**200**

9.0 Transitory Regulations:

Candidates who have been detained for want of attendance or not fulfilled academic requirements or who have failed after having undergone this 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 2.0 and they continue to be in the academic regulations in which they were readmitted.

10.0 With-holding of results:

If the candidate has any dues not paid to the Institute or if any case of indiscipline of 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 degree is liable to be withheld in such cases.

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11.0 Award of Class:

After the 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:

Table 7: Award of Division

Class Awarded	% of marks to be secured	Division/ Class	CGPA	From the aggregate marks secured for the best 186 Credits (excluding Skill Development Courses, EAA)
First Class with Distinction	70% and above	First class With Distinction	≥ 7.5	
First Class	Below 70% but not less than 60%	First Class	6.5 and < 7.5	
Second Class	Below 60% but not less than 50%	Second Class	≥ 5.5 and < 6.5	
Pass Class	Below 50% but not less than 40%	Pass	≥ 4 and < 5.5	

(The marks in internal evaluation and End Examination shall be shown separately in the marks memorandum)

12.0 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 falls.

Table 8: Conversion into Grades and Grade points assigned

Range in which the % of marks in the subject fall	Grade	Grade point Assigned	Performance
90 to 100	O	10	Outstanding
80 to 89.9	A^+	09	Excellent
70 to 79.9	A	08	Very Good
60 to 69.9	B^+	07	Good
50 to 59.9	B	06	Above Average
45 to 49.9	C	05	Average
40 to 44.9	P	04	Pass
<40	F	00	Fail
Ab	AB	00	Fail

12.1 Requirement for clearing any subject: The students have to obtain a minimum of 35% in End Examination and they have to score minimum of 40% marks from Internal and external exam marks put together to clear the subject. Otherwise they will be awarded fail grade.

12.2 F is considered as a fail grade indicating that the student has to reappear for the end supplementary examination in that subject and obtain a non fail grade for clearing that subject.

12.3 In case of skill development/ value added course / soft skill subjects, as there is no end exam, all 100 marks are for internal assessment only. Student has to score 40% in these courses to complete the subject which will be evaluated internally. Marks obtained in these courses shall not be considered for award of Division.

12.4 To become eligible for the award of degree the student must obtain a minimum CGPA of 4.0

13.0 Supplementary Examinations:

Apart from the regular End Examinations, the institute may also schedule and conduct supplementary examinations for all subjects for the benefit of students with backlogs. Such students writing supplementary examinations as supplementary candidates may have to write more than one

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examination per day. The student is not permitted to improve his performance in any subject in which he has obtained pass grade.

14.0 Grade Point Average (GPA) and Cumulative Grade Point Average(CGPA)

The Grade Point Average (GPA) for each semester and Cumulative Grade Point Average (CGPA) up to any semester is calculated as follows:

i) Semester Grade Point Average will be computed as follows:

$$GPA = \frac{\sum_1^n C_j \times GP_j}{\sum_1^n C_j}$$

Where, n is the number of subjects in that semester. C_j is Credits for the subjects. GP_j is the grade point obtained for the subject and the summation is over all the subjects in that semester.

ii) A Cumulative Grade Point Average (CGPA) will be computed for every student at the end of each semester. The CGPA would give the cumulative performance of the student from the first semester up to the end of the semester to which it refers to and is calculated as follows:

$$CGPA = \frac{\sum_1^m GPA_j \times TC_j}{\sum_1^m TC_j}$$

Where 'm' is the number of semester under consideration. TC_j the total number of credits for a jth semester and GPA_j is the Grade Point Average of the jth semester. Both GPA and CGPA will be rounded off to the second digit after decimal and recorded as such.

While computing the GPA / CGPA, the subjects in which the student is awarded zero grade points will also be included.

15.0 Grade Sheet:

A grade sheet (Memorandum) will be issued to each student indicating his performance in all subjects of that semester in the form of grades and also indicating the GPA and CGPA.

16.0 Transcripts:

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

17.0 Rules of Discipline:

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

17.2 When the student absents himself, he is treated as to have appeared and obtained zero marks in that subject(s) and grading is done accordingly.

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

17.4 When the student's answer book is confiscated for any kind of attempted or suspected malpractice, the decision of the Chief Superintendent is final.

18.0 Minimum Instruction Days:

The minimum instruction days for each semester shall be 95 clear instruction days excluding the days allotted for tests/examinations and preparation holidays declared if any.

19.0 Amendment of Regulations:

The college may, from time to time, revise, amend or change the regulations, scheme of examinations and syllabi. However the academic regulations of any student will be same throughout the course of study in which the student has been admitted. However students will continue to be in the academic regulations in which they were readmitted.

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20.0 Transfers

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

21.0 General:

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

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

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

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

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

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

1.0 The Students have to acquire a minimum of 142credits out of 148from II to IV year of B.Tech. Program (Regular) for the award of the degree.

2.0 Students, who fail to fulfil the requirement for the award of the degree in 6 consecutive academic years from the year of admission, shall forfeit their seat.

3.0 The same attendance regulations are to be adopted as that of B. Tech. (Regular).

4.0 **Promotion Rule:**
The student shall be promoted from third year to fourth year only if he fulfils the academic requirements of securing minimum of 50 credits out of 100 credits from all the exams conducted up to and including III year II semester regular examinations, whether the candidate takes the examinations or not.

5.0 **Award of Class:**
After the 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: The marks obtained in the best 134 credits will be considered for the calculation of percentage and award of class.

Table 1: Award of Division

Class Awarded	% of marks to be secured	Division/ Class	CGPA	From the aggregate marks secured for best 134 Credits (i.e. II year to IV year) excluding Skill Development Courses
First Class with Distinction	70% and above	First class With Distinction	≥ 7.5	
First Class	Below 70% but not less than 60%	First Class	$6.5 \, and < 7.5$	
Second Class	Below 60% but not less than 50%	Second Class	$\geq 5.5 \, and < 6.5$	
Pass Class	Below 50% but not less than 40%	Pass	$\geq 4 \, and < 5.5$	

(The marks in Internal evaluation and End Examination shall be shown separately in the marks memorandum)

6.0 All other regulations as applicable for B. Tech. Four-year degree course (Regular) will hold good for B. Tech. (Lateral Entry Scheme).

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COMPUTER SCIENCE AND ENGINEERING

I B.TECH, I-SEMESTER COURSE STRUCTURE

Subject Code	Name of the Subject	Theory	Tutorial	Lab	Credits	Internal	External	Total
		Hours/Week				Marks		
THEORY								
A0001151	Professional English-I	3	1	-	3	30	70	100
A0004151	Mathematics-I	3	1	-	3	30	70	100
A0002151	Engineering Physics	3	1	-	3	30	70	100
A0003151	Modern Engineering Chemistry	3	1	-	3	30	70	100
A0501151	C Programming	3	1	-	3	30	70	100
A0511151	Computer Fundamentals	3	1	-	3	30	70	100
PRACTICALS								
A0091151	Engineering Chemistry Lab	-	-	3	2	25	50	75
A0591151	C Programming Lab	-	-	3	2	25	50	75
A0391151	Engineering Workshop	-	-	3	2	25	50	75
A0092151	English Language & Communication Skills Lab	-	-	3	2	25	50	75
Contact Periods / Week		**18**	**6**	**12**	**26**	**280**	**620**	**900**

I B.TECH, II-SEMESTER COURSE STRUCTURE

Subject Code	Name of the Subject	Theory	Tutorial	Lab	Credits	Internal	External	Total
		Hours/Week				Marks		
THEORY								
A0005152	Professional English –II	3	1	-	3	30	70	100
A0006152	Mathematics –II	3	1	-	3	30	70	100
A0008152	Solid State Physics	3	1	-	3	30	70	100
A0301152	Engineering Drawing	3	3	-	3	30	70	100
A0502152	Data Structures Through C	3	1	-	3	30	70	100
A0242152	Principles of Electrical Engineering	3	1	-	3	30	70	100
PRACTICALS								
A0093152	Engineering Physics Lab	-	-	3	2	25	50	75
A0592152	Data Structures Through C Lab	-	-	3	2	25	50	75
A1291152	IT Workshop	-	-	3	2	25	50	75
A0288152	Principles of Electrical Engineering Lab	-	-	3	2	25	50	75
Contact Periods / Week		**18**	**8**	**12**	**26**	**280**	**620**	**900**

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COMPUTER SCIENCE AND ENGINEERING
II B.TECH, I-SEMESTER COURSE STRUCTURE

Subject Code	Name of the Subject	Theory	Tutorial	Lab	Credits	Internal	External	Total
		Hours/Week				Marks		
THEORY								
A0012156	Probability and Statistics	3	1	-	3	30	70	100
A0430153	Digital Logic Design	3	1	-	3	30	70	100
A0512153	Discrete Mathematics	3	1	-	3	30	70	100
A0513153	Object Oriented Programming through C++	3	1	-	3	30	70	100
A0514153	Database Management Systems	3	1	-	3	30	70	100
A0009153	Environmental Science	3	1	-	3	30	70	100
SKILL DEVELOPMENT COURSE								
A0011154	Corporate Management Skills	1	2	-	1	30	70	100
PRACTICALS								
A0595154	Advanced Data Structures Through C++ Lab	-	-	3	2	25	50	75
A0472153	Digital Logic Design Lab	-	-	3	2	25	50	75
A0596153	Database Management Systems Lab	-	-	3	2	25	50	75
	Contact Periods / Week	**19**	**8**	**9**	**25**	**285**	**640**	**925**

II B.TECH, II-SEMESTER COURSE STRUCTURE

Subject Code	Name of the Subject	Theory	Tutorial	Lab	Credits	Internal	External	Total
		Hours/Week				Marks		
THEORY								
A0016155	Engineering Economics and Accountancy	3	1	-	3	30	70	100
A0506156	Computer Architecture	3	1	-	3	30	70	100
A0516154	Core Java Programming	3	1	-	3	30	70	100
A0517154	Formal Languages and Automata Theory	3	1	-	3	30	70	100
A0518154	Design and Analysis Of Algorithms	3	1	-	3	30	70	100
A0519154	Operating Systems	3	1	-	3	30	70	100
SKILL DEVELOPMENT COURSE								
A0010153	Aptitude Arithmetic Reasoning & Comprehension	1	2	-	1	30	70	100
PRACTICALS								
A0597154	Operating Systems Lab	-	-	3	2	25	50	75
A0598154	Core Java Programming Lab	-	-	3	2	25	50	75
A0599154	Design and Analysis Of Algorithms Lab	-	-	3	2	25	50	75
	Contact Periods / Week	**19**	**8**	**9**	**25**	**285**	**640**	**925**

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COMPUTER SCIENCE AND ENGINEERING
III B.TECH, I-SEMESTER COURSE STRUCTURE

Subject Code	Name of the Subject	Theory	Tutorial	Lab	Credits	Internal	External	Total
		Hours/Week				Marks		
THEORY								
A0520155	Advanced Java Programming	3	1	-	3	30	70	100
A0509157	Computer Networks	3	1	-	3	30	70	100
A0521155	Compiler Design	3	1	-	3	30	70	100
A0522155	Software Engineering	3	1	-	3	30	70	100
A0523155	UNIX Tools and Programming	3	1	-	3	30	70	100
A0524155	Principles of Programming Languages	3	1	-	3	30	70	100
SKILL DEVELOPMENT COURSE								
A0013156	Professional Ethics and Soft Skills	1	2	-	1	30	70	100
PRACTICALS								
A0581155	Advanced Java Programming Lab	-	-	3	2	25	50	75
A0582155	UNIX Tools and Programming Lab	-	-	3	2	25	50	75
A0583155	Compiler Design and Computer Networks Lab	-	-	3	2	25	50	75
Contact Periods / Week		**19**	**8**	**9**	**25**	**285**	**640**	**925**

III B.TECH, II-SEMESTER COURSE STRUCTURE

Subject Code	Name of the Subject	Theory	Tutorial	Lab	Credits	Internal	External	Total
		Hours/Week				Marks		
THEORY								
A0510155	C# & .NET Frame Work	3	1	-	3	30	70	100
A0525156	Android Programming	3	1	-	3	30	70	100
A1226157	Information Security	3	1	-	3	30	70	100
A0508156	Web Technologies	3	1	-	3	30	70	100
	Department Elective-1	3	1	-	3	30	70	100
	Department Elective-2 / MOOCs	3	1	-	3	30	70	100
SKILL DEVELOPMENT COURSE								
A0586156	SCI Lab	1	2	-	1	30	70	100
PRACTICALS								
A0584156	Web Technologies Lab	-	-	3	2	25	50	75
A0594155	C# & .NET Frame Work Lab	-	-	3	2	25	50	75
A0585156	Android Programming Lab	-	-	3	2	25	50	75
Contact Periods / Week		**19**	**8**	**9**	**25**	**285**	**640**	**925**

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COMPUTER SCIENCE AND ENGINEERING
IV B.TECH, I-SEMESTER COURSE STRUCTURE

Subject Code	Name of the Subject	Hours/Week			Credits	Marks		
		Theory	Tutorial	Lab		Internal	External	Total
THEORY								
A0532157	Computer Graphics	3	1	-	3	30	70	100
A1217156	Software Testing Methodologies And Tools	3	1	-	3	30	70	100
A0533157	Data Warehousing & Mining	3	1	-	3	30	70	100
A1228157	Cloud Infrastructure and Services	3	1	-	3	30	70	100
	Open Elective-1	3	1	-	3	30	70	100
	Department Elective-3	3	1	-	3	30	70	100
SKILL DEVELOPMENT COURSE								
A0541157	Mock Interviews and Group Discussion	1	2	-	1	30	70	100
PRACTICALS								
A0587157	Data Mining Lab	-	-	3	2	25	50	75
A1283156	Software Testing Tools Lab	-	-	3	2	25	50	75
A0588157	Mini Project	-	-	3	2	25	50	75
Contact Periods / Week		**19**	**8**	**9**	**25**	**285**	**640**	**925**

IV B.TECH, II-SEMESTER COURSE STRUCTURE

Subject Code	Name of the Subject	Hours/Week			Credits	Marks		
		Theory	Tutorial	Lab		Internal	External	Total
THEORY								
A0017157	Management Science	3	1	-	3	30	70	100
	Department Elective-4 / MOOCs	3	1	-	3	30	70	100
	Department Elective-5	3	1	-	3	30	70	100
SKILL DEVELOPMENT COURSE								
A0589158	PHP Lab	1	2	-	1	30	70	100
A0571158	Seminar	-	-	-	1	50	-	50
A0572158	Comprehensive Viva-Voce	-	-	-	2	-	50	50
A0573158	Project Work	-	-	-	8	50	100	150
	Extracurricular & Co curricular Activities	-	-	-	2	-	-	-
Contact Periods / Week		**10**	**5**	**-**	**23**	**220**	**430**	**650**

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COMPUTER SCIENCE AND ENGINEERING
ELECTIVES

Subject Code	ELECTIVES
III B.TECH, II-SEMESTER	
ELECTIVE – I (DEPARTMENT ELECTIVE)	
A0526156	Object Oriented Analysis and Design
A0527156	Advanced Computer Networks
A0528156	Network Programming
A1221156	Information Storage and Management
ELECTIVE - II/MOOC (DEPARTMENT ELECTIVE/ MASSIVE ONLINE OPEN COURSE (MOOC)	
A0529156	Parallel Processing
A0530156	Advanced Computer Architecture
A0531156	Distributed Systems
IV B.TECH, I-SEMESTER	
ELECTIVE-III (DEPARTMENT ELECTIVE)	
A0538157	Software Quality and Software Project Management
A0539157	Business Intelligence
A0540157	PHP Programming
IV B.TECH, II-SEMESTER	
ELECTIVE –IV (DEPARTMENT ELECTIVE)	
A0542158	Advanced Databases
A0543158	Design Patterns
A0544158	Data Analytics and Big Data
ELECTIVE-V/MOOC (DEPARTMENT ELECTIVE)	
A1222156	Machine Learning
A0545158	Image Processing
A0546158	Multimedia and Application Development
A0515158	Backup Recovery Systems and Architecture

OPEN ELECTIVE-I (IV-I) Courses offered for other Departments

A1232157	Human Computer Interaction
A1239158	Soft Computing
A0534157	Game Theory
A0535157	Heuristic Algorithms
A0536157	Fuzzy & Neural Networks
A0537157	Public Speaking

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COMPUTER SCIENCE AND ENGINEERING

MINOR ACADEMIC CURRICULUM 2015-16

CIVIL ENGINEERING

Subject Code	Course Title	Credits	Internal	External	Total Marks
A0149153	Strength of Materials-I	3	30	70	100
A0114155	Water Resources Engineering-I	3	30	70	100
A0110154	Concrete Technology	3	30	70	100
A0112155	Transportation Engineering-I	3	30	70	100
A0171158	Minor Project	6			

ELECTRICAL & ELECTRONICS ENGINEERING

POWER ENGINEERING

Subject Code	Course Title	Credits	Internal	External	Total Marks
A0242152	Principles of Electrical Engineering	3	30	70	100
A0208154	Generation & Distribution of Electrical Power	3	30	70	100
A0212155	Transmission of Electrical Power	3	30	70	100
A0239158	Electrical Distribution Systems	3	30	70	100
A0271158	Minor Project	6			

ELECTRICAL MACHINES

Subject Code	Course Title	Credits	Internal	External	Total Marks
A0205153	Circuit Theory	3	30	70	100
A0206153	Electrical Machines-I	3	30	70	100
A0207154	Electrical Machines-II	3	30	70	100
A0210155	Electrical Machines-III	3	30	70	100
A0272158	Minor Project	6			

POWER ELECTRONICS

Subject Code	Course Title	Credits	Internal	External	Total Marks
A0242152	Principles of Electrical Engineering	3	30	70	100
A0211155	Power Electronics-I	3	30	70	100
A0214156	Power Electronics-II	3	30	70	100
A0226157	Power Semiconductor Drives	3	30	70	100
A0273158	Minor Project	6			

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COMPUTER SCIENCE AND ENGINEERING

MECHANICAL ENGINEERING

THERMAL ENGINEERING

Subject Code	Course Title	Credits	Internal	External	Total Marks
A0306153	Thermodynamics	3	30	70	100
A0309154	Internal Combustion Engines	3	30	70	100
A0313155	Thermal Engineering	3	30	70	100
A0318156	Heat Transfer	3	30	70	100
A0372158	Minor Project	6			

MECHANICAL DESIGN

Subject Code	Course Title	Credits	Internal	External	Total Marks
A0302151	Engineering Mechanics-I	3	30	70	100
A0305153	Material Science & Metallurgy	3	30	70	100
A0312155	Design of Machine Elements-I	3	30	70	100
A0325157	CAD/CAM	3	30	70	100
A0373158	Minor Project	6			

PRODUCTION ENGINEERING

Subject Code	Course Title	Credits	Internal	External	Total Marks
A0311154	Manufacturing Technology	3	30	70	100
A0316155	Machine Tools	3	30	70	100
A0319156	Engineering Metrology	3	30	70	100
A0341158	Modern Manufacturing Methods	3	30	70	100
A0374158	Mini Project	6			

ELECTRONICS & COMMUNICATION ENGINEERING

SIGNAL PROCESSING

Subject Code	Course Title	Credits	Internal	External	Total Marks
A0409153	Signals and Systems	3	30	70	100
A0406157	Digital Signal Processing	3	30	70	100
A0427157	Digital Image Processing	3	30	70	100
A0431157	DSP Architecture and Applications	3	30	70	100
A0471158	Minor Project	6			

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COMPUTER SCIENCE AND ENGINEERING

EMBEDDED SYSTEMS

Subject Code	Course Title	Credits	Internal	External	Total Marks
A0213155	Microprocessors and Microcontrollers	3	30	70	100
A0426157	VLSI Design	3	30	70	100
A0421156	Embedded System Concepts	3	30	70	100
A0418155	Embedded 'C' & Verilog	3	30	70	100
A0473158	Minor Project	6			

COMPUTER SCIENCE & ENGINEERING

COMPUTER SCIENCE

Subject Code	Course Title	Credits	Internal	External	Total Marks
A0518154	Design and Analysis of Algorithms	3	30	70	100
A0519154	Operating Systems	3	30	70	100
A0514153	Database Management Systems	3	30	70	100
A0509157	Computer Networks	3	30	70	100
A0574158	Minor Project	6			

WEB PROGRAMMING

Subject Code	Course Title	Credits	Internal	External	Total Marks
A0516154	Core Java Programming	3	30	70	100
A0508156	Web Technologies	3	30	70	100
A0510155	C# & .NET Frame Work	3	30	70	100
A0540157	PHP Programming	3	30	70	100
A0575158	Minor Project	6			

INFORMATION TECHNOLOGY

DATABASE TECHNICS

Subject Code	Course Title	Credits	Internal	External	Total Marks
A1202153	Foundations of Software Engineering	3	30	70	100
A1207154	Relational Database Design and Development	3	30	70	100
A1213155	Database Management Concepts	3	30	70	100
A1217156	Software Testing Methodologies and Tools	3	30	70	100
A1271158	Minor Project	6			

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COMPUTER SCIENCE AND ENGINEERING

WEB TECHNOLOGY CONCEPTS

Subject Code	Course Title	Credits	Internal	External	Total Marks
A1203153	Fundamentals of Object-Oriented Design	3	30	70	100
A1209154	Java Programming	3	30	70	100
A1212155	Web Application Through JAVA & Python	3	30	70	100
A1216156	Basics Of Scripting Languages	3	30	70	100
A1272158	Minor Project	6			

MASTER OF BUSINESS ADMINISTRATION

MARKETING MANAGEMENT

Subject Code	Course Title	Credits	Internal	External	Total Marks
E0011152	Marketing Management	3	30	70	100
E0021153	Product & Brand Management	3	30	70	100
E0033153	Advertising Management	3	30	70	100
E0014152	Business Research Methods	3	30	70	100
E0047254	Minor Project	6			

HUMAN RESOURCE MANAGEMENT

Subject Code	Course Title	Credits	Internal	External	Total Marks
E0009152	Human Resource Management	3	30	70	100
E0028153	Performance Management	3	30	70	100
E0039154	Organization Development	3	30	70	100
E0014152	Business Research Methods	3	30	70	100
E0047154	Minor Project	6			

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COMPUTER SCIENCE AND ENGINEERING

Program Outcomes (POs)

Engineering Graduates will be able to:

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

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

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

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

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

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

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

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

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

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

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

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

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COMPUTER SCIENCE AND ENGINEERING

Program Educational Objectives (PEOs)

PEO-1: Pursue a successful career in the field of Computer Science & Engineering or a related field utilizing his/her education and contribute to the profession as an excellent employee, or as an entrepreneur.

PEO-2: Be aware of the developments in the field of Computer Science & Engineering; continuously enhance their knowledge informally or by pursuing graduate studies

PEO-3: Engage in research and inquiry leading to new innovations and products

PEO-4: Be able to work effectively in multidisciplinary and multicultural environments.

PEO-5: To be responsible members and leaders of their communities, understand the human, social and environmental context of their profession and contribute positively to the needs of individuals and society at large.

Program Specific outcomes (PSOs)

PSO – I: Students will have the ability to understand the principles and working of computer systems to assess the hardware and software aspects of computer systems.

PSO-II: Students will have the ability to understand the structure and development methodologies of software system, that possess professional skills and knowledge of software design process.

PSO-III: Students will have the ability to use knowledge in various domains to identify research gaps and hence to provide solution to new ideas and innovations.

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COMPUTER SCIENCE AND ENGINEERING

I B.Tech. I-Sem (CSE)   T   C

4+1*   3

(A0001151) PROFESSIONAL ENGLISH – I
(Common to All Branches)

BACKGROUND:

❖ English is the international language of business and opens up many opportunities to engineering professionals. This course introduces the essential learning theories and practices needed for a core professional. The course details the needs of LSRW Skills of the English language and explains how to face variant situations through soft skills. With a clear structure and can-do objectives in every Unit, Professional English Course is a straight forward, student-friendly course. It gradually builds up all the necessary knowledge to help students achieve their learning objectives.

OBJECTIVES:

Students should be able to:

❖ Develop their awareness of the importance of English as a means of international communication.

❖ Develop their LSRW skills, namely listening, speaking, reading and writing skills thereby improving their proficiency in oral and written communication in technical English.

❖ Develop the linguistic competence that enables them to be aware of the cultural, economical and social issues of the society in order to contribute in giving solutions.

OUTCOMES:

Students would be able to:

❖ Introduction of English as a Lingua Franca and develop communication and Soft Skills

❖ Develop LSRW skills by prescribed lessons and technical reading exercises

❖ Inculcate basic letter writing formats

❖ Develop language through different genres like Short stories, Poems and Films and thereby creating awareness on cultural, economic and social diversities.

❖ Acquire basic language skills through grammar usage and learn vocabulary from the conceptual clues.

CO-PO MAPPING:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1										3		3		1	
CO2	3					2	2	3	2	3		3			
CO3	1									3					
CO4	2					3	2	3		3		3		2	
CO5	1					2	2	3	1	3		3		2	

UNIT I

Practical English Usage - I

     a)   Review of Grammar-Parts of Speech-Tenses

     b)   Introduction to International English Language Testing System (IELTS) Level-1

Practice Tests – IELTS

UNIT II

     a)   Technical Writing – I: Techniques of Writing-Comparison & Contrast Pattern-Cause & Effect Pattern - Paragraph Writing–Developing An Essay-Letter Formats-Full block Format–Official & Business Letters

     b)   Soft Skill – *Fish! Philosophy – Attitude is Everything* by Harry Paul

UNIT III

     a)   Reading Skills - SQR3 Technique–Skimming & Scanning- Reading Comprehension

     b)   Autobiography – New Horizons – *My Struggle for an Education* by Booker T. Washington

UNIT IV

     a)   Semantics - Etymology – Synonyms & Antonyms-Phrasal verbs–Idioms

     b)   Essay – *The Law of Pure Potentiality* by Deepak Chopra

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COMPUTER SCIENCE AND ENGINEERING

UNIT V
- a) Literary Techniques – Allegory – Metaphor - Epithet
- b) Short story - New Horizons - *The Happy Prince* by Oscar Wilde
- c) Poem – New Horizons - *Where the Mind is without Fear* by Rabindranath Tagore

UNIT VI
- a) Movie Analysis – Life of Pi - Plot – Characterization – Techniques
- b) Project & Case Studies

*TEXT BOOK PRESCRIBED: NEW HORIZONS, FOR THE JNTUA, PEARSON, 2014.
SUGGESTED READING:

1. Practical English Usage by Michael Swan, Oxford University Press
2. Murphy's English Grammar by Raymond Murphy, Cambridge University press 2004
3. Technical writing 3rd edition by *Sharon J. Gerson & Steven M. Gerson*, Pearson Education 2001
4. Communication Skills for Engineers(Second Edition) by C. Muralikrishna & Sunita Mishra, Pearson Education Ltd, 2011
5. Top tips for IELTS, British Council, On line edition

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COMPUTER SCIENCE AND ENGINEERING

I B.Tech. I-Sem (CSE)   T   C
                                                                      4+1*   3

(A0004151) MATHEMATICS-I
(Common to All Branches)

OBJECTIVES:

❖ To make aware students about the importance and symbiosis between Mathematics and Engineering. Achieve confidence with mathematical tools which an essential weapon in modern Graduate Engineer's Armory. Balance between the development of understanding and mastering of solution techniques with emphasis being on the development of student's ability to use Mathematics with understanding to solve engineering problems by retaining the philosophy learning by doing.

OUTCOMES:

Course Outcomes: Engineering Graduates will be able to

❖ Acquire knowledge of Infinite series, real analysis, ordinary differential equations and Laplace transforms and its applications in Basic sciences, Biological sciences and engineering.

❖ Understand to solve differential equations of first and higher order with wide range of applications in circuit analysis, fluid dynamics.

❖ Analyze solutions of differential equations to various physical problems such as Electric circuits, temperature, Concentration and Velocity of fluids in fluid dynamics.

❖ Apply Laplace Transform and its Inverse to convert the equations of calculus in to the equations of algebraic with applications in signals and systems of Digital circuit analysis.

❖ Synthesize real analysis with functions and differential equations with Laplace transforms.

CO-PO MAPPING:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO 1	PSO 2	PSO3
CO1	3		1		1							1			
CO2	1	3		2											2
CO3		2												2	
CO4				1	3							1			
CO5	1		2											2	

UNIT – I

Infinite Series: Sequence – Convergence and divergence of sequence. Series – Tests of convergence and divergence – P-Test, Comparison Test, Ratio Test, n-Root Test, logarithmic Test- Alternating Series – Absolute and conditional convergence of series.

UNIT-II

Differential equations of first order and first degree – Exact, linear and Bernoulli equations. Applications to LR & CR circuits, orthogonal trajectories.

UNIT – III

Non-homogeneous linear differential equations of second and higher order with constant coefficients with RHS term of the type e^{ax}, Sin ax, cos ax, polynomials in x, e^{ax} V(x), xV(x), Method of variation of parameters.

UNIT – IV

Rolle's Theorem – Lagrange's Mean Value Theorem – (excluding proof). Simple examples of Taylor's and Maclaurin's Series.

Functions of several variables – Jacobian – Maxima and Minima of functions of two variables, Lagrangian method of Multipliers with three variables only. Raidus of Curvature.

UNIT – V

Laplace transform of standard functions – Inverse transform – First shifting Theorem, Transforms of derivatives and integrals – Unit step function – Second shifting theorem – Dirac's delta function – Convolution theorem – Laplace transform of Periodic function.

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UNIT – VI

Differentiation and integration of Laplace transform – Application of Laplace transforms to ordinary differential equations of first and second order.

TEXT BOOKS:

1) Advanced Engineering Mathematics By Erwin Kreyszig.
2) Advanced Engineering Mathematics By R.K. Jain and S.R.K. Iyengar, Narosa Publications.

REFERENCES:

1) A Text Book of Engineering Mathematics, Vol – 1, T.K.V. Iyengar, B. Krishna Gandhi and Others S. Chand & Company.
2) Higher Engineering Mathematics by B.S.Grewal, Khanna Publishers.
3) A Text Book of Engineering Mathematics, Thomson Book Collection.
4) Engineering Mathematics By Srimantha Pal et.al. Oxford University Press.
5) Engineering Mathematics, Sarveswara Rao Koneru, Universities Press.

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I B.Tech. I-Sem (CSE)   T   C
                                                        4+1*   3

(A0002151) ENGINEERING PHYSICS

(Common to ALL Branches)

COURSE OBJECTIVES:

The Engineering Physics (Physics-I) for undergraduate program is designed

- ❖ To develop students with sufficient depth in both engineering and physics skills to produce engineers who can relate fundamental physics to practical engineering problems.
- ❖ To nurture innovative talent in modern applied physics, providing students both solid theoretical grounding and training in practical scientific research skills.
- ❖ To prepare students for careers in engineering where physics principles can be applied to the development of technology.

COURSE OUTCOMES:

After the completion of the course the student will be able to:

- ❖ Understand the concept of electromagnetic signals by studying light behavior.
- ❖ Apply the concepts of light in optical fibers and light wave communication systems.
- ❖ Solve electrical engineering problems using the concepts of wave and particle duality for electrons.
- ❖ Find remedies for acoustically defected buildings.
- ❖ Apply Ultrasonics for the testing of materials

CO-PO MAPPING:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2		2	1	1							1			
CO2	3		1	1	2										
CO3		3		2	2							1			2
CO4		3	2		1		1								
CO5		3	2		2							1		2	

UNIT I:

WAVE OPTICS

Interference –Types of Interference - Interference in thin films by reflection - Newton's rings – Applications - Diffraction –Distinction Between Interference and Diffraction - Fraunhofer diffraction at a single slit - Fraunhofer diffraction at a double slit (qualitative) - Diffraction grating– Determination of Wavelength of Light -Polarization –Optic axis - Double Refraction in Calcite Crystal - Nicol Prism –Different types of polarized lights - Quarter and Half wave plates– Applications - problems.

UNIT II:

FIBER OPTICS

Principle – Optical Fiber Cable- Propagation of Light in Optical fibres – Acceptance angle, Numerical aperture and Fractional Index change –Types of rays - Types of optical fibres(index, mode and material based)– Losses in Optical Fiber - Fibre optical communication system (Block diagram) – Merits of Optical Fibers – Applications - problems.

UNIT III:

LASERS

Introduction – Characteristics - Einsteins A and B coefficients - Principle of Spontaneous emission and stimulated emission, Population inversion, pumping.– Important Components of a laser - - Types of lasers – Nd-YAG, He-Ne, CO_2 and Semiconductor lasers (homo junction GaAs)–Hetro junction laser –Applications - problems.

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UNIT IV:

QUANTUM PHYSICS

Matter waves – properties - de-Broglie's hypothesis – Heisenberg's Uncertainty principle –Electron as a wave experiment - Schrödinger's Time independent wave equation – Physical significance of wave function – Particle in a one dimensional box - problems.

UNIT V:

ACOUSTICSAND ULTRASONICS

Introduction to acoustics - Reverberation and reverberation time - growth and decay of energy - Sabine's formula (qualitative) - absorption coefficient and its measurement - factors affecting architectural acoustics - problems.

Introduction to ultrasonics– Production – magnetostriction effect - magnetostriction generator, piezoelectric effect - piezoelectric generator- Detection of ultrasonic waves – Types of Ultrasonic waves - properties– Cavitations - Non Destructive Testing –pulse echo system through transmission and reflection modes - Testing Methods - A,B and C –scan displays - problems.

UNIT VI:

NUCLEARENERGY

Nuclear fission – Discovery of fission, binding energy curve, chain reaction (fission of U235), critical size, critical mass, essentials of nuclear reactor - problems.

Nuclear fusion – Thermonuclear reaction - fusion reaction in stars - p-p cycle, C-N cycle, controlled fusion – fusion reactor - problems.

TEXT BOOKS:

1. M.N. Avadhanulu and PG Kshirsagar, 'A Text book of Engineering Physics', S.Chand and company, Ltd., New Delhi, 2014.
2. D. K. Bhattacharya and PoonamTandon, " Engineering Physics", Oxford University Press, 2015.

REFERENCES:

1. Arthus Beiser, "Concepts of Modern Physics", Tata McGraw Hill Publications, New Delhi.
2. Resnick and Halliday, "Physics Volume – II", Wiley, New Delhi.
3. R. K. Gaur and S.C. Gupta, 'Engineering Physics' DhanpatRai Publications, New Delhi.
4. Rajagopal, "Engineering Physics", PHI, New Delhi.
5. Rajendran, V and Marikani A, "Engineering Physics", Tata McGraw HillPublications Ltd, III Edition, New Delhi.
6. Chitra Shadrach and SivakumarVadivelu, "Engineering Physics", PearsonEducation, New Delhi.

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I B.Tech. I-Sem (CSE)   T   C
                                                                                                                4+1*   3

(A0003151) MODERN ENGINEERING CHEMISTRY
(Common to All Branches)

OBJECTIVES:
- ❖ To know the importance of water and sustainable utilization of water resources and alternative methods for potable water like Reverse osmosis and the problems raised in the Production of steam by using the boilers are included in Water technology.
- ❖ To identify the structure of organic molecules using photo chemistry and chemical spectroscopy.
- ❖ To acquaint the student with concepts of important photo physical and Photochemical processes and spectroscopy.
- ❖ To make the students conversant with basics of polymer chemistry
- ❖ To develop an understanding of the basic concepts of phase rule and its applications to single and two component systems.
- ❖ To Understand and apply the concepts in electrochemistry and corrosion science

OUTCOMES:
Upon completion of the subject, students will be able to

- ❖ Apply the concepts of Organic chemistry for synthesis.
- ❖ Synthesize polymers.
- ❖ Estimate the hardness of water in terms of Calcium and magnesium ions.
- ❖ Standardize solutions using titration, conductivity meter and colorimeter.
- ❖ Know the fundamentals of spectroscopy like electromagnetic spectrum, UV visible, IR spectroscopy.

CO-PO MAPPING:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3		1												2
CO2	1		3									1			
CO3		3			2										
CO4		3		1	1										
CO5	3				1							1			

UNIT I:
WATER TECHNOLOGY: Sources of Water- Types of impurities in Water- Hardness of Water – Temporary and Permanent hardness - Disadvantages of hard water-Estimation of hardness by EDTA Method, Numerical Problems on Hardness.

Boiler troubles (Sludge, Scale, Caustic Embrittlement, Priming and foaming)–Softening of water (Ion exchange, Zeolite Methods).

Desalination-Reverse Osmosis Method.

Analysis of Water- Alkalinity Dissolved Oxygen.

UNIT II:
SURFACE CHEMISTRY:
Adsorption: Definition – Types-Langmuir Adsorption isotherm-Applications.

Phase Rule: Statement-Explanation of Terms involved with examples –One component System – Water & Sulphur Systems-Condensed Phase Rule- Pb-Ag System.

Engineering Materials: Abrasives –Mho' s Scale of Hardness-Natural &Synthetic Abrasives-Engineering Applications.

Refractories: Introduction, Classification & Properties Refractories-Reasons for failure of Refractories.

UNIT III:
ELECTRO CHEMISTRY: Conductance – Specific Conductance -Equivalent Conductance – Molar Conductance-Determination of conductance by Wheat Stone Bridge Method-Effect of dilution On Conductance – Conductometric Titrations (Acid Base & Precipitative Titration)- Electrode Potential- Reference Electrodes

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(SHE, Calomel) - Nernst equation- Numerical Problems. Representation of Cell- electro chemical cells-concentration cells.

Ion Selective Electrode-Principle & Applications.

Chemically Modified Electrodes (CMEs): CMEs as Potentiometric and amphereometric sensors.

UNIT IV:

CHEMISTRY OF CORROSSION & ITS PREVENTION: Definition, Mechanism of Dry (oxidation),Wet (Evolution of hydrogen & Absorption of Oxygen) Types of corrosion- Dry Corrosion, and Wet Corrosion, Theories and Mechanism- Galvanic Series- Galvanic Corrosion, Concentration Cell Corrosion, Water line corrosion, Pitting Corrosion. Factors Influencing Corrosion.

Control of Corrosion – Proper designing and material selection-Cathodic Protection – Sacrificial anode and Imprest Current methods. Use of Inhibitors.

Protective coatings: Metallic coatings & applications.

Electro Plating of Chromium & Nickel

UNIT V:

PHOTO CHEMISTRY&SPECTROSCOPY: Photo Chemistry: Principles - Growthers Droppers law –Stark Einstein law-Lamberts Beers law-Flouroscence-Phosphorescence-Chemiluminiscence-Photosensitization-Quantum efficiency determination-problems

Spectroscopy: Electromagnetic spectrum-absorption of radiation-Electronic, Vibrational and Rotational Transitions.

UV-Visible and IR Spectroscopy Principles, Instrumentation (block diagrams) & applications (Qualitative)

UNIT VI:

POLYMERS AND FUELS:

Polymer: Basic concepts- Types of Polymerization – Addition and Condensation Polymerization. Mechanism of Addition polymerization.

Plastics: Definition, Thermo& plastics. Preparation, Properties and Engineering Uses of Poly ethylene, Poly vinyl chloride, Teflon, Bakelite & Nylons.

Elastomers: Processing of Natural Rubber, Compounding of Rubber Drawbacks of Raw Rubber, Vulcanization of Rubber. Preparation, Properties & Uses of Buna-S, Buna-N, Silicone Rubber.

Fuels: Definition, Classification of fuels. Characteristics of a good fuel. Calorific Value and its Units.

Determination Calorific Value by Bomb Calorimeter.

Solid Fuel: Analysis of Coal (Proximate & Ultimate)

Liquid Fuels: Petroleum, Refining, Knocking, Octane, Cetane Number.

Gaseous Fuels: Producer Gas, Water Gas.

Combustion: Principles and Numerical Problems- Flue gas analysis by Orsat's apparatus.

TEXT BOOKS:
1) Text book of Engineering Chemistry by Jain & Jain, Dhanpat Rai Publishing Company, 15th edition New Delhi (2008).
2) Text book of Engineering Chemistry by sashi chawla, Dhanpat Rai Publishing Company, 12th edition New Delhi (2011).

REFERENCE:
1) A text book of Engineering Chemistry by S.S. Dara, S.Chand & Co, New Delhi (2008)
2) Dara S.S Text Book Of Engineering Chemistry, S.Chand & Company Ltd, NewDelhi 2003.
3) Chemistry of Engineering Materials by C.V. Agarwal, Tara Publication, Varanasi.2008.
4) Physical Chemistry - Glasston & Lewis.

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I B.Tech. I-Sem (CSE)   T   C

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(A0501151) C PROGRAMMING
(Common to All Branches)

OBJECTIVES:

- To make students aware about fundamentals of computer programming.
- To provide exposure on C programming language
- To provide exposure on various C programming concepts like arrays, functions, pointers, structures etc.,
- To develop solutions for various problems by using C programming language by students.

OUTCOMES:

By the end of this course, students should be able

- Clearly formulate a program's requirements
- Develop an algorithm for solving a problem
- Identify functions for solution of a problem, and identify and classify the parameters
- Write C programs using various control structures and arrays.
- Build sets of test data in order to evaluate computer programs.
- Write C programs using pointers

CO-PO MAPPING:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	2						2		2		1	2	
CO2	3	3	3							2					3
CO3		3	2											2	
CO4			3						3						2
CO5		3	3								2			2	
`CO6			3						3						2

UNIT I
INTRODUCTION TO COMPUTER PROGRAMMING LANGUAGES:

Evolution of Computer Programming languages. Fundamentals of Algorithms and Flowcharts. Simple examples on how to write and trace an effective algorithms and how to draw an effective flow charts. Program control structures – sequence, selection and iteration. Software Development Method.

UNIT II
C LANGUAGE FUNDAMENTALS

General Form of a C Program, Steps to execute C program, Character set of C language, Data Types, Constants and Variables, Identifiers, Keywords, Operators, Precedence of operators, Expressions. Example Programs on the topics covered in this unit

UNIT III
CONTROL STATEMENTS IN C LANGUAGE

Non iterative statements – if statement, if else statement, nested if else statement, if else ladder statement, switch statement, go to statement. Iterative statements – while loop, do while loop and for loop. Example Programs on the topics covered in this unit.

UNIT IV
ARRAYS IN C LANGUAGE

Importance of an array in C language, Definition, Need of arrays while writing C programs. Types of arrays - One dimensional array, Two dimensional array. Declaration of One dimensional array, initialization of one dimensional array, storing and accessing the elements from a one dimensional array. Two-dimensional Arrays and their declaration, initialization, storing & accessing elements from it. Example Programs on the topics mentioned above. Strings - Definition, Declaring and initializing strings, Basic Operations on strings, String handling Functions. Example Programs on the topics mentioned above.

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UNIT V
FUNCTIONS IN C LANGUAGE
Top down approach of problem solving, Library Functions and User defined functions. Need for user-defined functions. General form of declaring a function, Elements of an user defined functions- Function definition Function call, Function declaration, Function name, return type, parameters, return statements. Categorization of functions with respect to parameters and return values. Definition of Scope of a variable with suitable examples. Storage Classes - Automatic, External, Static, and Register. Arrays and functions - Passing an entire array as an Argument to a function. Pre-processor Commands. Example Programs on the topics mentioned above.

UNIT VI
POINTERS IN C LANGUAGE
Pointers - Pointer variable and its importance, Pointer variable declaration, initialization of pointer variables, how to access a value from a memory location through it's pointer variable. Arithmetic operations on pointer variables, Scale factor length. Pointers and functions - pointers as function arguments (i.e., call-by-reference), Pointers and Arrays, Pointers and Strings, Array of Pointers, Pointers to Pointers, Generic Pointers, Pointer to Functions. Example Programs on the topics mentioned above.

TEXT BOOKS:
1) Programming in C ,Pradeep Dey, Manas Ghosh, Oxford Heigher Education
2) Computer programming and Data Structures, E.Balaguruswamy, Tata Mc Graw Hill. 2009 revised edition.
3) The C Programming Language, Brian W.Kerninghan, Dennis M.Ritchie
4) Programming in C , Dr. N. Uday Bhaskar, Winger publications

REFERENCES:
1. Let us C – Yeshwanth kanetkar, 8th Edition.BPB Publications
2. C Programming with problem solving, J.A. Jones & K. Harrow, Dreamtech Press
3. Data Structures using C – A.M.Tanenbaum, Y.Langsam, and M.J. Augenstein, Pearson Education / PHI, Eighth Edition.
4. C Programming & Data Structures, B.A.Forouzan and R.F. Gilberg, Third Edition, Cengage Learning.

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COMPUTER SCIENCE AND ENGINEERING

I B.Tech. I-Sem (CSE)   T   C

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(A0511151) COMPUTER FUNDAMENTALS

COURSE OBJECTIVES:
- ❖ To understand the basic uses and applications of computer.
- ❖ To know different types of memory and various input and output devices.
- ❖ To get familiar with various computer codes.
- ❖ To know different types of communications and networks.
- ❖ To understand the basic uses and services of internet.

COURSE OUTCOMES:
- ❖ Students are able to identify various units in block diagram of computer.
- ❖ Students are able to describe the fetch-execute cycle of a computer.
- ❖ Students are able to understand how data can be stored in computer memory.
- ❖ Students are able to learn assembly language program
- ❖ Students are able to understand the network communication and concepts.
- ❖ Students are able to understand the internet services.

CO-PO MAPPING:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1					3		1		2				2	1	
CO2		1		2						3			2	1	
CO3						3					2			1	1
CO4	2				3					1					1
CO5		1					2				1		2	1	
CO6			3					1	2				1		

Unit-I: Exploring the computer

Introduction to Computers: Definition of computer, Block diagram of computer, Characteristics of Computer, History of Computer, Generations of Computer, Applications of Computers Classification of Computer, The Computer System: The Input-Process-Output Concept, Components of Computer Hardware.

Unit-II: The Computer System Hardware

Introduction: Inside a Computer Cabinet, Central Processing Unit, Memory Unit, Instruction Format, Instruction Set, Instruction Cycle, Interconnecting the Units of a Computer: System Bus, Expansion Bus and External Ports.

Unit-III: Computer Memory

Introduction, Memory Representation, Memory Hierarchy, CPU Registers, Cache Memory, Primary Memory: RAM, ROM, PROM, EPROM Secondary Memory: Magnetic Tape, Magnetic Disk, Optical Disk

Unit-IV: Data Representation

Introduction, Number System: Decimal, Binary, Octal, Hexadecimal number system, Conversion from Decimal to Binary, Octal, Hexadecimal, Conversion of Binary, Octal, Hexadecimal to Decimal, Conversion of Binary to Octal, Hexadecimal, Conversion of Octal, Hexadecimal to Binary, Binary Arithmetic.

UNIT -V: Data Communication and Computer Network

Introduction, Importance of Networking, Network types: LAN, MAN, WAN, LAN Topology, Communication Protocol, Network Devices: Network Interface Card, Repeater, Bridge, Hub, Switch, Router and Gateway, Wireless Networking.

UNIT-VI: The Internet and Internet Services

Introduction, History of Internet, Internetworking Protocol, The Internet Architecture, Managing the Internet, Connecting to Internet, Internet Connections: Dial-up Access, ISDN, DSL, Cable Modem, Internet Address, Internet Services: WWW, Electronic Mail, FTP, Telnet, Uses of Internet.

TEXTBOOKS:
1. Computer Fundamentals (First Edition-2010), Pearson, by Anita Goel.

REFERENCE BOOKS:
1. Fundamentals of Computer(First Edition- 2009), McGraw-Hillby Balaguruswamy
2. Computer Fundamentals (Fourth Edition- 2007), BPB Publications by Pradeep Sinha and Priti Sinha

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COMPUTER SCIENCE AND ENGINEERING

I B.Tech. I-Sem (CSE)

P	C
3	2

(A0091151) ENGINEERING CHEMISTRY LAB
(Common to All Branches)

OBJECTIVES:

Chemistry is one subject which gives adequate knowledge about the applications involved in the aerospace, mechanical, environmental and other engineering fields. Knowledge of chemistry plays a vital role in engineering profession enabling the potential engineers to understand and to perform successfully while working on multidisciplinary tasks.

The main objective of the department is to develop the necessary theoretical and practical aspects required for understanding intricacies of the subject and also give adequate exposure to the applied chemistry aspects in different disciplines of engineering. Our faculty educates the engineering students with all necessary concepts related to chemistry and develops a scientific attitude by means of distinguishing, analyzing and solving various engineering problems. We are training the students to develop their experimental skills and important practical knowledge in engineering by providing sophisticated chemistry laboratory.

COURSE OUTCOMES:
- ❖ Keen Observation and Skills developed.
- ❖ Knowledge of estimation of Quality of water.
- ❖ They acquired the knowledge of synthesis of polymering organic compounds.
- ❖ The total alkalinity of water and total dissolved oxygen calculated and this will useful while using the water for industrial applications.
- ❖ They acquire the knowledge determine the viscosity of oil and bulk density of solid substances

CO-PO MAPPING:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3			2			1					1			
CO2				2	2	1	1								
CO3				3		1									2
CO4		1	1	3											2
CO5					2	1									

Detailed Syllabus:

1) Standardization of $KMnO_4$ By using Mohr's salt.

Complexometric Titrations:

2) Determination of Hardness of water by using EDTA titration method.

3) Estimation of Magnesium ion by using EDTA titration method.

4) Estimation of copper ion by using EDTA titration method.

5) Estimation of dissolved oxygen by Winkler's Method.

Dichrometry:

6) Determination of Ferrous ion by using potassium dichromate.

Conductometric titration:

7) Determination of Strength of the given HCl by using conductometric titration.

8) Determination of Strength of the given CH_3COOH by using conductometric titration.

9) Determination of Alkalinity Present in a given solution.

10) Verification of Beer's-Lambert's Law by $KMnO_4$.

11) Determination of Strength Manganese by Colorometric Method

12) Determination of Calorific Value of Solid/Liquid fuel using Bomb Calorimeter.

13) Determination of Viscosity by using Red wood Viscometer-I (or) II

14) Potentiometric Determination of iron using Standard $K_2Cr_2O_7$ Solution.

Demonstration:

15) Determination of Bulk density.

16) Determination of Refractive index of a given Solution.

17) Preparation of Ethyl Acetate.

18) Preparation of Bakelite.

19) Determination of pH of Water and various other samples.

REFERENCES:

1. Laboratory Manual on Engineering Chemistry, Sudharani (Dhanpat Rai PublishingCompany).
2. Vogel's Textbook of Quantitative chemical analysis, J. Mendham et.al. (Pearson Education).
3. Advanced Inorganic Analysis, Agarwal & Keemtilal, Pragati prakashan.
4. Chemical tables, Dr N. S. Gnanapragasam, (Sultan Chand & sons).

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I B.Tech. I-Sem (CSE) P C
3 2

(A0591151) C PROGRAMMING LAB
(Common to All Branches)

OBJECTIVES:
- ❖ To make the student to learn how to write programs in **C** language.
- ❖ To make the Students to learn how to write algorithms for different types of problems.
- ❖ To introduce different constructs of **C** language to the students to solve various kinds of problems.

OUTCOMES:
By the end of this course, students should be able
- ❖ Write a C program using various features of c language.
- ❖ Build sets of test data in order to evaluate computer programs
- ❖ Thoroughly test a program.
- ❖ Debug a program.
- ❖ Understand the organization of a computer program.
- ❖ Understand the process of compiling, linking, and running a program

CO-PO MAPPING:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1			3						3				1	1	2
CO2		3	2						3					2	1
CO3			3						3		2		1	2	
CO4									3		3				1
CO5			3										2		
CO6									3				2	1	

RECOMMENDED SYSTEMS /SOFTWARE REQUREMENTS:
- ❖ Intel based desktop PC with ANSI C Compiler and Supporting Editors

Exercise l:

Write a C program to demonstrate the various operators used in C language.

Exercise 2:
- a) Write a C program to find the roots of a quadratic equation.
- b) Write a C program to find both the largest and smallest number in a list of integers.

Exercise 2:
- a) Write a C program, which takes two integer operands and one operator from the user, performs the specified operation and then prints the result. (Consider the operators +,- ,*, /, % and use Switch Statement)
- b) Write a C Program to find the reverse of a given number.

Exercise 3:
- a) Write a C program to find the sum of individual digits of a positive integer.
- b) Write a C program to generate the first 'n' terms of the Fibonacci sequence.
  [**Note:** 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.]
- c) Write a C program to generate all the prime numbers between 1 and n, where 'n' value is given by the user.
  [**Note:** Develop each of the above programs by using different loop constructs supported by C language. (i.e., while, do while and for Loops)]

Exercise 4:
- a) Write a C Program to mask the most significant digit of the given number.
- b) Write a program which Prints the following patterns

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```
ABCDEFGFEDCBA
ABCDEF FEDCBA            0
ABCDE   EDCBA           111
ABCD     DCBA          22222
ABC       CBA         3333333
AB         BA        444444444
A           A
```

Exercise 5:
a) Write a C program to generate Pascal's triangle.
b) Write a C program to construct a pyramid of numbers.

Exercise 6:
a) Write a C program to find all the even numbers in the given one dimensional array.
b) Write a C program to print the elements of an array in reverse order.
c) Write a C program to perform the following operations:
i) Addition of Two Matrices   ii) Multiplication of Two Matrices
[Note: Use functions to implement the above specified operations]

Exercise 7:
a) Write C programs that use both recursive and non-recursive functions
i) To find the factorial of a given integer.
ii) To find the GCD (greatest common divisor) of two given integers.

Exercise 8:
a) Write a C Program to solve the Towers of Hanoi problem by using recursive function.
b) Write a C Program to demonstrate the various storage classes, which are supported by the C language.
[i.e., automatic, external, static and register]

Exercise 9:
a) Write a C Program to demonstrate that, how to pass an entire array as an argument to a function with a suitable example.
b) Write a C Program to perform various operations on given two strings using string handling functions.

Exercise 10:
a) Write a C Program to perform various arithmetic operations on pointer variables.
b) Write a C Program to demonstrate the following parameter passing mechanisms:
i) call-by-value   ii) call-by-reference

Exercise 11:
a) Write a C program that uses functions to perform the following operations:
i) To insert a sub-string in to a given main string from the specified 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 12:
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.

REFERENCE BOOKS
1. Programming in C, Pradeep Dey, Manas Ghosh, Oxford Heigher Education
2. The Spirit of C, an introduction to modern programming, M.Cooper, Jaico Publishing House.
3. Mastering C, K.R. Venugopal and S.R. Prasad, TMH Publications.
4. Computer Basics and C Programming, V. Raja Raman, PHI Publications.

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COMPUTER SCIENCE AND ENGINEERING

I B.Tech. I-Sem (CSE)

	P	C
	3	2

(A0391151) ENGINEERING WORKSHOP
(Common to all branches)

OBJECTIVES:-The budding Engineer may turn out to be a technologist, scientist, entrepreneur, practitioner, consultant etc. There is a need to equip the engineer with the knowledge of common and newer engineering materials as well as shop practices to fabricate, manufacture or work with materials. Essentially he should know the labor involved, machinery or equipment necessary, time required to fabricate and also should be able to estimate the cost of the product or job work. Hence engineering work shop practice is included to introduce some common shop practices and on hand experience to appreciate the use of skill, tools, equipment and general practices to all the engineering students.

OUTCOMES: -
- ❖ A student should know the basic knowledge of various tools and their use in different sections of manufacturing such as fitting, carpentry, tin smithy, welding etc. and basic engineering practices such as plumbing, electrical wiring, electronic circuits, machine shop practice.
- ❖ Ability to design and model various basic prototypes in the trade of fitting such as Straight fit, V- fit.
- ❖ Ability to make various basic prototypes in the trade of Tin smithy such as rectangular tray, and open Cylinder.
- ❖ Ability to perform various basic House Wiring techniques such as connecting one lamp with one switch, connecting two lamps with one switch, connecting a fluorescent tube, Series wiring, Go down wiring.

CO-PO MAPPING:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1		1	2	2	1				2		2	1	2		
CO2					2	1			2	2	2			2	
CO3					2	1			2	2	2				
CO4					2	1			2	2	2				

Note: At least two exercises to be done from each trade.

1. TRADES FOR EXERCISES:

A] Carpentry	1. T-Lap Joint	2. Cross Lap Joint
	3. Dovetail Joint	4. Mortise and Tennon Joint
B] Fitting	1. Vee Fit	2. Square Fit
	3. Half Round Fit	4. Dovetail Fit
C] House Wiring	1. Parallel / Series Connection of two/three bulbs	
	2. Stair Case wiring	3 Tube Light Wiring
	4. Measurement of Earth Resistance/Go down Wiring	
D] Tin Smithy	1. Rectangular Tray	2. Square Box without lid
	3. Open Scoop	4. Funnel
E] Welding	1. Single V butt joint	2. Lap joint
	3. Double V butt joint	4. T fillet joint.
F] Soldering	1.Soldering & Desoldering Practice	
	2. Series Circuit	
	3. Parallel Circuit	

2. TRADES FOR DEMONSTRATION:
   a) Plumbing
   b) Machine Shop
   c) Bosch Power Tools

REFERENCE BOOKS:
1. Engineering Work shop practice for JNTU, V. Ramesh Babu, VRB Publishers Pvt. Ltd., 2009.
2. Work shop Manual / P.Kannaiah/ K.L.Narayana/ SciTech Publishers.
3. Engineering Practices Lab Manual, Jeyapoovan, Saravana Pandian, 4/e Vikas.
4. Dictionary of Mechanical Engineering, GHF Nayler, Jaico Publishing House.

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COMPUTER SCIENCE AND ENGINEERING

I B.Tech. I-Sem (CSE)

P	C
3	2

(A0092151) ENGLISH LANGUAGE & COMMUNICATION SKILLS LAB
(Common to All Branches)

BACKGROUND:
English Language Lab acts as a platform for learning, practicing and producing language skills through interactive lessons and communicative mode of teaching. Communicative method for learning languages combines extensive, high-quality content with flexible and interactive multimedia technology. Learners can act and respond in a variety of ways at their own pace. Through a wide range of activities, a variety of skills are aimed to develop in a learner. A learner needs to communicate: oral and written comprehension, as well as oral and written expression. It also addresses the concepts of grammar, lexicon**,** phonetics and conjugation.

OBJECTIVES:
* ❖ To develop language learning through accuracy in grammar
* ❖ To enrich the discourse competence, to prepare the learner to be able to produce contextualize written text and speech.
* ❖ To achieve good pronunciation patterns and accent.
* ❖ To acquire strategic competence to use both spoken & written language to use in a wide range of communication strategies.

OUTCOMES:
Students will be able to
* ❖ Social interactions, greetings, self-introductions and small talk.
* ❖ Practice standard pronunciations of through phonetics.
* ❖ To present oral and technical presentations.
* ❖ Acquire communication skills.
* ❖ Learn participate in GDs.

CO-PO MAPPING:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	1				2	1	2	2	3		2		2	
CO2	1	1				2	1	2	2	3		2			
CO3	1	1				2	1	2	2	3		2		2	
CO4	1	1				2	1	2	2	3		2		2	
CO5	1	1				2	1	2	2	3		2		1	

LICENSED SOFT WARE AVAILABLE IN THE LANGUAGE LAB:
* • K-VAN , SOFTX Technologies: English Language and Communication Skills Software IV.0
* • Alania Series, English Mastery, Visual & Media Works:Listening Comprehension – Grammar – Vocabulary
* • Rosetta Stone Software, Visual & Media Works: LSRW Skills
* • EL Client, Globerena Technologies: Phonetics – Job Skills
* • K-VAN Solutions: Advanced Communication Skills Lab Software.

UNIT-I
Functional English – self Introduction - Greetings – Requests – seeking information - Invitations
Ice breaking activities
UNIT-II
Multi Media Lab Practice
Introduction to Phonetics I – Speech sounds –Vowels – Diphthongs – Consonants
UNIT-III
Multi Media Lab Practice
Phonetics II– Word Accent – Intonation –Rhythm
UNIT- IV
Information Transfer – Activity -Description of Technical Objects
UNIT- V
Oral Presentations - Activity – JAM
UNIT-VI
Group Communication – Activity – GD/Role plays
REFERENCE BOOKS:
1) Better English Pronunciation by J.D. O' Connor, Cambridge University Press,1980
2) Longman Dictionary of Contemporary English for Advanced Learners, Pearson Education Ltd.
3) Speak with Power and Confidence: Tested Ideas for Becoming a More Powerful Communicator by Patric Collins , 2007
4) Professional Communication Skills**,** by Praveen S.R. Bhatia (Author), A.K. Jain (Author), A.M. Sheikh (Author), 2006.

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I B.Tech. II-Sem (CSE)   T   C
                                                                                            3+1*   3

(A0005152) PROFESSIONAL ENGLISH–II
(Common to All Branches)

BACKGROUND:
Professional English II has been prescribed with specific objectives of enlightening the learners in the arena of Language competence. The curriculum has been designed to sharpen the skills of the professional students to meet the job tasks and to sustain the global milieu. This skill based curriculum will mould the young learners as competent engineers.

OBJECTIVES:
- Students will be able to read and explore for enrichment works from various genres (novels, plays, poems, essays).
- Students will be able to engage in formal writing assignments that require utilization of all stages of the writing process.
- Students will be able to evaluate their own language competence according to established criteria and rubrics like IELTS / TOEFL
- Students will be acquainted and be able to assess the LSRW skills.

OUTCOMES:
Students will be able to:
- Application of Advance grammar concepts.
- Acquisition of English language skills and soft skills based on rubrics like IELTS/TOEFL.
- Enriching LSRW through various genres viz. Autobiography, Essays.
- Practice Technical writing and Documentation.
- Understand engineering related concepts like environment and social media.

CO-PO MAPPING:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1										3		3		2	
CO2	3					2	1	3	2	3		3			
CO3	1						3			3					
CO4	2					3		3		3		3		2	
CO5	1					2		3	1	3		3			2

UNIT I
Practical English Usage II
- a) Review of Advance Grammar– Active & Passive Structures – Reported speech
- b) Introduction to International English Language Testing System (IELTS) Level-2
  Practice Tests – IELTS

UNIT II
- a) **Listening Skills -** Active Listening – ROAR Technique – Note Making
- b) **Autobiography** - *A Daughter is born* from **I am Malala** by Malala with Christina Lamb

UNIT III
- a) **Technical Writing** –II - Design – Led Documentation - Online writing – E mails – Social Media – Netiquettes- Project Reports
- b) **Essay**– *Green Living by* Neil Chambers

UNIT IV
- a) **Concept of Communication** – Process - Principles
- b) **Prose** – *Immortal Speeches – M.K.Gandhi*

UNIT V
- a) **Introduction to Soft Skills** – Hard Skills vs Soft Skills – Team Dynamics
- b) **Soft Skill** – *The Art of Time Management* by Ramesh & Ramesh

UNIT VI
- a) **Expression through Art** - Fine Arts- Ravi Varma Paintings
- b) Project / Case Studies

*Text book Prescribed: *Falcon: Rise High, RGMCET Publication*
REFERENCE BOOKS

1. The Ace of Soft Skills by Gopala Swamy Ramesh & Mahadevan Ramesh, Pearson Education.
2. The Basics of Communication by Steven Duck, Sage Publication, New Delhi.
3. I am Malala by Malala Yousazai with Christina Lamb, Phoenex, 2014.
4. The Art of Public Speaking by Dale Carneige, Cosimo, Inc., 01-Nov-2007.

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I B.Tech. II-Sem (CSE)

	T	C
	3+1*	3

(A0006152) MATHEMATICS-II
(Common to All Branches)

COURSE OBJECTIVES:

❖ To make aware students about the importance and symbiosis between mathematics and engineering. Achieve confidence with mathematical tools which an essential weapon in modern Graduate Engineer's Armory. Balance between the development of understanding and mastering of solution techniques with emphasis being on the development of student's ability to use Mathematics with understanding to solve engineering problems by retaining the philosophy learning by doing.

OUTCOMES:

Engineering Graduates will be able to

❖ Gain knowledge of Multiple Integrals, vector calculus, Fourier series, Fourier transforms and Z-transforms.

❖ Understand Vector Differentiation to compute gradient of scalar fields, Curl and Divergence of vector fields and Vector Integration to find relations between line, surface and volume integrals by Green's, Stoke's and divergence theorems.

❖ Analyze the Problems of Fourier series of functions satisfying Dirichlet's conditions, both in general and arbitrary periods and half range series of sines and cosines.

❖ Apply Z-Transforms and Inverse Z-transforms of time invariant systems to study the analysis of the waves in communication systems which deal discrete functions.

❖ Synthesize Fourier transforms and Fourier series and difference equations with Z-transforms. Fourier Transforms can be used to solve partial differential equations with lot of applications in circuit analysis.

CO-PO MAPPING:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3			1	1									2	
CO2		3	1		1							1			
CO3		2												2	
CO4					3							1			
CO5	1		2		1										

UNIT – I

Multiple integrals: – Double and triple integrals – Change of Variables – Change of order of integration.

UNIT – II

Vector Differentiation: Introduction of Vector differentiation -Scalar and vector point functions-Gradient of scalar function– Directional derivatives- Divergence and curl of a vector function- properties of Grad, Div and Curl.

UNIT – III

Vector integration – Line integral - Potential function – Area , Surface and volume integrals. Vector integral theorems: Green's theorem – Stoke's and Gauss's Divergence Theorem (excluding their proof). Verification of Green's – Stoke's and Gauss's Theorems.

UNIT – IV

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

UNIT – V

Fourier integral theorem (statement only) – Fourier sine and cosine integrals. Fourier transform – Fourier sine and cosine transforms – Properties – Inverse transforms.

UNIT – VI

Z-transform – Inverse z-transform – Properties – Damping rule – Shifting rule – Initial and final value theorems. Convolution theorem – Solution of difference equations by z-transforms.

TEXT BOOKS:

1. Advanced Engineering Mathematics By Erwin Kreyszig.
2. Advanced Engineering Mathematics By R.K. Jain and S.R.K. Iyengar, Narosa Publications.

REFERENCES:

1. A Text Book of Engineering Mathematics, Vol – 1, T.K.V. Iyengar, B. Krishna Gandhi and Others S. Chand & Company.
2. Higher Engineering Mathematics by B.S.Grewal, Khanna Publishers.
3. A Text Book of Engineering Mathematics, Thomson Book Collection.
4. Engineering Mathematics By Srimantha Pal et.al. Oxford University Press.
5. Engineering Mathematics, Sarveswara Rao Koneru, Universities Press.

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I B.Tech. II-Sem (CSE)

T   C
3+1*   3

(A0008152) SOLID STATE PHYSICS
(Common to ECE, EEE, CSE & IT)

OBJECTIVES:

The Material Physics (Physics-II) is designed to meet the educational needs of each student and to provide the foundation for future career development.

- ❖ To provide students with a broad education required to recognize, understand, and further the evolving role that materials science plays in society.
- ❖ To prepare students for careers in materials physics and engineering, or in fields that require an understanding of materials, by providing a broad, fundamental view of materials as well as a solid foundation in science and engineering.
- ❖ To identify important scientific and engineering problems related to materials, and then design systems and processes as well as perform relevant experiments and interpret data to aid the solution of these problems;
- ❖ To understand and appreciate materials research and its application in advancing a wide range of established and emerging technologies.

COURSE OUTCOMES:

After the completion of the course the student will be able to:

- ❖ Identify engineering material structures like Si, Ge etc. using the concepts of crystal structures.
- ❖ Understand the origin of resistance and band structures with the study of conductors.
- ❖ Find the suitable semiconductor materials for the fabrication of transistors.
- ❖ Apply the concepts of magnetism, dielectric and superconductivity in electrical machines, inductors, capacitors, magnets etc.
- ❖ Motivate towards new small scale technology where the behavior of the materials is different.

CO-PO MAPPING:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1		3										1			
CO2	3		1												
CO3		3		1	2								2		
CO4	2		3												1
CO5	1		2		3							1			2

UNIT I

CRYSTAL PHYSICS: Classification of solids - Lattice – Space lattice - Basis- Crystal Structure - Unit cell – Primitive cell – crystal systems - Bravais lattice –Atomic radius –Coordination number – Packing factor for SC, BCC, FCC structures –diamond and graphite structures- Lattice planes – Miller indices – inter planar spacing in a cubic lattice –X-Ray Diffraction - Bragg's law –Powder method of crystal structure determination - problems.

UNIT II

CONDUCTING MATERIALS: Conductors – classical free electron theory of metals – Drift Velocity - Electrical and thermal conductivity – Quantum theory – Fermi energy – Fermi level -Effect of temperature on Fermi Function - Fermi distribution function – Sources of electrical resistivity – Kroning-Penney model (qualitative results-no derivation)– Energy bands–Effective mass – classification of materials - problems.

UNIT III

SEMICONDUCTING MATERIALS: Introduction - Intrinsic semiconductor – extrinsic semiconductors – Drift and diffusion – Einstein relation- Hall effect –Determination of Hall coefficient – Applications – Direct and indirect band gap semiconductors – p-n junction – Band diagram of p-n junction – p-n junction under forward and reverse bias – energy band diagram - Diode equation – solar cell – Expressions for Vm and Im - problems.

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COMPUTER SCIENCE AND ENGINEERING

UNIT IV

MAGNETIC AND SUPERCONDUCTING PROPERTIES: Terms and definitions - Origin of magnetic moment – Bohr magneton – Dia and para magnetism – Ferromagnetism –Hysteresis – soft and hard magnetic materials –anti – ferromagnetic materials – Ferrites – applications - problems.

Introduction to superconductors - Properties of a superconductor - Meissner's effect –London penetration depth - Type of superconductors– BCS theory of Superconductivity (Qualitative) – Applications of superconductors - problems.

UNIT V

DIELECTRIC PROPERTIES: Matter polarization and relative permittivity: definition - dipole moment and polarization vector P - polarization mechanisms: electronic, ionic, orientational, interfacial and total polarization – frequency dependence - Lorentz field and Clausius-Mossotti equation - dielectric constant and dielectric loss - capacitor materials - typical capacitor constructions - Ferro electricity - $BaTiO_3$–applications – problems.

UNIT VI

MODERN ENGINEERING MATERIALS: Nanomaterials: Introduction - Properties - synthesis – ball milling -solgel- applications.

Carbon nanotubes: introduction – types of CNTs - synthesis – chemical vapor deposition – properties and applications.

Metallic glasses – shape memory alloys (one way, two way) – applications.

TEXT BOOKS:
1. M.N. Avadhanulu and PG Kshirsagar, "A Textbook of Engineering Physics", S.Chand and company, Ltd., New Delhi, 2014.
2. D. K. Bhattacharya and PoonamTandon, "Engineering Physics", Oxford University Press, 2015.

REFERENCES:
1. Charles Kittel"Introduction to Solid State Physics", John Wiley & sons, 7th edition, Singapore.
2. Ali Omer, "Elementary Solid State physics", Person Publications 5th Edition, New Delhi.
3. Srivastava, "Elements of Solid State Physics", PHI, New Delhi.
4. Charles P. Poole and Frank J. Ownen, "Introduction to Nanotechnology", Wiley India.
5. S.P.Basavaraju, "Applied Physics", Subhas Stores, Bangalore.
6. M.Ratner & D. Ratner–"Nanotechnology",Pearson Ed, New Delhi.

COMPUTER SCIENCE AND ENGINEERING

I B.Tech. II-Sem (CSE)

	T	C
	3+3*	3

(A0301152) ENGINEERING DRAWING
(Common to all Branches)

COURSE OBJECTIVES:
- ❖ To impart and inculcate proper understanding of the theory orthographic projection.
- ❖ To improve the visualization skills.
- ❖ To enable the students with various concepts like dimensioning, Construction of conic Sections and polygons.
- ❖ To impart the knowledge on understanding and drawing of simple solids.
- ❖ To know about sections and developments of solids etc.

COURSE OUTCOMES:
At the end of the course, the student will be able to:
- ❖ Draw different engineering curves and know their applications.
- ❖ Draw orthographic projections of different objects.
- ❖ Visualize three dimensional objects and draw isometric projections.
- ❖ Use techniques and able to interpret the drawing in the engineering field.

CO-PO MAPPING

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1		1		3									2	
CO2	1	1	3		3										
CO3	1	1	3		3										
CO4	1	1	2		3					1	1				2

UNIT-I

Polygons-Construction of Regular Polygons using given length of a side; Conic sections- Ellipse- Arcs of Circles and Oblong Methods, Construction of Parabola and Hyperbola by eccentricity method only.

UNIT-II

Introduction to Orthographic Projections- Projections of Points-Projections of Straight Lines parallel to both planes; Projections of Straight Lines-Parallel to one and inclined to other plane, inclined to both planes, determination of true lengths, angle of inclinations.

UNIT-III

Projections of Planes- Regular Planes Perpendicular / Parallel to one Reference, Plane and inclined to other Reference Plane.

UNIT-IV

Projections of Solids-Prisms, pyramids, cones and Cylinders with the axis inclined to one Plane.

UNIT-V

Section of solids: Sectioning of prism, pyramid, cone and cylinder– sectional view – true shape. Solids in simple position and cutting plane inclined to one reference plane only.

Development of surface of solids: Development of truncated prism, pyramid, cone and cylinder – frustum of cone and pyramid

UNIT-VI

Conversion of Isometric Views to Orthographic Views / Projections - Conversion of Orthographic Views to Isometric Projections and Views.

TEXT BOOKS:
1. Engineering Drawing by N.D. Bhatt, Chariot Publications.
2. Engineering Drawing and Graphics, Venugopal/New age publiocations.

REFERENCES:
1. Engineering Drawing. K.L Narayana, P. Kannaiah, Scitech Publications.
2. Engineering Drawing, B.V.R Gupta, J.K. Publishers.
3. Engineering Drawing by M.B. Shah and B.C. Rana, Pearson Publishers.
4. Engineering Drawing, Johle, Tata Mc Graw - Hill.
5. K.V. Natarajan, 'A text book of Engineering Graphics', Dhanalakshmi publishers, Chennai (2006).

AUTONOMOUS
COMPUTER SCIENCE AND ENGINEERING

I B.Tech. II-Sem (CSE)   T   C
                                                                          3+1*   3

(A0502152) DATA STRUCTURES THROUGH C
(Common to All Branches)

COURSE OBJECTIVES:

❖ To make students aware about structures and unions in C language.
❖ To provide exposure on various searching and sorting techniques.
❖ To provide exposure on various data structures like stacks, queues, circular queues and linked lists etc.,
❖ To develop solutions for various problems by using C Programming Language by students.

COURSE OUTCOMES:
By the end of this course, students should be able

❖ To understand how to develop C programs to solve various kinds of problems by using different C programming concepts like structures and unions.
❖ To develop programs by performing I/O operations through Files.
❖ To implement different linear data structure stacks and applications of stacks.
❖ To implement different linear data structure queues and types of queues.
❖ To implement different linear data structures linked lists and its types.
❖ To implement various searching and sorting techniques.

CO-PO MAPPING:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	3	2	2	1			2		1	2	3	2	2
CO2	2	1	2	2	1	1			2	1	1	1	1	1	1
CO3	2	2	2	2	1	2			2	1	1	3		2	2
CO4	2	2	2	2	1	2			2	1	1	3		2	1
CO5	2	2	2	2	1	2			2	1	1	3		2	2
CO6	3	3	3	2		2			1	1	1	1	1	1	1

UNIT I
STRUCTURE AND UNIONS IN C LANGUAGE: Structures – Introduction, Features of Structures. Declaration and Initialization of Structures, Accessing structure members, structure initialization. Nested Structures, Array of Structures, Arrays within structures and Pointers to Structures, Structures and Functions, Bit Fields, Unions, Union of Structures. Example Programs on the topics mentioned above.

UNIT II
FILE INPUT/OUTPUT: Introduction, Types of Files, File I/O Operations- High level I/O functions- Open & Close a file, Read and Write data into a file, Searching data in the file, Error handling during I/O operations on files. Command Line Arguments, Applications of Command Line Arguments. Example Programs on the topics covered in this unit.

UNIT III
INTRODUCTION TO DATA STRUCTURES: Classification of data structures, dynamic memory allocation functions in C language. **Stacks:** Definition, Various representation methods, operations on stacks and their implementation in C language, applications of stacks.

UNIT IV
QUEUES: Definition, Various representation methods, operations on queues and their implementation in C language, applications of queues. Circular queues- operations on circular queues and their implementation in C language.

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COMPUTER SCIENCE AND ENGINEERING

UNIT V

LINKED LISTS: Definition, Various representation methods, operations on linked lists and their implementation in C language.

UNIT VI

SEARCHINGAND SORTING TECHNIQUES: Searching Techniques- Linear search and Binary Search Techniques. Sorting techniques- Bubble Sort, Selection Sort, Quick Sort, Insertion Sort, and Merge Sort. Implementation of all the above mentioned techniques in C language and trace them by giving different test data.

TEXT BOOKS:
1. Programming in C ,Pradeep Dey, Manas Ghosh,Oxford Heigher Education
2. Computer programming and Data Structures, E.Balaguruswamy, Tata McGraw Hill. 2009 revised edition
3. Programming in C , Dr. N. Uday Bhaskar, Winger publications

REFERENCES:
1. The C Programming Language, Brian W.Kerninghan, Dennis M.Ritchie
2. Let us C – Yeshwanth kanetkar, 8th Edition.BPB Publications
3. C Programming with problem solving, J.A. Jones & K. Harrow, Dreamtech Press
4. Data Structures using C – A.M.Tanenbaum, Y.Langsam, and M.J. Augenstein, Pearson Education / PHI, Eighth Edition.
5. C Programming & Data Structures, B.A.Forouzan and R.F. Gilberg, Third Edition, Cengage Learning.

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COMPUTER SCIENCE AND ENGINEERING

I B.Tech. II-Sem (CSE)

T	C
3+1*	3

(A0242152) PRINCIPLES OF ELECTRICAL ENGINEERING

OBJECTIVES:
The course will enable the students to
- ❖ Get exposed to the basics in Electrical and Magnetic terms
- ❖ Get exposed to the basics in DC and AC circuits
- ❖ Briefing of Electrical machines fundamentals

OUTCOMES:
After completion of the course the students are expected to be able to
- ❖ To acquire the basic knowledge of different electrical quantities like voltage, potential difference, current , power, energy etc.,
- ❖ To analyze different kind of networks with their relevant equations analysis and get the electrical quantities and solutions to numerical problems (kvl, kcl, star-delta, mesh, nodal etc.,).
- ❖ To acquire the basic knowledge on magnetic circuits like flux, mmf, reluctivity, mutual and self inductances, coefficient of coupling.
- ❖ To analyze the single phase ac circuits.
- ❖ To understand the constructional features and operation of various devices like dc generator, motor, transformers and induction motor.
- ❖ To acquire the knowledge for solving the problems on dc generator, motor, transformer, induction motors.

CO-PO MAPPING:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	2		1				1			1			
CO2	3	3	3		3				2	2		1	2		
CO3	2	2							1			1			
CO4	3	2	1		2				1	1		1	2		
CO5	3	2	1						2	1		1			
CO6	2	3	2		2				2	1		1			1

UNIT-I:

BASIC ELECTRICAL TERMS: Charge-Voltage- Current- Power- Energy- Work done

BASIC ELEMENTS: Resistor- inductor-capacitor-ideal voltage source-practical voltage source- ideal current source-practical current source-Energy stored in inductor and capacitor

MAGNETIC CIRCUIT TERMS AND ELEMENTS: Flux-reluctance-permeance – mmf – reluctivity - comparision between electrical circuit and magnetic circuit-self-inductance–mutual inductance-coefficient of coupling Problems on relations of basic terms in electric circuits and magnetic circuits

UNIT-II

DC CIRCUITS: Ohms law- KCL-KVL-Nodal analysis-mesh analysis-source transformation-resistors in series-parallel-Capacitors in series-parallel-Simple problems on dc circuits-Star to delta and delta to star transformation-simple problems.

UNIT-III

SINGLE PHASE AC CIRCUITS: Basic definitions-ac voltage source-time period-frequency-average value- RMS value-maximum value-form factor-peak factor-behaviour of L and C – RL series and parallel- RC series and parallel-RLC series and parallel -P-Q-S- impedance triangle-power triangle- power factor-Introduction to three phase system-Simple problems

UNIT-IV

TRANSFORMER: Faradays laws of electromagnetic induction-types of induced emfs (statically, dynamically)-Lenzs law-principle of operation of transformer-types of transformers (core , shell)-derivation of EMF equation-transformation ratio-simple problems on emf equation

UNIT-V

DC GENERATORS: Construction-principle of operation-emf equation-types-problems on EMF equation
DC MOTORS: Construction-principle of operation-back emf equation-types-problems on back EMF equation
UNIT-VI

INDUCTION MOTORS: Construction-RMF-working principle-slip-effect of slip on rotor quantities-comparison between transformer and induction motor-simple problems

TEXT BOOKS:
1. Basic Electrical Engineering by T K Nagasarkar and M S Sukhija. Oxford University press
2. Introduction to Electrical Engineering – M.S Naidu and S. Kamakshaiah, TMH Publ.

REFERENCES:
1. Basic Electrical Engineering by Kothari and Nagarath, TMH Publications, 2nd Edition.
2. Electrical Machines –B.L.Theraja, Vol-I

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(A0093152) ENGINEERING PHYSICS LAB
(Common to All Branches)

OBJECTIVES:

- The laboratory should help the student to develop a broad array of basic skills and tools of experimental physics and data analysis.
- The laboratory should help students to understand the role of direct observation in physics and to distinguish between inferences based on theory and the outcomes of experiments.
- To learn about the optical experiments, in establishing the fundamental Interference, Diffraction phenomena which will be clearly visualized with the light and laser experiments mentioned in the syllabus.
- To learn about the basic electronic experiments such as energy gap determination, type of extrinsic semiconductor using Hall effect, Stuart – Gees experiment in field intensity determination and Solar I – V characteristics.

OUTCOMES:

After the completion of the course the student will be able to:

- ❖ Identify type of extrinsic semiconductors with the use of Hall Effect experiment.
- ❖ Analyze four probe conductivity experiments in the determination of bandgap of the semiconductors.
- ❖ Understand the electromagnetic spectrum in the dispersive power experiment.
- ❖ Apply the concept of interference and diffraction in LASER wavelength determination with the use of Grating.

CO-PO MAPPING:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	1		1							1			
CO2	1		2	1											
CO3	2				1										2
CO4	2	1		1	2							1			

LIST OF EXPERIMENTS (Any10 Experiments)

1. Newton's rings
2. Determination of thickness of a thin film
3. Spectrometer – Transmission grating
4. Determination of wavelength of a Sodium light – Normal Incidence
5. Dispersive power of a prism - spectrometer
6. Laser experiment: wavelength determination using grating
7. Laser experiment: particle size determination
8. Determination of numerical aperture of an optical fiber
9. Field along the axis of coil carrying current – Stewart Gee's method
10. Determination of rigidity modulus – Torsional Pendulum
11. Determination of Band gap of Si or Ge – Four probe method
12. Study of B – H Curve.
13. Determination of Charge density and Hall coefficient or magnetic flux density – Hall effect.
14. Study of Solar I-V characteristics
15. Measurement of Dielectric constant

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(A0592152) DATA STRUCTURES THROUGH C LAB
(Common to All Branches)

OBJECTIVES:
- ❖ To introduce different constructs of C language like structures and unions to the students to solve various kinds of problems.
- ❖ To introduce different types of linear data structures like stacks, queues, circular queues and linked lists etc.
- ❖ To make the students to implement different kinds of sorting algorithms like selection sort, bubble sort, insertion sort, and quick sort and merge sort etc.
- ❖ To make the students to implement different kinds of searching algorithms like linear search and binary search etc.
- ❖ To implement various searching and sorting techniques

OUTCOMES:
By the end of this course, students should be able

- ❖ To understand how to develop C programs to solve various kinds of problems by using different C programming concepts like structures and unions.
- ❖ To develop programs by performing I/O operations through Files.
- ❖ To implement different linear data structures like stacks, queues, circular queues and linked lists etc.,
- ❖ To implement various searching and sorting techniques.

CO-PO MAPPING:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	3	2	2	1			2		1	2	3	2	2
CO2	2	1	2	2	1	1			2	1	1	1	1	1	1
CO3	2	2	2	2	1	2			2	1	1	3		2	2
CO4	3	3	3	2		2			1	1	1	1		2	1

RECOMMENDED SYSTEMS /SOFTWARE REQUREMENTS:
- ❖ Intel based desktop PC with ANSI C Compiler and Supporting Editors

Exercise l:
- a) Write a C Program to copy the contents of one structure variable to another structure variable.
- b) Write a C program to implement nested structure to store and display the student information. The structure student contains the field's S.no, name, and date. Date is the nested structure and it contains the fields day, month and year.

Exercise 2:
- a) Write a C program to simulate the multiplication of two fractions by passing individual structure members to a function.
- b) Write a C program to simulate the multiplication of two fractions by passing the whole structure to a function.

Exercise 3:
- a) 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.)
- b) Write a C program to implement Union Concept.

Exercise 4:
- a) Write a C program which copies last 'n' characters from one file to another.
- b) Write a C program to reverse the first 'n' characters in a file.
- c) Write a C program to merge two files into a third file.

Exercise 5:
Write a C program to implement the following operations on Stack using array representation
- a) Push   b) Pop   c) Display

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Exercise 6:
   Write a C program to implement the following operations on Queue using array representation
   - a) Insert
   - b) Delete
   - c) Display

Exercise 7:
   Write a C program to implement the following operations on Singly Linked list using linked representation
   - a) Insert
   - b) Delete
   - c) Display
   - d) Search

Exercise 8:
Write a C program that implements the following sorting methods to sort a given list of integers in ascending order.
   - a) Bubble sort
   - b) Selection sort
   - c) Insertion sort

Exercise 9:
Write a C program that implements the following sorting methods to sort a given list of integers in ascending order.
   - a) Quick Sort
   - b) Merge sort

Exercise 10:
Write C program to implement the following searching methods to search an element in a given list of integers
   - a) Linear Search
   - b) Binary Search

REFERENCE BOOKS
   1) Programming in C ,Pradeep Dey, Manas Ghosh,Oxford Heigher Education
   2) Computer programming and Data Structures, E.Balaguruswamy, Tata Mc Graw Hill. 2009 revised edition.
   3) Mastering C, K.R. Venugopal and S.R. Prasad, TMH Publications.

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(A1291152) IT WORKSHOP
(Common to All Branches)

OBJECTIVES:
- ❖ The IT Workshop for engineers is a training lab course.
- ❖ The modules include training on PC Hardware, Internet & World Wide Web and Productivity tools including Word, Excel, Power Point and Publisher. It enables the students to understand and fix the common hardware, software issues & makes the students to install either Windows or UNIX based Operating system in the machines.
- ❖ Enable students to understand how computers work, different types of computers, functions of applications, input and data storage devices, different operating systems, ethics, data communications, and systems analysis and design
- ❖ It makes the students to understand and use the common office suite tools like word, excel etc effectively in their daily usage.
- ❖ To ensure the students to understand the basic networking concepts like IP Address etc

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

CO-PO MAPPING:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1			3							3			3		
CO2			1							1			3		
CO3			2							1			2		
CO4			3			1	1	1						2	
CO5				1			3						2		

PC Hardware

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

Exercise 2 - Task 2: Every student should disassemble and assemble the PC back to working condition. Lab instructors should verify the work and follow it up with a Viva. Also students need to go through the video which shows the process of assembling a PC. A video shall be given as part of the course content.

Exercise 3 - Task 3: Every student should individually install MS windows on the personal computer. Lab instructor should verify the installation and follow it up with a Viva.

Exercise 4 - Task 4: Every student should install Linux on the computer. This computer should have windows installed. The system should be configured as dual boot with both windows and Linux. Lab instructors should verify the installation and follow it up with a Viva

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

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Exercise 6 - Task 6: Software Troubleshooting: Students have to be given a malfunctioning CPU due to system software problems. They should identify the problem and fix it to get the computer back to working condition. The work done should be verified by the instructor and followed up with a Viva.

OFFICE TOOLS
WORD
Exercise 7 - Word Orientation: The mentor needs to give an overview of LaTeX and Microsoft (MS) office 2007,2010/ equivalent tool word: Importance of LaTeX and MS office 2007,2010/ equivalent tool Word as word Processors, Details of the four tasks and features that would be covered in each. Accessing, overview of toolbars, saving files, Using help and resources, rulers, format painter in word.

Task 1-Task IV: Using Word to create project certificate. Features to be covered:-Formatting Fonts in word, Drop Cap in word, Applying Text effects, Using Character Spacing, Borders and Colors, Inserting Header and Footer, Using Date and Time option in Word.

INTRODUCTION TO LATEX
EXCEL
Exercise 8 - Excel Orientation: The mentor needs to tell the importance of MS office 2007,2010/ equivalent tool Excel as a Spreadsheet tool, give the details of the four tasks and features that would be covered in each. Using Excel – Accessing, overview of toolbars, saving excel files, Using help and resources.

Task 1-Task IV: Features to be covered:- Gridlines, Format Cells, Summation, auto fill, Formatting Text, Formulas, Functions

POWER POINT
Exercise 9 - Task1: Students will be working on basic power point utilities and tools which help them create basic power point presentation. Topic covered during this Exercise includes :- PPT Orientation, Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Auto Shapes, Lines and Arrows in Powerpoint. Students will be given model power point presentation which needs to be replicated (exactly how it's asked).

Exercise 10 - Task 2 : Second Exercise helps students in making their presentations interactive. Topic covered during this Exercise includes : Hyperlinks, Inserting –Images, Clip Art, Audio, Video, Objects, Tables and Charts

Internet & World Wide Web 2 Exercises
Exercise 11 - Task 1: **Orientation & Connectivity Boot Camp:** Students should get connected to their Local Area Network and access the Internet. In the process they configure the TCP/IP setting. Finally students should demonstrate, to the instructor, how to access the websites and email. If there is no internet connectivity preparations need to be made by the instructors to simulate the WWW on the LAN.

Web Browsers, Surfing the Web: Students customize their web browsers with the LAN proxy settings, bookmarks, search toolbars and pop up blockers.

Exercise 12 - Task 2: **Search Engines & Netiquette:** Students should know what search engines are and how to use the search engines. A few topics would be given to the students for which they need to search on Google. This should be demonstrated by the student to the satisfaction of instructors.

Cyber Hygiene: Students would be exposed to the various threats on the internet and would be asked to configure their computer to be safe on the internet. They need to first install an anti virus software, configure their personal firewall and windows update on their computer.

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

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(A0288152) PRINCIPLES OF ELECTRICAL ENGINEERING LAB

OBJECTIVES:

The course will enable the students to
- ❖ Get exposed to the basics in Electrical elements.
- ❖ Get exposed to basic electrical laws.
- ❖ Get exposed to the basics in DC and AC circuits.

COURSE OUTCOMES:

After completion of the course the students are expected to be able to
- ❖ To Understand the AC fundamentals
- ❖ To Measure the Various electrical quantities
- ❖ To Understand the wiring connection on fluorescent lamp
- ❖ To Analyze various connection of electric circuits
- ❖ To understand the behaviour and characteristics of different equipments
- ❖ Verification of theoretical concepts through experimentation

CO-PO MAPPING:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	1			2			1			1			
CO2	3	3	1			2			1	1		1	1		
CO3	3	1	1			2			1			1			
CO4	3	3	1			1			2	1		1	1		
CO5	2	2	1			1			1	2		1	2		
CO6	3	2	1			1			2	1		1			1

EXPERIMENTS

1. Verification of ohm's law

2. Resistors in series & parallel

3. Capacitors in series & parallel

4. Verification of Kirchhoff's laws

5. Fluorescent lamp

6. Determination of R M S & average values, form factor & peak factor

7. Lightening in series, & parallel

8. Resistor colour coding

9. Star-delta & delta-star transformation

10. Calculation of inductive and capacitive reactance in ac circuits

REFERENCES:
1. Basic Electrical Engineering by T K Nagasarkar and M S Sukhija. Oxford University press
2. Basic Electrical Engineering by Kothari and Nagarath, TMH Publications, 2nd Edition.
3. Principles of Electrical Engineering by V.k. Mehatha

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II B.Tech. I-Sem (CSE)   T   C

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(A0012156) PROBABILITY AND STATISTICS
(Common to CE, ME,CSE& IT)

OBJECTIVES:
- ❖ To help the students in getting a thorough understanding of the fundamentals of probability and usage of statistical techniques like testing of hypothesis, statistical quality control and queuing theory.

OUTCOMES:
- Knowledge of Probability, random variables and Distributions, Sampling Distributions, Test of Hypothesis, Queuing process to solve various problems of engineering and science.(PO1)
- Understand solutions of discrete and continuous distributions including moment generating functions, Functions of random variables and sampling distributions.(PO2)
- Analyze methods of sample spaces, counting techniques, laws of probability, conditional probability.(PO2)
- Apply various techniques of Probability and Statistics to solve all kinds engineering problems.(PO5)
- Synthesize problems of testing statistical hypotheses for a simple population using the knowledge of One-sample and two-sample estimation and hypothesis testing.(PO3)

CO-PO MAPPING:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2									1					
CO2		3													2
CO3		2													
CO4					2							1		2	
CO5			2												1

UNIT - I

Basic concept of probability-Random variables-Expectation-Discrete and continuous distributions.

UNIT – II

Distribution functions. Binomial, poison and normal Distributions-Related properties.

UNIT – III

Test of Hypothesis: population and sample – Confidence interval of mean from normal distribution – Statistical Hypothesis – Null and Alternative hypothesis- level of significance. Test of significance – Test based on normal distribution –Z test for means and proportions.

UNIT-IV

Small samples – t- test for one sample and two sample problem and paired t- test, F- test and chi-square test (Testing of goodness of fit and independence).

UNIT – V

Statistical quality control: Concept of quality of a manufactured product –Defects and Defectives – causes of variations – Random and assignable – The principle of Shewhart control chart-Charts for attribute and variable quality characteristics-Constructions and operation of $\bar{X}$Chart,R-Chart, P-chart and C-chart.

UNIT – VI

Queuing theory: Pure birth and Death process, M/M/1 and M/M/S and their related simple problems.

TEXT BOOKS:
1. Probability and statistics for Engineers by Miller and Freunds, Pearson education.
2. Probability and statistics for Engineers by Dr. J. Ravichandran, wiley-India publishers.

REFERENCES:
1. Higher Engineering Mathematics by B.S.Grewal, Khanna Publishers.
2. Statistical methods by S.P.Gupta, S.Chand Publications.
3. Probability and statistics for science and engineering by G.Shanker rao, universities press.
4. Engineering Mathematics By Srimantha Pal et.al. Oxford University Press.

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(A0430153) DIGITAL LOGIC DESIGN
(Common to CSE & IT)

OBJECTIVES:
- ❖ Understand the different number system, its conversions and binary arithmetic.
- ❖ Know the fundamentals of Boolean algebra and theorems, Karnaugh maps including the minimization of logic functions to SOP or POS form.
- ❖ Analysis of logic circuits and optimization techniques to minimize gate count, signals, IC count, or time delay.
- ❖ To strengthen the principles of logic design and use of simple memory devices, flip-flops, and sequential circuits.
- ❖ To fortify the documentation standards for logic designs, standard sequential devices, including counters and registers.
- ❖ To understand design of logic functions using PLDs (ROM, RAM, PAL, PLA).

OUTCOMES:
- ❖ Know the different number systems and its classifications.
- ❖ Apply the Boolean algebra , K-Map, method to minimize the Boolean function
- ❖ Understand the functionality of Registers, Rom, Ram, Pal & Pla
- ❖ Design and analyze and optimization of combinational logic circuits
- ❖ Design and analyze and optimization of sequential and logic circuits.

CO-PO MAPPING:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1		1		2								2		
CO2		1										1	1		
CO3	1	1										1		2	
CO4		2	3	2		1						1		1	
CO5		1										1			
CO6				2		1									

UNIT-I

BINARY SYSTEMS: Digital Systems, Binary Numbers, Number base conversions, Octal and Hexadecimal Numbers, complements, Signed binary numbers, Binary codes, Binary Storage and Registers, Binary logic.

UNIT-II

BOOLEAN ALGEBRA AND LOGIC GATES: Basic Definitions, Axiomatic definition of Boolean Algebra, Basic theorems and properties of Boolean algebra, Boolean functions canonical and standard forms, other logic operations, Digital logic gates, and their integrated circuit numbers.

UNIT-III

GATE – LEVEL MINIMIZATION: The map method, Four-variable map, Five-Variable map, product of sums simplification Don't-care conditions, NAND and NOR implementation other Two-level implementations, Exclusive – OR function,

UNIT - IV

COMBINATIONAL LOGIC: Combinational Circuits, Analysis procedure Design procedure, Binary Adder-Substractor, Decimal Adder, Binary Multiplier, Magnitude Comparator, Decoders, Encoders, Multiplexers, Introduction to HDL,VHDL code for basic and universal logic gates, Half adder ,full adder circuits.

UNIT - V

SYNCHRONOUS SEQUENTIAL LOGIC: Sequential circuits, latches, Flip-Flops Analysis of clocked sequential circuits, State Reduction and Assignment, Design Procedure**.**
ASYNCHRONOUS SEQUENTIAL LOGIC: Introduction, Analysis Procedure, Circuits with Latches, Design Procedure.

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UNIT - VI

Registers, shift Registers, Ripple counters synchronous counters, other counters, , Introduction, Random-Access Memory, Memory Decoding, Error Detection and correction Read-only memory, Programmable logic Array programmable Array logic, Sequential Programmable Devices. VHDL code for Flip-flops, decade counter.

TEXT BOOKS:
1) Digital Design – Third Edition, M.Morris Mano, Pearson Education/PHI.
2) Fundamentals of Logic Design, Roth, 5th Edition, Thomson.

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

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COMPUTER SCIENCE AND ENGINEERING

II B.Tech. I-Sem (CSE)   T   C
                                                                            3+1*   3

(A0512153) DISCRETE MATHEMATICS

OBJECTIVES:
- ❖ To teach students notations used in the discrete mathematics associated with computer science and engineering.
- ❖ To teach the rudiments of elementary mathematical reasoning (elementary proofs; proofs by induction).
- ❖ To prepare students for the theoretical parts of all further courses in CSE.
- ❖ To study logic and Boolean algebra from a mathematical perspective, but relating it to computer engineering applications.
- ❖ To introduce basic set-theoretical notions: relations, functions, graphs, equivalence relations and orderings.
- ❖ To relate these notions to applications in CSE.

OUTCOMES:
- ❖ Understand the truth tables, the concept of logical equivalence, normal forms. And express English assertions in symbolic form and in predicate calculus using quantifiers.
- ❖ Know the fundamentals of graph theory and traversing techniques of graphs.
- ❖ Know the applications of graphs such as Euler circuits, Hamiltonian graphs, Isomorphism, and Chromatic number.
- ❖ Percive the Fundamentals of counting and Boolean Algebra.
- ❖ Gain knowledge on how to check validity of premises using different methods such as rule-cp, indirect method, and direct method.
- ❖ Know the basics of relations, functions and lattices.

CO-PO MAPPING:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2		1		2		2	1			2			2
CO2	3	2		1	1	1			1			1		1	1
CO3	2	2			1	2		2		2		2	1	1	2
CO4	2							2		2		2		2	1
CO5	3	2	2	3	1			2		2		2		1	2
CO6	3	2	2	3	1			2		2		2		1	2

UNIT-I
Mathematical Logic: Statements and notations, Connectives, Well-formed formulas, Truth Tables, tautology, converse, inverse and contrapositive ,equivalence, implication, Normal forms.

UNIT-II
Predicates: Rules of inference, Consistency, Predicate calculus: Free and bounded variable, Quantifiers: Universal Quantifiers, Existential Quantifiers.

UNIT-III
Relations: Relations**,** Properties of binary Relations, Types of relations: equivalence, compatibility and partial ordering relations, Hasse diagram. Lattices and its Properties.
Functions: introduction to Functions , types of functions

UNIT-IV
Algebraic structures: Algebraic systems with examples and general properties, semi groups and monoids, groups & its types, Introduction to homomorphism and Isomorphism (Proof of theorems are not required)
Elementary Combinatory: Basis of counting, Combinations & Permutations, Permutation with repetitions, Constrained repetitions.

UNIT-V
Graph Theory: Representation of Graph, DFS, BFS, Spanning Trees, planar Graphs.

UNIT-VI
Graph Theory and Applications: Directed Graphs**,** Graphs, Basic Concepts of Isomorphism and Sub graphs, walks and their classification, Multi graphs and Euler circuits, Hamiltonian graphs, Euler's formula & its applications, Chromatic Numbers.

TEXT BOOKS:
1. Discrete Mathematical Structures with applications to computer science Trembly J.P. & Manohar .P, TMH**.(unit-1 to 4(Algebraic systems))**
2. Discrete Mathematics for Computer Scientists & Mathematicians, J.L. Mott, A. Kandel, T.P. Baker Prentice Hall.**(unit-4(Elementary Combinatory) to 6)**

REFERENCES:
1. Mathematical foundations of computer science Dr D.S.Chandrasekharaiah Prism books Pvt Ltd.
2. Discrete Mathematics, R.K. Bisht, H.S. Dhami, Oxford.

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II B.Tech. I-Sem (CSE)   T   C

3+1*   3

(A0513153) OBJECT ORIENTED PROGRAMMING THROUGH C++

OBJECTIVES:
- ❖ This course explores fundamental data structures, algorithms for manipulating them, and the practical problems of implementing those structures in real programming languages and environments

OUTCOMES:

After the successful completion of this course, the students should:
- Differentiate between structure oriented programming and object oriented programming.
- Write object-oriented programs.
- Understand and apply different object oriented features like polymorphism, inheritance, encapsulation and polymorphism to solve the computing problems.
- Understand the linear data structures and Non-linear data structures.
- Understand dynamic memory management techniques.
- Demonstrate various OOP concepts using C++ programs.

CO-PO MAPPING:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	2	1					1		1		1	1	1	1
CO2	2	1	2			1			1	1			1	2	1
CO3	1	1	1			1		1				1	1	2	1
CO4	1	1	2	1		1			1				1	2	2
CO5	2	1	1	1						1		1	1	1	2
CO6	2	2	1						1	1		1	1	1	2

UNIT I

Object Oriented Design- Goals and Principles, Basic Concepts, Benefits, Object Oriented Languages, Applications, C++ Programming Elements, Passing Parameter Methods, Inline Functions, Friend Functions, Classes and Objects, Constructors and Destructors, Static Class Members.

UNIT II

Dynamic Memory Allocation(new and delete), Inheritance- Inheritance Types, Base class Access Control, Examples of Inheritance, Virtual Base Classes and Abstract Classes, Constructors in Derived Classes, Polymorphism - Types of Polymorphism, Function Overloading, Operator Overloading - Unary and Binary Operator Overloading.

UNIT III

Runtime Polymorphism - Virtual Functions and Pure Virtual Functions, Templates – Class Templates, Function Templates, Templates with Multiple Parameters, Member Function Templates, Overloading of Template Functions, Exception Handling – Exception Handling Mechanism, Throwing Mechanism, Catching Mechanism, Rethrowing an Exceptions and Specifying Exceptions.

UNIT IV

Overview of Data Structures, Implementation of Data Structures, Stack ADT, Queue ADT, List ADT, Circular Queue ADT, Priority Queue ADT, Double Linked List ADT; Implementation using template classes in C++.

UNIT V

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

UNIT VI

Dictionaries, operations insertion, deletion and searching hash table representation, hash functions, collision resolution-separate chaining, Open addressing-linear probing, quadratic probing, double hashing, rehashing, extendible hashing; Implementation using template classes in C++.

AUTONOMOUS
COMPUTER SCIENCE AND ENGINEERING

TEXT BOOKS:
1. Object Oriented Programming Through C++, E. Balaguruswamy.
2. Classic Data Structures, Debasis Samanta, PHI Learning Pvt Ltd, 2nd edition.

REFERENCES:
1. Data structures, Algorithms and Applications in C++, S.Sahni, University Press (India) pvt.Ltd, 2nd edition, Universities Press Orient Longman Pvt. Ltd.
2. Object Oriented Programming with C++, Sourav Sahay, Oxford Second Edition.
3. Data structures and Algorithms in C++, Michael T.Goodrich, R.Tamassia and Mount, Wiley student edition, John Wiley and Sons.
4. Data structures and Algorithm Analysis in C++, Mark Allen Weiss, Pearson Education. Ltd.,Second Edition.
5. Data structures and algorithms in C++, 3rd Edition, Adam Drozdek, Thomson.
6. Data structures using C and C++, Langsam, Augenstein and Tanenbaum, PHI.
7. Problem solving with C++, The OOP, Fourth edition, W.Savitch, Pearson education.

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COMPUTER SCIENCE AND ENGINEERING

II B.Tech. I-Sem (CSE)   T   C

                                                     3+1*   3

(A0514153) DATABASE MANAGEMENT SYSTEMS

OBJECTIVES:

- ❖ Advantages applications of DBMS and Database system structure.
- ❖ Schema design: ER model and conceptual design.
- ❖ Relational model and SQL basics.
- ❖ Relational algebra and Query optimization.
- ❖ Storage and efficient retrieval of data: various indexing techniques.
- ❖ Schema refinement: normalization and redundancy removal and functional dependant.
- ❖ Transaction management: locking protocols, serializability concepts etc.
- • Concurrency control and crash recovery: various mechanisms, ARIES algorithm and deadlock concepts.

OUTCOMES:

- ❖ Students will learn about the need for DBMS, the largeness of the data and why it gives rise to steam oriented processing and strategies and are at higher level than general purpose programming language such as JAVA.
- ❖ Students will learn about storage and efficient retrieval of large Information via algebraic query optimization and the use of indexing.
- ❖ Students will also learn basics of SQL and about primary key concepts and foreign key concepts. They will also learn about data manipulation (insertions deletions & updation) and triggers.
- ❖ Students will learn about functional dependency and the need for schema refinement (normalization) to remove redundancy of data.
- ❖ Students will also learn about transaction management concurrency Control and crash recovery.

CO-PO MAPPING:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1		3										2		
CO2	1			3				2						2	3
CO3		2								1	1		1		
CO4							2								2
CO5			2				2						1		

UNIT I

Database System Applications, database System VS file System – View of Data – Data Abstraction –Instances and Schemas – data Models – the ER Model – Relational Model – Database Languages – DDL – DML – Database Access for applications Programs – Database Users and Administrator – Transaction Management – Database System Structure – Storage Manager – the Query Processor- Data base design and ER diagrams – Beyond ER Design- Entities, Attributes and Entity sets – Relationships and Relationship sets – Additional features of ER Model – Conceptual Design with the ER Model.

UNIT II

Introduction to the Relational Model – Integrity Constraint Over relations – Enforcing Integrity constraints – Querying relational data – Logical database Design – Introduction to Views – Destroying /altering Tables and Views. Relational Algebra – Selection and projection set operations – renaming – Joins – Division – Examples of Algebra queries – Relational calculus – Tuple relational Calculus – Domain relational calculus.

UNIT III

The Form of a Basic SQL Query – Examples of Basic SQL Queries – Introduction to Nested Queries – Correlated Nested Queries, Set – Comparison Operators – Aggregate Operators – NULL values – Comparison using Null values – Logical connectivity's – AND, OR and NOT – Impact on SQL Constructs – Outer Joins – Disallowing NULL values – Complex Integrity Constraints in SQL, Triggers and Active Data bases.

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COMPUTER SCIENCE AND ENGINEERING

UNIT IV

Schema refinement – Problems Caused by redundancy – Decompositions – Problems related to decomposition – Functional dependencies-reasoning about FDS – FIRST, SECOND, THIRD Normal forms – BCNF – Lossless join Decomposition – Dependency preserving Decomposition – Schema refinement in Data base Design – Multi valued Dependencies – FORTH Normal Form.

UNIT V

Overview Of Transaction Management: The ACID Properties, Transactions and Schedules, Concurrent Execution of transactions-Lock Based Concurrency Control, Performance of Locking, Transaction Support in SQL.

Concurrency Control: 2PL, Serializability and recoverability, Introduction Lock Management, Lock Conversions, Dealing with Deadlocks, Concurrency control without locking.

UNIT VI

Data on External Storage – File Organizations and Indexing – Cluster Indexes, Primary and Secondary Indexes – Index data Structures – Hash Based Indexing – Tree base Indexing – Comparison of File Organizations – The Memory Hierarchy, RAID, Disk Space Management, Buffer Manager, Files of Records, Page Formats, record Formats.

TEXT BOOKS:

1. Data base Management Systems, Raghu Ramakrishna, Johannes Gehrke, TATA McGraw Hill 3rd Edition
2. Data base System Concepts, Silberschatz, Korth, McGraw hill, V edition.

REFERENCES:

1. Data base Systems design, Implementation, and Management, Peter Rob & Carlos Coronel 7th Edition.
2. Fundamentals of Database Systems, ElmasriNavathe Pearson Education.
3. Introduction to Database Systems, C.J.Date Pearson Education.

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COMPUTER SCIENCE AND ENGINEERING

II B.Tech. I-Sem (CSE) T C
 4+1* 3

(A0009153) ENVIRONMENTAL SCIENCE
(Common to All Branches)

OBJECTIVES:
- Creating the awareness about environmental problems among people.
- Imparting basic knowledge about the environment and its allied problems.
- Developing an attitude of concern for the environment.
- Motivating public to participate in environment protection and environment improvement.
- Acquiring skills to help the concerned individuals in identifying and solving environmental problems.
- Striving to attain harmony with Nature.
- Environmental education should be compulsory, right from the primary up to the post graduate stage.
- Environmental education should have an interdisciplinary approach by including physical, chemical, biological as well as socio-cultural aspects of the environment. It should build a bridge between biology and technology.
- Environmental education should take into account the historical perspective, the current and the potential historical issues.
- Environmental education should emphasise the importance of sustainable development i.e., economic development without degrading the environment.
- Environmental education should emphasise the necessity of seeking international cooperation in environmental planning.
- Environmental education should lay more stress on practical activities and first hand experiences.

OUTCOMES:
- Understand environmental problems arising due to developmental activities.
- Realize the importance of ecosystem and biodiversity for maintaining ecological balance.
- Identify the natural resources and suitable methods for conservation and sustainable development.
- Identify the environmental pollutants and abatement devices.
- Adopt practices that help in promoting balance in nature by making judicious utilization of recourses.

CO-PO MAPPING:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2					1	3	2				2			
CO2	1	2					3	1	2			2			
CO3	1				1	1	3	1	1		1	2			
CO4		1	1		2	1	1	1			1	2			1
CO5		1	1				2	1				2			1

UNIT I

MULTIDISCIPLINARY NATURE OF ENVIRONMENTAL SCIENCE: Environment -Definition, scope and importance, Segments of Environment-Importance, Productivity, Aesthetical& Optional values of nature, need for public awareness.

UNIT II

RESOURCES AND UTILIZATION: Renewable and non-renewable resources.

a) Natural Resources: soil & water sources(salinity intrusion –conflictsof over utilization of water Resources-water logging,Hydro power project-problems), forest & mineral resources – Utilization-problems.
b) Non conventional resources of energy(Solar Energy,wind energy and their applications)
c) Chemical fertilizers and pesticides-problems.
d) Green Revolution-white revolution- blue Revolution.
e) Non equitable distribution of Resources.

UNIT III

a) CONCEPTS OF ECO-SYSTEM

Structure and functions of an ecosystem: producers, consumers and decomposers- Interaction between biotic and abiotic factors in an ecosystem- Energy flow and its importance- Trophic levels- food chain- Food web – Ecological Pyramid, Ecological succession

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COMPUTER SCIENCE AND ENGINEERING

b) TYPES OF ECOSYSTEM

Understanding the types of ecosystem:

(i) Terrestrial (forest, grassland and desert) and

(ii) Aquatic (fresh water and salt water) with an example of each.

UNIT IV

BIODIVERSITY: Introduction – Definition - genetic, species and ecosystem diversity- -
Biogeographical classification of India- Value of biodiversity- Hot-sports of biodiversity- Biodiversity at global, National and local levels- India as a mega diversity nation - Hot-spots of biodiversity- Threats to biodiversity- IUCN Red data book.

Conservation of bio diversity (IN-SITU and EX-SITU conservation)

UNIT V

ENVIRONMENTAL POLLUTION: Introduction - Cause, effects and control measures of

a. Air pollution

b. Water pollution

c. Soil pollution

d. Marine pollution

e. Noise pollution

f. Thermal pollution

g. Nuclear hazards

Municipal Solid waste Management: Sources and Disposable methods.

Disaster management: floods, earthquake, cyclone.

UNIT VI

HUMAN POPULATION:

a) Population and Environment:- Definition of species, community, population; Population growth rate curves, Sex ratio, From unsustainable to sustainable development, Diseases-HIV, Malaria, Diaharia, Cancer.

b) Human rights, fundamental duties and value education.

c) Women and child welfare & Family welfare programs.

SOCIAL ISSUES:

a) Resettlement and rehabilitation of people.

b) Energy Crisis – urban and rural sectors.

c) Greenhouse effect and global warming.

d) Climatic changes.

e) Acid rain.

f) Ozone layer depletion.

g) Sustainability- water conservation methods- Rain water harvesting.

TEXT BOOKS:

1. Deswal, S and Deswal A., (2004), A Basic Course in Environmental Studies, Dhanpat Rai & Co. Delhi.
2. Anubha Kousik and C P Kousik ., New age international publishers.
3. Garg, S.K and Garg, R., (2006), Ecological and Environmental Studies, Khanna Publishers, Delhi.
4. Chauhan, A.S., (2006), Environmental Studies, Jain Brothers, New Delhi

REFERENCES:

1. Agarwal, K.C. 2001 Environmental Biology, Nidi Publ. Ltd. Bikaner.
2. Bharucha Erach, The Biodiversity of India, Mapin Publishing Pvt. Ltd., Ahmedabad –380 013, India, Email:mapin@icenet.net (R)
3. Brunner R.C., 1989, Hazardous Waste Incineration, McGraw Hill Inc. 480p
4. Clark R.S., Marine Pollution, Clanderson Press Oxford (TB)
5. Cunningham, W.P. Cooper, T.H. Gorhani, E & Hepworth, M.T. 2001, Environmental Encyclopedia, Jaico Publ. House, Mumabai, 1196p
6. De A.K., Environmental Chemistry, Wiley Eastern Ltd.

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COMPUTER SCIENCE AND ENGINEERING

II B.Tech. I-Sem (CSE)   T   C

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(A0011154) CORPORATE MANAGEMENT SKILLS

(Common to All Branches)

OBJECTIVES:
- ❖ To improve the communication skills of the students.
- ❖ To raise the confidence of the students with respect to the inter-personal communication.
- ❖ To make them to habituate to the Team culture and Team Work.
- ❖ To ensure the students to take up the challenges of Group Discussion and Personal Interview.
- ❖ To improve the overall personality of the students.

OUTCOMES:
- ❖ Able to improve the communication skills.
- ❖ Able to obtain confidence of the student with respect to the interpersonal communication.
- ❖ Able to cultivate the team culture and teamwork.
- ❖ Able to take the challenges of group discussion.
- ❖ Able to perform better way in personal interviews and presentations.
- ❖ Able to identify the emotions of the people.

CO-PO MAPPING:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1										3		1		3	
CO2									3	1		1		2	
CO3							1		3			1			
CO4									2	2		1			
CO5							1	2	2	2		1		2	
CO6									3	2					

UNIT-I:

Concept of Communication: Significance-Functions of Communication-Process-Different types of Communication-Essentials of good communication-Channels of communication-Formal and informal communication networks.

UNIT-II:

Types of Communication: Oral Communication-Tips to make oral communication effective-Merits and Demerits of oral communication-Written Communication-Steps in Writing-Merits and Demerits of written communication-Non verbal communication and Different types in it.

UNIT-III:

Barriers to Communication: Types of barriers-Technological, Sociopsychological-How to overcome the barriers-Different communication styles and models.

UNIT-IV:

Interviews: Resume preparation, Interview Process-Types-Common mistakes in interview- Preparation for interviewer- Preparation for interviewee.

UNIT-V:

Emotional Intelligence: Felt Vs Displayed emotions-Emotional dimensions- External constraints on emotion-Gender and emotion-Importance of emotional intelligence.

UNIT-VI:

Personality and Perception: Determinants of personality-Theories of personality-Components of perception-Factors influencing the perception process-Johari Window.

TEXT BOOKS:
1. Business communication Meenakshi Raman oxford university prof
2. Business communication Lalitha Ramakrishna

REFERENCE BOOKS:
1. Business communication Hudson,5 /E,Jaico publication
2. Effective communication Harward Business school, Harward Business review no 1214
3. Management and organization Behaviour by P.Subbarao

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COMPUTER SCIENCE AND ENGINEERING

II B.Tech. I-Sem (CSE)   P   C

                                                                                                         3   2

(A0595154) ADVANCED DATA STRUCTURES THROUGH C++ LAB

OBJECTIVES:
- ❖ To make the student learn an object oriented way of solving problems.
- ❖ Learn how to implement some useful data structures.
- ❖ Understand the effect of data structures on an algorithm's complexity.
- ❖ To develop skills to design and analyze simple linear data structures
- ❖ To Strengthen the ability to identify and apply the suitable data structure for the given real world problem
- ❖ To Gain knowledge in practical applications of data structures

OUTCOMES:
- ❖ Basic ability to analyze algorithms and to determine algorithm correctness and time efficiency class.
- ❖ Design, write, execute, and debug programs in C++.
- ❖ At the end of this lab session, the student will
- ❖ Be able to design and analyze the time and space efficiency of the data structure
- ❖ Be capable to identity the appropriate data structure for given problem
- ❖ Have practical knowledge on the application of data structures

CO-PO MAPPING:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2							1				1	2	2	1
CO2	2	1				1							2	2	1
CO3	2		1			1							2	1	1
CO4	2			1		1							1	1	2
CO5	2			1									1	2	2
CO6	2											1	1	2	2

WEEK 1: Write C++ program that convert the given expression from Infix to prefix using templates.

WEEK 2: Write a C++ program to evaluate the given Postfix expression.

WEEK 3: Write C++ program that implement all the operations on Circular Queue with array representation with templates.

WEEK 4: Write C++ program that implement all the operations on DE Queue with array representation with templates.

WEEK 5: Write C++ programs to implement the following using an array representation with templates.
    a) Min Heap   b) Max Heap

WEEK 6: Write C++ programs to implement the following using an array representation with templates.
    a) Ascending Priority Queue   b) Descending Priority Queue

WEEK 7: Write C++ program to implement Doubly Linked List for all operations along with templates.

WEEK 8:   Write a C++ program to implement the following operations on Binary Tree
    a)   Insert   b)   Delete   c)   Search   d) Display

WEEK 9: Write a C++ program to implement the following operations on Binary Search Tree
    a)   Insert   b)   Delete   c)   Search   d) Display

WEEK 10: Write a C++ program to implement the following collision resolution techniques using templates.
    a)   Linear Probing   b)   Quadratic Probing   c)   Double Hashing

TEXT BOOKS:
1. Object Oriented Programming Through C++, E. Balaguruswamy.
2. Data Structures using C++, Oxford, Varsha H. Patil.
3. Classic Data Structures, Debasis Samanta, PHI Learning Pvt Ltd, 2nd edition.
4. Data Structures and Algorithms in C++, Third Edition, Adam Drozdek, Thomson.
5. Data Structures using C++, D.S. Malik, Thomson

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COMPUTER SCIENCE AND ENGINEERING

II B.Tech. I-Sem (CSE)   P   C

                                                                         3   2

(A0472153) DIGITAL LOGIC DESIGN LAB

(Common to CSE & IT)

OBJECTIVES:
- ❖ Know the fundamentals of Boolean algebra and theorems, Karnaugh maps including the minimization of logic functions to SOP or POS form.
- ❖ To strengthen the principles of logic design and use of simple memory devices, flip-flops, and sequential circuits.
- ❖ To fortify the documentation standards for logic designs, standard sequential devices, including counters and registers, combinational devices, includes decoder, multiplexer.

OUTCOMES:
- ❖ Ability to perform the three basic logic operations and construct the truth tables for the different types of gates. And Implement logic circuits using basic AND, OR and NOT gates.
- ❖ Ability to Use De-Morgan's theorem to simplify logic expressions and describe the concept of active LOW and active HIGH logic signals and Use Boolean algebra and K-map as tool to simplify and design logic circuits and Design simple logic circuits without the help of truth tables.
- ❖ Ability to Construct and analyse the operation of flip-flop and troubleshoot various types of flip-flop circuits, decoder, multiplexer.

CO-PO MAPPING:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1	2			1						2	2		
CO2	2	2	2						1			1	1	1	
CO3	3	2	2	3								1		2	1
CO4	2	3	3	1	2										
CO5	2	2	3	2	2										2
CO6	3	1	2			1						2		1	

EXPERIMENTS

1. Basic Logic Gates AND,OR,NOT and their applications

2. Universal gates NAND and NOR

3. Study of combinational circuits 1 Half Adder and Full Adder

4. Study of combinational circuits 1 Half Sub tractor and Full sub tractor.

5. Study of Flip flops
   a) S-R F/F   b) J-K F/F   c) D-F/F   d)T - F/F

6. Design of four bit ring counter using Flip Flop

7. 3 – bit synchronous counter using Flip Flop

8. 4-bit Johnson Ring counter using Flip Flop

9. MOD-5 Synchronous counter using F/F

10. 2-4 decoder

11. 4 to 1 Multiplexer

12. 3 – bit up/down counter using F/F

REFERENCES:
1. Digital Design – Third Edition, M.Morris Mano, Pearson Education/PHI.
2. Switching and Finite Automata Theory by Zvi. Kohavi, Tata McGraw Hill.

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COMPUTER SCIENCE AND ENGINEERING

II B.Tech. I-Sem (CSE)   P   C
                                                                          3   2

(A0596153) DATABASE MANAGEMENT SYSTEMS LAB

OBJECTIVES
- ❖ Student will be able to:
- ❖ Create and delete database schemas and execute SQL queries
- ❖ Inserting data, Altering and dropping the tables.
- ❖ Various types of data conversions using the functions.
- ❖ Make Use of PL/SQL Language Components.
- ❖ Make Use of PL/SQL Variables.
- ❖ Handle PL/SQL Reserved Words.
- ❖ Make Use of Identifiers in PL/SQL
- ❖ Make Use of Anchored Data type

OUTCOMES

Upon completion of the lab, the student should be able to:
- ❖ Map the model into a relational database system.
- ❖ Implement the given schema on a relational DBMS.
- ❖ Design, develop, and maintain Oracle Database Objects.
- ❖ Use a database language for manipulating and querying data.
- ❖ Develop advanced packages, stored procedures, and triggers and functions using PL/SQL

CO-PO MAPPING:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1			3		2								1		
CO2								2		2				2	
CO3			2							1	1		1		1
CO4					1							2	1		2
CO5	1		2										2		1

Recommended Systems/Software Requirements:
- ❖ Intel based desktop PC
- ❖ Mysql /Oracle latest version Recommended.

1) Creation, altering and dropping of tables and inserting rows into a table (use constraints while creating tables) examples using SELECT command.
2) Queries (along with sub Queries) using ANY, ALL, IN, EXISTS, NOTEXISTS, UNION, INTERSET, Constraints.
   Example:- Select the roll number and name of the student who secured fourth rank in the class.
3) Queries using Aggregate functions (COUNT, SUM, AVG, MAX and MIN), GROUP BY, HAVING and Creation and dropping of Views.
4) Nested Queries and correlated nested queries
5) Table alterations
6) Queries using Conversion functions (to_char, to_number and to_date), string functions (Concatenation, lpad, rpad, ltrim, rtrim, lower, upper, initcap, length, substr and instr), date functions (Sysdate, next_day, add_months, last_day, months_between, least, greatest, trunc, round, to_char, to_date)
7) Creating procedures
8) Creating functions and packages
9) Develop Programs using BEFORE and AFTER Triggers, Row and Statement Triggers and INSTEAD OF Triggers.
10) Introduction to ORACLE reports

REFERENCES:
1. ORACLE   PL/SQL by example. Benjamin Rosenzweig, Elena Silvestrova, Pearson Education 3rd Edition
2. ORACLE DATA BASE LOG PL/SQL Programming SCOTT URMAN, Tata Mc-Graw Hill.
3. SQL & PL/SQL for Oracle 10g, Black Book, Dr.P.S. Deshpande.

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COMPUTER SCIENCE AND ENGINEERING

II B.Tech. II-Sem (CSE)   T   C
                                                                                                            3+1*   3

(A0016155) ENGINEERING ECONOMICS AND ACCOUNTANCY
(Common to CSE, IT & ME)

OBJECTIVES
- ❖ To understand the principles of and techniques of managerial economics.
- ❖ To understand the business organizations.
- ❖ To understand the financial accounting and analysis.
- ❖ To understand maintain a particular product at the lowest cost while meeting the specifications of the customer

OUTCOMES:
- ❖ Students will able to analyse the demand in the present market.
- ❖ Students will able to know the product demand by using the demand forecasting techniques.
- ❖ Students will able to know how to fix product price and know how to reach Break even.
- ❖ Students will able to know the types of business organizations and economy of the country.
- ❖ Students will able to know how to prepare the cost sheet.
- ❖ Students will able to maintain the books by using the financial accounting.

CO-PO MAPPING:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1	2												
CO2			3	2	1										
CO3		2	3	1											
CO4					1		2	1							
CO5			3	2	1									2	
CO6								1			3	2			

UNIT-I
Introduction to managerial economics: Definition, Nature and scope of managerial economics, Demand analysis, Demand determinants, law of demand and its exceptions.

UNIT-II
Elasticity of Demand: Definition types measurement and significance of elasticity of Demand. Factors governing demand forecasting, methods of demand forecasting (survey methods, statistical methods, expert opinion method, test marketing, controlled experiment, judgmental approach to demand forecasting)

UNIT-III
Break even analysis and pricing strategies: Break even analysis-Determination of breakeven point (simple problems)- managerial significance and limitations of BEA.
Objectives and policies of pricing-methods of pricing: cost plus pricing, sealed bid pricing, going rate pricing, market skimming pricing, penetration pricing, Two part pricing, Block pricing, Bundling pricing, Peak oad pricing, cross subsidization.

UNIT-IV
Business and New economic policy: Characteristics of business , features and evaluation of forms of business organization based on ownership, Nature of the economy, structure of the economy, economic policies,new economic policy 1991 ,economic conditions.

UNIT-V
Cost accounting: introduction- classification of costs –methods of costing – techniques of costing – preparation of cost sheet.

UNIT-VI
Accountancy: Accounting principles, procedure-Double entry system-journal-ledger, Trail balance –cash book-preparation of trading, profit and loss account-Balance sheet.

TEXT BOOKS:
1. Management Economics and Financial Analysis, Aryasri, 4/e, TMH, 2009.
2. Managerial Economics, Varshney & Maheswari, Sultan Chand, 2009.

REFERENCES:
1. Agarwal AN," Indian Economy "Wiley Eastern Ltd,New Delhi
2. Jain and Narang "Accounting part-1"Kalyani publishers
3. Arora,M.N."Cost Accounting", Vikas publications
4. Ashwatappa. K "Business Environment"

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COMPUTER SCIENCE AND ENGINEERING

II B.Tech. II-Sem (CSE)

	T	C
	3+1*	3

(A0506156) COMPUTER ARCHITECTURE

(Common to ECE & CSE)

OBJECTIVES:

- ❖ To understand the structure, function, characteristics and performance issues of computer systems.
- ❖ To understand the design of the various functional units of digital computers.
- ❖ To understand the basic processing unit and how they are connected and how it generates control signals (using hardwired and micro programmed approaches).
- ❖ To understand the different types of memory and how they are related.
- ❖ To learn basics of Parallel Computing and Pipelining.

OUTCOMES:

- ❖ Explain the organization of basic computer, its design & the design of control unit and trade-offs between hardware and software.
- ❖ Students will formulate and solve problems, understand the performance requirement of the systems and the operations & languages of the register transfer, micro operations and input-output organization.
- ❖ Students can understand how computer stores positive and negative numbers.
- ❖ Understand the organization of memory and memory management hardware.
- ❖ Elaborate advanced concepts of computer architecture, Parallel Processing, inter processor communicationand synchronization.

CO-PO MAPPING:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1		1	3						2				1	3	3
CO2			2	3	1								3	1	2
CO3	3	2	1										1	2	3
CO4			3	2								1	1	3	2
CO5					3						2	1	2	3	1

UNIT-I

BASIC STRUCTURE OF COMPUTERS: Computer Types, Functional unit, Basic operational concepts, Bus structures, Software, Performance, multiprocessors and multi computers.

DATA REPRESENTATION: Fixed Point Representation, Floating Point Representation. Error Detection codes.

UNIT-II

REGISTER TRANSFER LANGUAGE AND MICROOPERATIONS: Register Transfer language, Register Transfer, Bus and memory transfers, Arithmetic Micro operations, logic micro operations, shift micro operations

BASIC COMPUTER ORGANIZATION AND DESIGN: Instruction codes, Computer Registers, Computer instructions, Instruction cycle, Memory- reference instructions, Input – Output and Interrupt.

UNIT-III

CENTRAL PROCESSING UNIT: Stack organization, Instruction formats, Addressing modes, Data transfer and manipulation, Program control, Reduced Instruction set computer

COMPUTER ARITHMETIC: Fixed point operations - Addition and subtraction, multiplication, Division Algorithms

UNIT-IV

THE MEMORY SYSTEM: Basic concepts, semiconductor RAM memories, Read-only memories, Cache memories, performance considerations

UNIT-V

PIPELINE AND VECTOR PROCESSING: Parallel processing, Arithmetic pipeline, Instruction Pipeline, RISC Pipeline, Vector processing, Array Processors.

UNIT-VI

MULTI PROCESSORS: Characteristics of Multi Processors, Inter Connection Structures, InterProcessor Arbitration, Inter Processor Communication & Synchronization, Cache Coherence

TEXT BOOKS

1. Computer Systems Architecture – M. Moris Mano, IIIrd Edition, Pearson/PHI
2. Computer Organization – Carl Hamacher, Zvonks Vranesic, SafeaZaky, Vth Edition, McGraw Hill.

REFERENCES

1) Computer Organization and Architecture–William Stallings Sixth Edition,Pearson/PHI

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COMPUTER SCIENCE AND ENGINEERING

II B.Tech. II-Sem (CSE)   T   C
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(A0516154) CORE JAVA PROGRAMMING

OBJECTIVES:

After taking this course, the student should be able to:

- ❖ Describe the Windows event-driven programming model
- ❖ Build simple JAVA applications according to the model
- ❖ Write fluent JAVA code for creating classes
- ❖ Use JAVA variables, data, expressions and arrays
- ❖ Design and create forms, menus and controls
- ❖ Write clear, elementary Java programs (applets and applications)
- ❖ Use a Java-enabled browser and/or the applet viewer to execute Java applets
- ❖ Use the Java interpreter to run Java applications
- ❖ Design and construct effective graphic user interfaces for application software.
- ❖ Use Java Beans, RMI to build complex business applications

OUTCOMES:

- ❖ Understand the syntax and concepts of JAVA
- ❖ Write JAVA programs to implementing Object Oriented Concepts
- ❖ Able to build directories and manage applications with interfaces
- ❖ Write JAVA programs that use data from flat files and databases
- ❖ Develop programs with error free and Multi-tasking.
- ❖ Program assignment utilizing Java GUI components, event listeners and event-handlers.

CO-PO MAPPING:

CO /PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	1	3	1	2				1		2	2	2	2	
CO2	2	1	3	2	2			1				3	1	2	1
CO3	1	2	2	1	1							2		1	
CO4	1	1	2	1	2			1			2	2		2	1
CO5	2	2	2		2			1			1	2	2	2	
CO6		1	1		2							1		1	1

UNIT-I

Introduction To Java – Introduction to OOP, OOP Concepts, History of Java, Java buzzwords, How Java differs from C , Structure of Java Program, data types, variables, constants, type conversion and casting, enumerated types, scope and life time of variables, operators, expressions , control flow- conditional statements, break and continue, simple java program, arrays, parameter passing, static fields and methods, access control, this, overloading methods and constructors, recursion, garbage collection.

UNIT-II

Inheritance –Inheritance concept, Super and Sub classes, Member access rules, types of Inheritance, super uses, final classes and methods, casting, polymorphism- dynamic binding, method overriding, abstract classes and methods, the Object class and its methods.

UNIT-III

Interfaces – Interfaces vs. Abstract classes, defining an interface, implementing interfaces, accessing implementations through interface references, extending interface.
Packages- Defining, Creating and Accessing a Package, Understanding CLASSPATH, importing packages.

UNIT-IV

Files – streams, text Input/output, binary input/output, random access file operations, File management using File class, Using java.io.
Strings: Strings, string functions.

UNIT-V

Exception handling – benefits of exception handling, exception hierarchy, checked exceptions and unchecked exceptions, usage of try, catch, throw, throws and finally, rethrowing exceptions, built in exceptions, creating own exceptions.

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Multithreading - Differences between multiple processes and multiple threads, thread states, creating threads, interrupting threads, thread priorities, synchronizing threads, interthread communication, thread groups, daemon threads, thread deadlock.

UNIT-VI

Event Handling - Events, Event sources, Event classes, Event Listeners, Relationship between Event sources and Listeners, Delegation event model, handling mouse and keyboard events, Adapter classes.

TEXT BOOKS:
1. Java; the complete reference, 7th editon, Herbert schildt, TMH.
2. Understanding OOP with Java, updated edition, T. Budd, pearson eduction.

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

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COMPUTER SCIENCE AND ENGINEERING

II B.Tech. II-Sem (CSE)　　　　　　　　　　　　　　　　　　　　　　T　　　C

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(A0517154) FORMAL LANGUAGES AND AUTOMATA THEORY

OBJECTIVES:

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

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

OUTCOMES:

- ❖ To introduce the computer science students to the theoretical foundations of computer science.
- ❖ To study abstract models of information processing machines and limits of digital computation.
- ❖ To provide theoretical preparation for the study of programming languages and compilers.
- ❖ To develop the skills of formal and abstract reasoning as needed; for example, when designing, analysing, and / or verifying complex software/hardware systems.
- ❖ Be familiar with thinking analytically and intuitively for problem-solving situations in related areas of theory in computer science.

CO-PO MAPPING:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1		1				1	2		1		1		
CO2	1	1		1									1		1
CO3		2		1					1		1			2	
CO4		2		1					1		1	1	2		
CO5	1	1						1			1	1			
CO6		2							1					1	

UNIT I:

Automata: The Methods and Madness-Why study Automata Theory: introduction to FA, Structural Representations, Automata and complexity. **The central concepts of Automata:** Alphabet**,** Strings, Language, Operations, Finite state machine. **Deterministic finite automaton:** definition, How DFA processes Strings, Simpler notations for DFA's, Extending the transition Function to Strings, The Language of a DFA. **Non deterministic finite automaton:** An informal view of NFA, Definition, The extended Transition Function, The language of a NFA, Equivalence of DFA and NFA, An Application.

Finite Automata with € transitions: use of € transitions, Notation, Epsilon closures, Eliminating € Transitions. NFA to DFA conversion, minimization of FSM, **Finite Automata with output:** Moore and Melay machines.

UNIT II:

Regular Languages: Regular sets, regular expressions, identity rules for regular expressions, Arden's Theorem. **Finite Automata and regular expressions:** Transition systems and regular expressions, Transition system containing € moves, Algebraic method using Arden's theorem, Conversion of Finite Automata equivalent to Regular expressions, Equivalence of two finite automata. Pumping lemma of regular sets, Applications of pumping lemma, closure properties of regular sets (proofs not required). **Regular sets and regular grammars:** construction of Regular grammar generating for a given DFA.

UNIT III:

Context free grammar and Languages- CFG: Definition of CFG, Right most and leftmost derivations, The language of a grammar, Sentential Forms. **Parse Trees:** Constructing Parse Trees, Application of CFG. **Ambiguity in grammars and Languages:** Ambiguous grammars.

Properties of CFL-Normal Forms for CFG: Eliminating Useless Symbols, Computing the generating and reachable symbols, Eliminating €- productions, Eliminating unit productions, Chomsky normal form, Greibach normal form, Pumping Lemma for Context Free Languages. Closure properties of CFL (proofs omitted).

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UNIT IV:
Push Down Automata- PDA: definition, model, graphical notation for PDA's, Instantaneous Descriptions of a PDA. **The Language of a PDA:** acceptance by final state and acceptance by empty state and its equivalence. Equivalence of CFL and PDA, inter conversion. (Proofs not required). Introduction to DCFL and DPDA.

UNIT V
Introduction to Turing Machines-TM: notation for the Turing Machine, Instantaneous Descriptions for TM, Transition Diagrams for TM, The language of a TM. Programming Techniques for TM, storage in the state, Multiple Tracks, Subroutines, Multitape TM, NDTM, Multistack machines.

UNIT VI
Chomsky hierarchy of languages, Church's thesis, Universal Turing Machine, Counter Machines, Recursive and recursively enumerable languages, linear bounded automata and context sensitive language, Post Correspondence Problem.

TEXT BOOKS:
1. "Introduction to Automata Theory Languages and Computation". John E. Hopcroft, Rajeev Motwani and Jeffery D. Ullman. Pearson Education – third edition
2. Formal Language and Automata Theory by KVN Sunitha ,Tata McGraw Hill Education

REFERENCES:
1. "Theory of Computer Science (Automata languages and computation)" K. L. P. Mishra and N. Chandra Shekaran, 2nd edition, PHI. (UNIT II)
2. Theory of Computation, Vivek Kulkarni, Oxford.
3. Formal Languages and Automata Theory, C.K. Nagpal.

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COMPUTER SCIENCE AND ENGINEERING

II B.Tech. II-Sem (CSE)

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(A0518154) DESIGN AND ANALYSIS OF ALGORITHMS

OBJECTIVES:
- ❖ Significance of algorithms in the computer field.
- ❖ Various aspects of algorithm development.
- ❖ Qualities of a good solution.
- ❖ Significance and importance of program correctness.
- ❖ Various fields that constitute the subject of algorithms.
- ❖ Relationship between algorithms and other fields in the computer realm.
- ❖ Significance of algorithm efficiency.

OUTCOMES:
- ❖ Students can be able to demonstrate how the worst-case time complexity of an algorithm is defined; compare the efficiency of algorithms using asymptotic complexity and Amortized analysis.
- ❖ Students can understand to design efficient algorithms using Divide and Conquer algorithm design technique.
- ❖ To describe the greedy method and its applications
- ❖ To apply Dynamic Programming algorithm design strategies.
- ❖ Learns the Backtracking and Branch& Bound algorithm design strategies.
- ❖ Understands the Distinguish between P and NP Problems.

CO-PO MAPPING:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1			3	2					2		1			1	
CO2		2							2		2		1		1
CO3		1							2		2		1	1	
CO4	2			1	2				2		2		2	1	1
CO5	1	2		2					3		2		1	1	1
CO6		2		2	3				3		2	2	2		2

UNIT I

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, Probabilistic analysis, Amortized analysis.

UNIT II

Divide and conquer: General method , applications-Binary search, Finding Maximum and minimum ,Quick sort, Merge sort, Strassen's matrix multiplication.

UNIT III

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

UNIT IV

Dynamic Programming: General method, applications- 0/1 knapsack problem, All pairs shortest path problem, Travelling sales person problem, Reliability design, optimal binary search tree.

UNIT V

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

Branch and Bound: General method, applications - Travelling sales person problem.

UNIT VI

NP-Hard and NP-Complete problems: Basic Concepts, Non Deterministic algorithms, the classes of NP Hard and NP Complete, Cook's Theorem.

TEXT BOOKS:
1. Fundamentals of Computer Algorithms, Ellis Horowitz, Satraj Sahni and Rajasekharam, Galgotia publications pvt. Ltd.
2. Algorithm Design: Foundations, Analysis and Internet examples, M.T.Goodrich and R.Tomassia,John wiley and sons.

REFERENCES:
1. Introduction to Algorithms, second edition, T.H.Cormen, C.E.Leiserson, R.L.Rivest,andC.Stein,PHI Pvt. Ltd./ Pearson Education.
2. Design and Analysis of algorithms, S. Sridhar, Oxford.
3. Design and Analysis of algorithms, Aho, Ullman and Hopcroft,Pearson education.
4. Algorithms – Richard Johnson baugh and Marcus Schaefer, Pearson Education.

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COMPUTER SCIENCE AND ENGINEERING

II B.Tech. II-Sem (CSE)   T   C
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(A0519154) OPERATING SYSTEMS

OBJECTIVES:
- ❖ This course deals with functions, structures and history of operating systems.
- ❖ To understand the design issues associated with operating systems.
- ❖ To understand various process management concepts including scheduling, synchronization, deadlocks.
- ❖ To be familiar with multithreading and the concepts of memory management including virtual memory.
- ❖ To understand the issues related to file system interface and implementation, disk management with protection and security mechanisms.
- ❖ Some example operating systems (Unix, Windows, Solaris etc)

OUTCOMES:
- ❖ Students will learn about and understand services provided by and the design of an operating system
- ❖ Students will learn about system calls for managing processes, memory and the file system and various process management concepts including scheduling
- ❖ Students will learn about and understand synchronization, deadlocks
- ❖ Students will learn about and understand different approaches to memory management
- ❖ Students will learn about and understand the issues related to file system interface and implementation, disk management
- ❖ Students will larn about and understand secondary storage structure and teritiary storage devices.

CO-PO MAPPING:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2				1		1		1	1		1	2	2	1
CO2	1	2	2	1					2	1			2	1	1
CO3	1	3	2	2	1				1	1			1	1	1
CO4	1	3	2		1				1	1			2	1	1
CO5	1	2	1	2	1				1				1	2	2
CO6	1	2	1	1			1				1	1	3	2	1

UNIT I
Introduction - what operating systems do, computer system architecture, process management, memory management, protection and security, distributed systems, special purpose systems
System structure - operating system services, systems calls, types of system calls, system programs, operating system structure, operating systems generation, system boot.

UNIT II
Process concepts - overview, process scheduling, operations on process, inter-process communication.
Multithread Programming – overview, multithreading models
Process scheduling – basic concepts, scheduling criteria, process scheduling algorithms, algorithm evaluation.

UNIT III
Concurrency - Process synchronization, the critical-section problem, Peterson's Solution, synchronization Hardware, semaphores, classic problems of synchronization, monitors
Principles of deadlock: system model, deadlock characterization, deadlock prevention, detection and avoidance, recovery form deadlock.

UNIT IV
Memory Management Strategies –back ground, Swapping, contiguous memory allocation, paging, , segmentation
Virtual memory management – background, demand paging, copy-on-write, page-replacement algorithms-FIFO, LRU, Optimal, LFU, MFU, Second chance algorithm

UNIT V
File system – file concept, Access Methods, Directory structure, protection.
File System implementation - File system structure, file system implementation, directory implementation, allocation methods, free-space management, Recovery.

UNIT VI
Secondary-storage structure- overview of Mass-storage structure, Disk structure, disk attachment, disk scheduling, swap-space management, RAID structure
Tertiary storage devices- removable disks, tapes, future technology, performance issues.

TEXT BOOKS:
1. Operating System Concepts, Abraham Silberchatz, Peter B. Galvin, Greg Gagne, Eighth edition, John Wiley.

REFERENCES:
1. Operating Systems: Internals and Design Principles, Stallings, Sixth Edition–2009, Pearson Education.
2. Principles of Operating Systems, Naresh Chauhan, Oxford.

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COMPUTER SCIENCE AND ENGINEERING

II B.Tech. II-Sem (CSE)　　　　　　　　　　　　　　　　　　　　T　　C

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(A0010153) APTITUDE ARITHMETIC REASONING & COMPREHENSION
(Common to All Branches)

OBJECTIVES:
- ❖ To make the students ready to the recruitment drives.
- ❖ To raise the confidence of the students to face the written test of any Company.
- ❖ To train the students regarding employability skills.

OUTCOMES:
- ❖ Acquire knowledge of Number Systems, Time and Work, Time and Distance , Geometry and Menstruation ,Coding, Decoding and Reasoning
- ❖ Understand to solve Quadratic Equations, Mixtures & Allegations, Simple Interest, Compound Interest, Permutations & Combinations and Non Verbal Reasoning.
- ❖ Analyze Data Interpretation, Data Sufficiency, Probability, Coding, Decoding, Connectives Clocks and Calendars Analytical.
- ❖ Apply Verbal and Non Verbal Reasoning to solve Analytical Puzzles, Sequencing, Routes & Networks.
- ❖ Synthesize Quantitative Techniques and Data Interpretation for Data Sufficiency.

CO-PO MAPPING:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO 1	PSO 2	PSO 3
CO1	1					2								2	
CO2				2											
CO3											2			3	
CO4		1								2			2		
CO5				3										1	

UNIT-I

Numbers, Number Systems Simple Equations, Ratio, Proportion, Variation Quadratic Equations, Progressions Percentages.

UNIT-II

Profit, Loss, Partnerships Averages, Mixtures & Allegations, Simple Interest, Compound Interest, Time and Work-Pipes, indices, surds, inequalities, Cisterns Time and Distance Geometry and Menstruation.

UNIT-III

Permutations & Combinations and Probability Data Interpretation & Data Sufficiency.

UNIT-IV

Number & Letter Series, Analogies, Coding Decoding, Odd Man Out Blood Relations.

UNIT-V

Direction Sense, Symbols and Notations Deductions & Connectives Clocks, Calendars Analytical

UNIT-VI

Reasoning (Distribution+ Binary Logic + Puzzles) Cubes, Venn Diagrams Analytical Puzzles (Linear + Circular +Selections + Sequencing + Routes & Networks + Comparisons) and Non Verbal Reasoning

TEXT BOOKS:
1. R.S.Agarwal " Quantitative Techniques" S.Chand Series

REFERENCES:
1. Shankuntala Devi " Techniques of Reasoning" S.Chand Series

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COMPUTER SCIENCE AND ENGINEERING

II B.Tech. II-Sem (CSE)   P   C
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(A0597154) OPERATING SYSTEMS LAB

OBJECTIVES:

A student will be able to:

  ❖ Prepare students for easy transfer from academia into practical life.
  ❖ Get an Insight into the Computer Technologies.
  ❖ Obtain Basic Knowledge of Operating Systems.

OUTCOMES:

The main learning outcomes are:

  ❖ Implement various modules for CPU scheduling algorithms
  ❖ Simulation of Bankers algorithm for deadlock avoidance and prevention
  ❖ Implement various modules for PAGE replacement algorithms
  ❖ Simulate various memory allocation techniques
  ❖ Simulate various file allocation and paging techniques
  ❖ Simulate various File organization techniques

CO-PO MAPPING:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO 1	PSO 2	PSO 3
CO1	1	3		1				1	1				3	1	2
CO2		3	1	2										1	2
CO3	1	2		1					1				2	1	2
CO4	1	3	1	1									3		
CO5	1	2		2	2								2	2	2

1. Simulate the following CPU scheduling algorithms

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

2. Simulate Bankers Algorithm for Dead Lock Avoidance

3. Simulate Bankers Algorithm for Dead Lock Detection

4. Simulate the page replacement algorithms

    a) FIFO   b) LRU c) Optimal

5. Simulate the dynamic storage allocation strategies

    a) First fit   b) Best fit   c) Worst fit

6. Simulate MVT architecture

7. Simulate MFT architecture

8. Simulate sequential file allocation strategy

9. Simulate linked file allocation strategy

10. Simulate paging technique

11. Simulate following File Organization Techniques

    a) Single level directory   b) Two level directory

REFERENCES:

1. Operating System Concepts, Abraham Silberchatz, Peter B. Galvin, Greg Gagne, Eighth edition, John Wiley.
2. Operating Systems, A Concept based Approach - D.M.Dhamdhere, Second Edition, TMH.
3. Operating Systems: Internals and Design Principles, Stallings, Sixth Edition–2009, Pearson Education.

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COMPUTER SCIENCE AND ENGINEERING

II B.Tech. II-Sem (CSE)

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(A0598154) CORE JAVA PROGRAMMING LAB

OBJECTIVES:
- ❖ To make the student operating systems.
- ❖ Learn object oriented way of solving problems.
- ❖ To teach the student to write programs in Java to solve the problems

OUTCOMES:

After Completion of the Lab Course student should be able:
- ❖ Student can able to write a programs using classes and objects.
- ❖ Student can able to develop the polymorphic behaviour of objects.
- ❖ Students can able to design a software using object oriented approach.
- ❖ Able to implement the programs handling built in exceptions and creating custom exceptions.
- ❖ Able to develop the Mutli thread programming .

CO-PO MAPPING:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO 1	PSO 2	PSO 3
CO1	2	1	3	1	2				1		2	2	3	2	1
CO2	2	1	3	2	2							3	2		
CO3	1	2	2	1	1							2	3	2	
CO4	1	2	1	1					2		2	2		2	1
CO5	2	2	2		2						1	2		2	

RECOMMENDED SYSTEMS/SOFTWARE REQUIREMENTS:
- ❖ Intel based desktop PC with minimum of 166 MHZ or faster processor with at least 64 MB RAM and 100 MB free disk space.
- ❖ JDK Kit. Recommended

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.

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.

3) Write a Java Program that reads a line of integers, and then displays each integer, and the sum of all the integers (Use String Tokenizer class of java. until)

4) Write a Java program to find both the largest and smallest number in a list of integers.

5) Write a Java program to illustrate method overloading.

6) Write a Java program that implements the Sieve of Eratosthenes to find prime numbers.

7) Write a Java program to sort a list of names in ascending order.

8) Write a Java program to implement the matrix ADT using a class. The operations supported by this ADT are:
    a) Reading a matrix.   c) Addition of matrices.
    b) Printing a matrix.   d) Subtraction of matrices. e) Multiplication of matrices.

9) Write a Java Program to solve Tower's of Hanoi problem.

10) Write a Java Program that uses a recursive function to compute ncr. (Note: n and r values are given)

11) Write a Java program to perform the following operations:
    a) Concatenation of two strings.

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    b)   Comparison of two strings.

12) Implement the complex number ADT in Java using a class. The complex ADT is used to represent complex numbers of the form c=a+ib, where a and b are real numbers. The operations supported by this ADT are:
    a)   Reading a complex number. d) Subtraction of complex numbers.
    b)   Writing a complex number. e) Multiplication of complex numbers.
    c)   Addition of Complex numbers. f) Division of complex numbers.

13) Write a Java program that makes frequency count of letters in a given text.

14) Write a Java program that uses functions to perform the following operations:
    a)   Inserting a sub-string in to the given main string from a given position.
    b)   Deleting n characters from a given position in a given string.

15)   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 to make frequency count of words in a given text.

16)   a)   Write a Java program that reads a file name from the user, then displays information about whether the file exists, whether the file is readable, whether the file is writable, the type of file and the length of the file in bytes.
    b)   Write a Java program that reads a file and displays the file on the screen, with a line number before each line.
    c)   Write a Java program that displays the number of characters, lines and words in a text file.
    d)   Write a Java program to change a specific character in a file.
            Note: Filename, number of the byte in the file to be changed and the new character are specified on the command line.

17) Write a Java program that:
    i)   Implements stack ADT.
    ii)   Converts infix expression into Postfix form
    iii)   Evaluates the postfix expression.

18)   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.

REFERENCES:
1. Java; the complete reference, 7th editon, Herbert schildt, TMH.
2. An Introduction to programming and OO design using Java, J.Nino and F.A. Hosch, John wiley & sons.
3. Programming in Java, Sachin Malhotra, Saurabh Choudhary, Second Edition.
4. An Introduction to OOP, second edition, T. Budd, pearson education.
5. Introduction to Java programming 6th edition, Y. Daniel Liang, pearson education.

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COMPUTER SCIENCE AND ENGINEERING

II B.Tech. II-Sem (CSE)

P	C
3	2

(A0599154) DESIGN AND ANALYSIS OF ALGORITHMS LAB

OBJECTIVES:
- ❖ The principle objective of this course is to build solid foundation in algorithms and their applications.
- ❖ This course deals with Algorithms and designing of algorithms.
- ❖ To implement different design issues of algorithms.
- ❖ To implement various divide and conquer techniques examples.
- ❖ To implement various Greedy techniques examples.
- ❖ To implement various Dynamic Programming techniques examples.
- ❖ To implement Backtracking techniques examples.
- ❖ To provide a practical exposure of all algorithms.
- ❖ To understand the importance of algorithm and its complexities.

OUTCOMES:
- ❖ Students can able to know the need and requirement of Algorithms.
- ❖ To enable them to identify the difference between the different design techniques, their importance and usage.
- ❖ Systematic development of an algorithm for solving a problem.
- ❖ Students can learn about and understand theoretical concepts and practically implement all algorithms.
- ❖ Students can gain practical experience.
- ❖ Student can be able to apply the technique of algorithms for solving real world problems.

CO-PO MAPPING:

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

EXPERIMENTS
1. Write a program to perform operation count for a given pseudo code
2. Write a program to perform Heap sort for any given list of numbers.
3. Write a program to perform Bubble sort for any given list of numbers.
4. Write a program to perform Insertion sort for any given list of numbers.
5. Write a program to perform Quick Sort for the given list of integer values.
6. Write a program to find Maximum and Minimum of the given set of integer values.
7. Write a Program to perform Merge Sort on the given two lists of integer values.
8. Write a Program to perform Binary Search for a given set of integer values recursively and non-recursively.
9. Write a program to find solution for knapsack problem using greedy method.
10. Write a program to find minimum cost spanning tree using Prim's Algorithm.
11. Write a program to find minimum cost spanning tree using Kruskal's Algorithm.
12. Write a program to perform Single source shortest path problem for a given graph.
13. Write a program to find solution for 0/1 knapsack problem using dynamic programming method.
14. Write a program for all pairs shortest path problem.
15. Write a program to solve N-QUEENS problem.
16. Write a program to solve Sum of subsets problem for a given set of distinct numbers.

REFERENCES:
1. Data Structures and Algorithms by G.A.V. Pai, 2009, TMH.
2. Fundamentals of Computer Algorithms by Ellis Horowitz, Sartaj Sahni and Sanguthevar Rajasekaran, 2nd edition, University Press.

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COMPUTER SCIENCE AND ENGINEERING

III B.Tech. I-Sem (CSE)

T	C
3+1*	3

(A0520155) ADVANCED JAVA PROGRAMMING

OBJECTIVES:
- ❖ This course demonstrates the basic Knowledge of the Java tools and Web technologies necessary for business application design and development. The course covers GUI programming through java and server side scripting like servlets, JSPs. And also covers some Component Based Learning with JavaBeans, Network applications like Client/Server Interaction.

OUTCOMES:
The main learning outcomes are:
- ❖ Design and develop static and dynamic web pages.
- ❖ Designing of window based applications.
- ❖ Develop programs with GUI features such as dialog boxes, menus etc.
- ❖ Implementation of client and server interactions trough networking.
- ❖ Developing and implementing Bean Components.
- ❖ Implementing of given Client side and server side technologies.

CO-PO MAPPING:

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

UNIT-I

Applet Basics: Applet class, Applet Architecture, Applet skeleton, Simple Applet display methods, Requesting Repainting, The HTML APPLET tag, passing parameters to Applets, Applet Context & show Document().

UNIT-II

GUI Programming with Java - Introduction to AWT, AWT Classes, Window Fundamentals, Working with Frame Window, Graphics, Colors, Fonts, Managing Text outputs, control fundamentals-labels, buttons, checkbox, text fields, text area, Understanding Layout Managers, menu bars and menus, dialog boxes, file dialog, **Swings:** Introduction to Swing, Swing vs. AWT, Swing Features , MVC connection, Components and Containers, A simple swing application, Crate a Swing Applet, Painting in Swing, **Exploring swing** – Jlabel, JTextFiled, Swing Buttons- Jbutton, JToggleButton, JCheckBox, JRadioButton, JTabbebPane, JScrollPane, JList, JComboBox, JMenu, JTable, JTree.

UNIT-III

Java Beans: Introduction to Java Beans, Advantages of Java Beans, Bean Development Kit, JAR Files, Introspection, Using Bean Info Interface, Bound properties and constrained properties, Persistence, Customizer, JavaBean API Developing a Simple Bean.

UNIT IV

Networking in Java – Introduction,'java.net' package exploration, Use of InetAddress, TCP/ IP Client Sockets, URL and Manipulating URLs, TCP/IP Server Sockets, Datagram.

UNIT V

Web Servers and Servlets: Installing the Java Software Development Kit, Tomcat Server & Testing Tomcat, Servlets- Introduction to Servlets, Lifecycle of a Servlet, A Simple servlet, The Servlet API, The javax. servlet Package, Reading Servlet Parameters.

UNIT VI

Introduction to JSP: The Problem with Servlet. The Anatomy of a JSP Page, JSP Processing. JSP Application Design with MVC Setting Up and JSP Environment.

TEXT BOOKS:
1. Java; the complete reference, 7th editon, Herbert schildt, TMH.
2. Java Server Pages –Hans Bergsten, SPD O'Reilly

REFERENCE BOOKS:
1. Introduction to Java programming 6th edition, Y. Daniel Liang, pearson education.
2. An introduction to Java programming and object oriented application development, R.A. Johnson-Thomson.
3. Core SERVLETS ANDJAVASERVER PAGES VOLUME1: Core Technologies By Marty Hall and Larry Brown Pearson.
4. SDFS Murach's beginning JAVA JDK 5, Murach, SPD.

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AUTONOMOUS
COMPUTER SCIENCE AND ENGINEERING

III B.Tech. I-Sem (CSE)   T   C

3+1*   3

(A0509157) COMPUTER NETWORKS
(Common to ECE & CSE)

OBJECTIVES:
 ❖ An understanding of the overriding principles of computer networking, including protocol design, protocol layering, algorithm design, and performance evaluation.
 ❖ An understanding of computer networking theory, including principles embodied in the protocols designed for the application layer, transport layer, network layer, and link layer of a networking stack.
 ❖ An understanding of specific implemented protocols covering the application layer, transport layer, network layer, and link layer of the Internet (TCP/IP) stack
 ❖ An understanding of security issues.

OUTCOMES:
 • Students are able to classify network services, protocols and architectures.
 • Student will learn to explain key Internet applications and their protocols.
 • Students will learn to explain security issues in computer networks.
 • Students are able to understand the concepts of the OSI and the TCP-IP model.
 • Students are able to familiar with network tools and network programming.
 • Students are able to learn the concepts of protocols, Wireless networking, network interfaces, and Design/performance issues in LAN's AND WAN's.

CO-PO MAPPING:

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

UNIT I

Introduction: Network Hardware, Network Software, References Models. The Physical Layer: Guided Transmission Media, Communication Satellites, The public Switched Telephone Network- The Local Loop: Modern ADSL, and wireless, Trunks and Multiplexing, Switching.

UNIT II

The Data Link Layer: Data link Layer Design Issues, Elementary Data Link Protocols, and Sliding Window Protocols.

UNIT III

The Medium Access Control Sublayer: Multiple Access protocols, Ethernet- Ethernet Cabling, Manchester Encoding, The Ethernet MAC Sublayer Protocol. The Binary Exponential Backoff Algorithm, Ethernet Performance, Switched Ethernet, Fast Ethernet. Wireless LANs- The 802.11 Protocol Stack, The 802.11 Physical Layer, The 802.11 MAC SubLayer Protocol, The 802.11 Frame Structure .

UNIT IV

The Network Layer: Network Layer Design Issues, Routing Algorithms (Shortest path, Flooding, Distance Vector, Link state and Hierarchical routing, Broad cast routing, Multicast routing), Congestion Control Algorithms, Internetworking, IPV4 Addresses.

UNIT V

The Transport Layer: The Transport Service, Elements of Transport Protocols, The Internet Transport Protocols: UDP, The Internet Transport Protocols: TCP,

UNTI VI

The Application Layer: DNS-The Domain Name System, Electronic Mail, The World Wide Web.

TEXT BOOKS:
 1. Computer Networks, Andrew S. Tanenbaum, Fouth Edition, Pearson Education.
 2. TCP/IP Protocol suite Fourth Edition- Behrouz A.Forouzan

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REFERENCES:

1. Computer Communications and Networking Technologies, Michael A. Gallo, William M. Hancock, Cengage Learning.
2. Computer Networks, Bhushan Trivedi, Oxford.
3. Computer Networks: Principles, Technologies and Protocols for Network Design, Natalia Olifer, Victor Olifer, Wiley India.
4. Data Communications and Networking, Behrouz A. Forouzan, Fourth Edition, Tata McGraw Hill.
5. Understanding Communications and Networks, Third Edition, W.A.Shay, Cengage Learning.
6. Computer and Communication Networks, Nader F. Mir, Pearson Education
7. Computer Networking: A Top-Down Approach Featuring the Internet, James F.Kurose, K.W.Ross, Third Edition, Pearson Education.
8. Data and Computer Communications, G.S.Hura and M.Singhal, CRC Press, Taylor andFrancis Group.

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COMPUTER SCIENCE AND ENGINEERING

III B.Tech. I-Sem (CSE)

	T	C
	3+1*	3

(A0521155) COMPILER DESIGN

OBJECTIVES:
- ❖ Thorough understanding of the overall architecture of a modern compiler.
- ❖ Being familiar with both top-down and bottom-up parsing paradigms.
- ❖ Fluent with syntax-directed translation scheme and different compiler-compilers.
- ❖ Knowledgeable with assembly language and code-block based code generation scheme.
- ❖ Knowing the inner details of compilers, libraries, operating systems/platforms, and how they interact with each other to form modern computing environments.

OUTCOMES:
- ❖ Identify and understand different phases and passes of Compiler and their functioning.
- ❖ Understand lexical, syntax and semantic analysis processes.
- ❖ Understand and define the role of lexical analyzer, use of regular expression and transition diagrams.
- ❖ Understand Finite state machine and use Context free grammar, and parse tree construction
- ❖ Determine code generation and optimization techniques.
- ❖ Apply error detection and correction methods.

CO-PO MAPPING:

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

UNIT-I
Introduction to compilers: compilers, cousins of the compiler, phases of a compiler, interpreter, grouping of phases into pass, bootstrapping

Lexical analysis: role of the lexical analyzer, input buffering, a language for specifying lexical analyzers

UNIT-II
Syntax analysis: the role of the parser, context free grammars, writing a grammar: eliminating ambiguity, elimination of left recursion, elimination of left factoring

Top-down parsing: Recursive descent parsing, first and follow, predictive parsing, construction of predictive parsing table.

UNIT-III
Bottom up Parsing: handles, handle pruning, shift reduce parsing, viable prefixes, conflicts during shift reduce parsing

LR Parsers: SLR Parsing: LR (0) items, SLR Parse table. CLR Parser: CLR (1) Items, CLR (1) Parsing table. LALR (1) parser: LR (1) items, LALR (1) parsing table.

UNIT-IV
Semantic analysis: type checking: type checking of expressions, type checking of statements, type checking of functions, type conversions

Syntax directed translation: form of a syntax directed definition, synthesize attributes, inherited attributes, dependency graph, annotated parse tree.

Intermediate code generation: intermediate code forms: abstract syntax tree, polish notation, three address code .implementation of three address code statements: quadruples, triples, indirect triples

UNIT-V
Symbol table and Runtime environments: symbol table format, storage organization, storage allocation strategies, parameter passing, activation trees, activation records, storage allocation for arrays, strings and records

UNIT-VI
Code optimization: Consideration for Optimization, Scope of Optimization, principle sources of optimization: function preserving transformations, local Optimization, loop Optimization, global Optimization

Data flow analysis: construction of flow graph, loops in flow graph

Code generation: object code forms, issues in code generation, a simple code generator algorithm, generic code from DAGS

TEXT BOOKS:
1. Compilers principles, techniques, &tools- A.V.Aho. J.D.Ullman; pearson Education. Second edition.

REFERENCES:
1. Compiler design: Theory, Tools and examples by Seth D. Bergmann.
2. Compiler design, K. Muneeswaran, Oxford.

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COMPUTER SCIENCE AND ENGINEERING

III B.Tech. I-Sem (CSE)   T   C

                                                          3+1*   3

(A0522155) SOFTWARE ENGINEERING

OBJECTIVES:

- ❖ To understand Software development as a process.
- ❖ Various software process models and system models.
- ❖ Various software designs: Architectural, object oriented, user interface etc.
- ❖ Software testing methodologies overview: various testing techniques including white box testing black box testing regression testing etc.
- ❖ Software quality: metrics, risk management quality assurance etc.

OUTCOMES:

- ❖ Understand software development life cycle
- ❖ Analyze and Apply various process models for a project
- ❖ Prepare SRS document for a project
- ❖ Understand requirement and Design engineering process for a project
- ❖ Identify different principles to create an user interface
- ❖ Identify different testing methods and metrics in a software engineering project

CO-PO MAPPING:

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

UNIT I

Introduction to Software Engineering: The evolving role of software, Changing Nature of Software, Software myths. **A Generic view of process:** Software engineering- A layered technology, a process framework, The Capability Maturity Model Integration (CMMI), Process patterns, process assessment, personal and team process models.

UNIT II

Process models: The waterfall model, Incremental process models, Evolutionary process models, The Unified process. **Software Requirements:** Functional and non-functional requirements, User requirements, System requirements, Interface specification, the software requirements document.

UNIT III

Requirements engineering process: Feasibility studies, Requirements elicitation and analysis, Requirements validation, Requirements management. **System models:** Context Models, Behavioral models, Data models, Object models.

UNIT IV

Design Engineering: Design process and Design quality, Design concepts, the design model.
Creating an architectural design: Software architecture, Data design, Architectural styles and patterns.

UNIT V

Performing User interface design: Golden rules, User interface analysis and design, interface analysis, interface design steps, Design evaluation. **Testing Strategies:** A strategic approach to software testing, test strategies for conventional software, Black-Box and White-Box testing, Validation testing, System testing, the art of Debugging.

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COMPUTER SCIENCE AND ENGINEERING

UNIT VI

Metrics for Process and Products: Product metrics: Software Quality, Metrics for Analysis Model, Metrics for Design Model, Metrics for source code, Metrics for testing, Metrics for maintenance**.** Software Quality, Software Measurement, Metrics for software quality. **Quality Management :** Quality concepts, Software quality assurance, Software Reviews, Formal technical reviews, Statistical Software quality Assurance, The ISO 9000 quality standards.

TEXT BOOKS:

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

REFERENCES:

1. Software Engineering- K.K. Agarwal & Yogesh Singh, New Age International Publishers
2. Software Engineering principles and practices, Deepak Jain, Oxford.
3. Software Engineering, an Engineering approach- James F. Peters, Witold Pedrycz, John Wiely.
4. Systems Analysis and Design- Shely Cashman Rosenblatt,Thomson Publications.
5. Software Engineering principles and practice- Waman S Jawadekar, The McGraw-Hill Companies.

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COMPUTER SCIENCE AND ENGINEERING

III B.Tech. I-Sem (CSE)   T   C

3+1*   3

(A0523155) UNIX TOOLS AND PROGRAMMING

OBJECTIVES:
Upon successful completion of this course, you should be able to:
- ❖ Define and redirect standard files.
- ❖ Use the pipe operator to connect two commands.
- ❖ Use wildcard met characters and the history command to recall commands.
- ❖ Use shell variables.
- ❖ Define and use foreground and background processes.
- ❖ Define and use processes and co-processes.
- ❖ Use directory information in scripts.
- ❖ Set and use positional parameters and escape sequences.
- ❖ Pass arguments to shell scripts and test arguments.
- ❖ Use conditions, control statements and the if command in a decision.
- ❖ Use while and for loops.
- ❖ Debug scripts using execute trace and verbose trace.
- ❖ Use command substitution and Group shell commands.
- ❖ Create and use aliases and functions.
- ❖ Identify and use signals and handle signals in a shell script.
- ❖ Use integer and floating-point arithmetic.
- ❖ Create and use variable arrays.
- ❖ Perform command evaluation using eval.
- ❖ Use here documents, file I/O operators and command options processing.
- ❖ Use a lock file to synchronize access.

OUTCOMES:
- ❖ Be familiar with Unix and Linux operating Systems.
- ❖ Be familiar with the Unix file system and its basic operations.
- ❖ Know the differentiate shell scripting and commands practice with various options.
- ❖ Be familiar with the Unix command interpreters.
- ❖ Familiar with pipes and redirection, filter parameters and options
- ❖ Gain the knowledge of korn shell programming environment.

CO-PO MAPPING:

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

UNIT-I
Introduction: Why Unix?, Architecture, Computer System, The Unix Environment, Unix structure, Accessing Unix, Common commands: date, cal, who, password, echo, man, lpr. Other useful commands: tty, clear, stty, telnet,ftp,script, uname, bc.
Vi editor: Editor concepts, The vi editor, Modes, Commands.

UNIT-II
File Systems: File Names, File Types, Regular Files, Directories, File System Implementation, Operations unique to regular files, Operations unique to directories, Operations common to both.
Security & File Permissions: users and groups, security levels, changing permissions, user masks, changing ownership and group.

UNIT-III
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.

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UNIT-IV
Filters: Filters and Pipes, Concatenating files, Display Beginning and End of files, Cut and Paste, Sorting, Translating Characters, Files with Duplicate Lines, Count characters, Words or Lines, Comparing Files, Regular Expressions.
Grep: Operation, grep Family, Searching for File Content.

UNIT-V
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.

UNIT-VI
Interactive Korn Shell: Korn Shell Features, Two Special Files, Variables, Output, Input, Exit Status of a Command, eval command, Command Execution Process.
Korn Shell Programming: Basic Script concepts, Expressions, special Parameters and Variables, changing Positional Parameters, Argument Validation, Script Examples.

TEXT BOOKS:
1. Unix and shell Programming Behrouz A. Forouzan, Richard F. Gilberg. Thomson
2. Your Unix the ultimate guide, Sumitabha Das, TMH. 2nd Edition.

REFERENCES:
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.

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COMPUTER SCIENCE AND ENGINEERING

III B.Tech. I-Sem (CSE) T C

3+1* 3

(A0524155) PRINCIPLES OF PROGRAMMING LANGUAGES

OBJECTIVES:

❖ The main objective is that students will have a deep, working knowledge of the functional paradigm and the key ideas used in modern programming languages. It provides an exposure to core concepts and principles in contemporary programming languages

OUTCOMES:

❖ Apply the parse tree, ambiguity, semantics and syntax of a grammar and understanding the programming domains.
❖ Understanding arrays of different programming languages and variables.
❖ Understanding the statements, parentheses and control statements of different programming language.
❖ Apply the concepts of subprograms of programming languages.
❖ Understanding the Abstract data types and designs various kinds of programming languages.
❖ Understanding the logic programming and functional programming.

CO-PO MAPPING:

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

UNIT I

Preliminary Concepts: Reasons for studying concepts of programming languages, Programming domains, Language Evaluation Criteria Influences on language design ,Language categories, Language Design Trades-Offs, Implementation Methods, Programming Environments Syntax and Semantics: general Problem of describing Syntax and Semantics, Formal Methods of Describing Syntax-BNF,EBNF.

UNIT II

Data types: Introduction, primitive, character, user defined, array, associative, record, union, design and implementation uses related to these types. Names, Variable, type checking, strong typing, type compatibility.

UNIT III

Expressions and Statements: Arithmetic relational and Boolean expressions, Short circuit evaluation Assignment Statements, Control Structures: Statement Level, Compound Statements, Selection, Iteration, guarded commands.

UNIT IV

Subprograms and Blocks: Fundamentals of sub-programs, Scope and lifetime of variable, Design issues of subprograms and operations, parameter passing methods, generic sub-programs, user defined overloaded operators, co routines.

UNIT V

Abstract Data types: Abstractions and encapsulation, introductions to data abstraction, language examples, object oriented programming in small talk, C++, Java, C#. Exception handling: Exceptions, exception Propagation, Exception handler in Java, Ada.

UNIT VI

Logic Programming Language: Introduction and overview of logic programming, basic elements of prolog, application of logic programming. Functional Programming Languages: Introduction, fundamentals of FPL,The first FPL: LISP, ML, Haskell, application of Functional Programming Languages and comparison of functional and imperative Languages.

TEXT BOOKS:

1. Concepts of Programming Languages Robert W. Sebesta, Eighth Edition, Pearson Education,2008.
2. Programming Language Design Concepts, D. A. Watt, Wiley Dreamtech, rp-2007.

REFERENCES:

1. Programming Languages, Second Edition, A.B. Tucker, R.E. Noonan, TMH.
2. Programming Languages, K. C.Louden, Second Edition, Thomson, 2003.
3. LISP, Patric Henry Winston and Paul Horn, Pearson Education.
4. Programming in Prolog, W.F. Clocksin and C.S.Mellish, Fifth Edition, Springer.

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COMPUTER SCIENCE AND ENGINEERING

III B.Tech. I-Sem (CSE)

	T	C
	$1+2^*$	2

(A0013156) PROFESSIONAL ETHICS AND SOFT SKILLS
(Common to all branches)

OBJECTIVE:

❖ The main objective of Engineering Ethics is to increase the awareness in engineering failures. Engineering decisions can impact public health, safety, business practices and politics. Engineering ethics is the field of applied ethics and system of moral principles that apply to the practice of engineering. The field examines and sets the obligations by engineers to society, to their clients, and to the profession. Engineering ethics in academic institutions has been undertaken by the directives of Supreme Court for creating awareness interactively among engineering students of all disciplines. By studying engineering ethics, the students develop awareness and assessment skill of the likely impact of their future decisions on moral and ethical grounds.

OUTCOMES:

❖ To apply ethical theories and moral reasoning to a good professional
❖ Understand the professional behaviour and implementation of process of communication
❖ To approach of corporate communication problem solving techniques
❖ To have a practical orientation of interpersonal communication
❖ Aware of intellectual property rights

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO 1	PSO 2	PSO 3
CO1	2					2	2	3	3	3	1	2			
CO2	1		1			2	1	3	3	3	1	2	2		
CO3	1		2			2	1	2	3	2	1	2	2		
CO4	2					2	1	3	2	2	1	3	2		
CO5	3					2	1	3	2	3	1	3			

UNIT-I

Nature and Scope of Engineering Ethics: Definition, Nature, Scope – Moral Dilemmas – Moral Autonomy – Kohlberg's theory – Gilligan's theory- Moral Reasoning and Ethical theories – Theories of Right Action-Self – Utilitarianism interest- Use of ethical Theories- case study.

UNIT-II

Professional Etiquettes: Professional Etiquettes **–** Mobile Etiquettes – Email Etiquettes -Kinesics – Proxemics - Chronemics – Chromatics – Olfacts - Haptics – Case study..

UNIT-III

Corporate Communication: Communication Models- Types of Communication – Downward and Upward Communication- Business Deliberations – Meetings – Negotiation Skills - Case Study.

UNIT-IV

Soft Skills: Interpersonal Communication – Johari Window – Interpersonal conflict resolutions- Daniel Goleman's Emotional Intelligence.

UNIT-V

Global Issues: Multinational Corporations – Corporate Governance - Corporate Social Responsibility Environmental Ethics – case study.

UNIT-VI

Introduction to Intellectual Property: Meaning and Types of Intellectual Property – Recent developments of the copy right act –Trademark Protection – Patent Law - Plagiarism.

TEXT BOOKS:

1. Professional Ethics by R.Subramanian, OXFORD
2. Business Communication , P.D. Chaturvedi, Mukesh Chaturvedi

REFERENCES:

1. The ACE of Soft Skills(Attitude, Communication and Etiquette for success) by – Gopalaswamy Ramesh & Mahadevan Ramesh, Pearson 2010.
2. Essentials of Business Communication, Rajendra Pal, JS.Korlahhi, S.Chand
3. Intellectual Property Right , Deborah E. BouchouxS, Cengage, 2005
4. Business Ethics and Professional Values, A.B. Rao, Excel,2009
5. M.P. Raghavan [2006], Professional Ethics and Human Values, Scitech Publications, Chennai.

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COMPUTER SCIENCE AND ENGINEERING

III B. Tech. I- Sem (CSE) 　　　　　　　　　　　　　　　　　　　　　　　　 P 　 C

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(A0581155) ADVANCED JAVA PROGRAMMING LAB

OBJECTIVE:

❖ To create a fully functional window based applications. To develop GUI applications like Calculator, Notepad, Simple user forms, and Designing and implementing Component based application like Jelly Beans, Color bean, and also designing of server side pages, client server interactions with TCP.

OUTCOMES:

❖ Student can able to Designing of window based applications.
❖ Student can able to create a client and server communication using net package.
❖ Student can able to design reusable software components using java beans.
❖ Able to develop server side programming.
❖ Able to develop the dynamic web pages using JSP.

CO-PO MAPPING:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO 1	PSO 2	PSO 3
CO1	2	1	1			1			2	2			3	2	1
CO2	2		1	2					2	2	1		2	2	
CO3	2		3	1	1	1			2					2	1
CO4	2		2	2			1		2					3	2
CO5	2		2	2		2						1	2	1	

HARDWARE AND SOFTWARE REQUIRED:

❖ A working computer system with either Windows or Linux (with minimum configurations- HDD:40 GB, RAM: 512MB) .
❖ Simple Editor Notepad or other editor tools like Edit plus or notepad++.
❖ A web browser IE/ Firefox/ chrome.
❖ Apache Tomcat web server.
❖ JVM(Java virtual machine) must be installed on your system
❖ BDK(Bean development kit) must be also be installed

1. A) Write a Java Program to create an applet that show a simple message along with background and foreground colors?

   B) Write a Java Program to create an applet that scrolls a message from left to right?

2. A) Write a Java Program to create 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.

   B) Write a Java Program to create an applet that receives a string and returns either it Uppercase or Lowercase, Reverse of given string, and length of a given String.

3. A) Write a java program to draw Lines, ovals, filled ovals and arcs, filled arcs?

   B) Write a java program to draw rectangle, filled rectangle and rounded rectangle and filled rounded rectangle with any two colors?

   C) Write a java program to draw a smiley face?

4. A) Write a Java program to demonstrate the mouse event handlers.

   B) Write a Java program to demonstrate the key event handlers.

5. Write a Java program that creates a user interface to perform integer divisions. The user enters two numbers in the text fields, Num1 and Num2. The division of Num1 and Num2 is displayed in the Result field when the Divide button is clicked. If Num1 or Num2 were not an integer, the program would throw a Number Format Exception. If Num2 were Zero, the program would throw an Arithmetic Exception Display the exception in a message dialog box.

6. Write a Java program that works as a simple calculator. Use a grid layout to arrange buttons for the digits and for the +, -,*, % operations. Add a text field to display the result.

7. A) Write a Java Program to create 4 push Buttons bearing the names of 4 colors. When a button is licked, that particular color is set as background color in a frame?

   B. 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.

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8. Write a Java Program a simple user form which reads the name of a user and mail id in Text fields, select gender with radio buttons, and selects some Known languages using checkboxes, and also enters an address in a text area. After filling details whenever a user press the "submit" button, then displays all the information about the user input.

9. Write a Java Program to create multiple frames, which create a Frame2 with a 'back 'button, such that when a user click 'back' button, Frame 2 is closed and we see the Frame1 only?

10. A) Write a Java Program to create an applet using Swings which contains two push buttons. If a user presses a particular button then display a message 'selected' button is pressed.

    B) Write a Java Program to create a frame using swing in which create a push button with a label and image. When the button is clicked an image is displayed in the Frame?

11. Write a Java Program to create a student table, which includes name, roll no, branch and age or DOB?

12. Write a Java Program to create a tabbed pane with two tabs. In the first tab sheet, display some push buttons with names of Branches. In second tab sheet, display checkboxes with names of subjects.

13. A) Write a java program to create a menu with several menu items by implementing JMenu.

    B) Write a java program to create a combo box with some name of some places. The user can select any one name from the list and the selected country name is displayed in the frame? (Use JComboBox)

    C) Write a java program to select multiple places and displayed in Frame using JList?

14. Write a java program to create a simple visual bean with a area filled with a color. The shape of the area depends on the property shape. If it is set to true then the shape of the area is Square and it is Circle, if it is false. The color of the area should be changed dynamically for every mouse click. The color should also be changed if we change the color in the "property window ".

15. Write a java program to create a bean that performs conversion of American dollar to Indian rupee.

16. Write a java program to create a bean that counts the number of button clicks?

17. A) Write a Java program that implements a simple client/server application. The client sends data to a server. The server receives the data, uses it to produce a result, and then sends the result back to the client. The client displays the result on the console. For ex: The data sent from the client is the radius of a circle, and the result produced by the server is the area of the circle. (Use java.net)

    B) Write a Java program to retrieve the information from the given URL? (**Note:** Read the URL from Command Line Arguments).

18. Write a java program to create a sample TCP chat application where client and server can chat with each other?

19. Installation of Apache Tomcat webserver.

20. A) Write a java Program to create a simple servlet and run it using tomcat server.

    B) Write a java Program to create a servlet to read information from client Registration page?

21. A) Write a java Program to create a JSP page to display a simple message along with current Date?

    B) Write a java Program to create a JSP page to display the random number?

22. Write a java Program to create a User request page in JSP?

REFERENCES:

1. Java; the complete reference, 7th editon, Herbert schildt, TMH.
2. Introduction to Java programming 6th edition, Y. Daniel Liang, pearson education.
3. An introduction to Java programming and object oriented application development, R.A. Johnson-Thomson.
4. Core Servlets and Java Server pages volume1: Core Technologies By Marty Hall and Larry Brown Pearson.

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COMPUTER SCIENCE AND ENGINEERING

III B. Tech. I- Sem (CSE)

	P	C
	3	2

(A0582155) UNIX TOOLS AND PROGRAMMING LAB

OBJECTIVES:
- ❖ To teach students various unix utilities and shell scripting.

OUTCOMES
- ❖ Understand the basic UNIX process structure and the UNIX file system.
- ❖ Understand the roles of unix developers / systems programmers
- ❖ Good knowledge of simple UNIX filters.
- ❖ Familiar with pipes and redirection, imagine the UNIX environment.
- ❖ Practice various commands related to Signals, filter parameters and options,
- ❖ Differentiate shell scripting and commands practice with various options.

CO-PO MAPPING:

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

Recommended Systems/Software Requirements:
- ❖ Intel based desktop PC with minimum of 166 MHZ or faster processor with at least 64 MB RAM and 100 MB free disk space LAN Connected
- ❖ Any flavour of Unix / Linux

Week1

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

Week2
- a) Log into the system
- b) Use the cat command to create a file containing the following data. Call it mytable use tabs to 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 my table (same name)
- f) Print the file mytable
- g) Use the cut and paste commands to swap fields 2 and 3 of mytable. Call it my table (same name)
- h) Print the new file, mytable
- i) Logout of the system.

Week3
- 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.

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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.

Week4
a) Develop an interactive grep script that asks for a word and a file name and then tells how many lines contain that word.
b) Repeat
c) Part using awk.

Week5
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.

Week6
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.

Week7
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 computes the value of first number raised to the power of the second number.

Week8
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.

Week9
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.

Week10
a) Write a shell script to generate multiplication table.
b) Write a shell script to print sum of individual digits of a number.

Week11
Write C programs that simulate the following unix commands:
a) mv   b) cp (Use system calls)

Week12
Write a C program that simulates ls Command(Use system calls / directory API)

REFERENCES:
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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                                                                                                        3   2

(A0583155) COMPILER DESIGN AND COMPUTER NETWORKS LAB

OBJECTIVES:
- ❖ Thorough understanding of the overall architecture of a modern compiler.
- ❖ Being familiar with both top-down and bottom-up parsing paradigms.
- ❖ Fluent with syntax-directed translation scheme and different compiler-compilers.
- ❖ To understand the functionalities of various layers of OSI model

OUTCOMES:
- ❖ Students are able to applying the top down and bottom approaches of parsing and lexical analysis.
- ❖ Students are able to generate code generation and optimization phases of compilation.
- ❖ Students are able to programming networking concepts and routing algorithms.
- ❖ Students are able to familiar with network tools and network programming.
- ❖ Students are able to design a compiler for a concise programming language.

CO-PO MAPPING:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO 1	PSO 2	PSO 3
CO1	2									3			1	2	
CO2			3					2			1			1	2
CO3		3		1							2			2	1
CO4	1						2					1	1		
CO5		1			3				1						2

COMPILER DESIGN
1. (a) Write a lex program for removal of white spaces and comments in a file
    (b) Write a lex program for count vowels and consonents in a file
2. Write a lex program for implementation of lexical analysis
3. Write a program to check whether a given string belongs to the grammar or not
4. Write a program for convert the given expression into polish notation
5. Write a program to find leading terminals
6. Write a program to find trailing terminals
7. Write a program to compute FIRST of non -terminals
8. Write a program to compute FOLLOW of non- terminals

COMPUTER NETWORKS
1. Implement the data link layer framing methods such as character, character stuffing and bit stuffing.
2. Implement on a data set of characters the three CRC polynomials – CRC 12, CRC 16 and CRC CCIP.
3. Implement Dijkstra's algorithm to compute the Shortest path thru a graph.
4. Now obtain Routing table art each node using distance vector routing algorithm.

REFERENCES:
1. Compiler design: Theory, Tools and examples by seth D.Bergmann
2. Computer Networks- Andrew S. Tanenbaum, Fourth Edition, Pearson Education.

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COMPUTER SCIENCE AND ENGINEERING

III B.Tech. II-Sem (CSE)   T   C
                                                                           3+1*   3

(A0510155) C# & .NET FRAMEWORK
(Common to CSE & IT)

AIM:
- ❖ To cover the fundamental concepts of the C# language and the .NET framework.

OBJECTIVE:
- ❖ The student will gain knowledge in the concepts of the .NET framework as a whole and the technologies that constitute the Framework.
- ❖ The student will gain programming skills in C# both in basic and advanced levels.
- ❖ By building sample applications, the student will get experience and be ready for large-scale projects.

OUTCOMES:
- ❖ Understand the .NET Framework and syntax of basic C# programming constructs.
- ❖ Create and use new types (enumerations, classes, and structures), and understand the differences between reference types and value types.
- ❖ Use collections to aggregate data, and use Generics to implement type-safe collection classes, structures, interfaces, and methods.
- ❖ Design, document, code and unit test class libraries as part of larger projects like WINFORMS, SQL Server and ADO.NET
- ❖ Create web-based distributed applications using C#, ASP.NET, SQL Server and ADO.NET.
- ❖ Create and debug application and class library solutions and projects.

CO-PO MAPPING:

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

UNIT I
INTRODUCTION to C#: Introducing C#, Understanding .NET, Overview of C#, Literals, Variables, Data Types, Operators, Expressions, Branching, Looping, Methods, Arrays, Strings, Structures, Enumerations.

UNIT II
OBJECT ORIENTED ASPECTS OF C#: Classes, Objects, Inheritance, Polymorphism, Interfaces, Operator Overloading, Delegates, Errors and Exceptions.

UNIT III
WINDOWS APPLICATIONS: Drawbacks of Console Applications, Container Controls, Non Container Controls, Developing Windows Application from Notepad and Visual Studio, Events, Types of Events – Mouse, Focus, Drag, Key and Other Related Events, Building Windows Applications.
ADO.NET: Problems with File Handling, Data Source Communication, Drivers and Providers, Introduction of ADO.NET, ADO.NET Namespaces, ADO.NET Objects, Accessing Data with ADO.NET.

UNIT IV
BUILDING ASP.NET WEB PAGES: HTML form Development, Client side Scripting, Server side Scripting, Web applications and Web servers, HTTP, Advantages Using ASP.NET, ASP.NET Application, ASP.NET Namespaces, ASP.NET Web Page Structure, Creating Sample C# Web Applications, ASP.NET Web Page Execution Architecture, Debugging and Tracing of ASP.NET.

UNIT V
ASP.NET WEB CONTROLS: Web Form Structures, Introduction to Web Form controls, Server Side Controls, Web Server Controls, GET and POST, Page Submission, Web Page Creation Techniques, Redirection between Web Pages, Validation Controls.

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UNIT VI

WEB SERVICES: Web Services, Web Service Architecture, WSDL, Building WSDL Web Service.

CONFIGURING .NET ASSEMBLIES: Private Assemblies, Shared Assemblies, and Versioning.

MULTITHREADED PROGRAMMING: Thread Class, Life Cycle of a Thread, Steps for Creating a Thread, Thread Synchronization.

TEXT BOOKS:

1. Pro C# 2010 and the .NET 4 Platform, Andrew Trolesen,
2. Programming in C#, E. Balagurusamy, Tata McGraw-Hill, 2004.

REFERENCE BOOKS:

1. Programming C#, J. Liberty, 2nd Edition., O'Reilly, 2002.
2. C# and the .NET Platform, Andrew Trolesen, 2nd Edition, Dreamtech Press
3. Sams Teach Yourself the C# Language in 21 Days', Bradley L Jones, 1st edition, 2001.
4. Microsoft C# Programming for the Absolute Beginner, Andy Harris, PTR publications, 2002.
5. The Complete Reference: C#, Herbert Schildt, Tata McGraw-Hill, 2004.
6. Professional C#, Robinson et al, 2nd Edition.,WroxPress, 2002.
7. C# and the .NET Platform, Andrew Troelsen, A! Press, 2003.
8. A Textbook on C#, S. ThamaraiSelvi, R. Murugesan, Pearson Education, 2003.

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                                                                  3+1*   3

(A0525156) ANDROID PROGRAMMING

OBJECTIVES:

Upon completion of this course, you will be able to:

- ❖ Build your own Android apps
- ❖ Explain the differences between Android and other mobile development environments
- ❖ Understand how Android applications work, their life cycle, manifest, Intents, and using external resources
- ❖ Design and develop useful Android applications with compelling user interfaces by using, extending, and creating your own layouts and Views and using Menus.
- ❖ Take advantage of Android's APIs for data storage, retrieval, user preferences, files, databases, and content providers
- ❖ Tap into location-based services, geocoder, compass sensors, and create rich map-based applications
- ❖ Utilize the power of background services, threads, and notifications.
- ❖ Use Android's communication APIs for SMS, telephony, network management, and internet resources (HTTP).
- ❖ Secure, tune, package, and deploy Android applications

OUTCOMES:

- ❖ Understand the Android Framework and architecture. Installation on Android studio and its project development environment.
- ❖ Display proficiency in coding on a mobile programming platform and accessing the User Interfaces built-in application tools.
- ❖ Storage tools, Webview and Telephony concepts for the Android platform.
- ❖ Design and develop Multimedia application in android.
- ❖ Create a Mobile app with a significant programming component Tap into Built-in Services.
- ❖ Create a Mobile app with a significant programming component to google map locations, content Provider and dialog box.

CO-PO MAPPING:

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

UNIT-I

Introduction to Android, Types of Mobile Applications, Android Architecture(About DVM, Linux kernel, Java libraries & Native libraries, application frame work), Android Framework(Activity, Service, Broadcast Receiver, Content Provider), Android Studio Environment(how to Install, install in emulator, real device) Project Structure(R.Java, res folder, manifest.xml and .apk file), Android features, History, Layout UI groups(Leaner Layout, Relative Layout, Table Layout, Frame Layout, Grid Layout), Width and height properties(Match parent, Wrap content, Pixel, Density pixel and Scaled pixel).

UNIT-II

Activity, Activity lifecycle, Life cycle Methods, Intents, Intent Methods, layout file and its child elements and attributes, Basic UI Components(Text View, Button, Edit Text, Radio Button, Check Box), Advanced UI Components (AutoCompleteTextView, Spinner, ListView) Adapters (ArrayAdapter, Custom Adapter), Toast.

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UNIT-III

WebView, WebView-HTML Communication, Fragment, Fragment Life Cycle. **Storage Methods:** shared preferences, SQLite Database (insert, read, update, delete). **Telephony:** send SMS, Call, Attaching File, and Send E-Mail.

UNIT-IV

Multimedia in Android: Media Player, Video View, Audio Recording, Video recording, Camera, Gallery. **Service:** Service, Service lifecycle methods.

UNIT-V

Built-in Services (location service, Notification service, Sensor Service, WIFI Service, Bluetooth Service, Vibrator Service), Broadcast Receivers.

UNIT-VI

Content Provider, Dialog Boxes (Custom dialog, Alert dialog, date Picker, Time Picker, Progress dialog, dialog Fragment), Google Maps.

TEXT BOOKS:

1. Android Application Development (with Kitkat Support), Black Book by Pradeep Kothari.

2. Android Programming: Pushing the Limits by Erik Hellman.

REFERENCES:

1. Beginning Android 4 Application Development by Wei-Meng Lee

2. Android Application Development for Dummies by Michael Burton

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III B.Tech. II-Sem (CSE)   T   C
                                                                                           3+1*   3

(A1226157) INFORMATION SECURITY
(Common to CSE & IT)

OBJECTIVES:
- ❖ This course covers the major aspects of computer and network security. It starts with a general introduction to information security, then proceeds to cover types of threats and attacks, hacking techniques, network vulnerabilities, security policies and standards, firewalls, cryptography, Authentication & digital signatures, the SSL protocol, Wireless security, intrusion detection and prevention

OUTCOMES:
The student will be able to:
- ❖ Define information security and outline its major components.
- ❖ Identify the major types of threats to information security and the associated attacks.
- ❖ Develop strategies to protect organization information assets from common attacks.
- ❖ Understand how security policies, standards and practices are developed.
- ❖ Understand the role of management in enforcing security policies, standards and practices.
- ❖ Identify the major techniques, approaches and tools used to discover network and system vulnerabilities.

CO-PO MAPPING:

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

UNIT-I

Security goals, Security Attacks (Interruption, Interception, Modification and Fabrication), Security Services (Confidentiality, Authentication, Integrity, Non-repudiation, access Control and Availability) and Mechanisms, A model for Inter network security, Internet Standards and RFCs, Buffer overflow & format string vulnerabilities, ARP attacks, route table modification and man-in-the-middle attacks.

UNIT-II

Conventional Encryption Principles, Conventional encryption algorithms, cipher block modes of operation, location of encryption devices, Approaches of Message Authentication, hash functions,Secure Hash Functions and HMAC.

UNIT-III

Public key cryptography principles, public key cryptography algorithms(RSA,DIFFIE-HELLMAN,DSS), digital signatures, Certificate Authority and key management, X.509 Directory Authentication Service.

UNIT-IV

Email privacy: Pretty Good Privacy (PGP) and S/MIME.

UNIT-V

IP Security: Basics, overview, Architecture& services, IPSEC modes, security associations , Authentication Header, Encapsulating Security Payload, Combining Security Associations and Key Management, OAKLEY key determination protocol ,ISAKMP.

UNIT-VI

Web Security: Secure Socket Layer (SSL) and Transport Layer Security (TLS), Secure Electronic Transaction (SET).

Firewalls: Introduction to Firewalls, types of firewalls, firewall configurations

TEXT BOOKS:
1. Network Security Essentials (Applications and Standards) by William Stallings Pearson Education.
2. Hack Proofing your network by Ryan Russell, Dan Kaminsky, Rain Forest Puppy, Joe Grand, David Ahmad, Hal Flynn Ido Dubrawsky, Steve W.Manzuik and Ryan Permeh, wiley Dreamtech

REFERENCES:
1. Fundamentals of Network Security by Eric Maiwald (Dreamtech press)
2. Network Security - Private Communication in a Public World by Charlie Kaufman, Radia Perlman and Mike Speciner, Pearson/PHI.
3. Cryptography and network Security, Third edition, Stallings, PHI/Pearson.
4. Principles of Information Security, Whitman, Thomson.
5. Network Security: The complete reference, Robert Bragg, Mark Rhodes, TMH.

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COMPUTER SCIENCE AND ENGINEERING

III B.Tech. II-Sem (CSE)   T   C
                                                                                3+1*   3

(A0508156) WEB TECHNOLOGIES
(Common to ECE & CSE)

OBJECTIVES:
- ❖ This course demonstrates an in-depth understanding of the tools and Web technologies necessary for business application design and development. The course covers client side scripting like HTML, JavaScript and server side scripting like servlets, JSPs. And also XML and web servers and database interfacing.

OUTCOMES:
The main learning outcomes are:
- ❖ Student can able to demonstrate the HTML important tags and for designing static web pages and separate design from content using CSS.
- ❖ Able to design a webpage with more user interactivity using Javascript.
- ❖ Students can able to understand the need of XML in the developing of Web applications.
- ❖ Students able to understand the need of Server side scripting using Servlets and JSP.
- ❖ Able to develop the web applications with MVC architecture design using Struts.
- ❖ Students can able to apply the java programming to develop interactive of databases and develop the scalable web applications.

CO-PO MAPPING:

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

UNIT I
Introduction to HTML - HTML common tags, HTML program structure, Attributes, List, Tables, images, image maps, forms, Frames; Cascading Style sheets;

UNIT II
JavaScript - Introduction to Java Scripts, Objects in Java Script, Dynamic HTML with Java Script, Data Validation using Java Script.

UNIT III
XML - Document type definition, XML Schemas, Document Object model, Presenting XML, Using XML Processors: DOM and SAX

UNIT IV
More On Servlets – Reading Initialization parameters, the javax.servlet HTTP package, Handling Http Request & Responses, Using Cookies-Session Tracking.
JSP Application Development - Generating Dynamic Content, Using Scripting Elements Implicit JSP Objects, Conditional Processing – Displaying Values Using an Expression to Set an Attribute, Declaring Variables and Methods Sharing Data between JSP pages, Sharing Session and Application Data.

UNIT VI
Struts: Tomcat &Struts Installation, Struts Request life cycle, Struts Configuration file, Form Validation with Struts, Simple Struts application.

UNIT VI
Database Access - Database Programming using JDBC, Types of JDBC Drivers, Studying Javax.sql.* package, Accessing a Database from a JSP Page, Application – Specific Database Actions.
AJAX – Introduction, Background, How AJAX works, Common steps AJAX will follow.

TEXT BOOKS:
1. HTML Black Book – Steve Holzner.
2. Web Programming, building internet applications, Chris Bates 2nd edition,WILEY Dreamtech

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3. The complete Reference Java 2 Fifth Edition by Patrick Naughton and Herbert Schildt. TMH
4. Java Server Pages –Hans Bergsten, SPD O'Reilly

REFERENCE BOOKS:

1. Programming world wide web-Sebesta,Pearson.
2. Web Technologies, Uttam K. Roy, Oxford.
3. Core SERVLETS ANDJAVASERVER PAGES VOLUME 1: CORE TECHNOLOGIES By Marty Hall and Larry Brown Pearson.
4. Internet and World Wide Web – How to program by Dietel and Nieto PHI/Pearson Education Asia.
5. Jakarta Struts Cookbook , Bill Siggelkow, S P D O'Reilly
6. Murach's beginning JAVA JDK 5, Murach, SPD.
7. An Introduction to web Design and Programming –Wang-Thomson.

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COMPUTER SCIENCE AND ENGINEERING

III B.Tech. II-Sem (CSE)   T   C
                                                                           3+1*   3

(A0526156) OBJECT ORIENTED ANALYSIS AND DESIGN
(Department Elective –1)

OBJECTIVES:
- ❖ Building block of UML . : things , relationships and diagrams
- ❖ Contents and common modeling techniques to model static aspects of any system using: Class diagrams, object diagrams, deployment diagram, usecase diagram
- ❖ Contents and common modeling techniques to model dynamic aspects of any system using: sequence diagram, collaboration diagram, activity diagram, state chart diagram
- ❖ Contents and common modeling techniques to model any system using component diagram to implement physically.

OUTCOMES:
- ❖ Analyze system requirements and model problem domains
- ❖ Evaluate quality of analysis
- ❖ Design and build object oriented systems
- ❖ Designs based on design principles patterns and heuristics
- ❖ Object-oriented code to correctly implement a design
- ❖ Read and write analysis and design documentation the Unified Modeling language

CO-PO MAPPING:

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

UNIT – I
Introduction to UML: Importance of modeling, principles of modeling, object oriented modeling, Conceptual model of the UML, Architecture, Software Development Life Cycle.

UNIT - II
Basic Structural Modeling: Classes, Relationships, common Mechanisms, and diagrams.
Advanced Structural Modeling: Advanced classes, advanced relationships, Interfaces, Types and Roles, Packages.

UNIT - III
Class & Object Diagrams: Terms, concepts, modeling techniques for Class & Object Diagrams.
Basic Behavioral Modeling-: Interactions, Interaction diagrams. Use cases,
Use case Diagrams, Activity Diagrams.

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

UNIT-V
Architectural Modeling: Component, Deployment, Component diagrams and Deployment diagrams.

UNIT - VI
Case Study: The Unified Library application, ATM application.

TEXT BOOKS:
1. Grady Booch, James Rumbaugh, Ivar Jacobson: The Unified Modeling Language User Guide, Pearson Education.

REFERENCE BOOKS:
1. Meilir Page-Jones: Fundamentals of Object Oriented Design in UML, Pearson Education.
2. Pascal Roques: Modeling Software Systems Using UML2, WILEY Dreamtech India Pvt. Ltd.
3. AtulKahate: Object Oriented Analysis & Design, The McGraw – Hill Companies.
4. Mark Priestley: Practical Object-Oriented Design with UML,TATA McGraw Hill
5. Appling UML and Patterns: An introduction to Object – Oriented Analysis and Design and Unified Process, Craig Larman, Pearson Education.
6. Hans-Erik Eriksson, Magnus Penker, Brian Lyons, David Fado: UML 2 Toolkit, WILEY-Dreamtech India Pvt. Ltd.

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COMPUTER SCIENCE AND ENGINEERING

III B.Tech. II-Sem (CSE)   T   C
                                                                                                            3+1*   3

(A0527156) ADVANCED COMPUTER NETWORKS
(Department Elective –1)

OBJECTIVES:
- ❖ To become familiar with the basics of Computer Networks
- ❖ To understand various Network architectures
- ❖ Concepts of fundamental protocols
- ❖ To understand the network traffic, congestion, controlling and resource allocation.

OUTCOMES:

Upon completion of the course students are able to
- ❖ Understand to build internetwork.
- ❖ Good knowledge of complex topics like End-to-End Protocols, DHCP, ICMP.
- ❖ Solution to the some of the Congestion Control Mechanisms.
- ❖ Understand protocol suite for Multimedia over internet.
- ❖ Design the framework for monitoring activities in Cellular networks.

CO-PO MAPPING:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO 1	PSO 2	PSO 3
CO1		1	3											1	2
CO2							2				1		2		
CO3				1						2				2	
CO4	2										1		2	1	
CO5					3					1					2

UNIT I

Wireless LAN - Introduction to wireless LANs, IEEE 802.11 WAN-Architecture and Services, Physical Layer - MAC sublayer - MAC management sublayer - Other IEEE 802.11 standards,

UNIT II DHCP-Outing in the Internet-MOSTF DVMRP, IP Over ATM,

UNIT III Storage Area Networks- Introduction to Storage Technology, Storage System Architecture, Introduction to Networked Storage, Direct-Attached Storage, SCSI, NAS, IP SAN, Information Availability & Monitoring & Managing Datacenter, Securing Storage and Storage Virtualization.

UNIT IV

Traffic Engineering Planning, WAP-WAP architecture-WAE-WTA Framework-WAP push services- WAP protocol stack, Tiny OS, NEST Cellular Network.

UNIT V

Tuning RED for Web Traffic - Introduction, Background Work, Experimental Methods, Experimental Network, Web-like Traffic Generation, Analysis of RED Response Times, Comparing FIFO and RED.

UNIT VI

XCP - Implementation, Experimental study- Multimedia Over Internet- RSVP, RTP, RTCP, RTSP-Skype. Internet Telephony- 1st Generation Protocols, Compression Techniques, 2nd Generation Systems, H.320 Standards, Directory Systems, IRC.

TEXT BOOKS:
1. J. Walrend, High Performance Communication Networks, 2nd Edition, Maurgan Kauffmann, 1999.
2. D.E. Comer, TCP/IP - Vol : I, II and III, Pearson Education, 2008.

REFERENCES:
1. Computer Networking: A Top-Down Approach Featuring the Internet, *James F. Kurose, Keith W.Ross*, Third Edition, Pearson Education, 2007
2. Computer and Communication Networks, *Nader F. Mir,* Pearson Education, 2007

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COMPUTER SCIENCE AND ENGINEERING

III B.Tech. II-Sem (CSE)   T   C
                                                                                          3+1*   3

(A0528156) NETWORK PROGRAMMING
(Department Elective –1)

OBJECTIVES:
- ❖ Understand fundamental concepts of computer communication
- ❖ Understand sockets and ports
- ❖ To provide an opportunity to do network programming using TCP/IP.
- ❖ Create comprehensive network applications using sockets

OUTCOMES:
- ❖ Understand the key protocols that support the Internet;
- ❖ Develop programming interfaces for network communication;
- ❖ Have a detailed knowledge of the TCP/UDP Sockets
- ❖ Create applications using techniques such as multiplexing, forking, multithreading;
- ❖ I/O, non-blocking I/O and event driven I/O.
- ❖ Apply knowledge of Unix/Linux operating systems to build robust client and server software for this environment;
- ❖ Learn advanced programming techniques such as IPv6 Socket Programming, Broadcasting, Multicasting

CO-PO MAPPING:

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

UNIT-I
Introduction to Network Programming: OSI model, Unix standards, TCP and UDP & TCP connection establishment and Format, Buffer sizes and limitation, standard internet services, Protocol usage by common internet application.

UNIT-II
Sockets: Address structures, value – result arguments, Byte ordering and manipulation function and related functions Elementary TCP sockets – Socket, connect, bind, listen, accept, fork and exec function, concurrent servers. Close function and related function.

UNIT-III
TCP client server: Introduction, TCP Echo server functions, Normal start up, terminate and signal handling server process termination, Crashing and Rebooting of server host shutdown of server host.

UNIT-IV
I/O Multiplexing and socket options: I/O Models, select function, Batch input, shutdown function, poll function, TCP Echo server, getsockopt and setsockopt functions. Socket states, Generic socket option IPV6 socket option ICMPV6 socket option IPV6 socket option and TCP socket options.

UNIT-V
Elementary UDP sockets: Introduction UDP Echo server function, lost datagram, summary of UDP example, Lack of flow control with UDP, determining outgoing interface with UDP.

Elementary name and Address conversions: DNS, get host by Name function, Resolver option, Function and IPV6 support, uname function, other networking information.

UNIT-VI
IPC: Introduction, File and record locking, Pipes, FIFOs streams and messages, Name spaces, system V IPC, Message queues, Semaphores.

TEXT BOOKS:
- ❖ UNIX Network Programming, Vol. I, Sockets API, 2nd Edition. - W.Richard Stevens, Pearson Edn. Asia.
- ❖ UNIX Network Programming, 1st Edition, - W.Richard Stevens. PHI.

REFERENCES:
1. UNIX Systems Programming using C++ T CHAN, PHI.
2. UNIX for Programmers and Users, 3rd Edition Graham GLASS, King abls, Pearson Education
3. Advanced UNIX Programming 2nd Edition M. J. ROCHKIND, Pearson Education.

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III B.Tech, II-Sem (CSE) 　　　　　　　　　　　　　　　　　　　　T　　C
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(A1221156) INFORMATION STORAGE AND MANAGEMENT
(Department Elective –1)
(Common to CSE & IT)

OBJECTIVE:
- ❖ To fill the knowledge gap in understanding varied components of modern information storage infrastructure, including virtual environments.
- ❖ To provide comprehensive learning of storage technology, which will enable students to make more informed decisions in an increasingly complex IT environment.
- ❖ To build strong understanding of underlying storage technologies and prepares students to learn advanced concepts, technologies, and products.

OUTCOMES:
- Students will be able to describe and apply information storage technologies.
- Students can identify leading storage technologies that provide cost-effective IT solutions for medium to large scale businesses and data centers.
- Students will be able to understand storage networking technologies such as FC-SAN,IP-SAN, NAS, Object-based and unified storage;
- Students can be able to find business continuity solutions such as backup, replication, and archive.
- Students can describe important storage technologies' features such as availability, scalability and performance.
- The increasingly critical area of information security; and the emerging field of cloud computing.

CO-PO MAPPING:

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

UNIT I:

Introduction to Information Storage: Introduction to evolution of storage architecture, key data center elements, virtualization, and cloud computing.

Data Center Environment: Key data center elements – Host (or compute), connectivity, storage, and application in both classic and virtual environments.

Data Protection: RAID: implementations, techniques, and levels along with the impact of RAID on application performance.

UNIT II:

Intelligent Storage Systems: Components of intelligent storage systems and virtual storage provisioning and intelligent storage system implementations.

Fibre Channel Storage Area Networks: Fibre Channel SAN components, connectivity options, and topologies including access protection mechanism 'zoning", FC protocol stack, addressing and operations, SAN-based virtualization and VSAN technology,

IP SAN and FCoE: iSCSI and FCIP protocols for storage access over IP network, Converged protocol FCoE and its components

UNIT III:

Attached Storage (NAS): components, protocol and operations, File level storage virtualization, **Object based and unified storage**: Devices, Content-Address Storage (CAS), CAS use cases, unified storage.

Introduction to Business Continuity: information availability, Business Continuity (BC) terminologies, planning, failure and impact analysis, BC technology solutions.

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COMPUTER SCIENCE AND ENGINEERING

UNIT IV:

Backup and Archive: purpose, considerations, granularity. Recovery - methods, targets and topologies, Data deduplication and backup in virtualized environment, archiving solution architecture.

Local Replication: replication terminology and consistency. Local replication technology, local replication in virtual environments.

UNIT V:

Remote replication: remote replication methods and technologies, three-site remote replication and data migration.

Cloud Computing: Characteristics and benefits

Cloud computing, definition, characteristics and benefits. Cloud service and deployment models, Cloud infrastructure components, Cloud challenges.

UNIT VI:

Securing the Storage Infrastructure: framework and domains of storage security along with covering security, implementation at storage networking. Security threats, and countermeasures in various domains Security solutions for FC-SAN, IP-SAN and NAS environments, Security in virtualized and cloud environments.

Managing the Storage Infrastructure: Monitoring and managing various information infrastructure components in classic and virtual environments, Information lifecycle management (ILM) and storage tiering, Cloud service management activities.

TEXT BOOKS:

1. Information Storage and Management**,**2^nd edn.Author :EMC Education Services, Publisher: India edn., (2012). ISBN: 9781118094839
   {Unit-I: Chps 1-3, Unit-II: Chps 4-6, Unit III: Chps 7-9, Unit IV: Chps 10-11, Unit V: Chps 12-13, Unit VI: Chps 14-15}

REFERENCE BOOKS:

1. Storage Virtualization**,** Author: Clark Tom, Publisher: Addison Wesley Publishing Company ISBN : 9780321262516

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COMPUTER SCIENCE AND ENGINEERING

III B.Tech. II-Sem (CSE)

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(A0529156) PARALLEL PROCESSING
(Department Elective –2/MOOCs)

OBJECTIVES:
- ❖ Implicit Parallelism Computing Platforms, Mapping Techniques
- ❖ Building blocks, Principles of Message-Passing Programming
- ❖ Dense Matrix Algorithms, Sorting, Graph Algorithms.

OUTCOMES:
- ❖ Students can able to Gain knowledge on parallel computing.
- ❖ Students will be able to Identify and understand various algorithms helpful in parallel computing.
- ❖ Students can understand the Issues in Sorting on parallel Computers
- ❖ To Understand Models of and issues in Concurrency in Computing
- ❖ To develop message –passing parallel programs using MPI

CO-PO MAPPING:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO 1	PSO 2	PSO 3
CO1	3			1	1	2					1		2		
CO2	2	1			2	2				1				2	
CO3										2					1
CO4					1					1	2		1		
CO5										1					2

UNIT-I: Parallel Programming Platforms
Implicit Parallelism: Trends in Microprocessor Architectures - Limitations of Memory System Performance - Dichotomy of Parallel Computing Platforms - Physical Organization of Parallel Platforms -Communication Costs in Parallel Machines - Routing Mechanisms for Interconnection Networks - Impact of Process-Processor Mapping and Mapping Techniques.

UNIT-II Principles of Parallel Algorithm Design algorithms
Preliminaries - Decomposition Techniques - Characteristics of Tasks and Interactions - Mapping Techniques for Load Balancing - Methods for Containing Interaction Overheads - Parallel Algorithm Models

UNIT-III Basic Communication Operations, algorithms
One-to-All Broadcast and All-to-One Reduction - All-to-All Broadcast and Reduction - All-Reduce and Prefix-Sum Operations - Scatter and Gather - All-to-All Personalized Communication - Circular Shift - Improving the Speed of Some Communication Operations

UNIT-IV Analytical Modeling of Parallel Programs
 Sources of Overhead in Parallel Programs - Performance Metrics for Parallel Systems - Effect of Granularity and Data Mapping on Performance - Scalability of Parallel Systems - Minimum Execution Time and Minimum Cost-Optimal Execution Time - Asymptotic Analysis of Parallel Programs - Other Scalability Metrics

UNIT-V Programming Using the Message Passing Paradigm
 Principles of Message-Passing Programming - The Building Blocks: Send and Receive Operations - MPI: The Message Passing Interface - Topologies and Embedding - Overlapping Communication with Computation - Collective Communication and Computation Operations - Groups and Communicators

Programming Shared Address Space Platforms Thread Basics
Why Threads? - The POSIX Thread Application Programmer Interface - Synchronization Primitives in POSIX - Controlling Thread and Synchronization Attributes - Thread Cancellation - Composite Synchronization Constructs

UNIT-VI
Dense Matrix Algorithms- Matrix-Vector Multiplication - Matrix-Matrix Multiplication
Sorting-Issues in Sorting on Parallel Computers -Sorting Networks - Bubble Sort and its Variants - Quick sort
Graph Algorithms- Definitions and Representation - Minimum Spanning Tree: Prim's Algorithm - Single-Source Shortest Paths: Dijkstra's Algorithm - All-Pairs Shortest Paths

TEXTBOOKS:
1. Introduction to Parallel Computing Ananth Grama, Anshul Gupta, George Karypis, Vipin Kumar - Pearson Publication
2. Introduction to Parallel Processing M. SasiKumar, Dinesh Shikhare P.Raviprakash - PHI Publication

REFERENCES:
1. Introduction To Parallel Programming Steven Brawer
2. Introduction To Parallel Processing M.Sasikumar, Dinesh Shikhare And P. Ravi Prakash
3. Parallel Computers – Architecture And Programming V. Rajaraman And C. Siva Ram Murthy

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III B.Tech. II-Sem (CSE)

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3+1*	3

(A0530156) ADVANCED COMPUTER ARCHITECTURE
(Department Elective –2/MOOCs)

OBJECTIVES:
- ❖ A broad understanding of computer architecture.
- ❖ To the extent possible, an understanding of the current state-of-the-art in uni-processor computer architecture.
- ❖ Study how to use technology to build the best computer/processor.
- ❖ To know different levels of parallelism.
- ❖ Issues in interconnection of networks and cluster design.

OUTCOMES:
Upon completion of this course, a student should have developed:
- ❖ Broad understanding of the design of computer systems, including modern architectures and alternatives.
- ❖ Understanding of the interaction amongst architecture, applications and technology.
- ❖ Understanding of a framework for evaluating design decisions in terms of application requirements and performance measurements.
- ❖ A historical perspective on computer system design.
- ❖ Develop applications for high performance computing systems.

CO-PO MAPPING:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO 1	PSO 2	PSO 3
CO1		1	3						2				1	3	3
CO2			2	3	1					2			3	1	2
CO3	3	2	1								1		1	2	3
CO4			3	2					2			1	1	3	1
CO5					3						2	1	2	3	1

UNIT -I

Fundamentals of computer design-Technology Trends, Cost , Measuring and reporting performance, Quantitative principles of computer design.

UNIT -II

Instruction set principle and examples-Classifying instruction set, Memory addressing, Addressing modes for signal processing, Operations in the instruction set, Instructions for control flow, encoding an instruction set, the role of the compiler.

UNIT –III

Instruction level parallelism-Over coming data hazards, Reducing branch costs, High performance instruction delivery, Hardware based speculation, Compiler techniques, Static branch prediction, H.W. vs S.W solutions, Limitations of ILP

UNIT –IV

Memory hierarchy design-Cache performance, Reducing cache miss penalty and miss rate, Virtual memory, Protection and examples of virtual memory.

UNIT –V

Multi processors and thread-level parallelism-symmetric shared memory architectures , Distributed -shared memory architectures, Synchronization, Multi-threading .

UNIT –VI

Storage systems Types of Storage Devices, RAID, Errors and failures in real time systems,

Interconnection Networks-: Interconnection network media, Practical issues for commercial interconnection of networks, Clusters, Designing a cluster.

TEXT BOOK:
1. Computer Architecture A quantitative approach 3rd edition John L. Hennessy & David A. Patterson Morgan Kufmann (An Imprint of Elsevier)

REFERENCES:
1. "Computer Architecture and parallel Processing" Kai Hwang and A.Briggs International Edition McGraw-Hill.
2. Advanced Computer Architectures, Dezso Sima, Terence Fountain, Peter Kacsuk, Pearson.

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3+1*	3

(A0531156) DISTRIBUTED SYSTEMS
(Department Elective–2/MOOCs)

OBJECTIVES:
- ❖ Present the principles underlying the functioning of distributed systems;
- ❖ Create an awareness of the major technical challenges in distributed systems design and implementation;
- ❖ Expose students to modern and classic technology used in distributed systems and their software;
- ❖ Provide experience in the implementation of typical algorithms used in distributed systems

OUTCOMES:
After completing this course the student will be able to:
- ❖ Explain what a distributed system is, why you would design a system as a distributed system.
- ❖ List the desired properties of distributed systems.
- ❖ List the principles underlying the functioning of distributed systems
- ❖ Describe the problems and challenges associated with principles, and evaluate the effectiveness and shortcomings of their solutions.
- ❖ Recognise how the principles are applied in contemporary distributed systems and explain how they affect the software design, and be able to identify features and design decisions that may cause problems

CO-PO MAPPING:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO 1	PSO 2	PSO 3
CO1		2	2		3								3	1	
CO2					2				1	2				2	1
CO3	1	3	1											2	2
CO4			1					1	2		2	1		2	2
CO5		1	1		2					2		1	1	1	2

UNIT I
INTRODUCTION: What is Distributed System? Goals: Advantages of Distributed Systems over Centralized Systems, Advantages of Distributed Systems over Independent PCs, Disadvantages of Distributed Systems, Hardware Concepts, Design Issues: Transparency, Flexibility, Reliability, Performance, Scalability.
Communication in Distributed Systems I: Layered Protocols.

UNIT II
Communication in Distributed Systems II: The Client Server Model: Clients and servers, Addressing, Blocking Versus Nonblocking Primitives, Buffered versus Unbuffered Primitives, Reliable versus Unreliable Primitives, Implementing the Client-Server Model, Remote Procedure call, Group Communication.

UNIT III
Synchronization in Distributed Systems: Clock synchronization, Mutual Exclusion: A centralized Algorithm, A Distributed Algorithm, A Token Ring Algorithm, A comparison of three algorithms, Election Algorithms: The Bully Algorithm, A Ring Algorithm, Atomic Transactions, Deadlocks in Distributed systems.

UNIT IV
Processes and Processors in Distributed Systems: Threads, System Models, Processor Allocation, Scheduling in Distributed Systems, Fault Tolerance, Real-Time Distributed Systems: What is a Real-Time System? Design Issues, Real-Time Communication, Real-Time Scheduling.

UNIT V
Distributed File Systems and Shared Memory: Distributed File System Design: The File Service Interface, The Directory Service Interface, Semantics of File Sharing, Distributed File System Implementation: File

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Usage, System Structure, Caching, Replication, What is Shared Memory? Page-Based Distributed Shared Memory.

UNIT VI

CASE STUDY 1 AMOEBA: Introduction to AMOEBA, Objects and Capabilities, Process Management, Memory Management, Communication.

CASE STUDY 2 MACH: Introduction to MACH, Process management, Memory Management, Communication.

TEXT BOOKS:

1. Distributed Operating Systems, A.S.Tanenbaum, Pearson Education.

REFERENCES:

1. Distributed Systems Concepts and Design, G Coulouris, J Dollimore and T Kindberg, Fourth Edition, Pearson Education
2. Distributed Operating Systems Concepts and Design, Pradeep K.Sinha, PHI.
3. Advanced Concepts in Operating Systems, M Singhal, N G Shivarathri, Tata McGraw-Hill Edition.
4. Reliable Distributed Systems, K.P.Birman, Springer.
5. Distributed Operating Systems and Algorithm Analysis,R.Chow, T.Johnson,Pearson.

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COMPUTER SCIENCE AND ENGINEERING

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                                                                                     1+2*   1

(A0586156) SCI LAB (SKILL DEVELOPMENT COURSE)

OBJECTIVES:
- ❖ To provide knowledge on SCI lab environment.
- ❖ To provide knowledge on SCI lab workspace and working directory.
- ❖ To provide knowledge on matrices, graphs SCI lab functions.

OUTCOMES:
- ❖ Gains knowledge on SCI lab.
- ❖ Understands the SCI lab workspace and working directory.
- ❖ Able to do polynomial problems and matrices operations.
- ❖ Understand SCI lab programming language constructs
- ❖ Understand SCI lab functions and file operations
- ❖ Understand loading of data files into SCI and dtat structuresStudent will be able to do Statistical problems

CO-PO MAPPING:

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

UNIT - I
Scilab environment
Scilab as an interactive calculator

UNIT-II
Scilab workspace and working directory
Creating matrices and some simple matrix operations

UNIT-III
Sub-matrices
Statistics
Working with polynomials

UNIT-IV
Plotting graphs
Scilab programming language
Script files and function files

UNIT-V
Writing Scilab functions
File operations

UNIT-VI
Reading Microsoft Excel files
Data Structures

TEXT BOOKS:
1. Scilab - A Hands on Introduction from Lulu

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	3	2

(A0584156) WEB TECHNOLOGIES LAB

OBJECTIVE :
- ❖ To create a fully functional website with mvc architecture. To develop an online Book store using we can sell books (Ex amazon .com).

OUTCOMES:
- ❖ To gain knowledge on designing static and dynamic web pages.
- ❖ Able to validate web pages at client-side.
- ❖ Design and validate XML documents.
- ❖ Gain knowledge on server side scripting.
- ❖ To develop a business application using STRUTS.

Hardware and Software required:
- ❖ A working computer system with either Windows or Linux
- ❖ A web browser either IE or firefox
- ❖ Tomcat web server and Apache web server
- ❖ XML editor like Altova Xml-spy [www.Altova.com/**XML**Spy – free] , Stylusstudio , etc.,
- ❖ A database either Mysql or Oracle
- ❖ JVM(Java virtual machine) must be installed on your system
- ❖ BDK(Bean development kit) must be also be installed

CO-PO MAPPING:

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

Week-1:

Design the following static web pages required for an online book store web site.

1) HOME PAGE:

The static home page must contain three **frames**.

Top frame: Logo and the college name and links to Home page, Login page, Registration page,

Catalogue page and Cart page (the description of these pages will be given below).

Left frame: At least four links for navigation, which will display the catalogue of respective links.

For e.g.: When you click the link **"CSE"** the catalogue for **CSE** Books should be displayed in the Right frame.

Right frame: The *pages to the links in the left frame must be loaded here*. Initially this page contains description of the web site.

Logo	Web Site Name			
Home	Login	Registration	Catalogue	Cart
CSE ECE EEE CIVIL	Description of the Web Site			

Fig 1.1

2) LOGIN PAGE:

This page looks like below:

Logo	Web Site Name			
Home	Login	Registration	Catalogue	Cart

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CSE ECE EEE CIVIL	Login : _____
	Password: _____
	Submit Reset

3) CATOLOGUE PAGE:

The catalogue page should contain the details of all the books available in the web site in a table.

The details should contain the following:

1. Snap shot of Cover Page.

2. Author Name.

3. Publisher.

4. Price.

5. Add to cart button.

Logo	Web Site Name			
Home	Login	Registration	Catalogue	Cart
CSE ECE EEE CIVIL		Book : XML Bible Author : Winston Publication : Wiely	$ 40.5	Add to cart
		Book : AI Author : S.Russel Publication : Princeton hall	$ 63	Add to cart
		Book : Java 2 Author : Watson Publication : BPB publications	$ 35.5	Add to cart
		Book : HTML in 24 hours Author : Sam Peter Publication : Sam publication	$ 50	Add to cart

Week-2:

4) CART PAGE:

The cart page contains the details about the books which are added to the cart.

The cart page should look like this:

Logo	Web Site Name			
Home	Login	Registration	Catalogue	Cart
CSE	Book name	Price	Quantity	Amount
ECE	Java 2	$35.5	2	$70
EEE	XML bible	$40.5	1	$40.5
CIVIL	Total amount - $130.5			

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5) REGISTRATION PAGE:

Create a "*registration form* "with the following fields

1) Name (Text field) 2) Password (password field)

3) E-mail id (text field)

4) Phone number (text field)

5) Sex (radio button)

6) Date of birth (3 select boxes)

7) Languages known (check boxes – English, Telugu, Hindi, Tamil)

8) Address (text area)

WEEK 3:

VALIDATION:

6) Write *JavaScript* to validate the following fields of the above registration page.

1. Name (Name should contains alphabets and the length should not be less than 6 characters).

2. Password (Password should not be less than 6 characters length).

3. E-mail id (should not contain any invalid and must follow the standard pattern (name@domain.com)

4. Phone number (Phone number should contain 10 digits only).

Week-4:

7) Design a web page using **CSS (C**ascading **S**tyle **S**heets**)** which includes the following:

1) Use different font, styles:

In the style definition you define how each selector should work (font, color etc.). Then, in the body of your pages, you refer to these selectors to activate the styles.

For example:

```
<HTML>
<HEAD>
<style type="text/css">
B.headline {color:red; font-size:22px; font-family:arial; text-
decoration:underline}
</style>

</HEAD>

<BODY>
<b>This is normal bold</b><br>
Selector {cursor:value}

For example:

<html>
<head>
<style type="text/css">
.xlink {cursor:crosshair}
.hlink{cursor:help}
</style>
</head>

<body>
<b>
<a href="mypage.htm" class="xlink">CROSS LINK</a>
<br>
<a href="mypage.htm" class="hlink">HELP LINK</a>
```

```
</b>
</body>
</html>


<b class="headline">This is headline style bold</b>
</BODY>


</HTML>
```

2) Set a background image for both the page and single elements on the page.

You can define the background image for the page like this:

```
BODY {background-image:url(myimage.gif);}


```

3) Control the repetition of the image with the background-repeat property.

As background-repeat: repeat Tiles the image until the entire page is filled, just like an ordinary background image in plain HTML.

4) Define styles for links as

> A:link
> A:visited
> A:active
> A:hover

Example:

```
<style type="text/css">
        A:link {text-decoration: none}
        A:visited {text-decoration: none}
        A:active {text-decoration: none}
        A:hover {text-decoration: underline; color: red;}
</style>
```

Week-5:

8) Write an XML file which will display the Book information which includes the following:

1) Title of the book

2) Author Name

3) ISBN number

4) Publisher name

5) Edition

6) Price

9) Write a Document Type Definition (DTD) to validate the above XML file.

10) Display the XML file as follows.

The contents should be displayed in a table. The header of the table should be in color GREY. And the Author names column should be displayed in one color and should be capitalized and in bold. Use your own colors for remaining columns.

Use XML schemas XSL and CSS for the above purpose.

Week-6:

11) Install TOMCAT web server and APACHE.

While installation assign port number 4040 to TOMCAT and 8080 to APACHE. Make sure that these ports are available i.e., no other process is using this port.

12) Access the above developed static web pages for books web site, using these servers by putting the web pages developed in week-1 and week-2 in the document root.

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Access the pages by using the urls : http://localhost:4040/rama/books.html (for tomcat)

http://localhost:8080/books.html (for Apache)

Week-7:

13) **User Authentication:** Write a Servlet which does the following job: Insert the details of the 3 or 4 users who register with the web site (week9) by using registration form. Authenticate the user when he submits the login form using the user name and password from the database

Week-8:

14) Install a database(Mysql or Oracle).

Create a table which should contain at least the following fields: name, password, email-id, phone number(these should hold the data from the registration form).

Practice 'JDBC' connectivity.

15) Write a java program/servlet/JSP to connect to that database and extract data from the tables and display them. Experiment with various SQL queries.

Insert the details of the users who register with the web site, whenever a new user clicks the submit button in the registration page (week2).

Week-9:

16) **Write a JSP which does the following job:** Insert the details of the 3 or 4 users who register with the web site (week9) by using registration form. Authenticate the user when he submits the login form using the user name and password from the database

Week-10:

17) Assume four users user1,user2, user3 and user4 having the passwords, pwd2,pwd3 and pwd4 respectively. Write a servlet for doing the following.

Create a Cookie and add these four user id's and passwords to this Cookie

Week-11:

18) Create and Run struts application and validate it using struts components.

REFERENCES:

1. HTML Black Book – Steve Holzner.
2. The complete Reference Java 2 Fifth Edition by Patrick Naughton and Herbert Schildt. TMH
3. Java Server Pages –Hans Bergsten, SPD O'Reilly

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(A0594155) C# & .NET FRAMEWORK LAB
(COMMON TO CSE & IT)

OBJECTIVE:
- ❖ The student will gain knowledge in the concepts of the .NET framework as a whole and the technologies that constitute the Framework.
- ❖ The student will gain programming skills in C# both in basic and advanced levels.
- ❖ By building sample applications, the student will get experience and be ready for large-scale projects.

OUTCOMES:
- ❖ Write, compile and debug programs in C# language.
- ❖ To learn the basics of object oriented programming.
- ❖ To get knowledge of windows programming.
- ❖ To get knowledge on server side programming.
- ❖ To gain knowledge on web services and dynamic link libraries.

CO-PO MAPPING:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO 1	PSO 2	PSO 3
CO1	1	1	1	1	2	1			1	1		2	2	2	2
CO2	2	2	1	1	2				1		1	2	1	2	1
CO3	2	2	2	2	2	1			2			2	1	1	1
CO4	2	2	1	1	3				1	1		2		2	1
CO5	2	2	2	2	2	1			2			1	1	2	2

LAB-1
1. Write a program to C# to find the smallest single digit factor for a given value.
2. Write a program in C# to print a number if it is prime; otherwise display the largest factor of that number.
3. Write a program in C# to find the magnitude of a number.

LAB-2
4. Write a C# program for addition and multiplication of two matrices.
5. Write a C# program to display the digits of an integer in words.
6. Write a C# program to which reads a set of strings into the rows a two dimensional array and then prints the string having more number of vowels..

LAB-3
7. Write a C# programs to demonstrate the concepts of Structures and Enumerations.
8. Write a C# programs to demonstrate the concepts of Constructors and Inheritance.
9. Write a C# programs to demonstrate the concepts of Polymorphism.

LAB-4
10. Write a C# programs to demonstrate the concepts of Partial classes and Extension methods.
11. Write a C# programs to demonstrate the concepts of Delegates.

LAB-5
12. Write a C# programs to demonstrate the concepts of Label, Text Box and Button controls.
13. Write a C# programs to demonstrate the concepts of Combo Box and List Box controls.

LAB-6
14. Create a Windows application in C# for registration form and fill the details and when you click the submit button it display the details in the message box.
15. Create a Windows application in C# having two text boxes and three buttons named as factorial, prime, factorial series. When you click any button the resultant value will be displayed on the second textbox.

LAB-7
16. Create a ADO.NET application in C# to verify if the connection is established with OLEDB and MS-ACCESS.
17. Create a ADO.NET applications in C# to demonstrate the Data Reader, Data Set, Data Adapter and Data View Objects.

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LAB-8
18. Develop the Static Web pages using HTML and some validations along with Java Script.
19. Design an ASP.NET Webpage to demonstrate the Label, Button and Textbox controls.

LAB-9
20. Design an ASP.NET Webpage to work with Cross page and Post back Submissions.
21. Design an ASP.NET Webpage to work with Dropdown list and ListBox controls.

LAB-10
22. Develop a Registration Form with all Validation Controls.
23. Create a Web Service for all Arithmetic operations.

LAB-11
24. Write a C# program to implement Assemblies.
25. Write a C# program to implement Multi Threading and Thread Synchronization.

REFERENCES:
1. Programming in C#, E. Balagurusamy, Tata McGraw-Hill, 2004.
2. Programming C#, J. Liberty, 2nd Edition., O'Reilly, 2002.
3. C# and the .NET Platform, Andrew Trolesen, 2nd Edition, Dreamtech Press
4. Sams Teach Yourself the C# Language in 21 Days', Bradley L Jones, 1st edition, 2001.

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		3	2

(A0585156) ANDROID PROGRAMMING LAB

OBJECTIVES:
- ❖ Understand how Android applications work, their life cycle, manifest, Intents, and using external resources
- ❖ Design and develop useful Android applications with compelling user interfaces by using, extending, and creating yourown layouts and Views and using Menus.
- ❖ Secure, tune, package, and deploy Android applications
- ❖ Use Android's communication APIs for SMS, telephony, network management, and internet resources (HTTP).

OUTCOMES:
- ❖ Display proficiency in coding on a mobile programming platform.
- ❖ Understand the limitations and features of developing for mobile devices.
- ❖ Creating a complete Mobile app with a significant programming component, involving the sensors and hardware features of the phone.
- ❖ Practice existing state of mobile app development via researching existing apps, meeting with industry professionals, and formulating new ideas.
- ❖ Display proficiency in coding on a mobile programming platform.
- ❖ Good knowledge of economics and features of the app marketplace by offering the app for download.

CO-PO MAPPING:

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

EXPERIMENTS:

1. a) Create an android application to display RGMCET Text Message.
   b) Create an android application to display RGMCET Message by using Button.

2. Create an android application to call different activities by using Implicit and Explicit Intents.

3 a) Create an android application to select item from given list by using AutoCompleteTextView (ACTV).
   b) Create an android application to display dropdown menu items and pick one item by using Spinner Component.

4 a) Create an android application to display internal storage data using Array Adapter.
   b) Create an android application to display internal storage data in vertical format by using Custom Adapter.

5. Create an android application to display WhatsApp videos in grid view by using Custom Adapter.

6. Create an android application to display webpage by using Web view   Component.

7. Create an android application to display different webpages in fragments by using Fragments Component.

8. Create an android application to store the data by using Shared Preferences.

9. Create an android application to demonstrate concept of SQLite Database Storage method.

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10. Create an android application to perform different types of operations
    (Send SMS, Making call and sending email) by using Telephony app.

11. Write an android program to develop Media player application.

12 a) Write an android program to develop Video view application
    b) Write an android program to develop Audio Recording application.

13 a) Write an android program to develop Video Recording application.
    b) Write an android program to develop Camera and Gallery application.

14 a) Create an android application to get latitude and longitude value by using
       Location Service.
    b) Create an android application to display X, Y Sensor values by using Sensor
       Service.

15 a) Create an android application to get the notifications on Notification Bar by Using
       Notification Service.
    b) Create an android application to display available Wi-Fi devices and Paired
       Wi-Fi devices by using Wi-Fi Service.

16 a) Create an android application to get the Bluetooth devices and list of devices using

    Bluetooth and Vibrator Service.

    b) Create an android application to get the System Announcements by using Broadcast

       Receiver.

17. Create an android application to share the data between multiple applications by using

    Content Provider.

18. Create an android application to display different Dialog Boxes.

19. Create an android application to display current location on Google maps by using

    Google-Maps Service.

REFERENCES:

1. Android Application Development (with Kitkat Support), Black Book by Pradeep Kothari.

2. Beginning Android 4 Application Development by Wei-Meng Lee.
3. Android Application Development for Dummies by Michael Burton

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(A0532157) COMPUTER GRAPHICS

OBJECTIVES:

This course is designed to provide a comprehensive introduction to computer graphics leading to the ability to understand contemporary terminology, progress, issues, and trends.

- ❖ The interdisciplinary nature of computer graphics is emphasized in the wide variety of examples and applications.
- ❖ Course material is structured to meet the needs of both designers and users of interactive computer graphics systems
- ❖ Provide an understanding of how a computer draws the fundamental graphics primitives - lines and filled polygons in both 2-D and 3-D.
- ❖ Understand the fundamental mathematics involved in generating a 3-D scene. Includes coordinate systems, transformations, and vector operations.
- ❖ Understand the 3-D graphics pipeline, i.,e. the steps taken to transform and draw an object. This includes 3-D transformations, lighting and shading, rasterization and texture mapping. Programmable shaders will be introduced.
- ❖ A thorough introduction to computer graphics techniques, focusing on 3D modelling, image synthesis, and rendering. Topics cover: geometric transformations, geometric algorithms, software systems (OpenGL), 3D object models (surface, volume and implicit), visible surface algorithms, image synthesis, shading and mapping, ray tracing, radiosity, global illumination, photon mapping, and anti-aliasing.
- ❖ Apply knowledge gained in a series of exercises using OpenGL that demonstrate the fundamental principles of computer graphics. A functional scene graph will be developed to render 3-D scenes with lighting, texture mapping, and a variety of 3-D objects

OUTCOMES:

- ❖ Be familiar with drawing primitive objects (lines, circles, polygons) on a display.
- ❖ Students will demonstrate an understanding of contemporary graphics hardware.Be exposed to graphical input and output devices
- ❖ Master 2D & 3D modelling and transformations.
- ❖ Be familiar with projection of 3-D objects on a 2-D plane.
- ❖ Master clipping, fill, and rendering techniques and be exposed to color and shading models.
- ❖ Understand the concepts of Animation techniques and languages

CO-PO MAPPING:

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

UNIT I

A Survey of Computer Graphics: Overview of graphics systems: Video-Display Devices, Raster-scan Systems, Random-scan Systems, Graphics Monitors and Work stations, Input devices, Hardcopy Devices and Graphics Software.

UNIT II

Output Primitives: Points and lines, Line drawing algorithms- DDA, Bresenhams line algorithm, Circle generation algorithm and Ellipse Generating algorithms.

UNIT III

2-D Geometrical transforms: Basic Transformations, Matrix representations and Homogeneous coordinates, Composite transforms, Other Transformations, Transformations between coordinate systems.

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UNIT IV
2-D Viewing: Definition of view port, clipping and window. The Viewing Pipeline, Viewing coordinate reference frame, Window to View-port coordinate transformation, 2D Viewing functions, Clipping Operation, Point Clipping, Line Clipping: Cohen-Sutherland and Liang - Barsky line clipping algorithms, Polygon Clipping: Sutherland – Hodgeman polygon clipping algorithm.

UNIT V
3-D Geometric and Modelling Transformations: Translation, Rotation, Scaling, other Transformations, Composite Transformations.

UNIT VI
3-D viewing: Viewing Pipeline, Viewing coordinates, Projections.
Computer Animation: Design of Animation Sequence, General Computer Animation functions, Raster Animation, Computer Animation Languages, Key-Frame systems, Motion Specifications.

TEXT BOOKS:
1. "Computer Graphics C version", Donald Hearn and M. Pauline Baker, Pearson education.

REFERENCES:
1. "Computer Graphics Principles & practice", second edition in C, Foley, VanDam, Feiner and Hughes, Pearson Education.
2. "Computer Graphics Second edition", Zhigand xiang, Roy Plastock, Schaum's outlines, Tata Mc Graw hill edition.
3. "Procedural elements for Computer Graphics", David F Rogers, Tata Mc Graw hill, 2nd edition.
4. "Principles of Interactive Computer Graphics", Neuman and Sproul, TMH.
5. "Principles of Computer Graphics", Shalini, Govil-Pai, Springer.
6. "Computer Graphics", Steven Harrington, TMH

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                                                               3+1*   3

(A1217156) SOFTWARE TESTING METHODOLOGIES AND TOOLS
(Common to CSE & IT)

BACKGROUND:

Software testing is an integral and important activity in every software development environment. Software seems to have has permeated almost every equipment that we use in our daily lives.This course is designed to enable a clear understanding and knowledge of the foundations, techniques, and tools in the area of software testing and its practice in the industry. The course will prepare students to be leaders in software testing. Whether you are a developer or a tester, you must test software. This course is a unique opportunity to learn strengths and weaknesses of a variety of software testing techniques.

OBJECTIVES:

Upon successful completion of this course students will be able to:
- ❖ Understand the basic concepts of software testing.
- ❖ Understand the various techniques and strategies of software testing and inspection and pointing out the importance of testing in achieving high-quality software.
- ❖ Perform effective and efficient structural testing of software.
- ❖ Integrate and test the various units and components of a software system.
- ❖ Perform effective and efficient functional testing of software.
- ❖ Select the appropriate tests to regression test your software after changes have been made.
- ❖ Plan, track and control the software testing effort.
- ❖ Understand the need of automated testing tools and various kinds of automated testing tools.

OUTCOMES:
- ❖ To understand the Purpose , consequences and taxonomy of bugs.
- ❖ To demonstrate path testing and its applications.
- ❖ To have an ability to apply data flow testing strategies.
- ❖ To understand the concepts logic base testing and kv charts.
- ❖ To construct path expression and to detect anomalies
- ❖ To have an ability to understand graph matrices and able to perform manual and automation testing using various testing tools.

CO-PO MAPPING:

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

UNIT I :

Purpose of testing, Dichotomies, model for testing, consequences of bugs, taxonomy of bugs.

UNIT II:

Flow graphs and Path testing: Basics concepts of path testing, predicates, path predicates and achievable paths, path sensitizing, path instrumentation, application of path testing.

UNIT III:

Dataflow testing:-Basics of dataflow testing, strategies in dataflow testing, application of dataflow testing.

UNIT IV:

Logic Based testing: Overview, decision tables, path expressions, KV charts, and specifications

UNIT V:

Paths, Path products and Regular expressions: path products & path expression, reduction Procedure, applications, regular expressions & flow anomaly detection.

UNIT VI:

Graph Matrices and Application: Motivational overview, matrix of graph, relations, power of a matrix, node reduction algorithm, Overview of Some Commercial Testing Tools: Win Runner, Load Runner, QTP, Selenium

TEXT BOOKS:

1. Software testing techniques - Boris Beizer, 2nd Edition, Dreamtech.

REFERENCE BOOKS:

1. Software Testing in the Real World – Edward Kit, Pearson.
2. Effective methods of Software Testing, Perry, John Wiley.
3. Art of Software Testing – Meyers, John Wiley.
4. Software testing Tools – Dr.K.V.K.K.Prasad, Dreamtech.

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COMPUTER SCIENCE AND ENGINEERING

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                                 3+1*   3

(A0533157) DATA WAREHOUSING & MINING

OBJECTIVES:

The main objective of this course is to provide students

- ❖ With the basic data warehousing and data mining concepts
- ❖ To learn mining rules in large databases
- ❖ To get idea on clustering analysis
- ❖ Applications that can enable them to set up and manage an industrial data warehousing and data mining system.
- ❖ To learn about OLTP and OLAP systems

OUTCOMES:

Upon completion of the course students should:

- ❖ Ability to do Conceptual, Logical, and Physical design of Data Warehouses
- ❖ Familiarity with Requirements Engineering for Data Warehouses
- ❖ OLAP applications and OLAP deployment
- ❖ Have a good knowledge of the fundamental concepts that provide the foundation of data mining.
- ❖ Learn broad classes of data mining technologies
- ❖ Understand how these concepts are engineered to use some of the basic data mining tools.

CO-PO MAPPING:

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

UNIT – I

Introduction: What Motivated Data Mining? Why is it Important?; What is Data Mining?; Data Mining-On What Kind of Data?; Data Mining Functionalities: What kinds of Data Can be Mined?; Are all of Patterns Interesting?; Classification of Data Mining Systems; Data Mining task primitives;

Data Warehouse and OLAP Technology: What is a Data Warehouse?; A Multidimensional Data Model: From Tables and Spreadsheet to Data Cubes, Stars, Snowflakes and Fact constellation schemas for Multidimensional Databases, Measures: Their Categorization and Computation, Concept Hierarchies, OLAP operations in the Multidimensional Data Model; Data Warehouse Architecture: Steps for the Design and Construction of Data Warehouses, A three-tier Architecture.

UNIT-II

Data Pre-processing: Why pre-process the data; Descriptive Data Summarization: Measuring the Central Tendency, Measuring the Dispersion of Data, Graphic Displays of Basic Descriptive Data Summaries; Data Cleaning: Missing values, Noisy Data Cleaning as a process; Data Integration and Transformation: Data Integration, Data Transformation, Data Reduction: Data Cube aggregation, attribute subset selection; Dimensionality Reduction, Numerosity Reduction;

UNIT-III

Mining Frequent patterns, Associations, and Correlations: Basic Concepts; Efficient and Scalable Frequent Itemset Mining methods: The Apriori Algorithm, Generating Association Rules from Frequent Itemsets, Improving Efficiency of Apriori, Mining Frequent Itemsets without Candidate Generation; Mining various kinds of Association Rules: Mining multilevel & multi-dimensional association rules; From Association Mining to Correlation Analysis: Strong Rules are not necessarily Interesting, From Association analysis to Correlation analysis;

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UNIT-IV

Classification I: Overview of Classification and Prediction: What is Classification, What is prediction?; Issues Regarding Classification and Prediction: Preparing data for Classification and Prediction, Comparing Classification and Prediction Methods; Bayesian Classification: Bayes' theorem, Naïve Bayesian Classification; Classification by Decision Tree Induction: Decision Tree Induction, Attribute Selection Measures, Tree Pruning, Scalability and Decision Tree Induction; Rule-Based Classification: Using IF-THEN rules for Classification, Rule Extraction from Decision Tree, Rule Induction using a Sequential Covering Algorithm; Classification by Back propagation: A Multilayer Feed-Forward Neural Network, Defining Network Topology, Back propagation;

UNIT-V

Classification II and Prediction: Support Vector Machines: The Case when the Data are Linearly Separable, The Case when the Data are Linearly Inseparable; Lazy Learners: k-Nearest-Neighbour Classifiers, Case-Based Reasoning; Prediction: Linear Regression, Nonlinear Regression; Accuracy and Error Measures: Classifier Accuracy Measures, Predictor Error Measures; Evaluating the Accuracy of a Classifier or Predictor: Holdout Method and Random sub sampling, Cross validation, Bootstrap;

UNIT-VI

Cluster Analysis: Overview of Cluster Analysis; Types of data in Cluster Analysis: Interval-Scaled Variables, Binary Variables, Categorical, Ordinal, and Ratio-Scaled variables, Variables of Mixed Types; A Categorization of Major Clustering Methods; Partitioning Methods: Classical Partitioning Methods: k-Means and k-Medoids, Partitioning Methods in Large Databases: From k-Medoids to CLARANS; Hierarchical Methods: Agglomerative and Divisive Hierarchical Clustering, BIRCH, ROCK; Density-Based Methods: DBSCAN;Grid-Based Methods: STING; Model-Based Clustering Methods: Expectation-Maximization;

TEXT BOOKS:

1. Data Mining – Concepts and Techniques - Jiawei Han & Micheline Kamber Harcourt India, second Edition.

REFERENCES:

1. Data Mining Introductory and advanced topics–Margaret H Dunham, Pearson Education
2. Data Mining Techniques – Arun K Pujari, University Press.
3. Data Warehousing in the Real World – Sam Anahory & Dennis Murray. Pearson Edn Asia.
4. Data Warehousing Fundamentals – Paulraj Ponnaiah Wiley Student Edition
5. The Data Warehouse Life cycle Tool kit – Ralph Kimball Wiley Student Edition.

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(A1228157) CLOUD INFRASTRUCTURE AND SERVICES
(Common to CSE & IT)

OBJECTIVES:
- ❖ Explain the importance and benefits of Cloud computing and the need for its rapid adoption
- ❖ Explain roadmap for transformation from classic to cloud environment
- ❖ Identify and differentiate various infrastructure components of classic and virtualized data center
- ❖ Explain virtualization requirements and available tools at each layer of IT infrastructure
- ❖ Explain business continuity options in a virtualized environment
- ❖ Discuss effective cloud computing deployment model for businesses/IT organizations
- ❖ Perform detailed exploration of cloud products and services
- ❖ Describe infrastructure framework and service management activities in Cloud computing
- ❖ Understand and address security concerns commonly found in Cloud computing environments
- ❖ Formulate high-level cloud migration strategy and best practices

OUTCOMES:

Upon successful completion of this course, participants should be able to:
- ❖ Explain the phases of transition from classic data center to virtual data center and then to the Cloud
- ❖ Describe virtualization technology at server, storage, network, desktop, and application layers of IT infrastructure
- ❖ Explain the key characteristics, services, and deployment models of Cloud
- ❖ Describe the Cloud infrastructure components and service management processes
- ❖ Describe Cloud security concerns and solutions
- ❖ List the key considerations for migration to the Cloud

CO-PO MAPPING:

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

UNIT I:

Journey to the Cloud: This unit focuses on the business drivers, definition, essential characteristics, and phases of journey to the Cloud. Business drivers for Cloud computing, Definition of Cloud computing, Characteristics of Cloud computing as per NIST, Steps involved in transitioning from Classic data center to Cloud computing environment.

UNIT II:

Classic Data Center (CDC); This unit focuses on the key elements of CDC – compute, storage, and network, with focus on storage networking, business continuity, and data center management. Application, DBMS, Compute, Storage and Networking, Object based and Unified storage technologies, Business continuity overview and backup, Replication technologies, CDC Management.

UNIT III:

Virtualized Data Center (VDC) – Compute and Storage: VDC Compute: compute aspect of the VDC, fundamental concepts of compute virtualization and techniques, virtual machine (VM) components and management of compute resources, process to convert physical machine to VM.

VDC Storage: storage virtualization implementation, key underlying technologies, methods for providing virtual storage to compute systems in a VDC environment.

UNIT IV:

Virtualized Data Center (VDC) – Networking and desktop applications: VDC Networking: network virtualization in VDC, VDC network infrastructure and components, virtual LAN, and virtual SAN. key network traffic management techniques.

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VDC Desktop and Application: the various aspects of desktop and application virtualization technologies. Business Continuity in VDC: concepts and techniques employed for ensuring business continuity, mechanisms to protect single point of failure, various technology options for backup, replication, and migration of VMs and their data, various options for recovering from total site failure due to a disaster.

UNIT V:

Cloud Computing and Infrastructure: Cloud Computing Primer: essential characteristics of Cloud Computing, Cloud services and deployment models, the economics of Cloud.

Cloud Infrastructure and Management: Cloud infrastructure components, Cloud service creation processes. Cloud service management processes, delivery of Cloud services is aligned with business objectives, expectations of Cloud service consumers.

Unit VI:

Cloud Security and Migration to cloud: Cloud Security: Security concerns and counter measures in a VDC and Cloud environment, Key security concerns and threats, infrastructure security mechanisms in VDC and cloud environments, access control, identity management, governance, cloud security best practices.

Cloud Migration Considerations: considerations for migration to the cloud, details 'cloud models' suitable for different categories of users, governance, risk and compliance aspects in Cloud, considerations for choosing applications suitable for Cloud, different phases to adopt the Cloud.

TEXT BOOKS:

1. **Cloud Computing: A Practical Approach** Author:Anthony T. Velte, Publisher: Tata Mcgraw Hill Education Private Limited (2009), ISBN: 0070683514

REFERENCE BOOKS:

1. **Cloud Computing For Dummies** Author: Halper Fern, Kaufman Marcia, Bloor Robin, Hurwit Judith, Publisher: Wiley India Pvt Ltd (2009), ISBN: 8126524871

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(A1232157) HUMAN COMPUTER INTERACTION (OPEN ELECTIVE-I)
(Common to CSE & IT)

OBJECTIVES:
1. To expose students to the central concepts of Human-Computer Interaction.
2. Establish target users, functional requirements, and interface requirements for a given computer application.
3. Describe and explain user interface design principles, and apply them to designing an interface.
4. Evaluate user interface designs through usability inspection and user models.
5. Develop user studies and analyze study data to gain information about users, tasks, and interface designs.

OUTCOMES:
The Student will be able to:
❖ Apply HCI principles and a user-centered approach to interaction design.
❖ Student can analyze user needs and requirements.
❖ They can able to Design and develop prototypes based on user assessments (needs and requirements), while applying HCI principles and models.
❖ Apply evaluation and usability testing methods to interactive products to validate design decisions.
❖ Categorize, design and develop information in proper architectural structures.
❖ Create interface design prototypes based on a range of design principles and user data, and user assessments.

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

UNIT I:
Introduction: Importance of user Interface – definition, Importance of good design. Benefits of good design.A brief history of Screen design.

UNIT II:
The graphical user interface – popularity of graphics, the concept of direct manipulation, graphical system, Characteristics, Web user – Interface popularity, characteristics- Principles of user interface.

UNIT III:
Design process – Understanding Human interaction with computers, Importance of human characteristics in design, Human consideration in Design, Human interaction speeds.

UNIT IV:
Screen Designing: Human Considerations in Screen Design – Interface Design Goals, Screen Meaning and purpose, organizing screen elements clearly and Meaningfully, Ordering of screen data and content – Screen navigation and flow – Visually pleasing composition – Amount of information – Focus and Emphasis – Presenting information simply and meaningfully – statistical graphics – Technological consideration in interface design.

UNIT V:
Windows: Select the Proper Kinds of Windows: Window Characteristics, Components of a Window, Window Presentation Styles, Types of Windows, Window Management, Window Operations. Select the Proper Device-Based Controls: Characteristics of Device-Based Controls, Selecting the Proper Device Based Controls.

UNIT VI:
Components: Choose the Proper Screen-Based Controls – Operable Controls, Text Entry, Selection Controls, Combination Entry/selection controls, Other Operable Controls, Custom Controls, and Presentation Controls. Write Clear Text and Messages – Words, Sentences, Messages and Text, Text for Web Pages. Icons, Multimedia, Color-What Is It? Color Uses, possible problems with colors, choosing colors.

TEXT BOOKS:
1. The essential guide to user interface design, Wilbert O Galitz, 3rd Edition, Wiley India, 2007.

REFERENCES:
1. Human – Computer Interaction. ALAN DIX, JANET FINCAY, GRE GORYD, ABOWD, RUSSELL BEALG, PEARSON.
2. Interaction Design PRECE, ROGERS, SHARPS. Wiley Dreamtech,
3. User Interface Design, Soren Lauesen , Pearson Education.

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(A1239158) SOFT COMPUTING (OPEN ELECTIVE – I)
(Common to CSE & IT)

OBJECTIVES:
1. Soft computing covers non-traditional technologies or approaches for solving hard real-world problems.
2. Content of course, in accordance with meaning of its name, is as follow: Tolerance of imprecision and uncertainty as the main attributes of soft computing theories, Neural networks and Fuzzy logic.
3. Healthy integration of all these techniques has resulted in extending the capabilities of thetechnologies to more effective and efficient problem solving methodologies.

OUTCOMES:
1. To familiarize with soft computing concepts.
2. The student will be able to acquire knowledge of soft computing theories fundamentals.
3. They can understand the concepts of Genetic algorithm and its applications to soft computing using some applications.
4. Apply fuzzy logic and reasoning to handle uncertainty and solve engineering problems.
5. Apply genetic algorithms to combinatorial optimization problems.
6. Apply neural networks to pattern classification and regression problems.

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

UNIT I
Introduction to Intelligent Systems and Soft Computing.: Introduction, Intelligent systems, Knowledge-based systems, Knowledge representation and processing, soft computing

UNIT II
Fundamentals of Fuzzy Logic Systems & Fuzzy Logic Control: Fuzzy sets, Fuzzy logic operations, Generalized fuzzy logic operations, Implication (if-then), Some definitions, Fuzziness and fuzzy solutions, Fuzzy relations, Composition and inference, Considerations of fuzzy decision-making. Basics of fuzzy control, Fuzzy control architectures.

UNIT III
Fundamentals of artificial neural networks: Learning and acquisition of knowledge, Features of artificial neural networks, fundamentals of connectionist modelling.

UNIT IV
Neuro-fuzzy Systems, Architecture of neuro-fuzzy systems, Construction of neuro-fuzzy systems

UNIT V
Evolution Computing: Overview of evolution computing, Genetic algorithms and Optimization, The schema theorem: the fundamental theorem of genetic algorithms, Genetic algorithm operators, Integration of genetic algorithms with neural networks, Integration of genetic algorithms with fuzzy logic, Known issues of GAs.

UNIT VI:
Applications from PR, IP, IRS, Share Market Analysis, Soft Computing for Calor Recipe Prediction case studies.

TEXT BOOK:
1. Soft computing and intelligent systems design, by Fakhreddine O. Karray and Clarence De Silva, Pearson Education, 2009

REFERENCE BOOK:
1. Neuro-Fuzzy and Soft Computing, J.S.R Jan, C.-T. Sun and E. Mizutani, PHI, 2005

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(A0534157) GAME THEORY (OPEN ELECTIVE-I)

OBJECTIVES:
- ❖ To give an overview of a broad range of models that are studied in game theory.
- ❖ To discuss the main concepts in the game theory.
- ❖ To explain the classes of games.
- ❖ To study the mathematics associated to zero-sum games.
- ❖ To discuss the application of game theory.

OUTCOMES:
- ❖ Analyse games based on complete and incomplete information about the players.
- ❖ Analyse games where players cooperate.
- ❖ Compute Nash equilibrium.
- ❖ Apply game theory to model network traffic.
- ❖ Analyse auctions using game theory.

CO-PO MAPPING:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	3	2	1		2				1			2	2	1
CO2	2	2	2	2	1	2				1		1	1	2	
CO3	1	2	3	2		3			1	2	1			1	
CO4	2	2	2	1		2			1	1	1		1		1
CO5	3	2	3	2	1	3			1	1	1	1		1	1

UNIT -I

Introduction and Outline of the Course, Definitions, Utilities, Rationality, Intelligence, Common knowledge, Classification of Games

NON-COOPERATIVE GAME THEORY: Extensive Form Game, Strategic Form Games with Illustrative Examples, Dominant Strategy Equilibria

UNIT –II

Pure Strategy Nash Equilibrium with Illustrative Examples and Key Results, Mixed Strategy Nash Equilibrium with Illustrative Examples and Key Results such as the Nash Theorem, Computation of Nash Equilibria and introduction to algorithmic theory, Matrix Games: Saddle Points, Minimax Theorem

UNIT- III

Bayesian Games, Bayesian Nash Equilibrium, Evolutionary Game Theory (ESS Strategies)
Repeated Game „. **MECHANISM DESIGN** The Mechanism Design Environment , Social Choice Functions with Illustrative Examples, Implementation of Social Choice Functions

UNIT IV

Incentive Compatibility and Revelation, Theorem, Gibbard-Satterthwaite and Arrow, Impossibility Theorem, Vickrey-Clarke-Groves (VCG) Mechanisms, Bayesian Mechanisms (dAGVA) , Revenue Equivalence Theorem

UNIT V

Myerson Optimal Auction, Further Topics in Mechanism Design, **COOPERATIVE GAME THEORY** Correlated Strategies and Correlated, Equilibrium, The Nash Bargaining Problem

UNIT VI

Coalitional Games (Transferable Utility Games), The Core, The Shapley Value , Other Solution Concepts: Kernel, Nucleolus , To Probe Further and Conclusion of the Course

TEXT BOOKS:
1. Y. Narahari, Dinesh Garg, Ramasuri Narayanam, Hastagiri Prakash Game Theoretic Problems in Network Economics and Mechanism Design Solutions. Springer Series in Advanced Information and Knowledge   Processing   (AIKP),   London,   UK,   2009. (URL:http://www.springer.com/math/applications/book/978-1-84800-937-0)
2. Roger B. Myerson. Game Theory: Analysis of Conflict. Harvard University Press, September 1997.

REFERENCES:
1. NPTEL Game Theory Course

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(A0535157) HEURISTIC ALGORITHMS
(OPEN ELECTIVE-I)

OBJECTIVES:
- ❖ Mathematical foundations for Genetic algorithm, operators
- ❖ Applications of Genetic Algorithms
- ❖ Genetic based machine learning and its applications

OUTCOMES:
- ❖ Gain the knowledge on genetic algorithms.
- ❖ Understand the mathematical concepts of K-Armed and 2-Armed. Solve the problems of K-Armed and 2-Armed.
- ❖ Use basic heuristic algorithms commonly used in problem solving.
- ❖ Understanding the mapping functions.
- ❖ Understanding the applications of GA and capable of develop small applications.
- ❖ Understand the implementation issues of Genetic Algorithms techniques.

CO-PO MAPPING:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1												1	1	
CO2	2	3	2	1					2		1			2	1
CO3	2	2	1	1					2	1				1	
CO4	2													1	
CO5	2	3	2	2					2	2	1			1	1
CO6	2										1				

UNIT- I

INTRODUCTION TO GENETIC ALGORITHM: Introduction to Genetic Algorithm – Robustness of Traditional Optimization and Search methods – Goals of optimization-GA versus Traditional methods – Simple GA – GA at work –Similarity templates (Schemata) – Learning the lingo.

UNIT-II

MATHEMATICAL FOUNDATIONS: Mathematical foundations: The fundamental theorem - Schema processing at work. – The 2-armed & k-armed Bandit problem. –The building Block Hypothesis. – Minimal deceptive problem.

UNIT – III

GA OPERATORS: Data structures – Reproduction- Roulette-wheel Selection – Boltzman Selection – Tournament Selection-Rank Selection – Steady –state selection –Crossover mutation – Atime to reproduce, a time to cross. – Get with the Main program. – How well does it work.

UNIT-IV

MAPPING OBJECTIVE FUNCTIONS: Mapping objective functions to fitness forum. – Fitness scaling. Coding – A Multi parameter, Mapped, Fixed – point coding – Discretization – constraints.

UNIT – V

APPLICATIONS OF GA: The rise of GA – GA application of Historical Interaction. – Dejung & Function optimization – Current applications of GA.

UNIT-VI

ADVANCE OPERATORS& TECHNIQUES IN GENETIC SEARCH: Advanced operators & techniques in genetic search:Dominance, Diploidy & abeyance – Inversion & other reordering operators. – other mine operators – Niche & Speciation – Multi objective optimization – Knowledge-BasedTechniques. – GA & parallel processes – Real life problem.

TEXT BOOKS

1. David E. Gold Berg, "Genetic Algorithms in Search, Optimization & Machine Learning", Pearson Education, 2001
2. S.Rajasekaran, G.A.Vijayalakshmi Pai, " Neural Networks, Fuzzy Logic and Genetic Algorithms ", PHI , 2003 (Chapters 8 and 9)

REFERENCE BOOKS

1. Kalyanmoy Deb, "Optimization for Engineering Design, algorithms and examples", PHI 1995

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(A0536157) FUZZY & NEURAL NETWORKS
(OPEN ELECTIVE-I)

OBJECTIVES:
- ❖ Fuzzy Relations, Operations and Properties.
- ❖ Fuzzification and De-Fuzzification methods and principles.
- ❖ Evolution of Neural Networks, Topologies.
- ❖ Recurrent neural networks Architecture.

OUTCOMES:
- ❖ Describe neural network architecture and apply single layer supervised algorithms for pattern classification problems
- ❖ Extract learning rules and apply supervised algorithms for problems solving
- ❖ Apply unsupervised algorithms for pattern classification, association problems.
- ❖ Apply fuzzy logic and reasoning to handle uncertainty and solve engineering problems.
- ❖ Prove and Apply fuzzy arithmetic operations and relations for problem solving
- ❖ Design Fuzzy logic controller for solving real life problems

CO-PO MAPPING:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1	1		1				2	3		1	1	2	1
CO2	3	1	1		1				1	3		1		2	1
CO3	3	1	1		1				1	2		1			2
CO4	3	3	1		3				1	1		2			1
CO5	2	1	1		2				1	2		1		1	2
CO6	1	3	2		2			2	2	1		2		2	

UNIT-I

Classical and fuzzy sets: Introduction, Operations and Properties, Fuzzy Relations: Cardinality, Operations and Properties, Equivalence and tolerance relation, Value assignment: cosine amplitude and max-min method;

UNIT–II

Fuzzification: Membership value assignment- Inference, rank ordering, angular fuzzy sets. Defuzzification methods, Fuzzy measures, Fuzzy integrals, Fuzziness and fuzzy resolution; possibility theory and Fuzzy arithmetic; composition and inference; Considerations of fuzzy decision-making.

UNIT–III

Basic structure and operation of Fuzzy logic control systems; Design methodology and stability analysis of fuzzy control systems; Applications of Fuzzy controllers. Applications of fuzzy theory.

UNIT–IV

Evolution of neural networks; Artificial Neural Network: Basic model, Classification, Feed forward and Recurrent topologies, Activation functions; Learning algorithms: Supervised, Un-supervised and Reinforcement; Fundamentals of connectionist modeling: McCulloach – Pits model, Perceptron, Adaline, Madaline.

UNIT-V

Topology of Multi-layer perceptron, Back propagation learning algorithm, limitations of Multi-layer perceptron. Radial Basis Function networks: Topology, learning algorithm; Kohenen's self-organising network: Topology, learning algorithm; Bidirectional associative memory Topology, learning algorithm, Applications.

UNIT-VI

Recurrent neural networks: Basic concepts, Dynamics, Architecture and training algorithms, Applications; Hopfield network: Topology, learning algorithm, Applications; Industrial and commercial applications of Neural networks: Semiconductor manufacturing processes, Communication, Process monitoring and optimal control, Robotics, Decision fusion and pattern recognition.

TEXTBOOKS:
1. Limin Fu, *"Neural Networks in Computer Intelligence,"* McGraw Hill, 2003.
2. Fakhreddine O. Karray and Clarence De Silva., *"Soft Computing and Intelligent Systems Design, Theory, Tools and Applications,"* Pearson Education, India, 2009.
3. Timothy J. Ross, *"Fuzzy Logic with Engineering Applications,"* McGraw Hill,1995.

REFERENCES:
1. B.Yegnanarayana, *"Artificial Neural Networks,"* PHI, India, 2006.

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(A0537157) PUBLIC SPEAKING
(OPEN ELECTIVE-I)

Public communication plays a role in almost everyone's life. We are asked to present our ideas to audiences in educational, work, social, and political settings. We listen to political and public addresses, class lectures, sermons, business presentations, and informal talks. *The public speaking course* is intended to help students to develop their understanding and skills as public communicators both as speakers and listeners.This course teaches nuts-and-bolts tips and techniques to become a more confident and competent public speaker. In this course, students are assessed on their abilities to apply the learning to specific presentations and coached to address areas of improvement.

OBJECTIVES:
- ❖ Captivate and engage an audience
- ❖ Use "Power Periods" and oral techniques to project competence
- ❖ Gesture, and position your body to convey strength
- ❖ Interact with displays, notes, and PowerPoint presentations
- ❖ Come up with customized ways to improve your own personal public speaking style

OUTCOMES:
- ❖ To be able to present ideas to the audience in an educational and professional settings
- ❖ Understand the structure and types of Public Speaking.
- ❖ To implement non-verbal cues and assess audience demographics.
- ❖ To have a practical orientation via successful speech analysis.
- ❖ To carry out technicalities such as PPTs and Multi-media.

CO-PO MAPPING:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2					2	2	3	3	3	1	2		2	
CO2	1					2	1	3	3	3	1	2			
CO3	1					2	1	3	3	2	1	2			
CO4	1					2	1	3	2	2	1	2		2	
CO5	1					2	1	3	2	3	1	2		2	

UNIT I
The Public communicator: A Perspective
The components of public communication - Perceptions and Attitudes
UNIT II
Getting started: Speaking to diverse audiences - Demographics – Psychographics –Rhetorographics
UNIT III
Developing the speech: Supporting Materials -Visual Aids - Photographs, pictures, Diagrams, Maps - Audio visual Aids
UNIT IV
Structuring the Speech: The Introduction -The Body -The Conclusion - Culture and Speaking Style -Listener Anxiety
UNIT V
Types of Speeches: Informative Speech - Persuasive Speech - Ceremonial Speech
UNIT VI
Successful speeches – case studies:
REFERENCE BOOKS
1. Handbook of Public Communication – Principles & Practice by AndrewD. Wolvin, Roy.M. Berko & Darlyin R.Wolvin. JAICO Books, 2007
2. Tips for Public Speaking: Selected from Carnegie's Original 1920 YMCA Course Books Paperback – 2007 by Dale Carnegie (Author), Marie Carnegie Hill (Editor) Speak Like Yourself… No, Really! Follow Your Strengths and Skills to Great Public Speaking, *by Jezra Kaye.*
3. Executive Presence: The Missing Link Between Merit and Success, by Sylvia Ann Hewlett.

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COMPUTER SCIENCE AND ENGINEERING

IV B.Tech. I-Sem (CSE)   T   C

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(A0538157) SOFTWARE QUALITY & SOFTWARE PROJECT MANAGEMENT
(Department Elective-III)

OBJECTIVES:

- ❖ The objective of the course is to familiarise students in practice with the initiation, management and supervision of a software project.
- ❖ During the course, actual software projects are defined and their implementation is managed and supervised.
- ❖ To provide basic project management skills with a strong emphasis on issues and problems associated with delivering successful IT projects.
- ❖ The module is designed to provide an understanding of the particular issues encountered in handling IT projects and to offer students methods, techniques and 'hands-on' experience in dealing with them.
- ❖ Software Testing plays a key role in software development and is a key measure that is taken against producing quality product.
- ❖ This course demonstrates an in-depth understanding of the Software quality metrics that are necessary and also on various kinds of testing tools that are helpful in testing process.

OUTCOMES:

- ❖ Students can evaluate a project to develop the scope of work, provide accurate cost estimates and to plan the various activities.
- ❖ Students can Understand and use risk management analysis techniques that identify the factors that put a project at risk and to quantify the likely effect of risk on project timescales;
- ❖ To Identify the resources required for a project and to produce a work plan and resource schedule;
- ❖ To Understanding importance of Quality & Software Testing.
- ❖ Students can Identifying various quality metrics & standards followed by various organizations.

CO-PO MAPPING:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	3	3											2	
CO2			3					2					1		
CO3		1								3	3				2
CO4			2	3			3						2		
CO5			2				3				3			1	

UNIT-I:
Introduction to software quality: Quality as a management information system, software modeling and commonly used models, The structure of the model, Guide book design concepts, The three CPIs , Total quality management practice, The first steps to planning for quality, the procedure.

Establishment of a software quality program:
Scope of the software quality program, professional ethics, a minimal QA effort, selling the quality plan.
Companion ISO Standards 9000: CMM, SEI.

UNIIT-II:
Software Quality Assurance Planning-An Overview:
History of the standard, contents and structure of the standard, possible problems with use of 730, establishing quality goals, the quality goal methodology, quality goals, quality perceptions, SQA planning software productivity and documentation.

The Trillion Dollar Dilemma-The Year 2000: Why it is a problem, A y2k life-cycle model, verification and testing, New Systems, lessons, realities, the programmer's paradigm, the basic assumptions behind development, a paradigm shift, locating and reusing hidden assets, analysis and design for maintenance**.**

UNIT-III
Software Quality Assurance Plan-Management: Organization, Quality Tasks, Responsibilities, A Minimal QA Effort, Factors Affecting the SQA Effort, The Critical Personnel Question, Fundamental Requirements, Ways to Kill Quality Assurance.

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Documentation: Software Requirements Specification (SRS), Software Design Description (SDD), Software Interfaces Documentation, Software Test Documentation, Software Development Plan, User Documentation, Document Distribution.

UNIT-IV
Conventional Software Management: The waterfall model, conventional software Management performance.
Evolution of Software Economics: Software Economics, pragmatic software cost estimation.
Improving Software Economics: Reducing Software product size, improving software processes, improving team effectiveness, improving automation, Achieving required quality, peer inspections.

UNIT-V
The old way and the new: The principles of conventional software Engineering, principles of modern software management, transitioning to an iterative process.
Life cycle phases: Engineering and production stages, inception, Elaboration, construction, transition phases.

UNIT - VI
Artifacts of the process: The artifact sets, Management artifacts, Engineering artifacts, programmatic artifacts.
Model based software architectures: A Management perspective and Technical Perspective.
Work Flows of the process: Software process workflows, Iteration workflows

TEXT BOOK:
1. Software Project Management, Walker Royce: Pearson Education, 2005.
2. Software Quality, Mordechai Ben-Menachem/Garry S. Marliss, Thomson Learning publication, 1997.

REFERENCES:
1. Software Project Management, Bob Hughes and Mike Cotterell: Tata McGraw-Hill Edition.
2. Software Project Management, Joel Henry, Pearson Education. Software Project Management in practice, Pankaj Jalote, Pearson Education.2005.
3. Testing and Quality Assurance for Component-based Software, by Gao, Tsao and Wu, Artech House Publishers
4. Software Testing Techniques, by Bories Beizer, Second Edition, Dreamtech Press
5. Managing the Testing Process, by Rex Black, Wiley
6. Handbook of Software Quality Assurance, by G. Gordon Schulmeyer, James I.McManus, Second Edition, International Thomson Computer Press.

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                                                3+1*   3

(A0539157) BUSINESS INTELLIGENCE
(Department Elective-III)

OBJECTIVES:

To give students

- ❖ Understand the role of BI in enterprise performance management and decision support.
- ❖ Understand the applications of data mining and intelligent systems in managerial work.
- ❖ Understand data warehousing and online analytical processing (OLAP) concepts,
- ❖ Including dimensional modelling, star and snowflake schemas, attribute hierarchies, Metrics, and cubes.
- ❖ Learn data analysis and reporting using available BI software.

OUTCOMES:

Students will be able to

- ❖ Appraise and apply evidence practice (EBP) to formulate effective solutions to deal with contemporary performance problems and issues associated with the delivery of business information systems.
- ❖ Create a consultant report that critically evaluates important design principles and operations involving business intelligence and that offers effective recommendations aimed at enhancing business outcomes.
- ❖ Demonstrate competence in oral, written, and visual communication in business reports and presentations.
- ❖ Develop small size reports in BI
- ❖ Focus on how Data Ware house and Data mining are used in BI.
- ❖ Get an exposure on BI software tools.

CO-PO MAPPING:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3													1	2
CO2			3	2										1	1
CO3				3						3		2	1		
CO4				2	3								1	1	
CO5					2								2	1	
CO6					3							2			2

UNIT-I

Introduction to Business intelligence: Definition and History of BI, Transaction processing versus analytical processing, BI Implementation, Major tools and techniques of BI

UNIT-II

Data warehousing: Definition and concepts, Data warehouse architecture, ETL process, data warehouse development, Top down vs. Bottom up, Data Mart vs. EDW, Implementation issues, Real-time data warehousing

UNIT-III

Business performance management: Key performance indicators and operational metrics, balanced scorecard, Six Sigma, Dashboards and scorecards.

UNIT-IV

Data Mining for Business Intelligence: Data mining process, Data mining methods, ANN for Data Mining

UNIT-V

Text and Web mining for Business intelligence: Text mining Applications, Process and Tools, Web content, structure and usage mining

UNIT-VI

BI implementation, Integration and emerging trends: Implementing BI, BI Application Life Cycle, Connecting BI to Enterprise systems, on- demand BI, Issues of legality, privacy and Ethics, Emerging topics in BI, Social Networking and BI, RFID and BI

TEXT BOOKS:

1. Business Intelligence: A Managerial Approach, 2nd Edition, PEARSON 2012 Authors: EfraimTurban, Ramesh Sharda, Dursun Delen, and David King ISBN-10: 0-13-610066-X ISBN-13: 978-0-13-610066-9
2. Oracle Business Intelligence Applications, McGraw Hill Education 2013 Authors : Simon Miller, William Hutchinson ISBN-10: 93-5134-153-4 ISBN-13: 978-93-5134-153-6

REFERENCE BOOKS:

1. Fundamentals of Business Analytics R.N Prasad, seema acharya, wiley(2011)
2. Getting Started with Business Analytics: Insightful Decision Making: David R Hardoon, galith shmueli, Chapman and Hall/CRC(2013)

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                                                                             3+1*   3

(A0540157) PHP PROGRAMMING
(Department Elective-III)

OBJECTIVES:

Learn How to:

- ❖ Write PHP programs that access form data.
- ❖ Use the "echo" and "print" to send output to the browser.
- ❖ Learn how to create and use PHP variables.
- ❖ Learn how to show PHP errors on web pages.

OUTCOMES:

The main learning outcomes are:

- ❖ Understand the syntax and basic concepts of PHP like variable,datatypes,conditional and looping statements
- ❖ Write PHP programs to implementing arrays and functions.
- ❖ Develop PHP Programs to implement strings and files.
- ❖ Understand and develop programs on PHP object oriented concepts.
- ❖ Develop programs with PHP advanced concepts (cookies and sessions) and date and time functions .
- ❖ Be able to develop a form containing several fields and be able to process the data with data base using HTML and PHP based script.

CO-PO MAPPING:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	1	1						1				1	1	
CO2	1	1	1	1					1					1	
CO3	1	1	2	1					1		1			2	
CO4	1	2	2		1				2	1	1	1		2	2
CO5	2	1	3						2	1	2	1	1	2	1
CO6	2	2	2		2	1	1		2	2	3	2	2	3	2

UNIT I

Introduction to PHP: Evaluation of Php, Features of php, Basic Syntax, Php variables, Php Data types, Tupe casting ,type juggling, Operators and Expressions.

working with flow control through control statement-If,If-else, If-else ladder, If-elseif-else, Switch.

working with flow control through control statement- For, While, Do-while, Foreach, Nesting of Loops

UNIT II

Arrays-What is an Array, Creating an array, Accessing array Element, Types of arrays, array functions.

Functions-What is a function, Define a function, Call by value and Call by reference, Recursive functions

UNIT III

Introduction to Strings-Creating and accessing String, String Related Library function.

File handling in php-Defining a File, different file operations.

UNIT IV

Introduction to OOPS-Introduction Objects, Declaring a class, properties and methods, Inheritance, Polymorphism & encapsulation, constructor, Destructor, Extending classes, using $this, Using acess specifiers, Abstract method and class, using interface.

UNIT V

PHP Advanced Concepts- Using Cookies, Using HTTP Headers, Using Sessions, Using Environment and Configuration variables.

Working with Date and Time-Displaying Human-Readable Dates and Times,Finding the Date for a Weekday, Getting the Day and Week of the Year, Determining Whether a Given Year Is a Leap Year, Obtaining the Difference Between Two Dates, Determining the Number of Days in the Current Month, Determining the Number of Days in Any Given Month.

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UNIT VI

Creating and Using Forms- Understanding Common Form Issues, GET vs. POST, Validating form input, Working with multiple forms, and Preventing Multiple Submissions of a form.

PHP and Database Access- Basic Database Concepts, Connecting to a MYSQL database, Performing basic database operations-create, Insert, Retrieving and Displaying results, Modifying, Updating and Deleting data.

TEXT BOOKS:
1. Beginning PHP and MySQL, 3rdEdition, Jason Gilmore, Apress Publications (Dream tech.).
2. PHP 5 Recipes A problem Solution Approach Lee Babin, Nathan A Good, Frank M.Kromann and Jon Stephens.

REFERENCES:
1. Open Source Web Development with LAMP using Linux, Apache, MySQL, Perl and PHP, J.Lee and B.Ware(Addison Wesley) Pearson Education.
2. PHP 6 Fast and Easy Web Development, Julie Meloni and Matt Telles, CengageLearning Publications.
3. PHP 5.1, I. Bayross and S.Shah, The X Team, SPD.

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(A0541157) MOCK INTERVIEWS AND GROUP DISCUSSION
(SKILL DEVELOPMENT COURSE)

UNIT-I

Group Discussion: Introduction-Types of GD-D topics-Do's and Don't's in GD -GD Tips-Difference between GD and Debate-Mock GD's and Debate - Role Play in a Group Discussion

UNIT-II

Presentation Skills: Presentation Evaluation-Just a minute speeches-Creating a power point presentation-Body language-Conclusions-Planning a meeting-Analyzing a meeting-Analysing agendas-Round table discussions-Small group presentation-Shaking hands-Logging silences-Talent search-To speak or not to speak-relationships.

UNIT-III

Team Work Skills: Dimensions of team building-Components of team building-Purpose of teams-Building blocks for team-Types of team-Team leader skills.

UNIT-IV

Interview Skills: Introduction – concept – Types of Interviews – Characteristics of Interviewer – Characteristics of Interviewee – Recruitment interview – Appraisal interview – Research interview.

UNIT – V

Extempore: Introduction To Extempore - Common Extempore Topics – SWOT Analysis

UNIT – VI

Motivational Themes: How to win Friends and influence people by Dale Carnegie, The Go-Giver: A little story about a powerful Business idea by Bob Burg and John David Mann, How to talk to anyone – 92 little tricks for big success in relationship by Leil Lowndes.

REFERNCE BOOKS:
1. How to win Friends and influence people by Dale Carnegie.
2. The Go-Giver: A little story about a powerful Business idea by Bob Burg and John David Mann
3. How to talk to anyone – 92 little tricks for big success in relationship by Leil Lowndes.

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(A0587157) DATA MINING LAB

OBJECTIVES:
- ❖ To make the students practical exposure for various techniques of Data mining.

OUTCOMES:
Students will be able to:
- ❖ Analyze different pre-processing techniques by implementing them using Programming language like C/C++.
- ❖ Understand how to generate frequent patterns.
- ❖ Implement the classification techniques in data mining.
- ❖ Implement the clustering techniques in data mining.

CO-PO MAPPING:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1			3	2	1				2					2	1
CO2	1		3	2					2					2	1
CO3		1	3	2	1				2					2	1
CO4		1	3	2	1				2					2	1

Implement the following Data mining techniques in C/C++.

1. Data cleaning techniques
   a) smoothing by bin means
   b) smoothing by bin medians
   c) smoothing by bin boundaries
2. Data Transformation techniques
   a) Min-Max normalization
   b) z-score normalization
   c) Normalization by decimal scaling.
3. Apriori algorithm.
4. Classification techniques
   a) Bayes classification.
   b) Nearest Neighbor classification.(NNC)
5. k-means clustering technique.

REFERENCES:
1. Data Preparation for Data Mining (The Morgan Kaufman Series) by Dorian pyle, First Edition.
2. Data Mining algorithms by Rajan Chattamvelli, Narosa publishing house.

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P	C
3	2

(A1283156) SOFTWARE TESTING TOOLS LAB
(Common to CSE & IT)

OBJECTIVES:

Upon successful completion of this course students will be able to:

- ❖ Understand the basic concepts of software testing.
- ❖ Understand the various techniques and strategies of software testing and inspection and pointing out the importance of testing in achieving high-quality software.
- ❖ Perform effective and efficient structural testing of software.
- ❖ Integrate and test the various units and components of a software system.
- ❖ Perform effective and efficient functional testing of software.
- ❖ Select the appropriate tests to regression test your software after changes have been made.
- ❖ Plan, track and control the software testing effort.
- ❖ Understand the need of automated testing tools and various kinds of automated testing tools.

OUTCOMES:

- ❖ To understand the control structure of C program, Test cases, Test criteria, Test strategies and Testing Tools.
- ❖ To analyze the comparative study of Various Testing Techniques, and Tools.
- ❖ To design and conduct Manual Test Cases for a software testing project.
- ❖ To apply software testing tool to support test automation.

CO-PO MAPPING:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	1		1		1	2			2	2	2	1	
CO2	3	3	3		2		2	2		1	3	1		2	1
CO3	3	1	3	3			1	3	3	3	3		1	1	
CO4	3		3	3	3		1	3	3	3	3			1	2

Lab Experiments:

1. Write programs in 'C' Language to demonstrate the working of the following constructs:
2. i) do...while
   ii) while….do
   iii) if…else
   iv) switch
   v) for
3. "A program written in 'C' language for Matrix Multiplication fails" Introspect the causes for its failure and write down the possible reasons for its failure.
4. Write manual test cases for Gmail application.
5. Write manual test cases for ATM application.
6. Write manual test cases for Banking application.
7. Study of Quick Test Professional(QTP):
8. Overview of QTP Components.
9. Record & Run Options.
10. Generating Basic Script.
11. Enhancement of Script.
12. Check Points.
13. Output Values.
14. Object Repository.
15. Writing Script manually.
16. Study of Rational Functional Tester(RFT).
17. Study of SELENIUM.

REFERENCES:

1. Software testing Tools – Dr.K.V.K.K.Prasad, Dreamtech.

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(A0588157) Mini Project

Objectives

To give exposure to real world environment and enhance capabilities in students for solving societal / industrial / research problems using latest technologies for better employability

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

1. Students will be able to practice acquired knowledge within the chosen area of technology for project development.
2. Identify, discuss and justify the technical aspects of the chosen project with a comprehensive and systematic approach.
3. Reproduce, improve and refine technical aspects for engineering projects.
4. W324. Work as an individual or in a team in development of technical projects.
5. Communicate and report effectively project related activities and findings.

CO-PO Table

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO-1	PSO2	PSO3
CO1	3	3				3	3		3	3	3			3	3
CO2	3	3			2			3	2		3	3		3	3
CO3	3	3		2					2	3	3	3		3	3
CO4	3	3	3	3	3	3		2	2	3	3	3	2	3	3
CO5					3			2	3	3	3	3		3	3

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(A0017157) MANAGEMENT SCIENCE
(Common to CSE, IT & EEE)

OBJECTIVES:
- ❖ To know the concept of management administration and organization structure.
- ❖ To know the personnel management and human resource management concept.
- ❖ To understand present effective production techniques.
- ❖ To know the marketing concept and functions.
- ❖ To know the rules for network diagram, PERT and CPM, project crashing.
- ❖ To know the concept of women entrepreneurship.

OUT COMES:
- ❖ Students are able to know importance of management in different areas.
- ❖ Students are able to know what type of structures is using the present organization.
- ❖ Students are able to know how to design the plant layout and plant location.
- ❖ Students are able to know the importance of human resource department in organization.
- ❖ Students are able to know how to complete the project within the time by crashing the activities.
- ❖ Students are able to understand the importance of women playing a vital role in entrepreneurship.

CO-PO MAPPING:

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

UNIT-I

INTRODUCTION TO MANAGEMENT: Concepts of Management and organization- nature, importance and Functions of Management, Taylor's Scientific Management Theory, Fayol's Principles of Management, Mayo's Hawthorne Experiments, Maslow's Theory of Human Needs, Douglas McGregor's Theory X and Theory Y, Herzberg's Two-Factor Theory of Motivation, Systems Approach to Management, Leadership Styles, Social responsibilities of Management.

UNIT-II

DESIGNING ORGANIZATIONAL STRUCTURES: Basic concepts related to Organization - Departmentation and Decentralization, Types of mechanistic and organic structures of organization (Line organization, Line and staff organization, functional organization, Committee organization, matrix organization, Virtual Organization, Cellular Organization, team structure, boundary less organization, inverted pyramid structure, lean and flat organization structure) and their merits, demerits and suitability.

UNIT-III

OPERATIONS MANAGEMENT: Principles and Types of Plant Layout-Methods of production (Job, batch and Mass Production), materials management: Objectives, Need for Inventory control, EOQ, ABC Analysis, Purchase Procedure, Stores Management and Stores Records-supply chain management, Marketing: functions of marketing, marketing mix, marketing strategies based on product life cycle, channels of distribution.

UNIT-IV

HUMAN RESOURCES MANAGEMENT (HRM): Concepts of HRM, HRD and Personnel Management and Industrial Relations (PMIR), HRM vs.PMIR, Basic functions of HR Manager: Manpower planning, Recruitment, Selection, Training and Development, Placement, Wage and Salary Administration, Promotion, Transfer, Separation, Performance Appraisal, Grievance Handling and Welfare Administration, Job Evaluation and Merit Rating.

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UNIT-V

PROJECT MANAGEMENT (PERT/CPM): Network Analysis, Programme Evaluation and Review Technique (PERT), Critical Path Method (CPM), Identifying critical path, Probability of Completing the project within given time, Project Cost Analysis, Project Crashing. (simple problems)

UNIT-VI

WOMEN ENTREPRENEURSHIP: Scope of Entrepreneurship among women- promotional efforts in supporting women entrepreneurs in India-opportunities for women entrepreneurs –challenges or problems of women entrepreneurs-successful cases of women entrepreneurs.

TEXT BOOKS:

1. Aryasri: Management Science, TMH, 2004.
2. Stoner, Freeman, Gilbert, Management, 6th Ed, Pearson Education, New Delhi, 2004.

REFERENCES:

1. Kotler Philip & Keller Kevin Lane: Marketing Mangement 12/e, PHI, 2005.
2. Koontz & Weihrich: Essentials of Management, 6/e, TMH, 2005.
3. Thomas N.Duening & John M.Ivancevich Management—Principles and Guidelines, Biztantra, 2003.
4. Kanishka Bedi, Production and Operations Management, Oxford University Press, 2004.
5. Memoria & S.V.Gauker, Personnel Management, Himalaya, 25/e, 2005

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(A0542158) ADVANCED DATABASES
(Department Elective –IV/MOOC)

OBJECTIVES:

The first is study of the classical distributed database management

- Issues in Distribution design, distributed query processing, and distributed transaction management.
- To learn about Optimization in DDB
- Architectural Issues in DDB

OUTCOMES:

Upon completion of the course students are able to

- Students will understand distributed database management concepts.
- Students will get good knowledge of distribution transparency and they will know the architecture of distributed databases.
- Students will be able to understand complex topics like Distribution design, distributed query processing.
- Students can be able to find solutions to the some of the Architectural issues.
- Students can solve the problems of deadlocks and concurrency control.
- Students will be able to give new examples of distributed database design.

CO-PO MAPPING:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3			1	1				1	1		1	2	1	1
CO2	2			1	1		1			1		1	2	1	
CO3	2	1		1	1				1	1		1	1	1	
CO4	2	1		1	1		1			1		1	1	1	1
CO5	1	1		1	1								1	1	1
CO6	1	1		1	1		1		1	1			1	1	1

UNIT I

Introduction to Distributed Databases: Features of Distributed versus Centralized Databases, why distributed databases?, Distributed Database Management Systems, Review of databases, Review of computer networks.

UNIT II

Levels Of Distribution Transparency: Reference Architecture for Distributed Databases , Types of Data Fragmentation, Distribution transparency for read only applications, Distribution transparency for update applications, distributed database access primitives, Integrity Constraints in Distributed Databases.

UNIT III

Distributed Database Design: A Framework for Distributed database Design,The Design of database Fragmentation

UNIT IV

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.

UNIT V

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 VI

Concurrency Control: Foundation of Distributed Concurrency Control, Distributed Deadlocks, Concurrency Control based on Timestamps, Optimistic Methods for Distributed Concurrency Control.

TEXT BOOKS:

1. Distributed Database Principles & Systems, Stefano Ceri, Giuseppe Pelagatti McGraw-Hill

REFERENCES:

1. Principles of Distributed Database Systems, M.Tamer Ozsu, Patrick Valduriez – Pearson Education.

COMPUTER SCIENCE AND ENGINEERING

IV B.Tech. II-Sem (CSE)   `   T   C
                                                   3+1*   3

(A0543158) DESIGN PATTERNS
(Department Elective –IV/MOOC)

OBJECTIVES:

By the end of this course, you will:
- ❖ Have a deeper knowledge of the principles of object-oriented design
- ❖ Understand the design patterns that are common in software applications
- ❖ Understand how these patterns related to object-oriented design

OUTCOMES:

Upon completion of course the students will be able to:
- ❖ Understand common design patterns in the context of iterative/incremental development
- ❖ Evaluate and Reuse software source code using patterns
- ❖ Analyze and combine the design patterns to work together in a software design
- ❖ Implement the design pattern in an object oriented language
- ❖ Understand the benefits of a pattern over a program in a software application

CO-PO MAPPING:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3		3				3	3		2	2	1	
CO2	3	3	3		3	3		3	3	3		3	1	3	2
CO3	3	3	3		2				1	3		2	3	1	
CO4	3	3	3		3				2	3		2	1	1	
CO5	2	3	3		3			2	2	3		3	2	1	

UNIT-I:

Review Of Formal Notations & Foundation Classes In C++ : Class diagram, Object diagram, Interaction diagram Examples. List, Iterator, List Iterator, Point, Rect.

UNIT-II

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

UNIT III

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 IV

Creational Patterns: Abstract Factory, Builder, Singleton, Discussion of Creational Patterns.

UNIT V

Structural Patterns: Adapter, Bridge, Composite, decorator.

UNIT VI

Behavioral Patterns: Observer, State, Strategy, Template Method, Discussion of Behavioral Patterns.

TEXT BOOKS:

1. Design Patterns By Erich Gamma, Pearson Education

REFERENCES:

1. Pattern's in JAVA Vol-I By Mark Grand ,Wiley DreamTech.
2. Pattern's in JAVA Vol-II By Mark Grand ,Wiley DreamTech.
3. JAVA Enterprise Design Patterns Vol-III By Mark Grand , Wiley DreamTech.
4. Head First Design Patterns By Eric Freeman-Oreilly-spd
5. Design Patterns Explained By Alan Shalloway,Pearson Education.
6. Pattern Oriented Software Architecture, F.Buschmann & others,John Wiley & Sons.

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COMPUTER SCIENCE AND ENGINEERING

IV B.Tech. II-Sem (CSE)   T   C
     3+1*   3

(A0544158) DATA ANALYTICS AND BIG DATA
(Department Elective –IV/MOOC)

OBJECTIVES:
- ❖ It is intended for the students with knowledge about big data
- ❖ To appreciate the basic concepts and foundations of big data and analytics with text data.
- ❖ To learn real world technology and methodologies of big data.
- ❖ Understanding Big Data challenges in Transforming Business Processes, Social media analytics etc...

OUTCOMES:
The student will be able to:
- ❖ Understand technical aspects of big data.
- ❖ Understand the importance of capturing, organization, integration, analysing different types data with Big Data Environment.
- ❖ Understanding the Impact of Streaming Data and Complex Event Processingon Business.
- ❖ Understand the company's need and use the Big Data Analytics to Preventing Fraud and increasing the Business Benefit.
- ❖ Know how to Adding New Dimensions to the Planning Cycle and Transforming Business Processes.
- ❖ Understanding the role of relational databases in big data and Managing and integrating different data types into a big data environment.

CO-PO MAPPING:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3		1					1			1	2	1		
CO2		3			1					2		1		2	
CO3	1	2								3			2		1
CO4			3		2			1				2		1	
CO5			2	1		1	1						1		2
CO6			2		1			1						1	3

Unit-I: **Grasping the Fundamentals of Big Data**
The Evolution of Data Management, Understanding the Waves of Managing Data, Creating manageable data structures, Web and content management , Managing big data ,Defining Big Data ,Building a Successful Big Data Management Architecture, Beginning with capture, organize, integrate, analyze, and act Setting the architectural foundation ,Performance matters, Traditional and advanced analytics.

Unit-II: **Examining Big Data Types**
Defining Structured Data, Exploring sources of big structured data, Understanding the role of relational databases in big data, Defining Unstructured Data Exploring sources of unstructured data, understands the role of a CMS in big data management, looking at Real-Time and Non-Real-Time Requirements Putting Big Data Together, Managing different data types, integrating data types into a big data environment.

Unit-III: **Understanding Text Analytics and Big Data**
Exploring Unstructured Data, Understanding Text Analytics, The difference between text analytics and search, Analysis and Extraction Techniques, Understanding the extracted information, Taxonomies, Putting Your Results Together with Structured Data, Putting Big Data to Use, Voice of the customer, Social media analytics, Text Analytics Tools for Big Data.

Unit-IV: **Dealing with Real-Time Data Streams and Complex Event Processing**
Explaining Streaming Data and Complex Event Processing, Using Streaming Data, Data streaming, The need for metadata in streams, Using Complex Event Processing, Differentiating CEP from Streams, Understanding the Impact of Streaming Data and CEP on Business.

Unit-V: **The Importance of Big Data to Business**
Big Data as a Business Planning Tool (Planning with data, doing the analysis, checking the results, acting on the plan), Adding New Dimensions to the Planning Cycle (Monitoring in real time, Adjusting the impact, Enabling experimentation),Keeping Data Analytics in Perspective, Getting Started with the Right Foundation Getting your big data strategy started, planning for Big Data, Transforming Business Processes with Big Data.

Unit-VI: **Improving Business Processes with Big Data Analytics: A Real-World View**
Understanding Companies' Needs for Big Data Analytics, Improving the Customer Experience with Text Analytics, The business value to the big data analytics implementation, Using Big Data Analytics to Determine Next Best Action, Preventing Fraud with Big Data Analytics, The Business Benefit of Integrating.

TEXT BOOKS:
1. Big Data for Dummies by Judith Hurwitz, Alan Nugent, Dr. Fern Halper, Marcia Kaufman and Published by John Wiley & Sons, Inc.

REFERENCES:
1. Big Data Now: 2012 Edition Publisher: O'Reilly Media.

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COMPUTER SCIENCE AND ENGINEERING

IV B.Tech. II-Sem (CSE)   T   C
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(A1222156) MACHINE LEARNING
(Department Elective –V)
(Common to CSE & IT)

OBJECTIVES:
To give students
- ❖ Basic knowledge about the key algorithms and theory that form the foundation of machine learning and computational intelligence
- ❖ A practical knowledge of machine learning algorithms and methods

OUT COMES:
They will be able to
- ❖ Understand the principles, advantages, limitations and possible applications of machine learning.
- ❖ Identify and apply the appropriate machine learning technique to classification, pattern recognition, optimization and decision problems.
- ❖ Provides a broad introduction to machine learning, data mining, and statistical pattern recognition.
- ❖ Understands a wide verity of learning algorithms and how to apply them on the data.
- ❖ Understand how to perform evolution of learning algorithms and model selection.
- ❖ Learn not only the theoretical underpinnings of learning but also gain practical know how needed to quickly and powerfully apply these techniques to new problems.

CO-PO MAPPING:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	2	1		2				2				1	1	2
CO2	3						2					1		1	1
CO3	2			2						1		2			1
CO4		3	1			1					2				1
CO5															1
CO6		2	1	1								2			1

UNIT – I
Introduction: Machine perception, pattern recognition example, pattern recognition systems, the design cycle, learning and adaptation.

UNIT – II
Bayesian Decision Theory: Introduction, continuous features – two categories classifications, minimum error-rate classification- zero–one loss function, classifiers, discriminant functions, and decision surfaces.

UNIT – III
Maximum likelihood and Bayesian parameter estimation: Introduction, maximum likelihood estimation, Bayesian estimation, Bayesian parameter estimation–Gaussian case.

UNIT – IV
Un-supervised learning and clustering: Introduction, mixture densities and identifiability, maximum likelihood estimates, application to normal mixtures, K-means clustering. Data description and clustering – similarity measures, criteria function for clustering.

UNIT – V
Component analysis: Principal component analysis, non-linear component analysis; Low dimensional representations and multi-dimensional scaling.**UNIT-VI**
Stochastic methods: Introduction, Stocastic search, Boltzmann learning

TEXT BOOKS:
1. **"Pattern classifications"**, Richard O. Duda, Peter E. Hart, David G. Stroke. Wiley student edition, Second Edition.

REFERENCE BOOKS:
1. **"Pattern Recognition and Image Analysis"** – Earl Gose, Richard John baugh, Steve Jost.
2. **"Introduction to Machine Learning"** by Ethem Alpaydin, PHI 2nd Edition.

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COMPUTER SCIENCE AND ENGINEERING

IV B.Tech. II-Sem (CSE)

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(A0545158) IMAGE PROCESSING
(Department Elective –V)

OBJECTIVES:
- ❖ To learn the fundamentals of Image Processing.
- ❖ To learn sampling and reconstruction procedures.
- ❖ To learn the various transforms used in image Processing.
- ❖ To study various concepts of image enhancement, reconstruction and image compression.
- ❖ To design image processing systems.

OUTCOMES:
- Understand Image Representation and modeling
- Apply Image Transformation methods
- Implement Image processing algorithms
- Implement Image Segmentation algorithms
- Apply the Image processing algorithms for object recognition and detection

CO-PO MAPPING:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	2	1		2				2	3			2	2	
CO2	2	2	1		3				2	3			1	1	
CO3	3	3	2		3				3	3			1	1	2
CO4	2	3	2		3				3	3			1	1	2
CO5	3	3	3		3			3	3	3	3	3	2	2	2

UNIT - I
Digital Image Fundamentals -- image model, image sampling and quantization, basic relationships between pixels, neighbors, distance measures – linear and nonlinear operations.

UNIT - II
Image enhancement in the spatial domain : gray-level transformation, histogram processing, enhancement using arithmetic and logic operators, basic spatial filtering, smoothing and sharpening spatial filters, combining the spatial enhancement methods.

UNIT – III
Image enhancement in the frequency domain: Fourier transform – one dimensional, two dimensional DFT, filtering – Smoothing frequency domain filters - lowpass filters – highpass filters – Homomorphic filtering.

UNIT-IV
Image restoration : A model of the image degradation/restoration process, noise models, restoration in the presence of noise–only spatial filtering, Weiner, constrained least squares filtering, geometric transforms.

UNIT - V
Image Compression : Fundamentals, image compression models, error-free compression, Lossy compression, Lossy predictive coding, transform coding, Wavelet Coding, image compression standards.

UNIT - VII
Image Segmentation : Detection of discontinuous, edge linking and boundary detection, thresholding, region–based segmentation, segmentation by morphological watersheds.

TEXT BOOK :
1. Digital Image processing – R.C. Gonzalez & R.E. Woods, Addison Wesley/ Pearson education,2nd Education, 2002.
2. Digital image processing by S.Jayaraman, S.Esakkirajan & T.Veera Kumar, Tata McGraw Hill, 2010.

REFERENCES :
1. Fundamentals of Digital Image processing – A.K.Jain , PHI.
2. Digital Image processing using MAT LAB – Rafael C. Gonzalez, Richard E Woods and Steven L. Edition, PEA, 2004.
3. Digital Image Processing – William K. Pratt, John Wilely, 3rd Edition, 2004.
4. Fundamentals of Electronic Image Processing – Weeks Jr., SPIC/IEEE Series, PHI.

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(A0546158) MULTIMEDIA AND APPLICATION DEVELOPMENT
(Department Elective –V)

OBJECTIVES:
- ❖ The skills have to be acquired across a range of careers in multimedia including games development, web application development, multimedia application development, computer based training, e-Learning application development, interactive multimedia development, software development, software analysis, project management.

OUTCOMES:
The student will be able to:
- Understand the fundamental concepts of multimedia.
- Identify the basic multimedia content types.
- Write the basic programs in Action Script 2.0
- Explain data compression algorithms.
- Learn action script programming skills.
- Understand different concepts in Digitization.

CO-PO MAPPING:

CO /PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2							1				1	1	1	1
CO2	2	1				1							1	1	1
CO3			1			1							1	2	1
CO4				1		1							1	2	1
CO5	2			1									1	2	1
CO6	2										1		1	1	1

UNIT-I: FUNDAMENTAL CONCEPTS IN TEXT AND IMAGE

Multimedia and hypermedia, world wide web, overview of multimedia software tools. Graphics and image data representation graphics/image data types, file formats, Color Models in images.

UNIT-II: FUNDAMENTAL CONCEPTS IN VIDEO AND DIGITAL AUDIO

Types of video signals, analog video, digitization of sound, quantization and transmission of audio.

UNIT-III: ACTION SCRIPT I

Action Script Features, Object-Oriented Action Script, Data types and Type Checking, Action Script Classes: Defining classes, Constructor functions, Properties, Methods, Constructors, Completing Box Class.

UNIT-IV: ACTION SCRIPT II

Inheritance, Interfaces, Packages, Exceptions.

UNIT-V: APPLICATION DEVELOPMENT

An OOP Application Frame work, Using Components with Action Script 2.0.

UNIT-VI: FUNDAMENTALS OF MULTIMEDIA DATA COMPRESSION

Lossless compression algorithm: Introduction, Basics of Information Theory, Run-Length Coding, Variable Length Coding, Dictionary Based Coding, Arithmetic Coding, Lossless Image Compression

Lossy compression algorithm: Introduction, Distortion Measures, The rate distortion Theory, Quantization.

TEXT BOOKS:
1. Fundamentals of Multimedia by Ze-Nian Li and Mark S. First Edition, Drew PHI/Pearson Education,2003.
2. Essentials Action Script 2.0, Colin Moock, 2nd Edition, SPD O,REILLY, 2004.

REFERENCE BOOKS:
1. Digital Multimedia, Nigel chapman and jenny chapman, Wiley-Dreamtech. Macromedia Flash MX Professional 2004 Unleashed, Pearson.
2. Multimedia and communications Technology, Steve Heath, Elsevier (Focal Press).
3. Multimedia Applications, Steinmetz, Nahrstedt, Springer.
4. Multimedia Basics by Weixel Thomson
5. Multimedia Technology and Applications, David Hilman, Galgotia

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COMPUTER SCIENCE AND ENGINEERING

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(A0515158) BACKUP RECOVERY SYSTEMS AND ARCHITECTURE
(Common to CSE & IT)

OBJECTIVES:

To provide students with a solid foundation in Backup and Recovery infrastructure. The course focuses on the concepts and technologies used in Backup and Recovery environments.

Students will learn about

- ❖ Backup and recovery theory, including backup methods, planning and key terminology,
- ❖ How storage technologies work and how their features such as replication and snapshots can be used for backup.
- ❖ Data sources at the backup client and storage node backup targets.

OUTCOMES:

After completing the course students will be able to:

- ❖ Describe the different types of backup storage media, their advantages and disadvantages.
- ❖ Do the backup and recovery on any small scale company.
- ❖ Identify major sources of backup data.
- ❖ Define backup and recovery terminology and describe the backup and recovery operations.
- ❖ Examine the steps involved in planning for backup and recovery.
- ❖ Identify and differentiate various types of storage systems such as SAN and NAS concepts and components.

CO-PO MAPPING:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1		3								1			2		
CO2		2								1					2
CO3		1							2	2			1		
CO4		2							1	3			1		
CO5		2								1				2	
CO6		2							1	1					3

UNIT I: Backup Theory

Introduction to backup and recovery, including the reasons for performing backups, definition of common backup and recovery terms, and a look at the flow of data in typical client/server backup and restore operations. Backup and Recovery overview, Backup/ Recovery Methods and Operations.

UNIT II: INFORMATION STORAGE CONCEPTS

Disk architecture and storage systems: Introduction to Storage Systems, Protecting Disks in Arrays, Intelligent Storage Systems, Direct-Attached Storage, SCSI Architecture, Storage Area Networks (SAN), Network-Attached Storage (NAS), Protecting Data in External Storage, Continuous Data Protection. Storage system features used in backup and recovery operations.

UNIT III: BACKUP CLIENT

Various sources of backup data including file system data and several types of databases, including Oracle, Microsoft SQL, Exchange, Protecting Data in File Systems vs. Applications, Microsoft Volume Shadow Copy Service, File Servers, Virtualization, Client and Remote Office Backups, Backup Considerations and Challenges.

UNIT IV: BACKUP STORAGE NODE

Backup and recovery from the perspective of the storage node, including the various protocols used when writing data and the advantages and disadvantages of the various types of backup storage media Storage Node Components, Protocols, Backup to Physical Tape, Backup to Disk, Backup to Virtual Tape, Deduplication Systems, Cloud Storage.

UNIT V :   BACKUP AND RECOVERY PLANNING

Various factors to be considered in backup and recovery planning, Management and Testing, Disaster Recovery Considerations.

UNIT VI: APPLICATION:

Use the concepts learned in the course to develop a proposed solution that addresses the backup and recovery concerns of a sample company's backup and recovery concerns.

TEXT BOOKS:-

1) **Pro Data Backup and Recovery** Author: Steven Nelson, Publisher: Apress (2011), ISBN: 9788132205876

REFERENCE BOOKS:-

1) **Disaster Recovery & Business Continuity**: Author: Thejendrabs, Publisher: Shroff/iT Governance Publishing ISBN:- 9788184043310

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(A0589158) PHP LAB
(SKILL DEVELOPMENT COURSE)

OBJECTIVES:

On completion of the course the student will be able to:

- ❖ Gain the PHP programming skills needed to successfully build interactive, data-driven web applications.
- ❖ Test and debug a PHP application.
- ❖ Work with form data
- ❖ Use cookies and sessions for authenticating users
- ❖ Validate data in PHP forms.
- ❖ Work with mysql database

OUTCOMES:

- ❖ Understand process of executing a PHP-based script on a web server.
- ❖ Be able to develop a form containing several fields and be able to process the data provided on the form by a user in a PHP-based script.
- ❖ Understand basic PHP syntax for variable use and standard language constructs, such as conditionals and loops.
- ❖ Understand the syntax and use of PHP object-oriented classes.
- ❖ Understand the syntax and functions available to deal with file processing for files on the server as well as processing web URLs.
- ❖ Understand the paradigm for dealing with form-based data, both from the syntax of HTML forms, and how they are accessed inside a PHP-based script.

CO-PO MAPPING:

CO /PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	1								2			1	2	
CO2	2	2		1	1		3						1	1	
CO3	2				2									2	1
CO4	2	1								1				2	1
CO5							2			1	2		1	1	1
CO6	1	2			1		2			1			1	2	3

WEEK 1

    a) Write a PHP program to perform arithmetic operations on variables.

    b) Write a PHP programs on different controls statements.

WEEK 2

    a) Create a PHP program to demonstrate the different predefined functions in array.

    b) Create a PHP program on call by value and call by reference

    c) Write a PHP program to find a factorial of a given number.

WEEK 3

    Create a PHP program to demonstrate the different predefined functions in strings.

WEEK 4

    a) Create a PHP program to demonstrate opening and closing a file.

    b) Create a PHP program to demonstrate reading a file.

    c) Create a PHP program to demonstrate writing in a file.

    d) Create a PHP program to demonstrate the different file handling methods.

WEEK 5

    a) Create a PHP program on Inheritance concept.

    b) Create a PHP program on constructors and destructors.

    c) Create a PHP program on interfaces.

WEEK 6

Assume four users user1, user2, user3 and user4 having the passwords pwd1, pwd2, pwd3 and pwd4 respectively. Use PHP script for programs 1 and 2.

    a) Create a Cookie and add these four user ID"s and passwords to this Cookie.

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b) Read the User id and Passwords entered in the Login form and authenticate with the values (UserId and Passwords) available in the cookies.If he is a valid user (i.e., UserName and Password match) you should welcome him by name (UserName) else you should display "You are not an authenticated user"".

WEEK 7

a) Write a PHP program to start a PHP Session.
b) Write a PHP program to destroy a PHP Session.
c) Write a PHP to create a PHP Session without cookies.
d) Write a PHP program to store page views count in SESSION, to increment the count on each refresh, and to show the count on web page.

WEEK 8

Write a PHP program on date and time concepts.

WEEK 9

a) Write a PHP program to send and receive the values using GET and POST methods.
b) Write a PHP program to validate Name, Email and Password

WEEK 10

a) Write a PHP program on multiple forms using hidden fields.
b) Write a PHP program to prevent multiple submissions on client and server side.

WEEK 11

a) Write a PHP program to create database connections.
b) Write a PHP program to create a personal database for the user in MYSQL

WEEK 12

a) Write a PHP program to perform the following database operations :
   i. Create   ii. Insert   iii. Update   iv. Delete
b) Write a PHP which does the following job: Authenticate the user when he submits the login form using the UserName and Password.

REFERENCES:

1. Beginning PHP and MySQL, 3rdEdition, Jason Gilmore, Apress Publications (Dream tech.).
2. PHP 6 Fast and Easy Web Development, Julie Meloni and Matt Telles, Cengage Learning Publications.
3. PHP 5.1, I. Bayross and S.Shah, The X Team, SPD.
4. PHP and MySQL by Example, E.Quigley, Prentice Hall(Pearson).PHP Programming solutions, V.Vaswani, TMH.

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(A0571158) Seminar

Course objectives:

To develop skills in doing literature survey, technical presentation and report preparation.

Course outcomes

The students will be able to analyze a current topic of professional interest and present it before an audience

Co-PO Table

	Po1	Po2	Po3	Po4	Po5	Po6	Po7	Po8	Po9	Po10	Po11	Po12	Pso1	Pso2	Pso3
Co1	3	-	3	-	3	2	2	-	3	3	3	-	-	1	3

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(A0572158) Comprehensive viva voce

Course outcomes
Comprehensive Viva-Voce enables a successful student to
CO1.Demonstrate knowledge in the program domain.
CO2.Present his views cogently and precisely.
CO3.Exhibit professional etiquette suitable for career progression.

CO PO Table

	Po1	Po2	Po3	Po4	Po5	Po6	Po7	Po8	Po9	Po10	Po11	Po12	Pso1	Pso2	Pso3
CO1	3	3	-	-	-	-	-	-	-	2	-	-	-	2	2
CO2	3	2								3	3	3		2	3
CO3	3	3								2	3	3		3	3

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(A0573158) Project Work

Project work course objectives
Detailed Syllabus   156

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To allow students to demonstrate a wide range of the skills learned at the College of Engineering during their course of study by asking them to deliver a product that has passed through the design, analysis, testing and evaluation
• To encourage multidisciplinary research through the integration learned in a number of courses.
• To allow students to develop problem solving, analysis, synthesis and evaluation skills.
• To encourage teamwork.
• To improve students' communication skills by asking them to produce both a professional report and a professional poster and to give an oral presentation

Course Outcomes (COs):

At the end of the course, the students should be able to:

1. Review the current state of Art and trends in their area of interest and identify a suitable problem in their chosen subject domain with justification.

2. Survey the available research literature/documents for the tools and techniques to be used. 3. Examine the functional, non-functional, and performance requirements of their chosen problem definition.

4. Design system architecture and different components and develop all the system components using appropriate tools and techniques.

5. Work effectively in a team and use good project management practices and defend the project work as a team

	Po1	Po2	Po3	Po4	Po5	Po6	Po7	Po8	Po9	Po10	Po11	Po12	Pso1	Pso2	Pso3
Co1	3	3				3	3		3	3	3			3	3
Co2	3	3			2			3	2		3	3		3	3
Co3	3	3		2					2	3	3	3		3	3
Co4	3	3	3	3	3	3		2	2	3	3	3	2	3	3
Co5					3			2	3	3	3	3		3	3