ACADEMIC REGULATIONS
COURSE STRUCTURE
AND
DETAILED SYLLABUS

CHOICE BASED CREDIT SYSTEM

MLR17

INFORMATION TECHNOLOGY

for

Bachelor of Technology (B.Tech)

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

MLR Institute of Technology

(Autonomous)
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FOREWORD

The autonomy is conferred on MLR Institute of Technology by UGC, based on its performance as well as future commitment and competency to impart quality education. It is a mark of its ability to function independently in accordance with the set norms of the monitoring bodies like UGC and AICTE. It reflects the confidence of the UGC in the autonomous institution to uphold and maintain standards it expects to deliver on its own behalf and thus awards degrees on behalf of the college. Thus, an autonomous institution is given the freedom to have its own **curriculum, examination system and monitoring mechanism**, independent of the affiliating University but under its observance.

MLR Institute of Technology is proud to win the credence of all the above bodies monitoring the quality in education and has gladly accepted the responsibility of sustaining, if not improving upon the standards and ethics for which it has been striving for more than a decade in reaching its present standing in the arena of contemporary technical education. As a follow up, statutory bodies like Academic Council and Boards of Studies are constituted with the guidance of the Governing Body of the College and recommendations of the JNTU Hyderabad to frame the regulations, course structure and syllabi under autonomous status.

The autonomous regulations, course structure and syllabi have been prepared after prolonged and detailed interaction with several expertise solicited from academics, industry and research, in accordance with the vision and mission of the college in order to produce quality engineering graduates to the society.

All the faculty, parents and students are requested to go through all the rules and regulations carefully. Any clarifications, if needed, are to be sought, at appropriate time with principal of the college, without presumptions, to avoid unwanted subsequent inconveniences and embarrassments. The Cooperation of all the stake holders is sought for the successful implementation of the autonomous system in the larger interests of the college and brighter prospects of engineering graduates.

PRINCIPAL

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

For pursuing four year under graduate Bachelor Degree Programme of study in Engineering (B.Tech) offered by MLR Institute of Technology under Autonomous status is herein referred to as MLRIT (Autonomous):

All the rules specified herein approved by the Academic Council will be in force and applicable to students admitted from the Academic Year 2017-18 onwards. Any reference to "Institute" or "College" in these rules and regulations shall stand for M L R Institute of 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, M L R Institute of Technology shall be the chairman Academic Council.

1. ADMISSION

1.1. Admission into first year of four year B. Tech. degree Program of study in Engineering:

1.1.1. Eligibility:

A candidate seeking admission into the first year of four year B. Tech. degree Program should have:

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

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

1.1.2. Admission Procedure:

Admissions are made into the first year of four year B. Tech. Degree Program as per the stipulations of the TSCHE.

(a) Category A seats are filled by the Convener, TSEAMCET.

(b) Category B seats are filled by the Management.

1.2. Admission into the second year of four year B. Tech. degree Program in Engineering

1.2.1 Eligibility:

A candidate seeking admission under lateral entry into the II year I Semester B. Tech. degree Program should have passed the qualifying exam (B.Sc. Mathematics or Diploma in concerned course) and based on the rank secured by the candidate at Engineering Common Entrance Test ECET (FDH) in accordance with the instructions received from the Convener, ECET and Government of Telangana.

1.2.2 Admission Procedure:

Admissions are made into the II year of four year B. Tech. degree Program through Convener, ECET (FDH) against the sanctioned strength in each Program of study as lateral entry students.

2. PROGRAMS OFFERED

MLR Institute of Technology, an autonomous college affiliated to JNTUH, offers the following B. Tech. Programs of study leading to the award of B. Tech. degree under the autonomous scheme.

1) B.Tech. - Aeronautical Engineering
2) B.Tech. - Computer Science and Engineering
3) B.Tech. - Electronics and Communication Engineering
4) B.Tech - Electrical & Electronics Engineering
5) B.Tech. - Information Technology
6) B.Tech. - Mechanical Engineering

3. DURATION OF THE PROGRAMS

3.1 Normal Duration

3.1.1 B. Tech. degree program extends over a period of four academic years leading to the Degree of Bachelor of Technology (B.Tech.) of the Jawaharlal Nehru Technological University Hyderabad.

3.1.2 For students admitted under lateral entry scheme, B. Tech. degree program extends over a period of three academic years leading to the Degree of Bachelor of Technology (B. Tech.) of the Jawaharlal Nehru Technological University Hyderabad.

3.2 Maximum Duration

3.2.1 The maximum period within which a student must complete a full-time academic program is 8 years for B. Tech. If a student fails to complete the academic program within the maximum duration as specified above, he shall forfeit the seat in B.Tech and his admission shall stand cancelled.

3.2.2 For students admitted under lateral entry scheme in B. Tech. degree program, the maximum period within which a student must complete a full-time academic program is 6 years. If a student fails to complete the academic program within the maximum duration as specified above, he shall forfeit the seat in B.Tech and his admission shall stand cancelled.

3.2.3 The period is reckoned from the academic year in which the student is admitted first time into the degree Program.

4. AWARD OF B.Tech. DEGREE

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

4.1 The candidate shall pursue a course of study for not less than four academic years and not more than eight years.

4.2 The candidate shall register for 192 credits and secure 192 credits.

5. PROGRAMME STRUCTURE

5.1 UGC/AICTE specified Definitions/ Descriptions are adopted appropriately for various terms and abbreviations used in these Academic Regulations/ Norms, which are listed below.

Semester Scheme:

Each UGP is of 4 Academic Years (8 Semesters), each year divided into two semesters of 22 weeks (≥90 working days), each Semester having - 'Continuous Internal Evaluation (CIE)' and 'Semester End Examination (SEE)'. Choice Based Credit System (CBCS) and Credit Based Semester System (CBSS) as denoted by UGC, and Curriculum/Course Structure as suggested by AICTE are followed.

5.1.2 The B.Tech. Programmes of MLR Institute of Technology are of semester pattern, with 8 Semesters constituting 4 Academic Years, each Academic Year having TWO Semesters (First/Odd and Second/Even Semesters). Each Semester shall be of 22 Weeks duration (inclusive of Examinations), with a minimum of 90 Instructional Days per Semester.

5.1.3 Credit Courses:

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

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

Mandatory Courses like Technical seminars/Micro Project/EPICS/Certification Courses, Computational Mathematics (FOSS), Study Tour, Guest Lecture, Tutorials, etc., will not carry any Credits

b) Contact Hours: Every student has to register for a set of course (subject) in each semester, with the total number of credits being limited by considering the permissible weekly contact hours - typically equal to 33 hours per week or equal to 40 periods per week (i.e. 1 hour = 60 Minutes & 1 period = 50 Minutes); for this an average course load of 24 credits per semester including Mandatory Non-Credit courses also in some semester.

5.1.4 **Subject/ Course Classification:**

All Subjects/ Courses offered for the UGP are broadly classified as: (a) Foundation Courses (FnC), (b) Core Courses (CoC), and (c) Elective Courses (EℓC).

- Foundation Courses (FnC) are further categorized as: (i) H&S (Humanities and Social Sciences), (ii) BS (Basic Sciences), and (iii) ES (Engineering Sciences);
- Core Courses (CoC) and Elective Courses (EℓC) are categorized as PS (Professional Subjects), which are further subdivided as – (i) PC (Professional / Departmental Core) Subjects, (ii) PE (Professional/ Departmental Electives), (iii) OE (Open Electives); and (iv) Project Works (PW);
- Minor Courses (1 or 2 Credit Courses, belonging to HS/BS/ES/PC as per relevance); and Mandatory Courses (MC - non-credit oriented).

5.1.5 **Course Nomenclature:**

The Curriculum Nomenclature or Course-Structure Grouping for the each of the UGP E&T (B.Tech. Degree Programmes), is as listed below (along with AICTE specified % Range of Total Credits).

S. No.	*Broad Course Classification*	*Course Group/ Category*	*Course Description*	*Range of Credits*
1)	Foundation Courses (FnC)	BS – Basic Sciences	Includes - Mathematics, Physics and Chemistry Subjects	**15%-20%**
2)		ES - Engineering Sciences	Includes fundamental engineering subjects.	**15%-20%**
3)		HS – Humanities and Social Sciences	Includes subjects related to Humanities, Social Sciences and Management.	**5%-10%**
4)	Core Courses (CoC)	PC – Professional Core	Includes core subjects related to the Parent Discipline/ Department/ Branch of Engg.	**30%-40%**
5)	Elective Courses (EℓC)	PE – Professional Electives	Includes Elective subjects related to the Parent Discipline / Department / Branch of Engg.	**10%-15%**
6)		OE – Open Electives	Elective subjects which include inter-disciplinary subjects or subjects in an area outside the Parent Discipline/ Department / Branch of Engg.	**5%-10%**
7)	Core Courses	Project Work	B.Tech. Project or UG Project or UG Major Project.	**10%-15%**
8)		Industrial Training/ Mini-Project	Industrial Training/ Internship/ UG Mini-Project/ Mini-Project.	
9)		Seminar	Seminar / Colloquium based on core contents related to Parent Discipline/ Department/ Branch of Engg.	

10)		Minor Courses	1 or 2 Credit Courses (subset of HS)	**Included**
11)		Mandatory Courses (MC)	Mandatory Courses (non-credit)	**-**
Total Credits for UGP (B. Tech.)Programme				**192 (100%)**

6. COURSE REGISTRATION

6.1 A 'Faculty Advisor or Counsellor' shall be assigned to each student, who advises him/her about the UGP, its Course Structure and Curriculum, Choice/Option for Subjects/Courses, based on his/her competence, progress, pre-requisites and interest.

6.2 Academic Section of the College invites 'Registration Forms' from students prior (before the beginning of the Semester), ensuring 'DATE and TIME Stamping'. The Registration Requests for any 'CURRENT SEMESTER' shall be completed BEFORE the commencement of SEEs (Semester End Examinations) of the 'PRECEDING SEMESTER'

A Student can apply for Registration, which includes approval from his faculty advisor, and then should be submitted to the College Academic Section through the Head of Department (a copy of the same being retained with Head of Department, Faculty Advisor and the Student).

6.4 A Student may be permitted to Register for his/her Subjects/Course of CHOICE with a typical total of 24 Credits per Semester (Minimum being 20C and Maximum being 28C, permitted deviation being± 17%), based on his PROGRESS and SGPA/CGPA, and completion of the 'PRE-REQUISITES' as indicated for various Subjects/Courses, in the Department Course Structure and Syllabus contents.

6.5 Choice for 'additional Subjects/Courses' to reach the Maximum Permissible Limit of 28 Credits (above the typical 24 Credit norm) must be clearly indicated, which needs the specific approval and signature of the Faculty Advisor/Counsellor.

6.6 If the Student submits ambiguous choices or multiple options or erroneous (incorrect) entries during Registration for the Subject(s)/Course(s) under a given/specified Course Group/ Category as listed in the Course Structure, only the first mentioned Subject/Course in that Category will be taken into consideration.

6.7 Dropping of Subjects/Courses or changing of options may be permitted, ONLY AFTER obtaining prior approval from the Faculty Advisor (subject to retaining a minimum of 20 C), 'within 15 Days of Time' from the commencement of that Semester. Subject/Course Options exercised through Registration are final and CAN NOT be changed, and CAN NOT be inter-changed; further, alternate choices will also not be considered. However, if the Subject/ Course that has already been listed for Registration (by the Head of Department) in a Semester could not be offered due to any unforeseen or unexpected reasons, then the Student shall be allowed to have alternate choice - either for a new Subject (subject to offering of such a Subject), or for another existing Subject (subject to availability of seats), which may be considered. Such alternate arrangements will be made by the Head of Department, with due notification and time-framed schedule, within the FIRST WEEK from the commencement of Class-work for that Semester.

7. SUBJECTS/ COURSES TO BE OFFERED

7.1 A Subject/Course may be offered to the Students, IF ONLY a Minimum of 1/3 of Students register to the course.

7.2 More than ONE TEACHER may offer the SAME SUBJECT (Lab/Practical's may be included with the corresponding Theory Subject in the same Semester) in any Semester. However, selection choice for students will be based on - 'CGPA Basis Criterion' (i.e., the first focus shall be on early Registration in that Semester, and the second focus, if needed, will be on CGPA of the student).

7.3 If more entries for Registration of a Subject come into picture, then the concerned Head of the Department shall take necessary decision, whether to offer such a Subject/Course for TWO (or multiple) SECTIONS or NOT .

7.4 OPEN ELECTIVES will be offered by a department to the students of other departments.

8. ATTENDANCE REQUIREMENTS

a. A student will be eligible to appear for the End Semester Examinations, if he acquires a minimum of 75% of attendance in aggregate of all the Subjects/Courses (excluding Mandatory or Non-Credit Courses) for that Semester.
b. Condoning of shortage of attendance in aggregate up to 10% (65% and above, and below 75%) in each Semester may be granted by the College Academic Committee on genuine and valid grounds, based on the student's representation with supporting evidence by following the govt. rules in vogue.
c. A stipulated fee shall be payable towards condoning of shortage of attendance.
d. Shortage of Attendance below 65% in aggregate shall in No case be condoned.
e. A student shall not be promoted to the next semester unless he/she satisfies the attendance requirements of the current semester. The student may seek readmission for the semester when offered next. He / She shall not be allowed to register for the subjects of the semester while he/she is in detention. A student detained due to shortage of attendance, will have to repeat that semester when offered next.
f. Students whose attendance is less than 75% are not entitled to get the scholarship / fee reimbursement in any case as per the TS Govt. Rules in force.

9. ACADEMIC REQUIREMENTS FOR PROMOTION / COMPLETION OF REGULAR B.TECH PROGRAM COURSE STUDY

9.1 A student shall be deemed to have satisfied the Academic Requirements and earned the Credits allotted to each Subject/Course, if he secures not less than 35% marks in the End Semester Examination, and a minimum of 40% of marks in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together; in terms of Letter Grades, this implies securing P Grade or above in that Subject/Course.

9.2 A student shall be deemed to have satisfied the Academic Requirements and earned the Credits allotted to - Industry oriented Mini-Project/Seminar, if he/she secures not less than 40% of the total marks (50 marks) to be awarded for each. The student would be treated as failed, if he/she - (i) does not submit a report on his Industry oriented Mini-Project, or does not make a presentation of the same before the Evaluation Committee as per the schedule, or (ii) does not present the Seminar as required in the IV year I/II Semester, or (iii) secures less than 40% of marks in Industry oriented Mini-Project/Seminar evaluations. He may reappear once for each of the above evaluations, when they are scheduled again; if he fails in such 'one reappearance' evaluation also, he has to reappear for the same in the next subsequent Semester, as per the schedule.

9.3 A Student will not be promoted from I Year to II Year, unless he/she fulfils the Attendance requirements

9.4 A Student will not be promoted from II Year to III Year, unless he/she fulfils the Attendance and Academic Requirements and (i) secures a total of **48 Credits out of 96 Credits** up to II Year II Semester from all the relevant regular and supplementary examinations.

9.5 A Student will not be promoted from III Year to IV Year, unless he/she fulfils the Attendance and Academic Requirements and (i) secures a **total of 72 Credits out of 144 Credits** up to III Year II Semester, from all the regular and supplementary examinations.

9.6 After securing the necessary 192 Credits as specified for the successful completion of the entire UGP, resulting in 192 Credits for UGP performance evaluation, i.e., the performance of the Student in these 192 Credits shall alone be taken into account for the calculation of 'the final CGPA.

If a Student registers for some more 'extra Subjects' (in the parent Department or other Departments/Branches of Engg.) other than those listed Subjects totalling to 192 Credits as specified in the Course Structure of his Department, the performances in those 'extra Subjects' (although evaluated and graded using the same procedure as that of the required 192 Credits) will not be taken into account while calculating the SGPA and CGPA. For such 'extra Subjects' registered, % marks and Letter Grade alone will be indicated in the Grade Card, as a performance measure, subject to completion of the Attendance and Academic Requirements as stated in items 8 and 9.1-9.7.

9.7 Students who fail to earn minimum of 192 Credits as per the Course Structure, and as indicated above, within 8 Academic Years from the Date of Commencement of their I Year shall forfeit their seats in B.Tech Programme and their admissions shall stand cancelled.

When a Student is detained due to shortage of attendance/lack of credits in any Semester, he may be re-admitted into that Semester, as and when offered. However the regulations at the time of admissions hold good.

10. EVALUATION - DISTRIBUTION AND WEIGHTAGE OF MARKS

10.1 The performance of a student in each Semester shall be evaluated Subject-wise (irrespective of Credits assigned) with a maximum of 100 marks for Theory. The B.Tech Project Work (Major Project) will be evaluated for 200 Marks. These evaluations shall be based on 25% CIE (Continuous Internal Evaluation) and 75% SEE (Semester End Examination), and a Letter Grade corresponding to the % marks obtained shall be given.

10.2 For all Theory Subjects/Courses as mentioned above, the distribution shall be 25 marks for CIE, and 75 marks for the SEE.

10.3 a) For Theory Subjects (inclusive of Minor Courses), during the Semester, there shall be 2 mid-term examinations for 25 marks each. Each mid-term examination consists of one subjective paper for 20 marks, and assignment for 5 marks for each subject.

Question paper contains 2 Parts (Part-A and Part-B.) The distribution of marks for PART-A and PART-B will be 5 marks & 15 marks respectively for UG programs.

Pattern of the question paper is as follows:

PART–A

Consists of ***one compulsory question*** with five sub questions each carrying one mark. For the I-Mid examinations the sub question would be from first 2 ½ units and for the II-Mid examination the sub question would be from the remaining 2 ½ units.

PART-B

Consists of five questions (out of which students have to answer three questions) carrying five marks each. Each question there will be an "either" "or" choice (that means there will be two questions from each unit and the student should answer any one question). The questions can consist of sub questions also.

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

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

d) If any candidate is absent for the MID term examination or those who want to improve their internal marks in any subject can opt for Computer Based Test (CBT) as and when offered. The CBT is a 45 minutes duration ONLINE exam consisting of 25 objective questions from the entire syllabus of the subject. The CBT can be taken after the payment of prescribed fee.

10.4 For Practical Subjects, there shall be a Continuous Internal Evaluation (CIE) during the Semester for 25 internal marks, and 75 marks are assigned for Lab/Practical End Semester Examination (SEE). Out of the 25 marks for internals, day-to-day work in the laboratory shall be evaluated for 15 marks; and for the remaining 10 marks - two internal practical tests (each of 10 marks) shall be conducted by the concerned laboratory teacher and the average of the two tests is taken into account. The SEE for Practical's shall be conducted at the end of the Semester by Two Examiners appointed by the Chief controller of examinations in consultation with the Head of the Department.

10.5 For the Subjects having Design and/or Drawing, (such as Engineering Graphics, Engineering Drawing, Machine Drawing, Production Drawing Practice, and Estimation), the distribution shall be 25 marks for CIE (10 marks for day-to-day work and 15 marks for internal tests) and 75 marks for SEE. 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.

10.6 **Open Electives:** Students can choose One Open Elective (OE-I) during V Semester, one (OE-II) during VI Semester, and one (OE-III) in VII Semester, from the list of Open Electives given. However, Students cannot opt for an Open Elective Subject offered by their own (parent) Department, if it is already listed under any category of the Subjects offered by parent Department in any Semester.

10.7 There shall be an industry-oriented Mini-Project, in collaboration with an industry of their specialization, to be taken up during the vacation after III year II Semester (VI Semester) examination. However, the mini-project and its report shall be evaluated in VII Semester. The industry oriented mini-project shall be submitted in a report form and presented before the committee. It shall be evaluated for 50 marks. The committee consists of an external examiner, head of the department, the supervisor of the mini-project and a senior faculty member of the department. There shall be no internal marks for industry-oriented mini-project.

10.8 There shall be a Seminar Presentation in VIII Semester. For the Seminar, the student shall collect the information on a specialized topic, prepare a Technical Report and submit to the Department at the time of Seminar Presentation. The Seminar Presentation (along with the Technical Report) shall be evaluated for 50 marks for internal examinations. There shall be no SEE for seminar.

10.9 There shall be a Comprehensive Viva in VI & VIII Semester and will be conducted SEE by through a test or a committee consisting of One External Examiner, Head of the Department and two Senior faculty members of the Department. The comprehensive viva is intended to assess the student's understanding of the subjects he/she studied during the B.Tech course of study. The Comprehensive Viva-Voce is evaluated for 50 marks by the committee. There shall be no CIE for Comprehensive Viva.

10.11 Each Student shall start the Project Work during the VII Semester, as per the instructions of the Project Guide/Project Supervisor assigned by the Head of Department. Out of total 200 marks allotted for the Project Work 50 marks shall be for CIE (Continuous Internal Evaluation and 150 marks for the SEE (End Semester Viva-voce Examination).

10.12 In VIII semester a mid-course review is conducted by Head of the Department and the project supervisor 25 marks based on the student's progress. On completion of the project the second evaluation is conducted for award of internal marks for another 25 marks before the report is submitted making the total internal marks 50. The end semester examination shall be based on the report submitted and a viva-voce exam for 150 marks by committee comprising of the Head of the Department, project supervisor and an external examiner. A minimum of 40% of maximum marks shall be obtained to earn the corresponding credits.

10.13. **End semester examination:**

a) Question paper contains 2 Parts (Part-A and Part-B) having the questions distributed equally among all units.
b) The distribution of marks for PART-A and PART-B will be 25 marks & 50 marks respectively for UG programs. Pattern of the question paper is as follows:

PART–A

Consists of two questions which are compulsory. The first question consists of five sub-questions one from each unit and carry 2 marks each. Second question consists of five sub-questions one from each unit and carry 3 marks each.

PART-B

Consists of 5 questions carrying 10 marks each. Each of these questions is from one unit and may contain sub questions. Each question there will be an "either" "or" choice (that means there will be two questions from each unit and the student should answer any one question).

10.14 For Mandatory Non-Credit Courses offered like Technical Seminar, Micro Project, EPICS, Certification, Computational Mathematics in a Semester, after securing ≥ 65% attendance and has secured not less than 35% marks in the SEE, and a minimum of 40% of marks in the sum total of the CIE and SEE taken together in such a course, then the student is **PASS** and will be qualified for the award of the degree. No marks or Letter Grade shall be allotted for these courses/activities.However, for non credit courses '**Satisfactory'** or "**Unsatisfactory'** shall be indicated instead of the letter grade and this will not be counted for the computation of SGPA/CGPA.

11. AWARD OF DEGREE

After a student has satisfied the requirement prescribed for the completion of the Program and is eligible for the award of B. Tech. Degree he shall be placed in one of the following four classes Shown in Table.

Table: **Declaration of Class based on CGPA (Cumulative Grade Point Average)**

Class Awarded	Grade to be Secured
First Class with Distinction	CGPA ≥ 8.00
First Class	≥ 6.50 to < 8.00 CGPA
Second Class	≥ 5.50 to < 6.50 CGPA
Pass Class	≥ 5.00 to < 5.50 CGPA
FAIL	CGPA < 5

a) **Improvement of Grades and Completion of the Course**

i) Candidates who have passed in a theory course in a semester are allowed to appear for improvement of SEE in the next immediate supplementary examination for a maximum of three subjects only. Candidates will not be allowed to improve grade in the Comprehensive viva, Laboratory, Seminars and Project Work.

ii) Improved grade will not be counted for the award of prizes/medals and Rank. However the previous grade will be considered for the award of prizes/medals and rank in case of toppers.

iii) If the candidate does not show improvement in the grade, his/her previous grade will be taken into consideration.

12. LETTER GRADE AND GRADE POINT

12.1 Marks will be awarded to indicate the performance of each student in each Theory Subject, or Lab/Practical's, or Seminar, or Project, or Mini-Project, Minor Course etc., based on the %marks obtained in CIE+SEE (Continuous Internal Evaluation + Semester End Examination, both taken together), and a corresponding Letter Grade shall be given.

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

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

12.3 A student obtaining F Grade in any Subject shall be considered 'failed' and will be required to reappear as 'Supplementary Candidate' in the End Semester Examination (SEE), as and when offered. In such cases, his Internal Marks (CIE Marks) in those Subject(s) will remain same as those he obtained earlier.

12.4 A Letter Grade does not imply any specific % of Marks.

12.5 In general, a student shall not be permitted to repeat any Subject/Course (s) only for the sake of 'Grade Improvement' or 'SGPA/CGPA Improvement'. However, he has to repeat all the Subjects/Courses pertaining to that Semester, when he is detained.

12.6 A student earns Grade Point (GP) in each Subject/Course, on the basis of the Letter Grade obtained by him in that Subject/Course (excluding Mandatory non-credit Courses). Then the corresponding 'Credit Points' (CP) are computed by multiplying the Grade Point with Credits for that particular Subject/Course.

Credit Points (CP) = Grade Point (GP) x Credits …. For a Course

12.7 The Student passes the Subject/Course only when he gets GP ≥ 4 (P Grade or above).

12.8 The Semester Grade Point Average (SGPA) is calculated by dividing the Sum of Credit Points (ΣCP) secured from ALL Subjects/Courses registered in a Semester, by the Total Number of Credits registered during that Semester. SGPA is rounded off to TWO Decimal Places. SGPA is thus computed as

SGPA = $\{\sum_{i=1}^{N} C_i G_i\} / \{\sum_{i=1}^{N} C_i\}$ …. For each Semester,

where 'i' is the Subject indicator index (takes into account all Subjects in a Semester), 'N' is the no. of Subjects 'REGISTERED' for the Semester (as specifically required and listed under the Course Structure of the parent Department), C_i is the no. of Credits allotted to that ix Subject, and G_i represents the Grade Points (GP) corresponding to the Letter Grade awarded for that i Subject.

Illustration of Computation of SGPA Computation

Course	Credit	Grade Letter	Grade Point	Credit Point (Credit x Grade)
Course1	3	A	8	3 x 8 = 24
Course2	4	B+	7	4 x 7 = 28
Course3	3	B	6	3 x 6 = 18
Course4	3	O	10	3 x10= 30
Course5	3	C	5	3 x 5 = 15
Course6	4	B	6	4 x 6 = 24

Thus, **SGPA =139/20 =6.95**

12.9 The Cumulative Grade Point Average (CGPA) is a measure of the overall cumulative performance of a student over all Semesters considered for registration. The CGPA is the ratio of the Total Credit Points secured by a student in ALL registered Courses in ALL Semesters, and the Total Number of Credits

registered in ALL the Semesters. CGPA is rounded off to TWO Decimal Places. CGPA is thus computed from the I Year Second Semester onwards, at the end of each Semester, as per the formula

CGPA = $\{ \sum_{j=1}^{M} C_j G_j \} / \{ \sum_{j=1}^{M} C_j \}$ … for all S Semesters registered

(i.e., up to and inclusive of S Semesters, S ≥ 2),

where 'M' is the TOTAL no. of Subjects (as specifically required and listed under the Course Structure of the parent Department) the Student has 'REGISTERED' from the 1st Semester onwards up to and inclusive of the Semester S (obviously M > N), 'j' is the Subject indicator index (takes into account all Subjects from 1 to S Semesters), C_j is the no. of Credits allotted to the jth Subject, and G_j represents the Grade Points (GP) corresponding to the Letter Grade awarded for that jth Subject. After registration and completion of I Year I Semester however, the SGPA of that Semester itself may be taken as the CGPA, as there are no cumulative effects.

For CGPA Computation

Semester 1	Semester 2	Semester 3	Semester 4	Semester 5	Semester 6
Credits : 20 SGPA : 6.9	Credits : 22 SGPA : 7.8	Credits : 25 SGPA : 5.6	Credits : 26 SGPA : 6.0	Credits : 26 SGPA : 6.3	Credits : 25 SGPA : 8.0

Thus, **CGPA =** $\dfrac{20 \times 6.9 + 22 \times 7.8 + 25 \times 5.6 + 26 \times 6.0 + 26 \times 6.3 + 25 \times 8.0}{144} = 6.73$

12.10 For Merit Ranking or Comparison Purposes or any other listing, ONLY the 'ROUNDED OFF' values of the CGPAs will be used.

12.11 For Calculations listed in Item 12.6–12.10, performance in failed Subjects/Courses (securing F Grade) will also be taken into account, and the Credits of such Subjects/Courses will also be included in the multiplications and summations. However, Mandatory Courses will not be taken into consideration.

13. DECLARATION OF RESULTS

a. Computation of SGPA and CGPA are done using the procedure listed in 12.6– 2.10.

14. WITH HOLDING OF RESULTS

If the student has not paid fees to College at any stage, or has pending dues against his name due to any reason what so ever, or if any case of indiscipline is pending against him, the result of the student may be withheld, and he will not be allowed to go into the next higher Semester. The Award or issue of the Degree may also be withheld in such cases.

15. SUPPLEMENTARY EXAMINATIONS

Supplementary examinations will be conducted immediately after the declaration of the regular examinations results for those who absent or appeared and failed in regular examinations. Such candidates writing supplementary examinations may have to write more than one examination per day.

16 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 RULES OF DISCIPLINE

17.1 Any attempt by any student to influence the teachers, Examiners, faculty and staff of controller of Examination 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 Examiner is final.

18. MALPRACTICE PREVENTION COMMITTEE

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

a) Controller of examinations - Chairman
b) Addl. Controller of examinations.- Member Convenor
c) Subject expert - member
d) Head of the department of which the student belongs to. - Member
e) The invigilator concerned - member

The committee shall conduct the meeting after taking explanation of the student and punishment will be awarded by following the malpractice rules meticulously.

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

19. TRANSITORY REGULATIONS

Student who has discontinued for any reason, or has been detained for want of attendance or lack of required credits as specified, or who has failed after having undergone the Degree Programme, may be considered eligible for readmission to the same Subjects/Courses (or equivalent Subjects/Courses, as the case may be), and same Professional Electives/Open Electives (or from set/category of Electives or equivalents suggested, as the case may be) as and when they are offered (within the time-frame of 8 years from the Date of Commencement of his I Year I Semester).

20. STUDENT TRANSFERS

There shall be no Branch transfers after the completion of Admission Process.

21. GRADUATION DAY

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

22. AWARD OF MEDALS

Institute will award Medals to the outstanding students who complete the entire course in the first attempt within the stipulated time.

23. SCOPE

i) Where the words "he", "him", "his", occur in the write-up of regulations, they include "she", "her".
ii) Where the words "Subject" or "Subjects", occur in these regulations, they also imply "Course" or "Courses".
iii) The Academic Regulations should be read as a whole, for the purpose of any interpretation.
iv) In case of any doubt or ambiguity in the interpretation of the above rules, the decision of the Chairman of the Academic Council is final.

The Academic Council may change or amend the Academic Regulations, Course Structure or Syllabi at any time, and the changes or amendments made shall be applicable to all Students with effect from the dates notified by the Academic Council Authorities.

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

(Effective for the students getting admitted into II year from the Academic Year 2017-2018 on wards)

1. The Students have to acquire 144 credits from II to IV year of B.Tech Program (Regular) for the award of the degree.
2. 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. The same attendance regulations are to be adopted as that of B. Tech. (Regular)
4. **Promotion Rule:**
5. A Student will not be promoted from III Year to IV Year, unless he/she fulfils the Attendance and Academic Requirements and (i) secures a **total of 48 Credits out of 96 Credits** up to III Year II Semester, from all the regular and supplementary examinations.
6. **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 144 credits will be considered for the calculation of CGPA and award of class shall be shown separately.
7. All other regulations as applicable for B. Tech. Four-year degree course (Regular) will hold good for B.Tech (Lateral Entry Scheme).

MALPRACTICES RULES - DISCIPLINARY ACTION FOR /IMPROPER CONDUCT IN EXAMINATIONS

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

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

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

COURSE STRUCTURE

B.Tech. - COURSE STRUCTURE - MLR-17
INFORMATION TECHNOLOGY

I B.Tech.- I SEMESTER

Course Code	Course Title	Course Area	Hours per Week			Credits	Scheme of Examination Maximum Marks		
			L	T	P		Internal (CIE)	External (SEE)	Total
A3HS01	Differential equations and applications	BS	4	1	-	4	25	75	100
A3HS02	Computational Methods and Integral Calculus	BS	4	1	-	4	25	75	100
A3HS06	Applied Physics-I	BS	3	1	-	3	25	75	100
A3HS09	Engineering Chemistry	BS	3	1	-	3	25	75	100
A3CS01	Computer Programming	ES	4	1	-	4	25	75	100
A3CS02	Computer Programming using 'C' Lab	ES	-	-	3	2	25	75	100
A3HS08	Applied Physics Lab	BS	-	-	3	2	25	75	100
A3HS20	IT and Engineering Workshop	ES	-	-	3	2	25	75	100
Total			**18**	**05**	**9**	**24**	**200**	**600**	**800**
Mandatory Course (Non-Credit)									
A3HS19	Technical Seminar - I (Micro Project/EPICS Certification/MOOCS)	MC	-	-	2	-	25	75	100

I B.Tech.-II SEMESTER

Course Code	Course Title	Course Area	Hours per Week			Credits	Scheme of Examination Maximum Marks		
			L	T	P		Internal (CIE)	External (SEE)	Total
A3HS03	Linear Algebra and Integral Transforms	BS	4	1	-	4	25	75	100
A3HS07	Applied Physics-II	BS	3	1	-	3	25	75	100
A3HS11	Technical English	HS	3	-	-	3	25	75	100
A3EC50	Basic Electrical Engineering	ES	3	1	-	3	25	75	100
A3CS04	Data Structures	ES	4	1	-	4	25	75	100
A3CS05	Data Structures Lab	ES	-	-	3	2	25	75	100
A3HS12	English Communication Skills Lab	HS	-	-	3	2	25	75	100
A3ME05	Engineering Drawing	ES	1	1	3	3	25	75	100
Total			**18**	**05**	**9**	**24**	**200**	**600**	**800**
Mandatory Course (Non-Credit)									
A3HS18	Technical Seminar & Computational Mathematics (FOSS)	MC	-	-	2	-	25	75	100

II B.Tech.- I SEMESTER									
Course Code	Course Title	Course Area	Hours per Week			Credits	Scheme of Examination Maximum Marks		
			L	T	P		Internal (CIE)	External (SEE)	Total
A3HS05	Probability and Statistics	BS	3	1	-	3	25	75	100
A3EC19	Digital Logic Design	ES	3	1	-	3	25	75	100
A3EC70	Electronic Devices	ES	3	1	-	3	25	75	100
A3CS06	Computer Architecture and Organization	PC	4	1	-	4	25	75	100
A3CS07	Discrete Mathematical Structures	BS	4	1	-	4	25	75	100
A3CS13	Java Programming	PC	3	1	-	3	25	75	100
A3EC71	Electronic Devices and Digital Logic lab	ES	-	-	3	2	25	75	100
A3CS15	JAVA Programming Lab	PC	-	-	3	2	25	75	100
Total			**20**	**06**	**06**	**24**	**200**	**600**	**800**
Mandatory Course (Non-Credit)									
A3HS16	Environmental Studies	MC	3	-	-	-	25	75	100

II B.Tech.- II SEMESTER									
Course Code	Course Title	Course Area	Hours per Week			Credits	Scheme of Examination Maximum Marks		
			L	T	P		Internal (CIE)	External (SEE)	Total
A3CS11	Design and Analysis of Algorithms	PC	4	1	-	4	25	75	100
A3CS14	Database Management Systems	PC	4	1	-	4	25	75	100
A3CS12	Operating Systems	PC	4	1	-	4	25	75	100
A3IT01	Advanced Web Technologies	PC	3	1	-	3	25	75	100
A3IT02	Python Programming	PC	3	1	-	3	25	75	100
A3IT03	Python Programming Lab	PC	-	-	3	2	25	75	100
A3IT04	Advanced Web Technologies Lab	PC	-	-	3	2	25	75	100
A3CS16	Database Management Systems Lab	PC	-	-	3	2	25	75	100
Total			**18**	**05**	**09**	**24**	**200**	**600**	**800**
Mandatory Course (Non-Credit)									
A3HS17	Gender Sensitization	MC	-	-	2	-	25	75	100

III B.Tech.- I SEMESTER									
Course Code	Course Title	Course Area	Hours per Week			Credits	Scheme of Examination Maximum Marks		
			L	T	P		Internal (CIE)	External (SEE)	Total
A3CS18	Computer Networks	PC	3	1	-	3	25	75	100
A3CS19	Linux Programming	PC	3	1	-	3	25	75	100
A3CS21	Software Engineering	PC	4	1	-	4	25	75	100
A3CS26	Data Mining and Warehousing	PC	3	1	-	3	25	75	100
A3IT05	Automata and Compiler Design	PC	4	1	-	4	25	75	100
	OPEN ELECTIVE-I	OE	3	-	-	3	25	75	100
A3CS24	Linux Programming Lab	PC	-	-	3	2	25	75	100
A3CS28	Data Mining & Warehousing Lab	PC	-	-	3	2	25	75	100
Total			**20**	**05**	**06**	**24**	**200**	**600**	**800**
Mandatory Course (Non-Credit)									
A3IT09	Technical Seminar-II (Micro Project /EPICS/ Certification/MOOCS)	MC	-	-	2	-	25	75	100

III B.Tech.- II SEMESTER									
Course Code	Course Title	Course Area	Hours per Week			Credits	Scheme of Examination Maximum Marks		
			L	T	P		Internal (CIE)	External (SEE)	Total
A3IT10	Angular JS	PC	3	1	-	3	25	75	100
A3IT11	Cross Platform Mobile Application Development	PC	4	1	-	4	25	75	100
A3CS32	Machine Learning	PC	4	1	-	4	25	75	100
	OPEN ELECTIVE-II	OE	3	-	-	3	25	75	100
	PROFESSIONAL ELECTIVE - I	PE	3	1	-	3	25	75	100
A3HS13	Advanced English Communication Skills Lab	HS	-	-	3	2	25	75	100
A3IT17	Angular JS Lab	PC	-	-	3	2	25	75	100
A3IT18	Cross Platform Mobile Application Development Lab	PC	-	-	3	2	25	75	100
A3IT19	Comprehensive Viva - I	CC	-	-	-	1	-	50	50
Total			**17**	**04**	**09**	**24**	**200**	**650**	**850**

Note: Industry Oriented Mini Project Carried out during summer vacation between III Year – II SEM & IV year – I SEM and evaluated in IVth year I Semester.

IV B.Tech.- I SEMESTER									
Course Code	Course Title	Course Area	Hours per Week			Credits	Scheme of Examination Maximum Marks		
			L	T	P		Internal (CIE)	External (SEE)	Total
A3CS30	Cryptography and Information Security	PC	3	1	-	3	25	75	100
A3CS31	Distributed Systems	PC	4	1	-	4	25	75	100
A3IT20	Human Computer Interaction	PC	4	1	-	4	25	75	100
	OPEN ELECTIVE-III	OE	3	-	-	3	25	75	100
	PROFESSIONAL ELECTIVE – II	PE	3	1	-	3	25	75	100
A3CS33	Cryptography and Information Security Lab	PC	-	-	3	2	25	75	100
A3CS34	Cloud Application Development Lab	PC	-	-	3	2	25	75	100
A3CS35	Big Data Engineering Lab using Hadoop	PC	-	-	3	2	25	75	100
A3IT25	Industry Oriented Mini Project	CC	-	-	-	1	-	50	50
Total			**17**	**04**	**09**	**24**	**200**	**650**	**850**

IV B.Tech.- II SEMESTER									
Course Code	Course Title	Course Area	Hours per Week			Credits	Scheme of Examination Maximum Marks		
			L	T	P		Internal (CIE)	External (SEE)	Total
A3HS15	Management Science	HS	3	1	-	3	25	75	100
	PROFESSIONAL ELECTIVE – III	PE	3	1	-	3	25	75	100
	PROFESSIONAL ELECTIVE – IV	PE	3	1	-	3	25	75	100
A3IT30	Comprehensive Viva - II	CC	-	-	-	1	-	50	50
A3IT31	Project	CC	-	-	12	12	50	150	200
A3IT32	Seminar	CC	-	-	3	2	50	-	50
Total			**09**	**03**	**15**	**24**	**175**	**425**	**600**

PROFESSIONAL ELECTIVES			
PE1		**PE2**	
A3IT15	Software Testing and Quality Assurance	A3IT24	PHP Scripting Language
A3IT16	Intellectual Property Rights	A3CS39	Building Internet of Things
A3CS37	Introduction to Analytics (Associate Analytics-1)	A3CS42	Big Data Engineering (Associate Analytics – 2)
A3CS38	Information Security Management (Security Analyst-1)	A3CS43	Information Security Assessments And Audits (Security Analyst-2)
PE3		**PE4**	
A3IT26	Soft Computing	A3IT27	Computer Graphics
A3CS50	Information Retrieval Systems	A3IT28	Map Reduce Programming
A3CS47	Predictive Analytics (Associate Analytics-3)	A3CS45	Service Oriented Architecture
A3CS48	Information Security Incident Response and Management (Security Analyst-3)	A3IT29	Cognitive Computing

OPEN ELECTIVE-I			
S. No.	**Course Code**	**Course Name**	**Offering Department**
1	A3ME25	Fundamentals of Mechatronics	Mechanical Engineering
2	A3ME26	Basics of Thermodynamics	
3	A3ME27	Fundamentals of Engineering Materials	
4	A3CS54	Fundamentals of Data bases	Computer Science & Engineering
5	A3CS55	Software engineering Principles	
6	A3CS56	Core Java Programming	
7	A3IT06	Fundamentals of Information Technology	Information Technology
8	A3IT07	Basics of Mobile Application development	
9	A3IT08	Fundamentals of e-commerce	
10	A3EC22	Logic design	Electronics and communication Engineering
11	A3EC23	Principles of communications	
12	A3EC24	Measurements and instrumentation	
13	A3AE17	Fabrication Process	Aeronautical Engineering
14	A3AE18	Fundamentals of Avionics	
15	A3AE19	Introduction to jets and rockets	
16	A3EE15	Electrical Engineering Materials	Electrical & Electronics Engineering
17	A3EE16	Electrical wiring and Safety Measures	

OPEN ELECTIVE-II			
S. No.	**Course Code**	**Course Name**	**Offering Department**
1	A3ME34	Fundamentals of Operation research	Mechanical Engineering
2	A3ME35	Economics for Engineers	
3	A3ME36	Basics of Robotics	
4	A3CS57	Elements of Cloud computing	Computer Science & Engineering
5	A3CS58	Computer Organization & Operating systems	
6	A3CS59	Fundamentals of Artificial Intelligence	
7	A3IT12	Principles of programming Languages	Information Technology
8	A3IT13	Human computer interface Design basics	
9	A3IT14	Computer and network security fundamentals	
10	A3EC30	Fundamentals of Integrated Circuits	Electronics and communication Engineering
11	A3EC31	Signal Transmission through linear systems	
12	A3EC32	Fundamentals of VLSI Design	
13	A3AE27	Introduction to aircraft Industry	Aeronautical Engineering
14	A3AE28	Non destructive testing Methods	
15	A3AE29	Fundamentals of Finite element methods	
16	A3EE21	Solar Energy and Applications	Electrical & Electronics Engineering
17	A3EE22	Non-Conventional Power Generation	

OPEN ELECTIVE-III			
S. No.	**Course Code**	**Course Name**	**Offering Department**
1	A3ME46	Introduction to material handling	Mechanical Engineering
2	A3ME47	Non conventional energy sources	
3	A3ME48	Aspects of heat & mass transfer	
4	A3CS60	Soft computing	Computer Science & Engineering
5	A3CS61	Problem solving Techniques	
6	A3CS62	Discrete structures	
7	A3IT21	Software testing fundamentals	Information Technology
8	A3IT22	Basics of multimedia systems	
9	A3IT23	Introduction to game development	
10	A3EC42	Introduction to Micro Processors & Micro Controllers	Electronics and communication Engineering
11	A3EC43	Fundamentals of Image processing	
12	A3EC44	TV Engineering	
13	A3AE39	Guidance and control of aerospace vehicles	Aeronautical Engineering
14	A3AE40	Wind tunnel Techniques	
15	A3AE41	Introduction to Aerospace Technology	
16	A3EE32	Energy Audit and Management Systems	Electrical & Electronics Engineering
17	A3EE33	Energy Storage Systems	

I B.TECH I SEMESTER SYLLABUS

Differential Equations & Applications
(Common to all Branches)

B. Tech: IT I–I Semester	L	T	P	C
Course Code: **A3HS01**	4	1	-	4

CourseOverview:

This course develops the theory of differential equations and indicating its applications. This course deals with more advanced Engineering Mathematics topics which provide students with the relevant mathematical tools required in the analysis of problems in engineering and scientific professions. Topics include the differential equations of first order and their applications, higher order linear differential equations and their applications, functions of single variable and their applications, partial differential equations, Fourier series. The mathematical skills derived from this course form a necessary base to analytical and design concepts encountered in the program.

Prerequisite(s): Knowledge of differentiation and integration.

CourseObjectives:

I. Get the knowledge of differential equations in mathematicalmodeling.
II. To explain higher order differential equations and their applications in engineeringproblem solving.
III. The modeling to mathematical problem and there by finds a solution using mathematicalconcepts.
IV. To develop alternative ways to solve a problem and systematic approach of a solution in reallife.
V. To gain experience of doing independent study andresearch.

CourseOutcomes:

Up on successful completion of this course, student will be ableto:

1. Specify standard methods for solving differential equations and their applications ingeometrical and physicalproblems.
2. Identify different types of higher order differential equations and their applications inengineering problemsolving.
3. Apply partial derivatives to study maxima and minima of functions of twovariables
4. Apply partial differential equations to solve the linear and nonlinear partial differential equations.
5. Have a fundamental understanding of Fourier series and able to give Fourier expansions of a given function.
6. Participate and succeed in competitive examinations like GATE,GRE.

SYLLABUS

UNIT-I **(8 Lectures)**

DIFFERENTIAL EQUATIONS OF FIRST ORDER AND THEIR APPLICATIONS: Exact equations and equations reducible to exact form- Application of first order differential equations- Orthogonal trajectories- Newton's law of cooling – Law of natural growth and decay.

UNIT – II **(10 Lectures)**

HIGHER ORDER LINEAR DIFFERENTIAL EQUATIONS AND THEIR APPLICATIONS: Linear differential equations of second and higher order with constant coefficients, Non-Homogeneous term of the type $Q(x) = e^{ax}$, sinax, cosax, $e^{ax}v(x)$, $x^nV(x)$ –Equations reducible to linear equations with constant coefficients- Cauchy's homogeneous linear equation – Legendre's linear equation – Method of variation of parameters –Applications to Electrical Circuits and Simple harmonic motion.

UNIT-III **(10 Lectures)**

PARTIAL DIFFERENTIATION: Introduction – Limit – Continuity – Partial derivatives – Partial derivatives of higher orders – Homogenous function – Euler's theorem on Homogenous function – Total Differential Coefficients.

FUNCTIONS OF SEVERAL VARIABLES: Jacobian – Functional dependence – Maxima and Minima of functions of two variables – Lagrange's method of undetermined multipliers.

UNIT – IV **(8 Lectures)**

PARTIAL DIFFERENTIAL EQUATIONS: Formation of partial differential equation by elimination of arbitrary constants and arbitrary functions- Solutions of first order linear (Lagrange) equation and nonlinear (standard type) equations – Equations reducible to standard forms.

UNIT – V **(8 Lectures)**

FOURIER SERIES: Determination of Fourier coefficients-Fourier series in an arbitrary interval-Fourier series of even and odd functions-Half range Fourier sine and cosine expansions.

TEXT BOOKS:

A fist course in differential equations with modeling application by dennis G.Zill, Cengage Learning
Higher Engineering Mathematics by Dr.B.S.Grewal, Khanna publishers
Advanced Engineering Mathematics by R K Jain & S R K Iyengar, Narosa Publishers

REFERENCE BOOKS:

Advanced Engineering Mathematics by E. Kreyszig, John Wiley & Sons Publisher.
Engineering Mathematics by N.P.Balil, Lakshmi Publications.
Advanced Engineering Mathematics by Michael Greenberg, pearson Education.

COMPUTATIONAL METHODS & INTEGRAL CALCULUS

B. Tech: IT I – I Semester | **L T P C**

Course Code: **A3HS02** | 4 **1 - 4**

Course Overview:

The course matters is devided into 5 chapters covering duly recognized areas of theory and study. This course deals with more advanced Engineering Mathematics and Statistics topics which
provide students with the relevant mathematical and statistical tools required in the analysis of problems in engineering and scientific professions. The topics covered include probability, random variables and distributions, solutions of algebraic and transcendental equations, interpolation, curve fitting, numerical integration and numerical solution of ordinary differential equations, Improper integration, multiple integrals and their applications, Vector integral theorems(Green's, Stoke's and Gauss's divergence theorems). The mathematical skills derived from this course forma necessary base to analytical and design concepts encountered in the programme.

Prerequisite(s):NIL

Course Objectives:

I. Develop an understanding of the role of distributions inengineering.
II. Acquaint students with the fundamental concepts of solving algebraic andtranscendental equations.
III. Develop an understanding of the role of Numerical Analysis inengineering.
IV. To gain experience of doing independent study andresearch.

Course Outcomes:

Up on successful completion of this course, student will be ableto:

1. Classify discrete and continuous distributionfunctions.
2. Determine numerical solution of Non Linearequations.
3. Discuss the Stability of a system ofequations.
4. Demonstrate the use of curve fitting in correlation and regressionanalysis.
5. Explain numerical differentiation andintegration.
6. Examine numerical interpolation and approximation offunctions.
7. Interpret errors in Numerical Methods.
8. Evaluatedoubleintegralsbychangingvariables, changingorderandtripleintegrationtofindthe area and volume of givenregion.
9. Apply Beta and Gamma functions to evaluate improper integrals.
10. Apply Green's theorem to evaluate line integrals along simple closed contours on the plane, Stoke's theorem to give physical interpretation of the curl of a vector field and Divergencetheorem to give physical interpretation of the divergence of a vectorfield.

SYLLABUS

UNIT-I **(10 Lectures)**

ALGEBRAIC AND TRANSCENDENTAL EQUATIONS:

Introduction – Graphical interpretation of solution of equations. Bisection method - Regula-falsi method - Iteration method - Newton-Raphson method – Solving system of non-homogeneous equations by L – U decomposition method (Crouts method) – Jacobi's Method – Gauss Seidel iteration method.

UNIT-II **(10 Lectures)**

INTERPOLATION: Finite differences: Forward, Backward and Central differences - Other difference operators and relations between them - Differences of a polynomial – Missing terms - Newton's forward interpolation, Newton's backward interpolation, Gauss's forward and backward interpolation formulae and Stirling's formula. Interpolation with unequal intervals – Lagrange's interpolation.

CURVE FITTING: Method of least squares - Fitting a straight line, second degree parabola and non-linear curves of the form $y= a e^{bx}$, $y= a x^{b}$, $y = a b^{x}$ by the method of least squares.

UNIT-III **(10 Lectures)**

NUMERICAL INTEGRATION:

Newton-cotes quadrature formula - Trapezoidal rule - Simpson's one-third rule - Simpson's three-eighth rule.

NUMERICAL SOLUTION OF ORDINARY DIFFERENTIAL EQUATIONS: Taylor's series method – Picard's method - Euler's - modified Euler's Method - Runge-Kutta method

UNIT- IV **(12 Lectures)**

IMPROPER INTEGRATION,MULTIPLE INTEGRALS & APPLICATION

BETA AND GAMMA FUNCTIONS: Relation between them, their properties – Evaluation of improper integrals using Gamma/Beta function.

MULTIPLE INTEGRALS: Double and triple integrals – Change of order of integration-Change of variables in double integrals.Finding the area and volume of a region using double and triple integration

UNIT-V **(12 Lectures)**

VECTOR CALCULUS: Scalar and vector point functions - Gradient, divergence, curl and their related properties -Solenoidal and irrotational vector point functions - Scalar potential function - Laplacian operator - Line integral - work done - surface integrals - volume integral - Vector integral theorems - Green's theorem in a plane - Stoke's theorem - Gauss divergence theorem (all theorem statements and their verification)

TEXT BOOKS:

Numerical Methods for Scientific and Engineering Computation by M.K. Jain, S.R.K.Iyengar and R.K. Jain, New Age International Publishers

Higher Engineering Mathematics by Dr.B.S.Grewal, Khanna publishers.

REFERENCE BOOKS:

Introductory Methods of Numerical Analysis by S. S. Sastry, PHIL Learning Pvt.Ltd

Advanced Engineering Mathematics by E. Kreyszig, John Wiley & Sons Publisher.

Advanced Engineering Mathematics by Lawrence Turyn, CRC press

APPLIED PHYSICS - I

B. Tech: IT I-I Semester | **L T P C**
Course Code: A3HS06 | **3 1 - 3**

Prerequisites: Fundamentals in Physics and Mathematics

Course Objectives:

1. Summarize the different types of errors
2. Describe the structures of crystals and study of different X-ray diffraction methods
3. Explain the origin of Electrical and Magnetic properties of various materials
4. Learn the properties of laser light and how it is used in various fields
5. Comparing the different types of imagining and its importance

Course Outcomes:
Upon successful completion of the course student will able to:

1. Analyze the propagation of errors using different methods
2. Identify and evaluate crystal structures and other properties of the unit cell by diffraction methods
3. Classify various magnetic, dielectric materials properties and can apply knowledge in engineering application
4. Analyze how laser light is more powerful than normal light and how it is used in engineering applications
5. Evaluate the advantages of imaging techniques based on different optical principles

SYLLABUS

UNIT-I **(10 hours)**

Measurements and Errors : Measurand, Accuracy, Precision, Resolution, certainty; Errors - Types of errors and sources of errors -Systematic error, Random error (definitions and examples), Ambiguity error, Dynamic error, Drift, Noise. Errors based on Magnitude- Absolute, Mean absolute, relative and percentage errors with examples. Combination of errors.

Data Analysis- Elements of statistics including bell shaped curve and Variance. Graphical representation of scientific data.

UNIT-II **(08 hours)**

Crystal Structures: Lattice points, Space lattice, Basis, Bravias lattice, unit cell and lattice parameters, Seven Crystal Systems with 14 Bravias lattices , Atomic Radius, Co-ordination Number and Packing Factor of SC, BCC, FCC, Miller Indices, Inter planer spacing of Cubic crystal system**.**

X-ray Diffraction: Bragg's Law, X-Ray diffraction methods: Laue Method, Powder Method- Merits and demerits.

UNIT –III **(12 hours)**

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

Magnetic Properties: Magnetic Permeability, Magnetic Field Intensity, Magnetic Field Induction, Intensity of Magnetization, Magnetic Susceptibility, Origin of Magnetic Moment-Orbital & Spin magnetic moment-Bohr Magnetron, Classification of Dia, Para and Ferro Magnetic Materials on the basis of Magnetic Moment, Hysteresis Curve on the basis of Domain Theory of Ferro Magnetism, Soft and Hard Magnetic Materials, Ferrites and their Applications.

UNIT – IV **(09 hours)**

Fundamentals of Laser: Characteristics of Laser, Energy levels in atoms, radiation matter interaction, absorption of light, spontaneous emission of light, Stimulated emission of light , population of energy levels, Einstein A and B coefficients, Metastable state, population inversion, resonant cavity, excitation mechanisms, Lasing action.

Types of Lasers & Applications: Solid State Laser- Ruby laser, Gas Laser- He-Ne Laser, Semiconductor Laser. Applications of Lasers: Drilling, welding, micro machining, measurement of long distances, in CD write devices & printers.

UNIT – V **(09 hours)**

Optics: Interference – coherence (spatial, temporal). Interference in thin film of uniform thickness (derivation); Diffraction Grating – use as a monochromator.

Imaging Techniques: Classification (visible, IR, electron, magnetic, UV/X-rays, gamma rays, microwaves); Imaging importance, Types of imaging - Microscopes, Telescopes-Working and Calculation of Magnification factors, Camera; Comparative study of different types of imaging with respect to magnification, resolution, image quality, applications.

Teaching Methodologies:

1. Animation videos
2. Assignments uploaded in website.
3. Tutorial questions uploaded in website.
4. Handbook uploaded in website.

Prescribed Books:

1. Modern Engineering physics-I & II : S. Chandralingam, K. Vijayakumar, S Chand Co.
2 . Engineering Physics : P.K.Palanisamy, Scitech Publishers.
3. Engineering Physics : S.O.Pillai, New age International.
4. Eugene Hecht & A.R Ganesan (2009), Optics, Pearson
5. Bottaccini M.R, E.E. Merill, Instruments and Measurements, Bell and Howell

Reference Books:

1. Solid State Physics: Charles Kittel, Wiley & Sons (Asia) Pvt. Ltd.
2. Fundamentals of physics: Halliday,Resnick,Walker.
3. Francis A.Jenkins, Harvey E. White, Fundamentals of Optics, McGraw Hill

ENGINEERING CHEMISTRY

B. Tech: IT I-I emester **L T P C**
Course Code: A3HS09 **3 1 - 3**

This course will involve minimum lecturing, content will be delivered through assigned reading and reinforced with large and small group discussions, as well as assigned in class (and occasional out of class) group activities. Water and its treatment for various purposes, engineering materials such as plastics, composites, ceramic, abrasives, their preparation, properties and applications, conventional and non-conventional energy sources, nuclear, solar, various batteries, combustion calculations, corrosion and control of metallic materials.

Course Objectives:

I. Discover the importance of electrical energy originated from chemical reactions articulate and utilize corrosion prevention strategies and estimate corrosion behavior of materials and components.
II. Describe the role of water as an engineering material in steam and power generation.
III. Substantiate the utility of polymers in chemical and hardware industries. Inculcate knowledge of basic construction materials with its vital role.
IV. Extrapolate the application of fuels in day to day life.
V. Focus on the behavior of different alloys in metallurgy. Understand the concept of colloid and extrapolate their applications in industry.

Course Outcomes:

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

1. Extrapolate the knowledge of cell, electrode, cathode, anode, electrolysis, electromotive force and reference electrode including corrosion of metals.
2. Under standing and Explore the engineering applications of polymeric materials, cement, lubricants and refractories
3. Interpret the vitality of phase rule in metallurgy.
4. Summarize the application of colloids and nanoparticles on industry level in controlling pollution.

SYLLABUS

UNIT – I ELECTROCHEMISTRY: Introduction, Conductance-Specific, Equivalent and Molar conductance, Effect of dilution on electrolytic conductance. EMF: Galvanic Cells, Nernst equation, numerical problems. Concept of concentration cells, electro chemical series-applications. **BATTERIES:** Primary cells (dry cells) and secondary cells (lead-Acid celll). Applications of batteries. **Fuel cells** – Hydrogen – Oxygen fuel cell; Advantages and Applications.

CORROSION AND ITS CONTROL: Introduction, causes of corrosion, theories of corrosion – Chemical, Electrochemical corrosion. Corrosion control methods: Cathodic protection,.sacrificial anode, impressed current cathode methods. Surface coatings: Electroplating(Copper plating), Hot dipping (galvanization & tinning),metal cladding.

UNIT–II

WATER AND ITS TREATMENT: Introduction – Hardness of water - its causes, expression of hardness- units. Types of hardness. Boiler troubles – Scale, sludges and caustic embrittlement. Treatment of boiler feed water: Internal treatment(Phosphate,Colloidal and Calgon conditioning). External treatments: Ion exchange and Zeolite processes. Desalination of brakish water by Reverse osmosis. Numerical problems. Potable water – its specification – steps involved in treatment of potable water- Sterilization by clorinisation and ozonization

UNIT–III

MATERIALS CHEMISTRY: Lubricants: characteristics of a good lubricant- classification with examples of lubricants. Mechanism of lubrication (thick film , thin film and extreme pressure).
Nanotechnology: Origin of Nanotechnology - Surface to Volume Ratio, Preparation of Nano materials by Sol-gel Process and Chemical Vapor Deposition methods. Physical, Chemical, Optical properties and Applications of Nano materials.

ENGINEERING MATERIALS: HIGH POLYMERS: Classification of polymers. **Plastics:** Thermoplastics & Thermosets. Preparation, properties and engineering applications of plastics: Poly vinyl chloride and Bakelite. **Rubbers**: Natural rubber and its vulcanization. **Synthetic rubbers**: Buna-S. **Fibers:** preparation, properties and applications of Polyester and Nylon. Conducting Polymers: mechanism of conduction in polyacetylene and applications of Conducting Polymers .

UNIT–IV
ENERGY SOURCES: Classification of fuels, **Solid fuels**: Coal- its analysis by proximate and ultimate analysis. **Liquid fuels**: Petroleum and its refining. Cracking- Fixed bed catalytic cracking, Knocking- Octane and Cetane rating. **Gaseous fuels**: LPG, CNG and their applications. **Combustion**- Calorific value- LCV & HCV. Calculation of air quantity required for combustion of fuel.

UNIT–V
PHASE RULE: Gibb's phase rule equation. Definition of Terms: Phase, Components and Degrees of Freedom. Significance and limitations of phase rule. Phase diagrams: One component system- Water system. Two component system- Silver- lead system.

SURFACE CHEMISTRY: Adsorption: Types of adsorption. Adsorption isotherm: Langmuir adsorption isotherm, applications of adsorption. Colloids: Classification of colloids. Properties of colloids- Electrical & optical properties- Applications of colloids.

TEXT BOOKS:
1. PC Jain & Monica Jain, (2010). Engineering Chemistry, Dhanpatrai Publishing Company. New Delhi

REFERENCE BOOKS:
1. Engineering Chemistry by Rama Devi, Venkata Ramana Reddy and Rathan, Cengage Learning , New Delhi (2016).
2.S.S Dara & Mukkanti, (2006). Engineering Chemistry, S. Chand & Co. New Delhi.
3. J.C Kuriacase & J Raja ram (2004), Engineering Chemistry, Tata McGraw Hills Co. New Delhi.
4. Engineering Chemistry by M Tirumala Chary & E. Laxminarayana (Second Edition), Scitech Publications, Chennai.

COMPUTER PROGRAMMING

I B. Tech. - I Semester	L	T	P	C
Course Code: A3CS01	4	1	-	4

COURSE OVERVIEW:

The course covers the basics of programming and demonstrates fundamental programming techniques, customs and terms including the most common library functions and the usage of the pre processor. This course helps the students in gaining the knowledge to write simple C language applications, mathematical and engineering problems. This course helps to undertake future courses that assume this programming language as a background in computer programming. Topics include variables, data types, functions, control structures, pointers, strings, arrays and dynamic allocation principles. This course in reached to student by power point presentations, lecture notes, and lab involve the problem solving in mathematical and engineering areas.

COURSE OBJECTIVES:

1. To express algorithms and draw flowcharts in a language independent manner.
2. To teach how to write modular, efficient and readable C programs
3. To impart knowledge in creating and using Arrays of the C data types.
4. To describe the techniques for creating program modules in C using functions and recursive functions.
5. To demonstrate creation of derived data types and perform operations on files.
6. To familiarize pointers and dynamic memory allocation functions to efficiently solve problems

COURSE OUTCOMES:

Upon completion of the course, the students will be able to:

1. Write, compile and debug programs in C language.
2. Use different data types in a computer program.
3. Design programs involving decision structures, loops, arrays and functions.
4. Identify the difference between call by value and call by reference
5. Use pointers to understand the dynamics of memory
6. Create and perform different file operations.

SYLLABUS

UNIT-I

Introduction to the C Language – Algorithm, Pseudo code, Flow chart, Background, C Programs, Identifiers, Data Types, Variables, Constants, Input / Output, Operators(Arithmetic, relational, logical, bitwise etc.), Expressions, Precedence and Associatively, Expression Evaluation, Type conversions.

UNIT-II

Statements- Selection Statements(making decisions) – if and switch statements, Repetition statements (loops)-while, for, do-while statements, Loop examples, other statements related to looping – break, continue, go to, Simple C Program examples.

UNIT-III

Functions- Introduction to Structured Programming, Functions- basics, user defined functions, inter function communication(call by value, call by reference), Standard functions.
Storage classes-auto, register, static, extern, scope rules, arrays to functions, recursive functions, example C programs.

UNIT – IV

Arrays– Basic concepts, one-dimensional arrays, two – dimensional arrays, multidimensional arrays, C programming examples
Pointers – Introduction (Basic Concepts), pointers to pointers, compatibility, Pointer Applications, Arrays and Pointers, Pointer Arithmetic, memory allocation functions, array of pointers, pointers to void, pointers to functions, command –line arguments, Introduction to structures and unions.

UNIT-V

Strings – Concepts, C Strings, String Input / Output functions, string manipulation functions, string /data conversion.

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

TEXT BOOKS:

1. Computer Science: A Structured Programming Approach Using C, B.A.Forouzan and R.F. Gilberg, Third Edition, Cengage Learning.
2. The C Programming Language by Brian Kernighan and Dennis Ritchie 2nd edition

REFERENCE BOOKS:

1. Let Us C Yashavant kanetkar BPB.
2. Absolute beginner's guide to C, Greg M. Perry, Edition 2, Publisher: Sams Pub., 1994.
3. Computer Programming and Data Structures by E Balagurusamy, Tata McGraw Hill.

COMPUTER PROGRAMMING USING C LAB

	L	T	P	C
I B. Tech. - I Semester				
Course Code: A3CS02	-	-	3	2

COURSE OBJECTIVES

I. To impart knowledge of C programming to write modular, efficient and readable C programs by Identifying the structural elements and layout of C source code.
II. To familiarize single and multi-dimensional arrays of the C data types and derived data types like structures, unions.
III. To demonstrate use of predefined functions from the portable C library and to describe the techniques for creating program modules using functions and recursive functions.
IV. To facilitate in creating and manipulating strings.
V. To describe memory allocation techniques and file operations.

COURSE OUTCOMES:

1. Upon completion of the course, the students will be able to:
2. To write, compile and debug programs in C language.
3. Design programs involving decision structures, loops and arrays.
4. Use functions to solve complex problems.
5. Analyze dynamics of memory by the use of pointers.
6. Use different file operations to create/update basic data files.

EXPERIMENTS

WEEK 1

a. Basic Linux commands
b. Write C programs to implement basic arithmetic operations – sum, average, product, difference, quotient and remainder of given numbers etc.

WEEK 2

a. Write a C program to find largest and smallest of given numbers.
b. Write a C program to find roots of a quadratic equation.

WEEK 3

a. Write a C program to find the grade of a student
b. Write a C program which takes two integer operands and one operator form the user(+,-,*,/,% use switch)

WEEK 4

a. Write a C program to find Sum of individual digits of given integer
b. Write a C program to generate first n terms of Fibonacci series
c. Write a C program to generate prime numbers between 1 and n

WEEK 5

a. Write a C program to calculate sum of series SUM=1-x2/2! +x4/4!-x6/6!+x8/8!-x10/10!
b. Write a C program to generate Pascal's triangle

WEEK 6

a. Write a C program to find the factorial of a given integer using recursion and non recursion
b. Write a C program to find GCD of given integers using recursion and non recursion

WEEK 7

a. Write a C program to solve the Towers of Hanoi using recursion.
b. Write a C program to generate first n terms of Fibonacci series using recursion and non recursion

WEEK 8

a. Write a C program to find largest and smallest number in a list of integers
b. Write a C program to find Addition of Two Matrices
c. Write a C program to find Multiplication of Two Matrices

WEEK 9

a. Write a C program to print 2-D array using pointers
b. Write a C program to allocate memory dynamically using memory allocation functions (malloc, calloc, realloc, free)

WEEK 10

Write C Program that uses functions to perform the following operations:

a) i) Insert sub-string into main string from given position.
ii) Delete specified number of Characters from a given position in a given string.
b) Check whether the given string is a palindrome or not

WEEK 11

a) Write a C program to copy one file to another file
b) Write a C program to reverse first 'n' number of characters in a file(file name and 'n' value are passed from command line)

WEEK 12

a) Write a C program to display the contents of a file
b) Write a C program to merge two files into a third file

TEXT BOOKS:

1. C programming and Data Structures, P. Padmanabham, Third Edition, BS Publications.
2. Computer Programming in C, V. Rajaraman, PHI Publishers.
3. C Programming, E. Balagurusamy, 3rd edition, TMH Publishers.
4. Mastering C, K.R. Venugopal and S.R. Prasad, TMH Publishers.

REFERENCE BOOKS:

1. Let Us C Yashavant kanetkar BPB.
2. Absolute beginner's guide to C, Greg M. Perry, Edition 2, Publisher: Sams Pub., 1994.
3. Computer Programming and Data Structures by E Balagurusamy, Tata McGraw Hill.

APPLIED PHYSICS LAB

B. Tech: IT I-I Semester L T P C
Course Code: A3HS08 - - 3 2

Course Overview:

Applied physics laboratory course includes the experimental methods for the determination of the mechanical property (Rigidity modulus of a given material), frequency of an AC Signal, basic electronic circuits (LED, RC, LCR circuits), and to study characteristics of LASERS & Optical fiber (LASER wavelength, divergence, Numerical aperture of fiber, Losses in fibers) and Polarisation of light. And also about study of Hall effect , Planck' s constant. This interdisciplinary knowledge is designed for the continuous innovation occurring with technology.

Course Objectives:

The experiments are selected from various area of Physics like Physical Optics, Lasers, Fiber Optics, Mechanics, Electricity & Magnetism and Basic Electronics.

1. To impart knowledge of LED and SOLAR CELLS
2. To describe the rigidity modulus of given wire by using Torsional pendulum
3. To familiarize the propagation of laser light and how it is used for communication in Optical Communication network.
4. To know how to calculate energy gap of given semiconductor
5. To describe Metling point of solids
6. To describe the phenomenon of interference of light, Hall effect, Polarization.
7. To findout the frequency of A.C with electric tuning fork
8. To calculate the wavelength of given light source using diffraction grating material
9. To determine the Plank's Constant value
10. To determine the type of given Semiconductor using Hall effect

Course Outcomes:

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

1. Identify elastic materials and modulus by its properties with Torsional Pendulum
2. Analyze energy gap of any given semiconductor
3. Analyze the wavelength of laser source using diffraction grating.
4. Evaluate the magnetic field along the axis of a current carrying coil by using Stewart&Gee's apparatus
5. Conclude the interference phenomenon by using Newton's ring apparatus.
6. Determine the Numerical aperture and acceptance angle of any given optical fiber
7. Analyze the temperature dependent of resistance of a thermistor
8. Evaluate the Plank's constant value using polarization filters
9. Analyze the polarization phenomenon of light using Malus experiment
10. Evaluate the threshold voltage of different colours of LEDs
11. Determine the AC frequency using electric tuning fork by Transverse and Longitudinal waves
12. Evaluate the characteristics of SOLAR CELL for variety of applications
13. Determine the Time Constant of RC circuits
14. Identify the type of Semiconductor by using Hall effect

List of Experiments:
(Any 12 experiments compulsory)

1. Study of V-I characteristics of an LED
2. Determination of numerical aperture – optical Fibers.
3. Study of V-I characteristics of Solar Cell
4. Determination of Energy gap of a given Semiconductor material
5. Determination of rigidity modulus of the material of a given wire-Torsional Pendulum
6. Determination of wavelength of given laser source by using diffraction grating
7. Study of variation of magnetic field along a circular current carrying conductor – Stewart & Gee apparatus.
8. Determine the radius of curvature of given convex lens by forming Newton's rings
9. Study the Charging and discharging of a capacitor
10. Determine the frequency of AC using Melde's Experiment
11. To calibrate a thermistor using a thermometer and using the calibrated thermistor as temperature sensor find the melting point of a given chemical compound
12. To measure the value of Planck' s constant 'h'
13. To study Hall effect in extrinsic semiconducting samples and determine the type of Semiconductor
14. To study the polarization of light, to verify Malus law

LABORATORY MANUAL:

1. Laboratory Manual of Engineering Physics by Dr.Y.Aparna & Dr.K.Venkateswara Rao (V.G.S Publishers)
2. Solar photovoltaics – Technology Fundamentals system: A manual for Technics, Trainers & Engineers 2013

IT AND ENGINEERING WORKSHOP
(Common to all)

1)

	L	T	P	C
B. Tech: IT I-I Semester				
Course Code: A3HS20	-	-	3	2

Course Objectives:

The course should enable the students to:

I. Identify the tools used in various engineering workshop trades.
II. Practice safety norms while handling tools and equipments in engineering workshop.
III. Develop models using fitting, carpentry, foundry, Black-Smithy and Tin-Smithy trades.
IV. Demonstrate the process of house wiring for connecting and controlling home appliances.
V. Show the metal joining arc welding process, plumbing, and power tools.
VI. Give hands on practice on productivity tools like word processors, spreadsheets, presentations.
VII. Explain the internal parts of a computer, assembling and disassembling a computer.
Describe the networking of computers and use internet facility for browsing and searching.

Course Outcomes:

Students will be able to

1. Identify various components and peripherals of computer.
2. Assemble and Disassemble a computer
3. Create documents and spread sheets using MS Word and MS Excel
4. Create Presentations using MS Power Point.
5. Assess various browsers based on their performance and security parameters.

LIST OF EXPERIMENTS

Week-1 OPERATING SYSTEM INSTALLATION

Windows 7, Windows 8 and Windows 10.

Week-2 OPERATING SYSTEM INSTALLATION

Linux (Ubuntu) and dual booting.

Week-3 INSTALLING DRIVERS

LAN, graphics, audio, video and command prompt, commands.

Week-4 NETWORK CONNECTIONS

IP configurations, connecting devices in LAN through bridge, hub, switch; Wi-Fi, Li-Fi and Bluetooth settings; Crimping: Crossover, strait over.

Week-5 TROUBLESHOOTING

Hardware troubleshooting, software troubleshooting.

Week-6 BLOG CREATION

Creating blogs, import the data into blogs, blog templates, blog design.

Week-7 SKYPE INSTALLATION

Skype installation and usages of Skype.

Week-8 CYBER HYGIENE

Install antivirus software; Configure their personal firewall and windows update on their computer.

Week-9 MS WORD

Prepare the project document and resume.

Week-10 MS EXCEL

Spreadsheet basics, modifying worksheets, formatting cells, formulas and functions, sorting and filtering, charts.

Week-11 MS POWER POINT

Power point screen, working with slides, add content, work with text, working with tables, graphics, slide animation, reordering slides, adding sound to a presentation.

Week-12 HOUSE WIRING

Power point, light fitting and switches, television, home theater.

Week-13 CARPENTRY

Study of tools and joints; Practice in planning, chiseling, marking and sawing; Joints: Cross joint, T joint, Dove tail joint.

Week-14 SOLDERING

Electronic components (PCB'S), resistance soldering, desoldering, and soldering effects.

Week-15 FITTING

Study of tools, practice in filing, cutting, drilling and tapping; Male and female joints, stepped joints**.**

Week-16 ELECTRICAL WINDING

Lap winding, wave winding and design of transformer.

TEXT BOOKS:

1. Peter Norton, "Introduction to Computers", Tata Mc Graw Hill Publishers, 6th Edition, 2010.
2. Scott Muller, Que, "Upgrading and Repairing", Pearson Education, PC's 18th Edition, 2009.
3. H. S. Bawa, "Workshop Practice", Tata Mc Graw Hill Publishing Company Limited, New Delhi, 2nd Edition, 2007.

TECHNICAL SEMINAR – I
(MICRO PROJECT/EPICS/CERTIFICATION/MOOCS)
MANDATORY NON-CREDIT COURSE

B. Tech: IT I-I Semester | **L T P C**
Course Code: A3HS19 | **- - 2 -**

OBJECTIVE:

Seminar is an important component of learning in an Engineering College, where the student gets acquainted with preparing a report & presentation on a topic.

PERIODICITY / FREQUENCY OF EVALUATION :Twice

PARAMETERS OF EVALUATION:

1. The seminar shall have topic allotted and approved by the faculty.
2. The seminar is evaluated for 25 marks for internal and 25 marks for external.
3. The students shall be required to submit the rough drafts of the seminar outputs within one week of the commencement of the class work.
4. Faculty shall make suggestions for modification in the rough draft. The final draft shall be presented by the student within a week thereafter.
5. Presentation schedules will be prepared by Department in line with the academic calendar.

The Seminars shall be evaluated in two stages as follows:

A. Rough draft

In this stage, the student should collect information from various sources on the topic and collate them in a systematic manner. He/ She may take the help of the concerned faculty.

The report should be typed in “MS-Word” file with “calibri” font, with font size of 16 for main heading, 14 for sub-headings and 11 for the body text. The contents should also be arranged in Power Point Presentation with relevant diagrams, pictures and illustrations. It should normally contain 10 to 15 slides, consisting of the followings:

1.	Topic, name of the student & faculty	1 Slide
2.	List of contents	1 Slide
3.	Introduction	1 Slide
4.	Descriptions of the topic (point-wise)	6 - 10 Slides
5.	Conclusion	1 - 2 Slides
6.	References/Bibliography	1 Slide

The soft copy of the rough draft of the seminar presentation in MS Power Point format along with the draft report should be submitted to the concerned faculty, with a copy to the concerned HOD within stipulated time.

The evaluation of the rough draft shall generally be based upon the following.

1	Punctuality in submission of rough draft	2
2	Dress Code	3
3	Resources from which the seminar have been based	2
4	Report , and content of Presentation	5
5	Depth of the students knowledge in the subject	5
6	Reception from Questions	5
7	Time Management, Classroom Dynamic	3
	Total Marks	**25**

After evaluation of the first draft the supervisor shall suggest further reading, additional work and fine tuning, to improve the quality of the seminar work.

Within 7 days of the submission of the rough draft, the students are to submit the final draft incorporating the suggestions made by the faculty.

B. Presentation: (External)

After finalization of the final draft, the students shall be allotted dates for presentation (in the designated seminar classes) and they shall then present it in presence students, HOD, Incharge, faculties of the department and at least one faculty from some department / other department.

The student shall submit 3 copies of the Report neatly bound along with 2 soft copies of the PPT in DVD medium. The students shall also distribute the title and abstract of the seminar in hard copy to the audience. The final presentation has to be delivered with 18-25 slides.

The evaluation of the Presentation shall generally be based upon the following.

1.	Contents	5 Marks
2.	Delivery	5 Marks
3.	Relevance and interest the topic creates	5 Marks
4.	Ability to involve the spectators	5 Marks
5.	Question answer session	5 Marks
	Total	**25 Marks**

4. WHO WILL EVALUATE?

The presentation of the seminar topics shall be made before an internal evaluation committee comprising the Head of the Department or his/her nominee, seminar supervisor and a senior faculty of the department / other department.

I B.TECH II SEMESTER SYLLABUS

Linear Algebra & Integral Transforms

B.Tech.:IT I-II Semester

L	T	P	C
4	1	-	4

Course Code: A3HS03

Course Overview:

This course focus on basic areas of theory and more advanced Engineering Mathematics topics which provide students with the relevant mathematical tools required in the analysis of problems in Engineering and scientific professions. The topics covered include solutions for linear systems, Eigen values and Eigen vectors, linear transformation, Laplace transforms, Application of partial differential equations, Fourier Transforms. The mathematical skills derived from this course form a necessary base to analytical and design concepts encountered in the program

Prerequisite(s):

- NIL

Course Objectives:

I. Learn concepts of matrix algebra, methods of solving system of linear equations and determine eigen values and eigen vectors of a matrix

II. Understand how the eigen values and eigen vectors of Hermitian, Unitary and Normal matrices differ from those of general matrices.

III. Know the basic properties of standard partial differential equations to solve engineering problems

IV. Determine the Fourier Transforms of a given function.

V. Analyze the characteristics and properties of Fourier transforms

Course Outcomes:

After completing this course, the student will be able to:

1. Use elementary transformations to reduce matrices to echelon form, normal form and hence find their rank.
2. Make use of echelon forms in finding the solution of system of linear equations.
3. Compute eigen values and eigen vectors of square matrices. Reduce the quadratic form to canonical form.
4. Apply Laplace transform to solve differential equations which will be converted toalgebraic equation.
5. Determine Fourier transform, Fourier sine and cosine transform of a function
6. Apply partial differential equations to solve engineering problems.

SYLLABUS

UNIT – I **(12 Lectures)**

THEORY OF MATRICES: Real matrices: Symmetric-skew-symmetric and orthogonal matrices – Complex matrices: Hermitian, Skew –Hermitian and Unitary matrices –Elementary row and column transformations –Elementary matrix-Finding rank of a matrix by reducing to Echelon form and Normal form-Finding the inverse of a matrix using elementary row/column transformations (Gauss-Jordan method)-Consistency of system of linear equations (homogeneous and non-homogeneous) using the rank of a matrix –Solving m X n and n X n linear system of equations by Gauss Elimination-Cayley-Hamilton Theorem (Statement and verification)-Finding inverse and powers of a matrix by Cayley-Hamilton Theorem.

UNIT – II **(12 Lectures)**

LINEAR TRANSFORMATIONS: Linear dependence and independence of vectors –Linear Transformation, orthogonal transformation-Eigen values and Eigen vectors of a matrix-properties of eigen values and eigen vectors of real and complex matrices- Diagonalization of a matrix. Quadratic forms up to three variables-Rank, Index, Signature and Nature of Quadratic form-Reduction of a Quadratic form to canonical form using linear and orthogonal transformations.

UNIT – III **(8 Lectures)**

SECOND ORDER PARTIAL DIFFERENTIAL EQUATIONS AND APPLICATIONS: Method of separation of variables for second order equations-Applications of Partial differential equations- one dimensional wave equation, Heat equation.

UNIT – IV **(12 Lectures)**

LAPLACE TRANSFORM AND ITS APPLICATIONS TO ORDINARY DIFFERENTIAL EQUATIONS: Laplace transforms of elementary functions- First shifting theorem - Change of scale property – Multiplication by t^n- Division by t – Laplace transforms of derivatives and integrals – Unit step function – Second shifting theorem – Periodic function – Evaluation of integrals by Laplace transforms – Inverse Laplace transforms- Method of partial fractions – Other methods of finding inverse transforms – Convolution theorem – Applications of Laplace transforms to ordinary differential equations.

UNIT – V **(10 Lectures)**

FOURIER TRANSFOREMS: Fourier integral theorem (statement)-Fourier sine and cosine integrals –Fourier transforms –Fourier sine and cosine transforms-properties- Inverse transforms-Finite Fourier transforms – Parseval's Identity.

TEXT BOOKS:

Higher Engineering Mathematics by Dr.B.S.Grewal, Khanna publishers.

Engineering Mathematics Vol –I by Garg and Guptha, person publishers

Advanced Engineering Mathematics by R K Jain& S R K Iyengar,Narosa Publishers

REFERENCE BOOKS:

Advanced Engineering Mathematics by E. Kreyszig, John Wiley & Sons Publisher.

Engineering Mathematics by N.P.Balil, Lakshmi Publications.

Advanced Engineering Mathematics by Michael Greenberg, pearson Education.

APPLIED PHYSICS – II

B. Tech: IT I-II Semester | **L T P C**
Course Code: A3HS07 | **3 1 - 3**

Prerequisites: Fundamentals in Physics and Mathematics

Course Objectives:

1. Learn the behavior of matter waves and applications of Schrodinger wave equations and periodic potential Energy of electron.
2. Explain the classification of semiconductors and construction of LED, LCD & Solar cell
3. Discuss the different types of optical fibers how it is used for communication in optical fiber networks
4. Explain the engineering applications of ultrasonics and how super conductors are used in transmission lines
5. Describe the fundamentals in quantum computations and analyze how it can be used in Cryptography

Course Outcomes:

Upon successful completion of the course student will able to:

1. Conclude the dual nature of material particles and able to explain how moving particles are associated with its energies
2. Analyze how the Semiconductors are classified and their applications in various domains
3. Summarize the principles and fundamentals of optical fibers and their engineering applications
4. Explain the production of Ultrasonics and Analyze engineering applications of ultrasonics and Summerize Superconducting phenomenon
5. Originate the basic idea of quantum computing and explain the applications in secured quantum information

SYLLABUS

UNIT-I **(10 hours)**

Quantum Mechanics: Waves and Particles, de Broglie Hypothesis, Matter Waves, Davisson and Germer's Experiment, Heisenberg's Uncertainty Principle, Schrodinger's Time Independent
Wave Equation-Physical Significance of the wave Function, Particle in One Dimensional Potential Box.

Band Theory of Solids: Fermi-Dirac Statistics (Qualitative treatment), Electron in a periodic potential-Bloch theorem, Kronig –Penny Model (Qualitative treatment), Origin of Energy Band formation in Solids, Classification of Materials into Conductors, Semiconductors & Insulators, Effective mass of an Electron.

UNIT-II **(10 hours)**

Semiconductor Physics: Intrinsic and Extrinsic Semiconductors, Fermi Level, Fermi level in Intrinsic and Extrinsic Semiconductors, Direct and Indirect Band gap semiconductors, Hall Effect and Applications.

Physics of Semiconductor Devices: LED materials- Construction and Working of LED, Advantages and Disadvantages. LCD-Characteristics of LCD, Action of LCD display device. Solar Cells-Photovoltaic effect, Efficiency Issues, Solar materials, Advantages of Solar Cells.

UNIT –III **(08 hours)**

Fundamentals of Fiber Optics: Structure and Principle of Optical Fiber, Acceptance Angle, Numerical Aperture. Types of Optical Fibers-Step Index and Graded Index fibers; Modes of fibers-SMSI, MMSI, MMGI, Attenuation and dispersion in Optical Fibers, Optical fiber Communication System with block diagram.

Fiber Optics sensors: Basic principle of Sensors, Classification of Optical sensors - Active, Passive, Intrinsic and Extrinsic sensors, Construction and working of Pressure, Temperature, Displacement and Liquid level Sensors.

UNIT – IV **(10 hours)**

Ultrasonics: Introduction – Types of ultrasonics: Longitudinal, transverse, Surface and Lamb waves. Properties of ultrasonics, Production of Ultrasonic waves - Magnetostriction and Piezoelectric methods, Detection of Ultrasonic waves- Acoustic grating,Kundt's method, Sensitive flame, Thermal detection and piezoelectric detection. Cavitation effect-uses. Engineering applications of Ultrasonics: NDT Testing.

Superconductivity: Zero resistance, Critical temperature Tc , Critical field Hc. Perfect diamagnetism,-Meissner effect. Type I and Type II superconductors. Formation of Cooper pairs, Electron-Phonon interaction and BCS theory. Applications of Superconductors.

UNIT – V **(10 hours)**

Quantum computation and cryptography: Introduction to cryptography, Classical and Public key cryptosystems, Vernam cipher, The RSA protocol;

Idea of classical bits and qubits, Bloch vector representation of state of qubit. Single qubit logic gates- pauli X, Y, Z and Hadmard gate in matrix form. Two level gates: CNOT and SWAP gate. Comments on No cloning theorem; Quantum Key distribution protocol -BB84 protocol; Quantum Teleportation – Basic Idea;

Teaching Methodologies:

1. Animation videos
2. Assignments uploaded in website.
3. Tutorial questions uploaded in website.
4. Handbook uploaded in website.

Prescribed Books:

1. Modern Engineering physics-I & II : S. Chandralingam, K. Vijayakumar, S Chand Co.
2. Engineering Physics: P.K.Palanisamy, Scitech Publishers.
3. Engineering Physics: S.O.Pillai, New age International.
4. Nielsen M. A., I. L Chung, Quantum Computation & Quantum Information, Cambridge Univ. Press

Reference Books:

1. Solid State Physics: Charles Kittel, Wiley & Sons (Asia) Pvt. Ltd.
2. Fundamentals of physics:Halliday,Resnick,Walker.
3. Engineering Physics – By V Rajendran, Mc Graw Hill Edn.
4. Solar Photovoltaics – Fundamentals, Technologies and Applications 3rd Edition, PHI
5. Principles of Quantum computation and Information – By G. Benenti, G. Casati, G. Strini, World scientific.

TECHNICAL ENGLISH

B. Tech: IT I-II Semester | **L T P C**
Course Code: A3HS11 | **3 - - 3**

BUSINESS ENGLISH CERTIFICATE - BEC PRELIMINARY

Course Overview:

The basic idea behind offering this certificate course as a subject at the undergraduate level is to acquaint students with a language held by common consent to be the most popular language and predictably the most used in countries across the globe. The lessons included as part of syllabus, aim to take the nuances of English to students as it reveals its strengths and complexity when used to perform a variety of functions. For prospective engineers, nothing could be more useful or productive than being able to reach out to the world of technology and business through grammar, vocabulary, collocations besides letter-writing, advertisements, posters, technical presentations, report writing, seminars etc. Teachers of English have a special role to play in polishing and honing the linguistic skills of engineers in the making, through a variety of tasks, assignments and role plays that bring alive the language in the classroom and prepare students for the world of work. The mission of taking the language to students is achieved from teaching texts that are rich in vocabulary and grammar, texts that teach learners how to contextualize, situate meaning amidst ambiguity and learn the art of being able to persuade, compel, cajole, complain, narrate, describe etc. through recourse to a range of devices- linguistic and literary- on offer. Besides, the course has in mind the task of preparing students to fulfill basic functions with language that come their way during the course of study, such as being able to compose email effectively in precise writing, essay writing , prepare technical reports/papers, write effective business ,formal and job application letters etc.

Course objectives:

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

- talk about business subjects
- understand charts and graphs
- Write short business emails, reports and make notes on simple topics.
- Follow short telephone conversations.
- Follow simple presentations/demonstrations.
- Exchange straightforward opinions and make requests.
- offer advice and state routine requirements

Course Outcomes:

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

1. Acquire the use of grammar effectively (vocabulary and so on) through extensive coursework on writing reports and reading comprehensions, articles, essays, general discussion etc.
2. To bring an awareness among the future entrepreneurs about the risks in the running enterprises.
3. To inculcate profound knowledge through BEC for practical, everyday use in business.
4. Assess the skills of writing business letters in various situations and generate skills of writing business letters, essays and memos.
5. Categorize the various structures of reports and compose to use them in the professional scenario.

SYLLABUS

UNIT – I (Lectures – 10)

Grammar : Introduction to Grammar, Parts of Speech
Vocabulary : Technical Vocabulary
Listening : Listening for specific information in short, long conversations and monologues.
Speaking : Conversation between students in pairs and groups, general interaction and social language.
Reading : Reading for the Main idea, finding specific information, reading for detail, Reading and transferring information, Understanding the attitudes.
Writing :Writing short messages that include certain information.

UNIT – II (Lectures – 10)

Grammar : Sentence and Sentence Construction
Vocabulary : Homophones, Homographs, Homonyms
Listening : Listening for Gist and detailed meaning and to identify the attitudes and opinions of the speakers
Speaking : Mini-presentations on a business theme by organizing a larger unit of discourse & Giving information and expressing opinions.
Reading : Reading for Opinion and writer's purpose, Reading for interpreting the visual information, reading for gist.
Writing : Writing a longer piece of correspondence based on another text.

UNIT – III (Lectures – 10)

Grammar : Verb - Tense
Vocabulary : Word Formation – prefix and suffix.
Listening : Answering multiple choice questions on short conversations or monologues.
Speaking : Two-way conversation between the candidates followed by further prompting from the interlocutor.
Reading : Reading for inference and Global meaning, Understanding Vocabulary and grammar in a short text
Writing : Writing for functional/ communicative task- e.g. Re-arranging appointments, asking for permission, giving instructions.

UNIT - IV (Lectures – 10)

Grammar : Voice and Reported speech
Vocabulary : Synonyms and Antonyms.
Listening : Listening for completing notes based on conversation on a monologue.
Speaking : Expressing opinions, Agreeing and Disagreeing, Talking about oneself, ones current situations and plans.
Reading : Reading for understanding short, real world messages etc,
Writing : Writing for apologizing and offering compensation, making or altering reservations.

UNIT – V (Lectures – 08)

Grammar : Concord, Modal Auxiliary, Question Tags.
Vocabulary : Business Vocabulary.
Listening : Listening for answering multiple choice questions on a longer conversation or interview.
Speaking : Giving ones opinion on business situations, talking about some prompts for an extended period of time & Discussion with a business situation with a partner.
Reading : Reading for detailed comprehension of detailed material; Skimming and Scanning.
Writing : Writing to deal with requests, giving information about a product.

Reference books:

- ✓ ***Business Benchmark*** **- Norman Whitby**
- ✓ ***Business results*** **–** ***Intermediate*** **– John Hughes, John Newton**

Web References:

- ✓ **www.cambridgeenglish.org**

BASIC ELECTRICAL ENGINEERING

	L	T	P	C
B. Tech: IT I-II Semester				
Course Code: A3EC50	**3**	**1**	**-**	**3**

Course Overview:

This is a basic course for all Engineering students of first year. The objective is to make them familiar with basic principles of Electrical Engineering. The course addresses the underlying concepts & methods behind Electrical Engineering. The course is present a problem oriented introductory knowledge of the Fundamentals of Electrical Engineering and to focus on the study of basic electrical parameters, basic principles, different types of electrical circuit and methods to solve electrical circuit.

Course Objectives:

I. To teach fundamentals of Electric Circuits, their components and the mathematical tools used to represent and analyze Electrical circuits.
II. To inculcate fundamentals of Ohm's law, Kirchoff's laws and be able to solve for currents, voltages and power in complex circuits.
III. To explain loop current and node voltage equations for arbitrary DC, AC networks including resistors, capacitors, inductors, dependent and independent sources.
IV. Familiarize various two port network parameters and their relations and develop the design and analysis of basic DC and AC circuits with network topologies.

Course Outcomes:

At the end of the course students will be able to

1. To identify basic electrical concepts, including electric charge, current, potential, electrical Power and energy.
2. To distinguish the relationship of voltage and current in resistors, capacitors, inductors, and mutual Inductors.
3. To differentiate circuits with ideal, independent, and controlled voltage and current sources and able to apply Kirchhoff's voltage and current laws to the analysis of electric circuits.
4. To apply concepts of electric network topology, nodes, branches, and loops to solve circuit problems, including the use of computer simulation.
5. To use basic laws and techniques to develop a working knowledge of the methods of analysis used.
6. To Interpret solve series and parallel magnetic circuits.
7. To design various two port network parameters and relations between them.

SYLLABUS

UNIT I
Electrical Circuits
Basic definitions-Ohm's Law – Kirchhoff's Laws – simple problems. types of elements, types of sources, resistive networks, inductive networks, capacitive networks, series & parallel circuits.

UNIT – II
Network theorems
Mesh and Nodal analysis, star to delta and delta to star transformations, thevinin's, superposition and maximum power transfer theorem.

UNIT - III
Measuring Instruments
Basic principle of indicating instruments, permanent magnet moving coil and moving iron instruments.

Transformers
Construction and Working principle of Transformer, EMF equation, losses and efficiency, simple problems.

UNIT - IV
DC Motor & Generator

Principle of operation of DC Motor, types of DC motor, losses and Torque equation. DC generator construction,working principle and its EMF equation, Applications.

UNIT-V
AC Machines
Principle of operation of 3-phase alternator, Principle of operation of 3-phase induction motor, slip, Torque-Equation, Applications.

TEXT BOOKS:

1. Basic Electrical Engineering by M.S.Naidu and S.Kamakshaiah TMH
2. Mehta V K, "Principles of Electrical Engineering", S.Chand & Company

REFERENCE BOOKS:

1. Nagsarkar T K and Sukhija M S, "Basics of Electrical Engineering", Oxford press. Basic concepts of Electrical Engineering, P.S. Subramanyam, BS Publications.

DATA STRUCTURES

	L	T	P	C
I B. Tech. - II Semester				
Course Code: A3CS04	**4**	**1**	**-**	**4**

COURSE OBJECTIVES:

1. To teach efficient storage mechanisms of data for an easy access.
2. To design and implementation of various basic and advanced data structures.
3. To introduce various techniques for representation of the data in the real world.
4. To develop application using data structures.
5. To improve the logical ability

COURSE OUTCOMES:

Upon completion of the course, the students will be able to:
Upon completion of the course, the students will be able to:

1. Student will be able to choose appropriate data structure as applied to specified problem Definition.
2. Student will be able to handle operations like searching, insertion, deletion, traversing mechanism etc. on various data structures.
3. Students will be able to apply concepts learned in various domains like DBMS, compiler construction etc.
4. Students will be able to use linear and non-linear data structures like stacks, queues, linked list.
5. Students will be able to write the programs using data structures in C.

SYLLABUS

UNIT-I

Enumerated, Structure ,and Union Types– The Type Definition (typedef), Enumerated types, Structures –Declaration, initialization, accessing structures, operations on structures, Complex structures, structures and functions, Passing structures through pointers, self referential structures, unions, bit fields, C programming examples.

UNIT-II

Data Structures – Introduction to Data Structures, abstract data types.
Linear list – singly linked list implementation, insertion, deletion and searching operations on linear list, circularly linked lists- Operations for Circularly linked lists, doubly linked list implementation, insertion, deletion and searching operations, applications of linked lists.

UNIT-III

Stack ADT- definition, operations, array and linked implementations in C, applications-infix to postfix conversion, Postfix expression evaluation, recursion implementation.
Queue ADT- definition and operations, array and linked Implementations in C, Circular queues-Insertion and deletion operations, Deque (Double ended queue) ADT, array and linked implementations in C

UNIT-IV

Searching and Sorting – Searching-linear and binary search methods
Sorting- selection sort, bubble sort, insertion sort, quick sort, merge sort comparison of sorting and searching methods.

UNIT-V

Trees – Definitions, tree representation, properties of trees, Binary tree, Binary tree representation, binary tree properties, binary tree traversals, binary tree implementation, applications of trees.

TEXT BOOKS:

1. Fundamentals of Data structures in C, 2nd Edition, E.Horowitz, S.Sahni and Susan AndersonFreed, Universities Press.
2. Data structures A Programming Approach with C, D.S.Kushwaha and A.K.Misra, PHI.

REFERENCE BOOKS:

1. Data structures: A Pseudo code Approach with C, 2nd edition, R.F.GilbergAndB.A.Forouzan, Cengage Learning.
2. Data structures and Algorithm Analysis in C, 2nd edition, M.A.Weiss, Pearson.
3. Data Structures using C, A.M.Tanenbaum,Y. Langsam, M.J.Augenstein, Pearson.
4. Data structures and Program Design in C, 2nd edition, R.Kruse, C.L.Tondo and B.Leung,Pearson

DATA STRUCTURES LAB

I B. Tech. - II Semester | **L T P C**
Course Code: A3CS05 | **- - 3 2**

COURSE OBJECTIVES

I. To develop skills to design and analyze simple linear and nonlinear data Structures
II. To strengthen the ability to identify and apply the suitable data structure for the given real world problem
III. To gain knowledge in practical applications of data structures

COURSE OUTCOMES

Upon completion of the course, the students will be able to:
1. Design and analyze the time and space efficiency of the data structure
2. Identity the appropriate data structure for given problem
3. Analyze various data structures that can be applied to a given problem
4. Select the most appropriate data structure for a given problem

EXPERIMENTS

WEEK 1:
1. Write a C program that uses functions to perform following operations on complex numbers a) read b) write c) add d) multiply (Use structure to represent complex number)
2. Write a C program that uses functions to perform following operations on Time in seconds, minutes and hours a) read b) write c) add d) sub (Use structure to represent Time)

WEEK 2:
1. Write a program for creation, Search and Traversal of Single Linked List
2. Write a program to perform insertion and deletion operations in Single Linked List

WEEK 3:
1. Write a program for creation, Search and Traversal of Double Linked List
2. Write a program to perform insertion and deletion operations in Double Linked List

WEEK 4:
1. Write a program to implement stack using Arrays
2. Write a program to implement stack using Linked List

WEEK 5:
1. Write a program to convert infix expression to postfix expression using stack
2. Write a program to evaluate postfix expression

WEEK 6:
1. Write a program to implement Linear queue using Array
2. Write a program to implement Linear queue using Linked List

WEEK 7:
1. Write a program to implement insertions and deletions in a circular Queue
2. Write a program to perform search and count operations in a circular queue

WEEK 8:
1. Write a program to implement insertions and deletions in a Deque using array
2. Write a program to perform search and count operations in a circular queue using linked list

WEEK 9:
Write a program to implement the following
A) Linear search B) Binary Search

WEEK 10:
Write a program to implement the following
a) Bubble sort b) Insertion sort c) Selection sort

WEEK 11:
Write a program to implement the following
a) Merge sort b) Quick sort

WEEK 12:
Write a C program that uses functions to perform the following:
a) Create a binary search tree of integers.
b) Traverse the above Binary search tree recursively in Inorder, Preorder and Postorder

TEXT BOOKS:
1. Fundamentals of Data structures in C, 2nd Edition, E.Horowitz, S.Sahni and Susan Anderson-Freed, Universities Press.
2. Data structures A Programming Approach with C, D.S.Kushwaha and A.K.Misra, PHI.

REFERENCE BOOKS:
1. Data structures: A Pseudocode Approach with C, 2nd edition, R.F.GilbergAndB.A.Forouzan, Cengage Learning.
2. Data structures and Algorithm Analysis in C, 2nd edition, M.A.Weiss, Pearson.
3. Data Structures using C, A.M.Tanenbaum,Y. Langsam, M.J.Augenstein, Pearson.
4. Data structures and Program Design in C, 2nd edition, R.Kruse, C.L.Tondo and B.Leung,Pearson

ENGLISH COMMUNICATION SKILLS LAB

B. Tech: IT I-II Semester **L T P C**
Course Code: A3HS12 **- - 3 2**

Course Overview:

English- being the foremost global language has its domination in internationally sensitive domains such as science and technology, business and commercial relation, education and diplomatic relationships, politics and administration and so on. It is the language of corporate India, a passport for better career, better pay, and advanced knowledge and for communication with the entire world. In higher education, English is the prevalent prestigious language. Careers in any area of business communication or within the government, or in science and technology require fluency in English. It is certainly considered instrumental in terms of having access to information from all over the world as a key factor for professional success. With the number of foreign investors flocking to India and the growth of outsourcing, English has come to play a key role for the transactions in written form in professional relationships between foreign and Indian companies. Hence in the existing world of cutthroat completion, it is vital to the students pursuing Engineering course to have a command not only on the academic skills but also on communication skills.

The basic idea behind offering English as a practical subject at the undergraduate level is to acquaint students with a language that enjoys currency as a lingua franca of the globe. For prospective engineers nothing could be more useful or productive than being able to reach out to the world of technology. In the ELCS lab the students are trained in Communicative English Skills, phonetics, word accent, word stress, rhythm and intonation, making effective oral presentations- both extempore and Prepared- seminars, group discussions, presenting techniques of writing, role play, telephonic skills, asking and giving directions, information transfer , debates, description of person, place, objects etc; . The lab encourages students to work in a group, engage in peer-reviews and inculcate team spirit through various exercises on grammar, vocabulary, listening and pronunciation games, etc.

Course Objectives:

- To talk about business subjects
- To understand charts and graphs
- To write short business emails, reports and make notes on simple topics.
- To follow short telephone conversations.
- To follow simple presentations/demonstrations.
- To exchange straightforward opinions and make requests.
- To offer advice and state routine requirements

Supported Objectives:

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

- To expose the students to a variety of self-instructional and learner-friendly modes of language learning.

- To help the students to cultivate the habit of reading passages from the computer monitor, thus provides them the required facility to face computer-based competitive exams such as GRE, TOEFL, GMAT etc.
- To enable them to learn better pronunciation through stress or word accent, intonation, and rhythm.

- To train them to face interviews with confidence and enable them to prepare resume with cover

letter.

- To motivate them to use language effectively.
- To prepare them to use communicative language and participate in public speaking.
- To initiate them into greater use of the computer in power point presentation preparation, report Writing and e-mail writing etc.
- To expose the Students to participate in group discussions, debates with ease.

Course Outcomes:

The following outcomes are achieved:

Learners learn how to pronounce words using the rules they have been taught.

- Students learn the importance of speaking English using rhythm and intonation.
- Students learn to overcome stage fear and make presentations with ease.
- Students learn to use right words and phrases in keeping the demands of occasion.
- Students learn to face different types of interviews with confidence.
- Students learn to participate in group discussions.
- Students learn to distinguish informal speech from formal speech through role plays.
- Students learn to use the telephone etiquettes.

SYLLABUS

The following course content is prescribed for the **BUSINESS ENGLISH CERTIFICATE- BEC PRELIMINARY English Language Communication Skills Lab**

Exercise – I

Listening: Listening to multiple-choice questions on short conversations or monologues
Speaking: Giving information about oneself and their opinions and Giving a short a talk on business related topic
Reading: Reading multiple-choice questions on short text.
Writing: Writing a piece of internal business communication of 30-40 words (Email)

Exercise – II

Listening : Listening for completing notes based on a conversation and a monologue
Speaking : Giving short talk on business related topic.
Reading: Matching descriptions of people to short texts. Matching statements to information given in a graph or graphs.
Writing : Writing a piece of internal business communication of 30-40 words (Message)

Exercise – III

Listening: Listening to multiple-choice questions on a longer conversation or interview.
Speaking: Debates. Extempore.
Reading : Reading a longer text and deciding whether the statements about the text are right or wrong or if the information is not given.
Writing : Write a business letter or e-mail of 60-80 words, based on an input text and some notes.

Exercise – IV

Listening: Listening to TV news channels and taking notes.
Listening to songs and writing down the lyrics.
Speaking: Interview sessions.

Reading: Read a longer text and answer multiple-choice questions. Do a multiple choice task.
Writing: Write a report.

Exercise – V

Listening: Watching short documentaries and making notes.

Speaking: Short plays. Presentations**.**

Reading : Read short texts and fill in a form using information from the texts.

Writing : Write a short story.

Suggested Software:

- K-Van solutions Software with CD
- The Rosetta stone English library.
- Clarity pronunciation power –part I.
- Oxford advanced learner's compass, 7th Edition.
- Learning to speak English -4 CDs.
- Vocabulary in use, Michael McCarthy, felicity o'den, Cambridge.
- Murphy's English grammar, Cambridge with CD.

REFERENCE BOOKS:

- Suresh Kumar. E. & Sreehari P.A (2007), Handbook for English Language Laboratories,
- Cambridge University Press India Pvt. Ltd, New Delhi.
- Mandal S. K (2006),Effective Communication & Public Speaking , Jaico Publishing House, New Delhi.
- Grant Taylor (2004), English Conversation Practice, Tata McGraw Hill, New Delhi.
- Balasubramanian .T (2000), A text book of English Phonetics for Indian Student, MacMillan Publishers, India.
- Kamalesh Sadanand, Susheela Punitha (2008), Spoken English: A foundation Course: Parts 1 & 2, New Delhi, Orient Longman Pvt. Ltd

Web References:

- www.cambridgeenglish.org.
- www.esl-lab.com

ENGINEERING DRAWING

B. Tech: IT I-II Semester **L T P C**
Course Code: A3ME05 **1 1 3 3**

Course Overview:

One of the best ways to communicate one's ideas is through some form of picture or drawing. This is especially true for the engineer. An engineering drawing course focuses on usage of drawing instruments, lettering, construction of geometric shapes, etc. Students study use of dimensioning, shapes and angles or views of such drawings. Dimensions feature prominently, with focus on interpretation, importance and accurate reflection of dimensions in engineeringdrawing. Other areas of study in this course may include projected views and development of surfaces.

Course Objectives:

I. To have the knowledge of interpretation of dimensions of different quadrant projections.
II. To understand the basic principles of engineering drawing
III. To have the knowledge of generating the pictorial views
IV. To understand the development of surfaces

Course Outcomes:

On completion of this course students will be able to:

1. Prepare and understand drawings.
2. Identify various Dcurves used in Engineering Drawing and their applications.
3. Use the principles of orthographic projections.
4. By studying about projections of solids students will be able to visualize three dimensional objects and that will enable them to design new products.
5. Design and fabricate surfaces of different shapes.
6. Represent the objects in three dimensional appearances.

SYLLABUS

UNIT - I

INTRODUCTION TO ENGINEERING DRAWING: Principles of engineering graphics and their significance – drawing instruments and their use – conventions in drawing – lettering – BIS conventions. Dimensioning rules, geometrical construction.

CURVES USED IN ENGINEERING PRACTICE AND THEIR CONSTRUCTIONS: Conic Sections, Special Curves-Cycloids, Epicycloids, Hypocycloids.

UNIT - II

ORTHOGRAPHIC PROJECTION IN FIRST ANGLE PROJECTION ONLY: Principles of orthographic projections – conventions – first and third angle projections. Projections of points and lines inclined to both the planes.

UNIT - III

PROJECTIONS OF PLANES AND SOLIDS: Projections of regular planes, inclined to both planes. Projections of regular solids inclined to both planes.

UNIT – IV

DEVELOPMENT OF SURFACES: Development of surfaces of right, regular solids – development of prisms, cylinders, pyramids, cones and their parts.

UNIT – V

ISOMETRIC PROJECTIONS: Principles of Isometric Projections-Isometric Scale- Isometric Views-Conventions-Plane Figures, Simple and Compound Solids.

TRANSFORMATION OF PROJECTIONS: Conversion of isometric Views to Orthographic Views. Conversion of orthographic views to isometric projections vice-versa.

TEXT BOOKS:

1. Engineering Drawing- Basant Agarwal, TMH
2. D. M. Kulkarni, A. P. Rastogi, and A. K. Sarkar (2009), Engineering Graphics with AutoCAD, PHI Learning Private Limited, New Delhi.
3. Jolhe, Dhananjay (2006), Engineering Drawing: With an Introduction to CAD, Tata Mc Graw Hill, India.

REFERENCE BOOKS:

1. N. D. Bhat (2006), *Engineering Drawing*, Charotar Publications, New Delhi.
2. Venugopal (2010), *Engineering Drawing and Graphics*, 2nd edition, New Age Publications, New Delhi.
3. Johle (2009), *Engineering Drawing*, Tata Mc Graw Hill, New Delhi, India.
4. Trymbaka Murthy (2007), *Computer Aided Engineering Drawing*, I.K. International Publishers, New Delhi.R.B. Choudary (2005), *Engineering graphics with Auto CAD*, Anuradha Publishers, New Delhi

TECHNICAL SEMINAR & COMPUTATIONAL MATHEMATICS (FOSS)
MANDATORY NON-CREDIT COURSE

B. Tech: IT I-II Semester | **L T P C**
Course Code: A3HS18 | **- - 2 -**

Pre Requisites: No Pre Requisites, Foundation course.

Objectives:

- The aim of this lab is to develop programming skills in C/MATLAB for the numerical methods & allied problems. More emphasis will be on writing programs with minimum possible code.

OUTCOMES:

- After completion of this lab course, student will be well acquainted with the programming skills in C/MATLAB and able to write the codes for the problems they come across in engineering courses.

SYLLABUS

UNIT- 1: Interpolation

Programming Tasks:

1. A) Write a program to determine y for a given x, if two arrays of x and y of same size are given. (Using Newton's interpolation both forward and backward).
   B) Write a program to determine y for a given x, if two arrays of x and y of same size are given. (Using Lagrange's interpolation).
   C) Write a program to determine y for a given x, if two arrays of x and y of same size are given. (Using Gauss interpolation).
   (Selection criteria of the interpolation formula are important).

UNIT -2: Curve Fitting

Programming Tasks:

2. A) Write a program to find a line of best fit from the given two arrays of x and y of same size.
   B) Write a program to find a curve of the form $y = A e^{bx}$ from the given two arrays of x and y of same size.
   C) Write a program to find a curve of the form $y = Ax^{b}$ the given two arrays of x and y of same Size.
   D) Write a program to find a curve of the form $y = Ax^{2} + B x + C$ the given two arrays of x and y of same Size.

UNIT -3: Solution of Algebraic and Transcendental Equations

Programming Tasks:

3. A) Write a program to find the root of a given equation using bisection method. (Write this program such that the initial values given to the system are not usable, then the system should ask us to give new set of initial values).
   B) Write a program to find the root of a given equation using method of false position. (Regula false position).
   C) Write a program to find the root of a given equation using iteration method.

D) Write a program to find the root of a given equation using Newton Raphson method.

UNIT-4: Linear system of equations
Programming Tasks:

4. A) Write a program to find the solution of given system of linear equations using L-U decomposition method.
   B) Write a program to find the solution of given system of linear equations using Jacobi's method.
   C) Write a program to find the solution of given system of linear equations using Gauss siedel iteration method.
   D) Write a program to find the solution of given system of linear equations using Gauss Jordan elimination method.

UNIT-5: Numerical Differentiation, Integration and Numerical solutions of First order differential Equations

Programming Tasks:

5. A) Write a program to evaluate definite integral using trapezoidal rule, Simpsons 1/3rd rule and 3/8th rule.
   B) Write a program to solve to given differential equation using Taylor's series.
   C) Write a program to solve to given differential equation using Euler's and modified Euler's method.
   D) Write a program to solve to given differential equation using Runge-Kutta method.

TEXT BOOKS:

1. Introductory methods of numerical analysis by S S Sastry
2. Numerical and Statistical methods with programming in c by Sujatha sinha and Subhabadra dinda, Scitec publishers.
3. Numerical Methods, principles, analysis and algorithms by Srimantapal & Subodh bhunia, Oxford university press.

REFERENCES:

1. Advanced engineering mathematics by Alan Jeffery.
2. Applied numerical methods using matlab by Rao.v.Dukkipati, new age publishers.
3. numerical methods in science and engineering- a practical approach by S.Rajasekharan, S. Chand publications.

II B.TECH I SEMESTER SYLLABUS

PROBABILITY AND STATISTICS

B. Tech: IT II-I Semester | **L T P C**
Course Code: A3HS05 | **3 1 - 3**

Prerequisite(s): Knowledge of permutations and combinations and Fundamentals in Basic Mathematics.

Course Objectives:

I. Understand a random variable that describes randomness or an uncertainty in certain realistic situation. It can be of either discrete or continuous type.

II. In the discrete case, study of the binomial and the Poisson random variables and the Normal random Variable for the continuous case predominantly describe important probability distributions. Important Statistical properties for these random variables provide very good insight and are essential for Industrialapplications.

III. Most of the random situations are described as functions of many single random variables. In this unit, the objective is to learn functions of many random variables through joint distributions.

IV.The types of sampling, Sampling distribution of means,Sampling distribution of variance, Estimations of Statistical parameters, testing of hypothesis of few unknown statistical parameters.

V.The mechanism of queuing system,the characteristics of queue, The mean arrival and service rates

VI. The expected queue length, the waiting line.

Course Outcomes:

Up on successful completion of this course, student will be ableto:

1. Identify distribution in certain realistic situation. Also able to differentiate among many random variableinvolved in the probability models.
2. Calculate the moment generating functions of three distributions and sample mean and sample variance.
3. Calculate mean and proportions (small and large sample) and to make important decisions from few samples which are taken out of unmanageably huge populations .It is Mainly useful for non-circuitbranches of engineering.
4. Test the hypothesis (small and large sample) and to make important decisions.
5. Find the expected queue length, the ideal time, the traffic intensity and the waiting time. These Are very useful tools in many engineering and data management problems in the industry. It is useful for all branches of engineering.

SYLLABUS

UNIT-I **(10 Lectures)**

Single Random variables and probability distributions: Random variables – Discrete and continuous.

Probability distributions, mass function/ density function of a probability distribution, Mathematical Expectation ,Moment about origin, Central moments Moment generating function of probability distribution. Binomial, Poisson & normal distributions and their properties.

UNIT-II **(8 Lectures)**

Multiple Random variables, Sampling Distributions: Joint probability distributions- Joint probability mass /density function, Marginal probability mass / density functions, Moment generating functions of the above three distributions, and hence finding the mean and variance. **Sampling:** Definitions of population, sampling, statistic, parameter. Types of sampling, Expected values of Sample mean and variance, sampling distribution, Standard error, Sampling distribution of means and sampling distribution of variance

UNIT-III **(10 Lectures)**

Testing of Hypothesis - large samples:

Parameter estimations – likelihood estimate, interval estimations.

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

Large sample tests:

(i) Test of Equality of means of two samples equality of sample mean and population mean (cases of known variance & unknown variance, equal and unequal variances)

(ii) Tests of significance of difference between sample S.D and population S.D.

(iii) Tests of significance difference between sample proportion and population proportion &difference between two sample proportions.

UNIT-IV **(8 Lectures)**

Testing of Hypothesis-small sample tests:

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

Snedecor's F- distribution and its properties. Test of equality of two population variances

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

UNIT-V **(8 Lectures)**

Correlation & Regression: Coefficient of correlation, the rank correlation, Covariance of two random variables. Regression- Regression Coefficient, The lines of regression and multiple correlation & regression

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

TEXT BOOKS:

Higher Engineering Mathematics by Dr.B.S.Grewal, Khanna publishers
Probability and Statistics for Engineers by Richard Arnold Johnson, Irwin Miller and John E. Freund, New Delhi, Prentice Hall
Probability and Statistics for Engineers and Sciences by Jay L. Devore, Cengage Learning

REFERENCE BOOKS:

Advanced Engineering Mathematics by E. Kreyszig, John Wiley & Sons Publisher
Fundamentals of Mathematical Statistics by S.C. Guptha &V.K. Kapoor, S. Chand
Introduction to Probability and Statistics for Engineers and Scientists by Sheldon M. Ross, Academic Press.

DIGITAL LOGIC DESIGN

B. Tech: IT II-I Semester	L	T	P	C
Course Code: A3EC19	3	1	-	3

Course Overview:

The course addresses the concepts, principles and techniques of designing digital systems. The course teaches the fundamentals of digital systems applying the logic design and development techniques. This course forms the basis for the study of advanced subjects like Computer Architecture and Organization, Microprocessor through Interfacing, VLSI Designing. Students will learn principles of digital systems logic design and distinguish between analog and digital representations. They will be able to analyze a given combinational or sequential circuit using k-map and Boolean algebra as a tool to simplify and design logic circuits. Construct and analyze the operation of a latch, flip-flop and its application in synchronization circuits.

Course Objectives:

I. To teach various number systems,binary codes and their applications
II. To inculcate concepts of KMAP to simplify a Bolean expression
III. To facilitate students in designing a logic diagram
IV. To guide students in state chart reductions

Course Outcomes:

At the end of the course students will be able to:

1. Use number systems and complements
2. Identify the importance of SOP and POS canonical forms in the minimization or other optimization of Boolean formulas in general and digital circuits.
3. Minimize functions using any type of minimizing algorithms (Boolean algebra, Karnaugh map or Tabulation method).
4. Analyze the design procedures of Combinational and Sequential circuits.
5. Design the finite state machine using algorithmic state machine charts and perform simple projects with a few flip-flops.

SYLLABUS

UNIT - I

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

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

UNIT - II

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

UNIT III

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

UNIT - IV

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

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

UNIT - V

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

TEXT BOOKS:

1. M. Morris Mano, Michael D. Ciletti (2008), Digital Design, 4th edition, Pearson Education Inc, India.

REFERENCE BOOKS:

1. Zvi. Kohavi (2004), Switching and Finite Automata Theory, Tata McGraw Hill, India.
2. C. V. S. Rao (2009), Switching and Logic Design, 3rd Edition, Pearson Education, India.
3. Donald D. Givone (2002), Digital Principles and Design, Tata McGraw Hill, India
4. Roth (2004), Fundamentals of Logic Design, 5th Edition, Thomson, India.

ELECTRONIC DEVICES

B. Tech: IT II-I Semester | **L T P C**
Course Code: A3EC70 | **3 1 - 3**

Course Overview:

This course covers fundamental topics that are common to a wide variety of electronic engineering devices and systems. The topics include an introduction to semiconductor devices and their applications. The course creates the background in the physics of the compound semiconductor-based electronic devices and also prepares students to advanced courses in electronics. This course provides a basis for students to continue education by undertaking advanced study and research in the variety of different branches of semiconductor device applications.

Course Objectives:

I. To teach dynamics of electrons and the principle of operation of CRO and its applications.
II. To impart knowledge physics of semiconductor electronic devices, the characteristics and their equivalent models.
III. To demonstrate flow of current through the p-n junction and relating this phenomena to the characteristics and operation of the diodes, bipolar and unipolar transistors.
IV. To explain internal working of the regulated power supply which includes characteristic parameters of rectifiers with and without filters using Zener regulation.
V. To teach the concepts of biasing in BJT and JFET

Course Outcomes:

After completing this course, the student will be able to:

1. Identify, formulate & solve Engineering problems by making use of modern software/hardware tools.
2. Analyze behaviour of electronic devices.
3. Design and analyze various rectifiers, filter circuits.
4. Design an amplifier circuit with proper biasing techniques (BJT and FET).
5. Analyze Field effect transistor (FET) and mosfet characteristics

.

SYLLABUS

UNIT - I

PN JUNCTION DIODE: Operation of PN junction Diode: No bias , forward bias and reverse bias, diode current equation (qualitative treatment), volt-ampere (V-I) characteristics, temperature dependence of V-I characteristics, ideal versus practical diode, static and dynamic resistances, diode equivalent circuits, breakdown mechanisms in semiconductor diodes, zener diode characteristics.

UNIT - II

RECTIFIERS AND FILTERS: PN junction as a rectifier, half wave rectifier, Center-Tapped full wave rectifier, Bridge full wave Rectifier, Harmonic components in a rectifier circuit, Capacitor filter and Inductor filter.

UNIT - III

BIPOLAR JUNCTION TRANSISTOR (BJT): BJT construction, operation, symbol, transistor current components, input &output characteristics of a transistor in CB, CE and CC configurations

TRANSISTOR BIASING AND STABILIZATION: Need for biasing, operating point, DC and AC load lines, stability factor, fixed bias circuit, collector to base bias circuit, self bias circuit.

UNIT - IV

BJT AMPLIFIERS: Operation **o**f CE amplifier, Operation of RC coupled amplifier, Operation of Class-A power amplifier, Operation of Class-B Push-Pull power amplifier

FIELD EFFECT TRANSISTOR: Junction field effect transistor (construction, principle of operation, symbol), volt-ampere characteristics of JFET, MOSFETS (construction, principle of operation, symbol), volt- ampere characteristics of MOSFETS in enhancement and depletion modes.

UNIT - V

FEEDBACK AMPLIFIERS: Feedback concepts, types of feedback circuits (block diagram representation), general characteristics of negative feedback amplifier

OSCILLATORS: Barkhausen criterion, RC Phase shift oscillator using BJT, General form of LC oscillators , Hartley oscillator, Colpitts oscillator and Crystal oscillator.

TEXT BOOKS:

1. J. Millman, Christos C. Halkias (2008), Electronic Devices and Circuits, Tata McGraw Hill, New Delhi.
2. R.L. Boylestad and Louis Nashelsky (2006), Electronic Devices and Circuits, 9th edition, Prentice Hall of India, New Delhi.

REFERENCE BOOKS:

1. Rober T. Paynter (2003), Introduction to Electronic Devices and Circuits, 6th edition, Pearson Education, New Delhi, India.
2. S. Salivahana, N. Suresh Kumar, A. Vallavaraj (2008), Electronic Devices and Circuits, 2nd edition, Tata McGraw Hill, New Delhi.

COMPUTER ARCHITECTURE AND ORGANIZATION
(Common to CSE&IT)

II B. Tech. - I Semester **L T P C**
Course Code: A3CS06 **4 1 - 4**

This course introduces the principles of computer organization and the basic architecture concepts. The course emphasizes performance and cost analysis, instruction set design, pipelining, memory technology, memory hierarchy, virtual memory management, and I/O systems. Basic technical writing skills are also taught in this class.

COURSE OBJECTIVES:

1. To impart basic concepts of computer architecture and organization,
2. To explain key skills of constructing cost-effective computer systems.
3. To familiarize the basic CPU organization.
4. To help students in understanding various memory devices.
5. To facilitate students in learning IO communication

COURSE OUTCOMES:

At the end of the course students will be able to:

1. Identify various components of computer and their interconnection
2. Identify basic components and design of the CPU: the ALU and control unit.
3. Compare and select various Memory devices as per requirement.
4. Compare various types of IO mapping techniques
5. Critique the performance issues of cache memory and virtual memory

SYLLABUS

UNIT - I

STRUCTURE OF COMPUTERS: Computer types, Functional units, Basic operational concepts, Von-Neumann Architecture, Bus Structures, Software, Performance, Multiprocessors and Multicomputer, Data representation, Fixed and Floating point, Error detection and correction codes.
COMPUTER ARITHMETIC: Addition and Subtraction, Multiplication and Division algorithms, Floating-point Arithmetic Operations, Decimal arithmetic operations.

UNIT - II

BASIC COMPUTER ORGANIZATION AND DESIGN: Instruction codes, Computer Registers, Computer Instructions and Instruction cycle. Timing and Control, Memory-Reference Instructions, Input-Output and interrupt. Central processing unit: Stack organization, Instruction Formats, Addressing Modes, Data Transfer and Manipulation, Complex Instruction Set Computer (CISC) Reduced Instruction Set Computer (RISC), CISC vs RISC

UNIT - III

REGISTER TRANSFER AND MICRO-OPERATIONS: Register Transfer Language, Register Transfer, Bus and Memory Transfers, Arithmetic Micro-Operations, Logic Micro-Operations, Shift Micro-Operations, Arithmetic logic shift unit.
MICRO-PROGRAMMED CONTROL: Control Memory, Address Sequencing, Micro-Program example, Design of Control Unit.

UNIT - IV

MEMORY SYSTEM: Memory Hierarchy, Semiconductor Memories, RAM(Random Access Memory), Read Only Memory (ROM), Types of ROM, Cache Memory, Performance considerations, Virtual memory, Paging, Secondary Storage, RAID.

UNIT – V

INPUT OUTPUT: I/O interface, Programmed IO, Memory Mapped IO, Interrupt Driven IO, DMA.
MULTIPROCESSORS: Characteristics of multiprocessors, Interconnection structures, Inter

Processor Arbitration, Inter processor Communication and Synchronization, Cache Coherence.

TEXT BOOKS:

1. M. Moris Mano (2006), Computer System Architecture, 3rd edition, Pearson/PHI, India.

REFERENCE BOOKS:

1. Carl Hamacher, Zvonks Vranesic, SafeaZaky (2002), Computer Organization, 5th edition, McGraw Hill, New Delhi, India.
2. William Stallings (2010), Computer Organization and Architecture- designing for performance, 8th edition, Prentice Hall, New Jersy.
3. Anrew S. Tanenbaum (2006), Structured Computer Organization, 5th edition, Pearson Education Inc,
4. John P. Hayes (1998), Computer Architecture and Organization, 3rd edition, Tata McGrawHill

DISCRETE MATHEMATICAL STRUCTURES
(Common to CSE&IT)

II B. Tech. - I Semester | **L T P C**
Course Code: A3CS07 | **4 1 - 4**

COURSE OVERVIEW:
Earn the fundamental concepts in mathematics. It can be used by the students in computer science as an introduction to the underlying ideas of mathematics for computer science. It explains topics like mathematical logic, predicates, relations, functions, combinatory, and graph theory

COURSE OBJECTIVES:
1. To help students understand discrete and continuous mathematical structures
2. To impart basics of relations and functions
3. To facilitate students in applying principles of Recurrence Relations to calculate generating functions and solve the Recurrence relations

COURSE OUTCOMES:
At the end of the course students will be able to:
1. Analyze and examine the validity of argument by using propositional and predicate calculus
2. Apply basic counting techniques to solve the combinatorial problems
3. Apply sets relations and digraphs to solve applied problems
4. Use the basic concepts of graph theory and some related theoretical problems
5. Apply the concepts in NET, GATE, PGECET and other competitive examinations

SYLLABUS

UNIT - I
Mathematical Logic: Statements and notations, Connectives, Well formed formulas, Truth Tables, Tautology, Equivalence implication, Normal forms, Quantifiers, Universal quantifiers. Predicates: Predicative logic, Free & Bound variables, Rules of inference, Consistency, Proof of contradiction, Automatic Theorem Proving.

UNIT - II
Relations: Properties of Binary Relations, Equivalence Relation, Transitive closure, Compatibility and Partial ordering relations, Lattices, Hasse diagram. Functions: inverse Function , Composition of functions, Recursive Functions.

UNIT - III
Elementary Combinatorics: Basis of counting, Combinations & Permutations, With repetitions, Constrained repetitions, Binomial Coefficients, Binomial Multinomial theorems, The principles of Inclusion – Exclusion, Pigeon- hole principles and its applications.

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

UNIT - V
Introduction to Trees, Spanning Trees, DFS,BFS, Minimal Spanning Trees, Prims, Kruskal's Algorithm, Representation of Graphs, Planar Graphs, Graph theory and applications. Isomorphism and sub graphs, Multi graph and Euler circuits, Hamiltonian Graphs, Chromatic number.

TEXT BOOKS:
1. T1. Discrete Mathematics for computer scientists & Mathematicians, *J.L. Mott, A. Kandel, T.P.* Baker PHI

REFERENCES:
1. R1. Logic and Discrete Mathematics, *Grass Man & Trembley*, Pearson Education.

JAVA PROGRAMMING
(Common to CSE&IT)

II B. Tech. - I Semester	L	T	P	C
Course Code: A3CS13	3	1	-	3

COURSE OVERVIEW:

This course explains the fundamental ideas behind the object oriented approach to programming. Knowledge of java helps to create the latest innovations in programming. Like the successful computer languages that came before, java is the blend of the best elements of its rich heritage combined with the innovative concepts required by its unique environment. This course involves OOP concepts, java basics, inheritance, polymorphism, interfaces, inner classes, packages, Exception handling, multithreading, collection framework, files, JDBC and GUI components.

COURSE OBJECTIVES:

1. To teach principles of object oriented programming paradigm including abstraction, encapsulation, inheritance and polymorphism.
2. To impart fundamentals of object-oriented programming in Java, including defining classes, invoking methods, using class libraries, etc.
3. To inculcate concepts of inheritance to create new classes from existing one & Design the classes needed given a problem specification;
4. To familiarize the concepts of packages and interfaces.
5. To facilitate students in handling exceptions.
6. To demonstrate the concept of event handling used in GUI.

COURSE OUTCOMES:

At the end of the course students will be able to:

1. Analyze the necessity for Object Oriented Programming paradigm over structured programming and become familiar with the fundamental concepts in OOP like encapsulation, Inheritance and Polymorphism
2. Design and develop java programs, analyze, and interpret object oriented data and report results.
3. Design an object oriented system, AWT components and multithreaded processes as per needs and specifications.
4. Participate and succeed in competitive examinations like GATE, Engineering services, recruitment interviews etc.
5. Plan their career in java based technologies like HADOOP etc

SYLLABUS

UNIT - I

JAVA BASICS: Review of Object oriented concepts, History of Java, Java buzzwords, JVM architecture, Data types, Variables, Scope and life time of variables, arrays, operators, control statements, type conversion and casting, simple java program, constructors, methods, Static block, Static Data, Static Method String and String Buffer Classes, Using Java API Document.

UNIT - II

INHERITANCE AND POLYMORPHISM: Basic concepts, Types of inheritance, Member access rules, Usage of this and Super key word, Method Overloading, Method overriding, Abstract classes, Dynamic method dispatch, Usage of final keyword.

PACKAGES AND INTERFACES: Defining package, Access protection, importing packages, Defining and Implementing interfaces, and Extending interfaces. I / O STREAMS: Concepts of streams, Stream classes- Byte and Character stream, Reading console Input and Writing Console output, File Handling.

UNIT - III

EXCEPTION HANDLING: Exception types, Usage of Try, Catch, Throw, Throws and Finally keywords, Built-in Exceptions, Creating own Exception classes.MULTI THREADING: Concepts of

Thread, Thread life cycle, creating threads using Thread class and Runnable interface, Synchronization, Thread priorities, Inter Thread communication.

UNIT - IV

AWT CONTROLS: The AWT class hierarchy, user interface components- Labels, Button, Text Components, Check Box, Check Box Group, Choice, List Box, Panels – Scroll Pane, Menu, Scroll Bar. Working with Frame class, Colour, Fonts and layout managers. EVENT HANDLING: Events, Event sources, Event Listeners, Event Delegation Model (EDM), Handling Mouse and Keyboard Events, Adapter classes, Inner classes.

UNIT - V

SWINGS: Introduction to Swings, Hierarchy of swing components. Containers, Top level containers - JFrame, JWindow, JDialog, JPanel, JButton, JToggleButton, JCheckBox, JRadioButton, JLabel,JTextField, JTextArea, JList, JComboBox, JScrollPane.APPLETS: Life cycle of an Applet, Differences between Applets and Applications, Developing applets, simple applet.

TEXT BOOKS:

1. Herbert schildt (2010), The complete reference, 7th edition, Tata Mc graw Hill, New Delhi

REFERENCE BOOKS:

1. Head First Java, O'rielly publications
2. T. Budd (2009), An Introduction to Object Oriented Programming, 3rd edition, PearsonEducation, India.
3. J. Nino, F. A. Hosch (2002), An Introduction to programming and OO design using Java, John Wiley & sons, New Jersey.
4. Y. Daniel Liang (2010), Introduction to Java programming, 7th edition, Pearson education, India.

ELECTRONIC DEVICES AND DIGITAL LOGIC LAB

	L	T	P	C
B. Tech: IT II-I SEMESTER				
Course Code: A3EC71	-	-	3	2

Course Overview:

Introductory experimental laboratory that explores the design, construction, and debugging of analog electronic circuits. Lectures and six laboratory projects investigate the performance characteristics of diodes, transistors, JFETs, and op-amps, including the construction of a small audio amplifier and preamplifier. Seven weeks are devoted to the design and implementation and written and oral presentation of a project in an environment similar to that of engineering design teams in industry. The course provides opportunity to simulate real-world problems and solutions that involve tradeoffs and the use of engineering judgment. Engineers from local analog engineering companies come to campus to help students with their design projects.

Course Objectives:

I. To teach modulation, demodulation techniques used in communication system, and develop the Modulation techniques used in both time and frequency domains.

II. To impart knowledge of pre-emphasis and de-emphasis circuits used in the analog communication

III. To familiarize the Signal Modulation (amplitude, frequency, and phase) and transmission techniques (base band, SSB system) will be emphasized.

IV. To explain the concepts of mixer, PLL, Digital phase detector and synchronous detector to develop a clear insight into the relations between the input and output ac signals in various stages of a transmitter and a receiver of AM & FM systems

Course Outcomes:

1. Students will be able to analyze signals in time and frequency domain.
2. Students will be able to identify different analog modulation schemes; analyze and solve typical problems involving analog modulation/demodulation systems.
3. Students will be able to distinguish between different pulse modulation systems, multiplexing techniques and analyse PCM systems including effects of noise.
4. Students will be able to identify different digital modulation schemes, and design corresponding modulators/demodulators. They will be able to distinguish between different network topologies, protocols, data -flow and error control techniques, sand between synchronous and asynchronous transmission.
5. Students will be able to solve fundamental problems on entropy, information rate, source coding, coding efficiency and channel capacity

SYLLABUS

PART - A

ANALOG DEVICES AND CIRCUITS

1. Characteristics of PN Junction diode
2. Characteristics of Zener diode
3. Ripple Factor and Load Regulations of Half-wave Rectifier with and without filters
4. Ripple Factor and Load Regulations of Full-wave Rectifier with and without filters
5. Input and Output characteristics of Transistor in Common Emitter configuration
6. Drain and Transfer Characteristics of Junction Field Effect Transistor (JFET)
7. Gain and Frequency response of Common Emitter Amplifier
8. Gain and Frequency response of Feedback Amplifier (Voltage series or current series)
9. Heartley and Colpitts Oscillator
10. RC phase shift Oscillator

PART - B

DIGITAL CIRCUITS

1. Realization of Logic gates using discrete components
2. Binary Adders and Subtractors
3. Comparators
4. Multiplexers
5. Decoders
6. Flip-Flops
7. Counters
8. Shift Registers

JAVA PROGRAMMING LAB
(Common to CSE,IT & ECE)

II B. Tech. - II Semester | **L T P C**
Course Code: A3CS15 | **- - 3 2**

LABORATORY OVERVIEW:

A Java Programming lab manual is intended to provide a basic knowledge of java programming for students. To develop software development skills in java programming and Students will have the proficiency to develop projects in java programming. The course helps the students to solve the inter disciplinary applications through java programming.

COURSE OBJECTIVES:

1. To teach fundamentals of object oriented programming in Java. Understand various concepts of JAVA.
2. To familiarize Java environment to create, debug and run simple Java programs.
3. To demonstrate java compiler and eclipse platform and learn how to use Net Beans IDE to create Java Application.

COURSE OUTCOMES:

At the end of the course students will be able to:

1. Implement Object oriented features using Java
2. Apply the concept of polymorphism and inheritance.
3. Implement exception handling
4. Develop network and window application using awt and swings.

SYLLABUS

WEEK 1

a) Write a Java program that prints all real solutions to the quadratic equation $ax^2 + bx + c = 0$. Read in a, b, c and use the quadratic formula. If the discriminate b^2-4ac is negative, display a message stating that there are no real solutions.

b) The Fibonacci sequence is defined by the following rule: The first two values in the sequence are 1 and 1. Every subsequent value is the sum of the two values preceding it. Write a Java program that uses both recursive and non recursive functions to print the nth value in the Fibonacci sequence.

WEEK 2

a) Write a Java program that prompts the user for an integer and then prints out all prime numbers up to that integer. (use Scanner class to read input)

b) Write a Java program to multiply two given matrices.

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

WEEK 3

a) Write a Java program that checks whether a given string is a palindrome or not. Ex: MADAM is a palindrome.

b) Write a Java program for sorting list of names. Read input from command line.

c) Write a Java program to make frequency count of words in a given text.

WEEK 4

a) Write a Java program to create a Student class with following fields
   i. Hall ticket number
   ii. Student Name
   iii. Department
   Create ‘n’ number of Student objects where ‘n’ value is passed as input to constructor.

b) Write a Java program to demonstrate String comparison using == and equals method.

WEEK 5

a) Write a java program to create an abstract class named Shape that contains an empty method named number Of Sides ( ).Provide three classes named Trapezoid, Triangle and Hexagon such that each one of the classes extends the class Shape. Each one of the classes contains only the method number Of Sides ( ) that shows the number of sides in the given geometrical figures.

b) Suppose that a table named Table.txt is stored in a text file. The first line in the file is the header, and the remaining lines correspond to rows in the table. The elements are separated by commas. Write a java program to display the table using JTable component.

WEEK 6

a) Write a Java program to read copy content of one file to other by handling all file related exceptions.

WEEK 7

a) Write a Java program that reads a file name from the user, and 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.

WEEK 8

a) Write a Java program that creates three threads. First thread displays “Good Morning” everyone second, the second thread displays “Hello” every two seconds and the third thread displays “Welcome” every three seconds.

b) Write a Java program that correctly implements producer consumer problem using the concept of inter thread communication.

WEEK 9

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

WEEK 10

a. Write a Java program for handling mouse events.

b. Write a Java program for handling key events using Adapter classes

WEEK 11

a) Write a java program that simulates a traffic light. The program lets the user select one of three lights: red, yellow, or green. When a radio button is selected, the light is turned on, and only one light can be on at a time No light is on when the program starts.

b) Write a Java program that allows the user to draw lines, rectangles and ovals.

WEEK 12

a) Develop simple calculator using Swings.

b) Develop an applet that displays a simple message in center of the screen

ENVIRONMENTAL STUDIES
MANDATORY NON-CREDIT COURSE

B. Tech: IT II-I Semester | **L T P C**
Course Code: A3HS16 | **3 - - -**

Course Overview:

Environmental study is interconnected; interrelated and interdependent subject. Hence, it is multidisciplinary in nature. The present course is framed by expert committee of UGC under the direction of Honorable Supreme Court to be as a core module syllabus for all branches of higher education and to be implemented in all universities over India. The course is designed to create environmental awareness and consciousness among the present generation to become environmental responsible citizens. The course description is: multidisciplinary nature of environmental studies, Natural Resources: Renewable and non-renewable resources; Ecosystems; Biodiversity and its conservation; Environmental Pollution; Social Issues and the Environment; Human Population and the Environment; pollution control acts and Field Work. The course is divided into five chapters for convenience of academic teaching followed by field visits.

Course Objectives:

I. Determine the Natural resources on which the structure of development is raised for sustainability of the society through equitable maintenance of natural resources.
II. Illustrate about biodiversity that raises an appreciation and deeper understanding of species, ecosystems and also the interconnectedness of the living world and thereby avoids the mismanagement, misuse and destruction of biodiversity.
III. Summarize a methodology for identification, assessment and quantification of global environmental issues in order to create awareness about the international conventions for mitigating global environmental problems.
IV. Sustainable development that aims to meet raising human needs of the present and future generations through preserving the environment.
V. Outline green environmental issue provides an opportunity to overcome the current global environmental issues by implementing modern techniques like CDM, green building, green computing etc.

Course Outcomes:

Upon successful completion of the course, the student should be familiar with and be able to:
1. Explain the natural resources and their management.
2. Understanding the Classification and functioning of Ecosystems.
3. Remembering the Importance of biodiversity and its conservation.
4. Understanding the problems related to environmental pollution and management.
5. Apply the role of information technology, Analyze social issues and Acts associated with environment.

SYLLABUS

UNIT-I

Ecosystems: Definition, Scope and Importance of ecosystem. Classification, structure and function of an ecosystem, Food chains, food web and ecological pyramids. Flow of energy, Biogeochemical cycles, Bioaccumulation, Bio magnification, ecosystem value, services and carrying capacity.

UNIT-II:

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

UNIT-III:

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

UNIT-IV:

Environmental Pollution and Control Technologies: Environmental Pollution: Classification of pollution,

Air Pollution: Primary and secondary pollutants, Automobile and Industrial pollution, Ambient air quality standards.

Water pollution: Sources and types of pollution, drinking water quality standards.

Soil Pollution: Sources and types, Impacts of modern agriculture,.

Noise Pollution: Sources and Health hazards, standards,

Solid waste: Municipal Solid Waste management, composition and characteristics of e-Waste and its management.

Pollution control technologies: Wastewater Treatment methods: Primary, secondary and Tertiary. Overview of air pollution control technologies, Concepts of bioremediation.

Global Environmental Problems and Global Efforts: Climate change and impacts on human environment. Ozone depletion and Ozone depleting substances (ODS).. International conventions / Protocols: Earth summit, Kyoto protocol and Montréal Protocol.

UNIT-V:

Environmental Policy, Legislation & EIA: Environmental Protection act, Legal aspects Air Act-1981, Water
Act, Forest Act, Wild life Act, Municipal solid waste management and handling rules, biomedical waste management and handling rules, hazardous waste management and handling rules.

EIA: EIA structure, methods of baseline data acquisition. Overview on Impacts of air, water, biological and Socio-economical aspects. Strategies for risk assessment,

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

TEXT BOOKS:

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

REFERENCE BOOKS:

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

II B.TECH II SEMESTER SYLLABUS

DESIGN AND ANALYSIS OF ALGORITHMS
(Common to CSE&IT)

II B. Tech. - II Semester | **L T P C**
Course Code: A3CS11 | **4 1 - 4**

COURSE OVERVIEW:
The primary objective of this course is to introduce the concept of algorithm as a precise mathematical concept, and study how to design algorithms, establish their correctness, study their efficiency and memory needs. The course consists of a strong mathematical component in addition to the design of various algorithms

COURSE OBJECTIVES:
1. To demonstrate performance of algorithms with respect to time and space complexity.
2. To explain graph and tree traversals.
3. To explain the concepts greedy method and dynamic programming. Applying for several applications like knapsack problem, job sequencing with deadlines, and optimal binary search tree, TSP and so on respectively.
4. To Illustrate the methods of backtracking and branch bound techniques to solve the problems like n-queens problem, graph colouring and TSP respectively.
5. To familiarize the concepts of deterministic and non-deterministic algorithms.

COURSE OUTCOMES:
At the end of this course students will be able to:
1. Identify various Time and Space complexities of various algorithms
2. Understand Tree Traversal method and Greedy Algorithms
3. Apply Dynamic Programming concept to solve various problems
4. Apply Backtracking, Branch and Bound concept to solve various problems
5. Implement different performance analysis methods for non deterministic algorithms

SYLLABUS

UNIT - I
INTRODUCTION: Algorithm, pseudo code for expressing algorithms, performance analysis-space complexity, time complexity, asymptotic notation- big (O) notation, omega notation, theta notation and little (o) notation, recurrences, probabilistic analysis, disjoint set operations, union and find algorithms.

UNIT - II
DIVIDE AND CONQUER: General method, applications-analysis of binary search, quick sort, merge sort, AND OR Graphs.
GREEDY METHOD: General method, Applications-job sequencing with deadlines, Fractional knapsack problem, minimum cost spanning trees, Single source shortest path problem.

UNIT - III
GRAPHS (Algorithm and Analysis): Breadth first search and traversal, Depth first search and traversal, Spanning trees, connected components and bi-connected components, Articulation points.
DYNAMIC PROGRAMMING: General method, applications - optimal binary search trees, 0/1 knapsack problem, All pairs shortest path problem, Travelling sales person problem, Reliability design.

UNIT - IV
BACKTRACKING: General method, Applications- n-queen problem, Sum of subsets problem, Graph coloring and Hamiltonian cycles.
BRANCH AND BOUND: General method, applications - travelling sales person problem, 0/1 knapsack problem- LC branch and bound solution, FIFO branch and bound solution.

UNIT - V

NP-HARD AND NP-COMPLETE PROBLEMS: Basic concepts, non-deterministic algorithms, NP-hard and NP-complete classes, Cook's theorem.

TEXT BOOKS:

1. Ellis Horowitz, Satraj Sahni, Rajasekharam (2007), Fundamentals of Computer Algorithms, 2nd edition, University Press, New Delhi.

REFERENCE BOOKS:

1. R. C. T. Lee, S. S. Tseng, R.C. Chang and T. Tsai (2006), Introduction to Design and Analysis of Algorithms A strategic approach, McGraw Hill, India.
2. Allen Weiss (2009), Data structures and Algorithm Analysis in C++, 2nd edition, Pearson education, New Delhi.
3. Aho, Ullman, Hopcroft (2009), Design and Analysis of algorithms, 2nd edition, Pearson education, New Delhi

DATABASE MANAGEMENT SYSTEMS
(Common to CSE&IT)

II B. Tech. - II Semester **L T P C**
Course Code: A3CS14 **4 1 - 4**

COURSE OVERVIEW:

This course introduces the core principles and techniques required in the design and implementation of database systems. This introductory application-oriented course covers the relational database systems RDBMS - the predominant system for business, scientific and engineering applications at present. It includes Entity-Relational model, Normalization, Relational model, Relational algebra, and data access queries as well as an introduction to SQL. It also covers essential DBMS concepts such as: Transaction Processing, Concurrency Control and Recovery. It also provides students with theoretical knowledge and practical skills in the use of databases and database management systems in information technology applications.

COURSE OBJECTIVES:

I. **To Teach** the basic database concepts, applications, data models, schemas andinstances.
II. **To familiarize** Entity Relationship model for a database.
III. **To Demonstrate** the use of constraints and relational algebra operations.
IV. **To Describe** the basics of SQL and construct queries using SQL.
V. **To Emphasize** the importance of normalization in databases.
VI. **To Demonstrate** the basic concepts of transaction processing and concurrency control.
VII. **To familiarize** the concepts of database storage structures and identify the access techniques.

COURSE OUTCOMES:

At the end of the course the students are able to:
1. Use the basic concepts of Database Systems in Database design
2. Apply SQL queries to interact with Database
3. Design a Database using ER Modelling
4. Apply normalization on database design to eliminate anomalies
5. Analyze database transactions and can control them by applying ACID properties.

SYLLABUS

UNIT - I

INTRODUCTION: Introduction and applications of DBMS, Purpose of data base, Data, Independence, Database System architecture- Levels, Mappings, Database, users and DBA

DATABASE DESIGN: Database Design Process, ER Diagrams - Entities, Attributes, Relationships, Constraints, keys, extended ER features, Generalization, Specialization, Aggregation, Conceptual design with the E-Rmodel.

UNIT - II

THE RELATIONAL MODEL: Introduction to the relational model, Integrity constraints over relations, Enforcing integrity constraints, Querying relational data, Logical database design: E-R to relational, Introduction to views, Destroying/altering tables and views.

RELATIONAL ALGEBRA AND CALCULUS: Preliminaries, relational algebra operators, relational calculus - Tuple and domain relational calculus, expressive power of algebra and calculus.

UNIT - III

SQL: Basics of SQL, DDL, DML,DCL, structure – creation, alteration, defining constraints – Primary key, foreign key, unique, not null, check, IN operator, Functions - aggregate functions, Built-in functions – numeric, date, string functions, set operations, sub-queries, correlated sub-queries, Use of group by, having, order by, join and its types, Exist, Any, All , view and its types. transaction control commands – Commit, Rollback, Save point, cursors, stored procedures,Triggers

UNIT - IV

SCHEMA REFINEMENT AND NORMAL FORMS: Introduction to schema refinement, functional dependencies, reasoning about FDs. Normal forms: 1NF, 2NF, 3NF, BCNF, properties of decompositions, normalization, schema refinement in database design, case studies.

UNIT – V

TRANSACTIONS MANAGEMENT: Transaction concept, transaction state, implementation of atomicity and durability, concurrent executions, Serializability, recoverability, implementation of isolation, transaction definition in SQL, testing for Serializability.

CONCURRENCY CONTROL AND RECOVERY SYSTEM: Concurrency control, lock based protocols, time-stamp based protocols, validation based protocols, multiple granularity. Recovery system - failure classification, storage structure, recovery and atomicity, log- based recovery, shadow paging, buffer management, failure with loss of non-volatile storage, advanced recovery techniques, remote backup systems.

OVERVIEW OF STORAGE AND INDEXING: Tree structured indexing - intuition for tree indexes, indexed sequential access method (ISAM), B+ Trees - a dynamic tree structure.

TEXT BOOKS:

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

REFERENCE BOOKS:

1. Abraham Silberschatz, Henry F. Korth, S. Sudarshan (2005), Database System Concepts, 5th edition, McGraw-Hill, New Delhi,India.
2. Peter Rob, Carlos Coronel (2009), Database Systems Design, Implementation and Management, 7thedition.

OPERATING SYSTEMS
(Common to CSE&IT)

II B. Tech. - II Semester **L T P C**
Course Code: A3CS12 **3 1 - 3**

COURSE OVERVIEW:
Operating systems course is intended as a general introduced to the techniques used to implement operating systems and related kinds of systems software. The topics covered will be functions and structure of operating systems, process management (creation, synchronization, and communication); processor scheduling; deadlock prevention, avoidance, and recovery; main-memory management; virtual memory management (swapping, paging, segmentation and page-replacement-algorithms); control of disks and other input/output devices; file-system structure and implementation; and protection and security

COURSE OBJECTIVES:
1. To explain main components of OS and their working
2. To familiarize the operations performed by OS as a resource Manager
3. To impart various scheduling policies of OS
4. To teach the different memory management techniques.

COURSE OUTCOMES:
At the end of the course students will be able to:
1. Outline various concepts and features of Operating systems.
2. Compare various operating systems with respect to characteristics and features
3. Implement algorithm of CPU Scheduling, Memory Scheduling and disk scheduling.
4. Make changes in the OS configurations as per need

SYLLABUS

UNIT - I
OPERATING SYSTEMS OVERVIEW: Introduction, operating system operations, process management, memory management, storage management, protection and security, distributed systems.
OPERATING SYSTEMS STRUCTURES: Operating system services and systems calls, system programs, operating system structure, operating systems generations.

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

UNIT - III
DEADLOCKS: System model, deadlock characterization, deadlock prevention, detection and avoidance, recovery from deadlock banker's algorithm.
MEMORY MANAGEMENT: Swapping, contiguous memory allocation, paging, structure of the page table, segmentation, virtual memory, demand paging, page-replacement algorithms, allocation of frames, thrashing, case study - UNIX.

UNIT IV
FILE SYSTEM: Concept of a file, access methods, directory structure, file system mounting, file sharing, protection. File system implementation: file system structure, file system implementation, directory implementation, allocation methods, free-space management, efficiency and performance,

comparison of UNIX and windows.

UNIT - V

I/O SYSTEM: Mass storage structure - overview of mass storage structure, disk structure, disk attachment, disk scheduling algorithms, swap space management, stable storage implementation, tertiary storage structure.

I/O: Hardware, application I/O interface, kernel I/O subsystem, transforming I/O requests to hardware operations, streams, performance.

TEXT BOOKS:

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

REFERENCE BOOKS:

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

ADVANCED WEB TECHNOLOGIES

B. Tech: IT II-II Semester	L	T	P	C
Course Code: A3IT01	3	1	-	3

Course Overview:

The World Wide Web continues to provide a foundation for the development of a broad range of increasingly influential and strategic technologies, supporting a large variety of applications and services, both in the private and public sectors. There is a growing need for management and decision makers to gain a clearer understanding of the application development process, from planning through to deployment and maintenance.

Course Objectives:

I. To teach students the basics of server side scripting using PHP
II. To explain web application development procedures
III. To impart servlet technology for writing business logic
IV. To facilitate students to connect to databases using JDBC
V. To familiarize various concepts of application development using JSP

Course Outcomes:

Upon completion of this course, students will be able to:

1. Create web pages using PHP
2. Identify the difference between the HTML PHP and XML documents.
3. Identify the engineering structural design of XML and parse tree
4. Analyze the difference between and PHP and XML.
5. Understand the concept of JAVA SCRIPTS.
6. Identify the difference between the JSP and Servlet.
7. Design web application using MVC architecture
8. Understand the JSP and Servlet concepts.
9. Apply JDBC and ODBC technologies to create database connectivity

SYLLABUS

UNIT – I

Client side Scripting

Introduction to JavaScript: JavaScript language – declaring variables, scope of variables functions, event handlers (on click, on submit etc.), Document Object Model, Form validations.Simple AJAX applications.

UNIT – II

XML

Introduction to XML, Defining XML tags, their attributes and values, Document type definition, XML Schemas, Document Object model, XHTML

Parsing XML Data

DOM and SAX parsers in java

UNIT – III

Introduction to PHP

Declaring variables, data types, arrays, strings, operations, expressions, control structures, functions, Reading data from web form controls like Text Boxes, radio buttons, lists etc., Handling File Uploads, Connecting to database (My SQL as reference), executing simple queries, handling results, Handling sessions and cookies.

File Handling in PHP

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

UNIT – IV

Introduction to Servlets

Common Gateway Interface (CGI), Lifecycle of a Servlets, deploying a Servlets, The Servlets API, Reading Servlets parameters, Reading initialization parameters, Handling Http Request & Responses, Using Cookies and sessions, connecting to a database using JDBC.

UNIT – V

Introduction to JSP

The Anatomy of a JSP Page, JSP Processing, Declarations, Directives, Expressions, Code Snippets, implicit objects, Using Beans in JSP Pages, Using Cookies and session tracking, connecting to database in JSP.

TEXT BOOKS:

1. Dietel and Nieto (2008), Internet and World wide Web How to Program, 4th edition, PHI/Pearson Education Asia, New Jersey.
2. Java Script step by step, Suehring Steve, PHI publications.

REFERENCE BOOKS:

1. Head first servlet and jsp.
2. Database programming with JDBC and JAVA, O'reilly publications.
3. Beginning ASP.NET 4.5 in C# and VB.NET, ImarSpaanjaars , WROX publications.
4. C. Bates(2002), Web Programming building Internet Applications, 2nd edition, WILLEY Dream Tech, New Delhi, India.

PYTHON PROGRAMMING

B. Tech: IT II-II Semester | **L T P C**
Course Code: A3IT02 | **3 1 - 3**

Course Overview:

In this course you'll learn how to write simple programs using Python, a dynamic object-oriented programming language that can be used for many kinds of software development projects. It offers strong support for integration with other computer languages and tools, comes with extensive standard libraries, and the basic principles of the language can be learned in a few days. Many programmers new to Python report substantial productivity gains and feel the language encourages the development of higher quality, more maintainable code.

Course Objectives:

I. To Describe the basic elements of the Python language and the Python interpreter and discuss the differences between Python and other modern languages.
II. To Describe Python dictionaries and demonstrate the use of dictionary methods.
III. Define, analyze and code the basic Python conditional and iterative control structures and explain how they can be nested and how exceptions can be used.
IV. To Explain and demonstrate methods of error handling and Python exceptions.
V. To demonstrate the understanding of ―magic methods‖ through use of these in the context of a Python application.

Course Outcomes:

At the end of this course students will be able to:
I. Write and debug Python programs which make use of the fundamental control structures and method-building techniques common to all programming languages. Specifically, the student will use data types, input, output, iterative, conditional, and functional components of the language in his or her programs.
II. Use object-oriented programming techniques to design and implement a clear, well-structured Python program. Specifically, the student will use and design classes and objects in his or her programs.
III. Outline the specific features of Python which made it more powerful programming language.

SYLLABUS

UNIT - I

Introduction, Python Overview, Basic data types, Control Flow, Tuples, ListsMore advanced data types (dictionary, string), file I/O, functions

UNIT - II

Module and Packages, Object oriented programming, advanced function: map, filter, and reduce

UNIT - III

Exceptions, sorting, introduction to standard libraries, serialization with pickle

UNIT - IV

Network programming with python, multi-processing and multi-threading, debugging with pdb, python unit testing

UNIT - V

Selected topics: DB programming, Web development (Django with python) , Python native call, Performance optimizations

TEXT BOOK:

1. Learning Python, by Shroff Pub& Dist., O'relly publications, Publication Year: 2013.

REFERENCES:

1. Python Programming for Beginners: Python Programming Languageby Joseph Joyner

PYTHON PROGRAMMING LAB

B. Tech: IT II-II Semester	L	T	P	C
Course Code: A3IT03	-	-	3	2

Course Overview:

This course is designed to know about the Scripting languages that require very different style of programming than system programming languages such as C or Java. Scripting languages are typically used for "gluing" applications together. Scripting languages are often type less and usually provide methods for higher level of programming and more rapid development of applications than typical system programming languages. This course provides an introduction to the script programming paradigm, and introduces and compares a range of scripting languages used for UNIX and Web-based applications.

Course Objective:

This course enables to student to know:

I. Enabling Knowledge: effectively apply knowledge of Perl and Python to new situations. Critical Analysis: examine and consider accurately and objectively any topic, evidence, or situation.
II. Analyze requirements of software systems for the purpose of determining the suitability of implementing in Perl or Python;
III. Analyze and model requirements and constraints for the purpose of designing and implementing software systems in Perl and Python;
IV. Evaluate and compare designs of such systems on the basis of specific requirements and constraints.
V. Problem Solving: analyze problems and synthesize suitable solutions.

Course Outcomes

At the end of the course, students will

1. Understand process of executing a PHP-based script on a webserver.
2. 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.
3. Understand basic PHP syntax for variable use, and standard language constructs, such as conditionals and loops.
4. Understand the syntax and use of PHP object-oriented classes.
5. Understand the syntax and functions available to deal with file processing for files on the server as well as processing web URLs.
6. 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.

SYLLABUS

1. Write a Python program to print the following string in a specific format (see the output). *Sample String :* "Twinkle, twinkle, little star, How I wonder what you are! Up above the world so high, Like a diamond in the sky. Twinkle, twinkle, little star, How I wonder what you are" *Output :*

Twinkle, twinkle, little star, How I wonder what you are! Up above the world so high, Like a diamond in the sky. Twinkle, twinkle, little star, How I wonder what you are

2. Write a Python program to get the Python version you are using.

3. Write a Python program to display the current date and time.
Sample Output :
Current date and time : 2014-07-05 14:34:14

4. Write a Python program which accepts the radius of a circle from the user and compute the area.

5. Write a Python program which accepts the user's first and last name and print them in reverse order with a space between them.

6. Write a Python program which accepts a sequence of comma-separated numbers from user and generate a list and a tuple with those numbers.
Sample data : 3, 5, 7, 23
Output :
List : ['3', ' 5', ' 7', ' 23']
Tuple : ('3', ' 5', ' 7', ' 23')

7. Write a Python program to accept a filename from the user and print the extension of that.
Sample filename : abc.java
Output : java

8. Write a Python program to display the first and last colors from the following list.
color_list = ["Red","Green","White" ,"Black"]

9. Write a Python program to display the examination schedule. (extract the date from exam_st_date).
exam_st_date = (11, 12, 2014)
Sample Output : The examination will start from : 11 / 12 / 2014

10. Write a Python program that accepts an integer (n) and computes the value of n+nn+nnn.

11. Write a Python program to print the documents (syntax, description etc.) of Python built-in function(s).

12. Write a Python program to print the calendar of a given month and year.
Note : Use 'calendar' module.

13. Write a Python program to print the following here document.
Sample string : a string that you "don't" have to escape
This is a ..... multi-line
heredoc string --------> example

14. Write a Python program to calculate number of days between two dates.
Sample dates : (2014, 7, 2), (2014, 7, 11)
Expected output : 9 days

15. Write a Python program to get the volume of a sphere with radius 6.

16. Write a Python program to get the difference between a given number and 17, if the number is greater than 17 return double the absolute difference.

Text Books:

1. Build Your Own Database Driven Web Site Using PHP & MySQL by Kevin Yank, available from Sitepoint.
2. PHP/MySQL by Joel Murach and Ray Harris, available from Murach's.
3. PHP Solutions by David Powers, available from Friends of Ed.
4. Learning PHP, MySQL, and JavaScript by Robin Nixon, available from O'Reilly

ADVANCED WEB TECHNOLOGIES LAB

B. Tech: IT II-II Semester	L	T	P	C
Course Code: A3IT04	-	-	3	2

Course Overview:

The World Wide Web continues to provide a foundation for the development of a broad range of increasingly influential and strategic technologies, supporting a large variety of applications and services, both in the private and public sectors. There is a growing need for management and decision makers to gain a clearer understanding of the application development process, from planning through to deployment and maintenance. This module will give you an insight into architectures, protocols, standards, languages, tools and techniques; an understanding of approaches to more dynamic and mobile content; and demonstrate how you can analyze requirements, plan, design, implement and test a range of web applications.

Course Objectives:

I. To teach students the basics of server side scripting using PHP
II. To explain web application development procedures
III. To impart Servlets technology for writing business logic
IV. To facilitate students to connect to databases using JDBC
V. To familiarize various concepts of application development using JSP

Course Outcomes:

Upon completion of this course, students will be able to:

1. Create web pages using PHP
2. Identify the difference between the HTML PHP and XML documents.
3. Identify the engineering structural design of XML and parse tree
4. Analyze the difference between and PHP and XML.
5. Understand the concept of JAVA SCRIPTS.
6. Identify the difference between the JSP and Servlets.
7. Design web application using MVC architecture
8. Understand the JSP and Servlet concepts.

SYLLABUS

Note:

1. **Apache, MySQL and PHP for the Lab Experiments. Though not mandatory, encourage the use of Eclipse platform wherever applicable**
2. **The list suggests the minimum program set. Hence, the concerned staff is requested to add more problems to the list as needed**

1. Install the following on the local machine
   - Apache Web Server (if not installed)
   - Tomcat Application Server locally
   - Install MySQL (if not installed)
   - Install PHP and configure it to work with Apache web server and MySQL (if not already configured)
2. Write an HTML page including any required Javascript that takes a number from one text field in the range of 0 to 999 and shows it in range of 0 to 999 and shows it in another text field in words. If the number is out of range, it should show “out of range” and if it is not a number, it should show “not a number” message in the result box.
3. Write an HTML page that has one input, which can take multi-line text and a submit button. Once the user clicks the submit button, it should show the number of characters, words and lines in the text entered using an alert message. Words are separated with while space and lines are separated with new line character.
4. Write an HTML page that contains a selection box with a list of 5 countries. When the user selects a country, its capital should be printed next to the list. Add CSS to customize the

properties of the font of the capital (color, bold and font size).

5. Create an XML document that contains 10 users information. Write a Java program, which takes User Id as input and returns the user details by taking the user information from the XML document using (a) DOM Parser and (b) SAX parser.
6. Implement the following web applications using (a) PHP, (b) Servlets and (c) JSP:

i. A user validation web application, where the user submits the login name and password to the server. The name and password are checked against the data already available in Database and if the data matches, a successful login page is returned. Otherwise a failure message is shown to the user.
ii. Modify the above program to use an xml file instead of database.
iii. Modify the above program to use AJAX to show the result on the same page below the submit button.
iv. A simple calculator web application that takes two numbers and an operator (+, -, /, * and %) from an HTML page and returns the result page with the operation performed on the operands.
v. Modify the above program such that it stores each query in a database and checks the database first for the result. If the query is already available in the DB, or it computes the result and returns it after storing the new query and result on DB.
vi. A web application takes a name as input and on submit it shows a hello<name>page where<name> is taken from the request. It shows the start time at the right top corner of the page and provides a logout button. On clicking this button, if should show a logout page with Thank You <name> message with the duration of usage (hint: Use session to store name and time).
vii. A web application that takes name and age from an HTML page. If the age is less than 18, it should send a page with “Hello <name>, you are not authorized to visit this site” message, where <name> should be replaced with the entered name. Otherwise it should send “Welcome <name> to the site” message.
viii. A web application for implementation: The user is first served a login page which takes user’s name and password. After submitting the details the server checks these values against the data from a database and takes the following decisions. If name and password doesn’t match, then serves “password mismatch” page If name is not found in the database, serves a registration page, where user’s full name is asked and on submitting the full name, it stores, the login name, password and full name in the database (hint: use session for storing the submitted login name and password)
ix. A web application that lists all cookies stored in the browser on clicking “List Cookies” button. Add cookies if necessary.

TEXT BOOKS:

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

REFERENCE BOOKS:

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

Outcomes:

- Use LAMP Stack for web application
- Use Tomcat Server for Servlets and JSPs
- Write simple applications with Technologies like HTML, Javascript, AJAX, PHP, Servlets and JSPs
- Connect to Database and get results
- Parse XML files using Java (DOM and SAX parsers)

DATABASE MANAGEMENT SYSTEMS LAB
(Common to CSE&IT)

II B. Tech. - II Semester | **L T P C**
Course Code: A3CS16 | **- - 3 2**

LABORATORY OVERVIEW:

This course introduces the core principles and techniques required in the design and implementation of database systems. This introductory application-oriented course covers the relational database systems RDBMS - the predominant system for business scientific and engineering applications at present. It includes Entity-Relational model, Normalization, Relational model, Relational algebra, and data access queries as well as an introduction to SQL. It also covers essential DBMS concepts such as: Transaction Processing, Concurrency Control and Recovery. It also provides students with theoretical knowledge and practical skills in the use of databases and database management systems in information technology applications.

COURSE OBJECTIVES:

1. To explain basic database concepts, applications, data models, schemas and instances.
2. To demonstrate the use of constraints and relational algebra operations. IV. **Describe** the basics of SQL and construct queries using SQL.
3. To emphasize the importance of normalization in databases.
4. To facilitate students in Database design
5. To familiarize issues of concurrency control and transaction management.

COURSE OUTCOMES:

At the end of the course the students are able to:

1. Apply the basic concepts of Database Systems and Applications.
2. Use the basics of SQL and construct queries using SQL in database creation and interaction.
3. Design a commercial relational database system (Oracle, MySQL) by writing SQL using the system.
4. Analyze and Select storage and recovery techniques of database system.

SYLLABUS

Experiment 1
Student should decide on a case study and formulate the problem statement.

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

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

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

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

Experiment 6
Practicing DML commands- Insert, Select, Update, Delete

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

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

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

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

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

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

GENDER SENSITIZATION
MANDATORY NON-CREDIT COURSE

B. Tech: IT II-II Semester | **L T P C**
Course Code: A3HS17 | **- - 2 -**

Objectives of the Course:

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

Learning objectives:

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

SYLLABUS

UNIT - I

UNDERSTANDING GENDER: Gender: Why Should we Study It? (Towards a world of equals: Unit-1) Socialization: Making Women, Making Men (Towards a world of equals: unit-2)
Introduction. Preparing for Womanhood. Growing up Male. First lessons in caste. Different Masculinities.
Just Relationships: Doing together as equals (towards a world of equals unit-12)
Mary Kom and Onler. Love and acid just to do not Mix. Love Letters, mothers and fathers. Further Reading: Rosa Parks - The Brave Heart.

UNIT - II

GENDER AND BIOLOGY: Missing Women: Sex selection and consequences (Towards a world of equals:unit-4) Declining sex ration. Demographic consequences.
Gender Spectrum: Beyond the Binary (Towards a world of equals: Unit-10) Two or Many? Struggles with Discrimination. **Additional Reading**: Our Bodies, Our Health (Towards a world of equals: Unit-13)

UNIT - III

GENDER AND LABOUR: Housework: The Invisible Labour (Towards a world of equals: unit-3) "My Mother doesn't Work "Share the Load." **Women's work:** Its Politics and Economics (Towards a world of equals: unit-7) Fact and Fiction: Unrecognized and Unaccounted work. Further Reading: Wages and conditions of work.

UNIT - IV

ISSUES OF VOILENCE: Sexual Harassment: Say No! (Towards a world of equals: unit-6) Sexual Harassment, no Eve teasing-Coping with Everyday Harassment-Further Reading "Chupulu".

Domestic Violence: Speaking out (Towards a world of equals: unit-8) Is Home a Safe Place? – When Women unite [Film].Rebuilding Lives . Further Reading: New Forums for Justice. **Thinking about Sexual Violence (Towards a World of Equals: unit-11)** Blaming the Victim- "I Fought for my Life…." Further Reading: The Caste Face of Violence.

UNIT - V

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

Essential Reading: All the units in the Textbook, "Towards a world of equals; A Bilingual Textbook on Gender" written by A.Suneetha, Uma Bhrugubanda, Duggirata Vasanta, Rama Molkote ,Vasudha Nagaraj, Asma Rasheed, Gogu Shymala, Deepa Sreenivas and Susie Tharu.

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

REFERENCE BOOKS:

1. Sen Amartya "More than one Million Women are Missing" New York review of Books 37.20 (20th December 1990). Print "We Were Making History…" Life stories of Women in the Telangana People's struggle. New Delhi: Kail for Women, 1989.
2. Tripti Luhiri: By the Numbers: Where Indian Women's Work "Women's studies journal (14 November 2012) .Available online at: http://blogs.wsj.com/ India real time/2012/11/14/by- the numbers - where - Indian – Women- work/>
3. K.Satyanarayana and Susie Tharu (Ed) Steel Nibs Are Sprouting: New Dalit Writing From South India, Dossier 2: Telugu And Kannad http://harpercollins.co.in/BookDetail.asp?Book Code=3732
4. Vimala. "Vantillu (The Kitchen)". Women Writing in India: 600 BC to the Present. Volume II: The 20th Century. Ed,, Susie Tharu and K.Lalita. Delhi: Oxford University Press, 1995, 599-601.
5. Shatrughna, Veena et al. Women's Work and its Impact on Child Health and Nutrition, Hyderabad, National Institute of Nutrition, Indian Council of Medical Research. 1993.
6. Stree Shakti Sanghatana. "We Were Making History …. 'Life Stories of Women in the Telangana People's Struggle. New Delhi: Kali for Women, 1989.
7. Menon, Nivedita. Seeing like a Feminist. New Delhi: Zubban-Penguin Books, 2012
8. Jayaprabha, A. "Chupulu (Stares)". Women Writing in India: 600BC to the Present. Volume II: The 20th Century Ed, Susie Tharu and K. Lalita. Delhi: Oxford University Press, 1995. 596-597.
9. Javeed, Shayan and Anupam Manuhaar. "Women and Wage Discrimination in India: A Critical Analysis." International Journal of Humanities and Social Science Invention 2.4 (2013)
10. Gautam, Liela and Gita Ramaswamy. "A 'conversation' between a Daughter and a Mother." Broadsheet on Contemporary Politics. Special Issue on Sexuality and Harassment: Gender Politics on Campus Today. Ed Madhumeeta Sinha and Asma Rasheed. Hyderabad: Anveshi Research Center for Women's Studies, 2014.
11. Abdulali Sohaila. "I Fought For My Life… and Won. "Available online at: http:www.thealternative.in/lifestyle/i-fought-for-my-lifeand-won-sohaila-abdulal/
12. Jeganathan Pradeep, Partha Chatterjee (Ed). "Community, Gender and Violence Subaltern Studies XI". Permanent Black and Ravi Dayal Publishers, New Delhi, 2000
13. K Kapadia. The Violence of Development: The Politics of Identify, Gender and Social Inequalities in India. London: Zed Books, 2002
14. S. Benhabib. Situating the Self: Gender, Community, and Postmodernism in Contemporary Ethics, London: Routledge, 1992
15. Virginia Woolf. A Room of One's Own. Oxford: Black Swan. 1992.
16. T. Banuri and M. Mahmood, Just Development: Beyond Adjustment with a Human Face, Karachi: Oxford University Press, 1997

III B.TECH I SEMESTER SYLLABUS

COMPUTER NETWORKS
(Common to CSE & IT)

III B. Tech. - I Semester | **L T P C**
Course Code: A3CS18 | **4 1 - 4**

COURSE OVERVIEW:
The course introduces main concepts of networking; application areas; classification; reference models; transmission environment; technologies; routing algorithms; IP, UDP and TCP protocols; reliable data transferring methods; application protocols; network security; management systems; perspectives of communication networks. The course structure consists of lectures, tutorials, laboratory works in computer classroom and individual work.

SYLLABUS

UNIT - I
INTRODUCTION: Network applications, network hardware, network software, reference models: OSI, TCP/IP, Internet, Connection oriented network - X.25, frame relay. THE PHYSICAL LAYER: Theoretical basis for communication, guided transmission media, wireless transmission, the public switched telephone networks, mobile telephone system.

UNIT - II
THE DATA LINK LAYER: Design issues, error detection and correction, elementary data link protocols, sliding window protocols, example data link protocols - HDLC, the data link layer in the internet. THE MEDIUM ACCESS SUBLAYER: Channel allocations problem, multiple access protocols, Ethernet, Data Link Layer switching, Wireless LAN, Broadband Wireless, Bluetooth

UNIT - III
THE NETWORK LAYER: Network layer design issues, routing algorithms, Congestion control algorithms, Internetworking, the network layer in the internet (IPv4 and IPv6), Quality of Service.

UNIT – IV
THE TRANSPORT LAYER: Transport service, elements of transport protocol, Simple Transport Protocol, Internet transport layer protocols: UDP and TCP.

UNIT - V
THE APPLICATION LAYER: Domain name system, electronic mail, World Wide Web: architectural overview, dynamic web document and http. APPLICATION LAYER PROTOCOLS: Simple Network Management Protocol, File Transfer Protocol, Simple Mail Transfer Protocol, Telnet.

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

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

LINUX PROGRAMMING
(Common to CSE & IT)

III B. Tech. - I Semester | **L T P C**
Course Code: A3CS19 | **3 1 - 3**

Course Overview:

This course explains the fundamental ideas behind the open source operating system approach to programming. Knowledge of Linux helps to understand OS level programming. Like the successful computer languages that came before, Linux is the blend of the best elements of its rich heritage combined with the innovative concepts required by its unique environment. This course involves kernel concepts, basics commands, shell scripting, file processing ,Socket programming ,Processes, Inter process communication. This course is presented to students by power point projections, course handouts, lecture notes, assignments, objective and subjective tests

Course Objectives:

1. To teach principles of operating system including File handling utilities, Security by file permissions, Process utilities, Disk utilities, Networking Commands, Basic Linux commands, Scripts and filters.
2. To familiarize fundamentals of the Bourne again shell (bash), shell programming, pipes, input and output redirection Control structures, arithmetic in shell interrupt processing, functions, debugging shell scripts.
3. To impart fundamentals of file concepts kernel support for file, File structure related system calls (file API's).
4. To facilitate students in understanding Inter process communication.
5. To facilitate students in understanding semaphore and shared memory.
6. To facilitate students in understanding process.

Course Outcomes:

1. Ability to use various Linux commands that are used to manipulate system operations at admin level and a prerequisite to pursue job as a Network administrator.
2. Ability to write Shell Programming using Linux commands.
3. Ability to design and write application to manipulate internal kernel level Linux File System.
4. Ability to develop IPC-API's that can be used to control various processes for synchronization.
5. Ability to develop Network Programming that allows applications to make efficient use of resources available on different machines in a network.

SYLLABUS

UNIT – I

INTRODUCTION TO LINUX AND LINUX UTILITIES: A brief history of LINUX, architecture of LINUX, features of LINUX, introduction to vi editor.

Linux commands- PATH, man, echo, printf, script, passwd, uname, who, date, stty, pwd, cd, mkdir, rmdir, ls, cp, mv, rm, cat, more, wc, lp, od, tar, gzip, file handling utilities, security by file permissions, process utilities, disk utilities, networking commands, unlink, du, df, mount, umount, find, unmask, ulimit, ps, w, finger, arp, ftp, telnet, rlogin.Text Processing utilities and backup utilities , tail, head , sort, nl, uniq, grep, egrep, fgrep, cut, paste, join, tee, pg, comm, cmp, diff, tr, awk, cpio

UNIT - II

Introduction to Shells: Linux Session, Standard Streams, Redirection, Pipes, Tee Command, Command Execution, Command-Line Editing, Quotes, Command Substitution, Job Control, Aliases, Variables, Predefined Variables, Options, Shell/Environment Customization.

Filters: 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.

UNIT - III

Grep: Operation, grep Family, Searching for File Content.
Sed : Scripts, Operation, Addresses, commands, Applications, grep and sed.
UNIX FILE STRUCTURE: Introduction to UNIX file system, inode (Index Node), file descriptors, system calls and device drivers.

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

UNIT - IV

PROCESS AND SIGNALS: Process, process identifiers, process structure: process table, viewing processes, system processes, process scheduling, starting new processes: waiting for a process, zombie processes, orphan process, fork, vfork, exit, wait, waitpid, exec, signals functions, unreliable signals, interrupted system calls, kill, raise, alarm, pause, abort, system, sleep functions, signal sets. File locking: creating lock files, locking regions, use of read and write with locking, competing locks, other lock commands, deadlocks.

UNIT - V

INTER PROCESS COMMUNICATION: Pipe, process pipes, the pipe call, parent and child processes, and named pipes: fifos, semaphores: semget, semop, semctl, message queues: msgget, msgsnd, msgrcv, msgctl, shared memory: shmget, shmat, shmdt, shmctl, ipc status commands.

INTRODUCTION TO SOCKETS: Socket, socket connections - socket attributes, socket addresses, socket, connect, bind, listen, accept, socket communications.

TEXT BOOKS:

1. *W. Richard. Stevens* (2005), *Advanced Programming in the UNIX Environment*, 3rd edition, Pearson Education, New Delhi, India.
2. Unix and shell Programming Behrouz A. *Forouzan, Richard F. Gilberg*.Thomson

REFERENCES:

1. Linux System Programming, *Robert Love, O'Reilly*, SPD.
2. Advanced Programming in the UNIX environment, 2nd Edition, *W.R.Stevens*, Pearson Education.
3. UNIX Network Programming, *W.R. Stevens*, PHI.
   UNIX for Programmers and Users, 3rd Edition, *Graham Glass, King Ables*, Pearson Education

SOFTWARE ENGINEERING
(Common to CSE&IT)

III B. Tech. - I Semester | **L T P C**
Course Code: A3CS21 | **4 1 - 4**

COURSE OVERVIEW:
Software Engineering comprises the core principles consistent in software construction and maintenance: fundamental software processes and life-cycles, mathematical foundations of software engineering, requirements analysis, software engineering methodologies and standard notations, principles of software architecture and re-use, software quality frameworks and validation, software development, and maintenance environments and tools. An introduction to object-oriented software development process and design.

COURSE OBJECTIVES:
1. To familiarize with basic Software engineering methods and practices, and its applications.
2. To explain layered technology in software engineering
3. To teach software metrics and software risks.
4. To familiarize with software requirements and the SRS documents.
5. To facilitate students in software design

COURSE OUTCOMES:
At the end of the course the students are able to:
1. Analyze the requirements
2. Categorize requirements and design SRS
3. Apply software engineering principles and techniques.
4. Design and evaluate large-scale software systems.
5. Demonstrate ethical standards and legal responsibilities.
6. Identify suitable process model for a given software requirement

SYLLABUS

UNIT - I

INTRODUCTION TO SOFTWARE ENGINEERING: The Evolving nature of software engineering, Changing nature of software engineering, Software engineering Layers, The Software Processes, Software Myths.

PROCESS MODELS: A Generic Process Model, Waterfall Model, Incremental Process Models, Evolutionary Process Models, Spiral Model, The Unified Process, Personal and Team Process Models, the Capability Maturity Model Integration (CMMI).

UNIT - II

REQUIREMENTS ENGINEERING: Functional and Non-Functional Requirements, The Software requirements Document, Requirements Specification, requirements Engineering, Requirements Elicitation and Analysis, Requirement Validation, Requirement Management, System Modelling: Context Models, Interaction Models, Structural Models, Behavioural Model, Model-Driven Engineering.

DESIGN CONCEPTS: The Design Process, Design Concepts, The Design Models And Architectural Design: Software Architecture, Architectural Genres, And Architectural Styles.

UNIT - III

DESIGN AND IMPLEMENTATION: Design Patterns, Implementation Issues, Open Source Development. User Interface Design: The Golden Rules, User Interface Analysis and Design, Interface Analysis, Interface Design Steps, Design Evaluation.

SOFTWARE TESTING STRATEGIES: A Strategic approach to Software Testing, Strategic Issues, Test Strategies for Conventional Software, Validation Testing, System Testing, The Art of Debugging, White-Box Testing, Black Box Testing.

UNIT - IV

PRODUCT METRICS: A Frame Work for Product Metrics, Metrics for the Requirements Model, Metrics for Design Model, Metrics for Source Code, Metrics for Testing.

PROCESS AND PROJECT METRICES: Metrics in the Process and Project Domains, Software Measurements, Metrics for Software Quality, Risk Management: Risk verses Proactive Risk Strategies, Software Risks, Risk Identification, Risk Projection, Risk Refinements, Risk Mitigation Monitoring and Management (RMMM), The RMMM Plan.

UNIT - V

OVERVIEW OF QUALITY MANAGEMENT AND PROCESS IMPROVEMENT: Overview of SEI - CMM, ISO 9000, CMMI, PCMM, TQM and Six Sigma.

OVERVIEW OF CASE TOOLS: Software tools and environments: Programming environments; Project management tools; Requirements analysis and design modelling tools; testing tools; Configuration management tools;

TEXT BOOKS:

1. Roger S. Pressman (2011), Software Engineering, A Practitioner's approach, 7th edition, McGraw Hill International Edition, New Delhi.
2. Sommerville (2001), Software Engineering, 9th edition, Pearson education, India.

REFERENCE BOOKS:

1. K. K. Agarval, Yogesh Singh (2007), Software Engineering, 3rd edition, New Age International Publishers, India.
2. Lames F. Peters, Witold Pedrycz (2000), Software Engineering an Engineering approach, John Wiely & Sons, New Delhi, India.
3. Shely Cashman Rosenblatt (2006), Systems Analysis and Design, 6th edition, Thomson Publications, India.

DATA MINING AND WAREHOUSING
(Common to CSE&IT)

III B. Tech. - I Semester | **L T P C**
Course Code: A3CS26 | **3 1 - 3**

COURSE OVERVIEW:

This course helps the students to understand the overall architecture of a data warehouse and methods for data gathering and data pre-processing using OLAP tools. The different data mining models and techniques will be discussed in this course. Data mining and data warehousing applications in bioinformatics will also be explored.

COURSE OBJECTIVES:

1. To teach the basic principles, concepts and applications of data warehousing and data mining
2. To introduce the task of data mining as an important phase of knowledge recovery process
3. To familiarize Conceptual, Logical, and Physical design of Data Warehouses OLAP applications and OLAP deployment
4. To impart knowledge of the fundamental concepts that provide the foundation of data mining

COURSE OUTCOMES:

After undergoing the course, Students will be able to understand

1. Design a data mart or data warehouse for any organization
2. Develop skills to write queries using DMQL
3. Extract knowledge using data mining techniques
4. Adapt to new data mining tools.
5. Apply the techniques of clustering, classification, association finding, feature selection and visualization to real world data

SYLLABUS

UNIT - I

INTRODUCTION TO DATA MINING: Motivation, Importance, Definition of Data Mining, Kind of Data,Data Mining Functionalities, Kinds of Patterns, Classification of Data Mining Systems, Data Mining Task Primitives, Integration of A Data Mining System With A Database or Data Warehouse System, Major Issues In Data Mining, Types of Data Sets and Attribute Values, Basic Statistical Descriptions of Data, Data Visualization, Measuring Data Similarity.
PREPROCESSING: Data Quality, Major Tasks in Data Preprocessing, Data Reduction, DataTransformation and Data Discretization, Data Cleaning and Data Integration.

UNIT - II

DATA WAREHOUSING AND ON-LINE ANALYTICAL PROCESSING: Data Warehouse basicconcepts, Data Warehouse Modeling - Data Cube and OLAP, Data Warehouse Design and Usage, Data Warehouse Implementation, Data Generalization by Attribute-Oriented Induction.
DATA CUBE TECHNOLOGY: Efficient Methods for Data Cube Computation, Exploration andDiscovery in Multidimensional Databases.

UNIT - III

MINING FREQUENT PATTERNS, ASSOCIATIONS AND CORRELATIONS: Basic Concepts,Efficient and Scalable Frequent Item set Mining Methods, Are All the Pattern Interesting, Pattern Evaluation Methods, Applications of frequent pattern and associations.
FREQUENT PATTERN AND ASSOCIATION MINING: A Road Map, Mining Various Kinds ofAssociation Rules, Constraint-Based Frequent Pattern Mining, Extended Applications of Frequent Patterns.

UNIT - IV

CLASSIFICATION: Basic Concepts, Decision Tree Induction, Bayesian Classification Methods, Rule-Based Classification, Model Evaluation and Selection, Techniques to Improve Classification Accuracy: Ensemble Methods, Handling Different Kinds of Cases in Classification, Bayesian Belief

Networks, Classification by Neural Networks, Support Vector Machines, Pattern-Based Classification, Lazy Learners (or Learning from Your Neighbors), Other Classification Methods.

UNIT - V

CLUSTER ANALYSIS: Basic Concepts of Cluster Analysis, Clustering structures, Major ClusteringApproaches, Partitioning Methods, Hierarchical Methods, Density-Based Methods, Model-Based Clustering - The Expectation-Maximization Method, Other Clustering Techniques, Clustering High-Dimensional Data, Constraint-Based and User-Guided Cluster Analysis, Link-Based Cluster Analysis, Semi-Supervised Clustering and Classification, Bi-Clustering, Collaborative Clustering.
OUTLIER ANALYSIS: Why outlier analysis, Identifying and handling of outliers, Distribution-BasedOutlier Detection: A Statistics-Based Approach, Classification-Based Outlier Detection, Clustering-Based Outlier Detection, Deviation-Based Outlier Detection, Isolation-Based Method: From Isolation Tree to Isolation Forest.

TEXT BOOKS:

1. Jiawei Han, MichelineKamber, Jian Pei (2012), Data Mining: Concepts and Techniques, 3rdedition, Elsevier, United States of America.

REFERENCE BOOKS:

1. Margaret H Dunham (2006), Data Mining Introductory and Advanced Topics, 2ndedition,Pearson Education, New Delhi, India.
2. Amitesh Sinha (2007), Data Warehousing, Thomson Learning, India.
3. Xingdong Wu, Vipin Kumar (2009), the Top Ten Algorithms in Data Mining, CRC Press, UK.

AUTOMATA AND COMPILER DESIGN

B. Tech: IT III-I Semester | **L T P C**
Course Code: A3IT05 | **4 1 - 4**

Course Overview:

This course deals with the basic techniques of Compiler Construction and tool s that can used to perform Syntax -directed translation of a high -level programming language into an executable code. This will provide deeper insights into the more advanced semantics aspects of programming languages, code generation, machine independent optimizations, dynamic memory allocation, types and their inferences, object orientation. The course is presented to the students by using power point projections, lecture notes, subjective and objective tests, assignments, and laboratory

Course Objectives:

i. Identify the major concepts of language translation and phases of compiler design
ii. Discuss the common forms of parsers
iii. Extend the knowledge of parser by parsing LL parser and LR parser
iv. Demonstrate intermediate code using technique of syntax directed translation
v. Illustrate the various optimization techniques for designing various optimizing compilers
vi. Construct machine dependent optimizations that are effective in improving the quality of output code

Course Outcomes:

1. Understand the compiler construction tools and Describes the Functionality of each stage of compilation process
2. Able to construct Grammars for Natural Languages and find the Syntactical Errors/Semantic errors during the compilations using parsing techniques
3. Understand the different representations of intermediate code.
4. Able to construct new compiler for new languages.
5. Able to participate in GATE, PGECET and other competitive examinations

SYLLABUS

UNIT - I

INTRODUCTION TO COMPILERS: Definition of compiler, interpreter and its differences, the phases of a compiler, role of lexical analyzer, regular expressions, finite automata, from regular expressions to finite automata, pass and phases of translation, bootstrapping, LEX-lexical analyzer generator.

PARSING: Parsing, role of parser, context free grammar, derivations, parse trees, ambiguity, elimination of left recursion, left factoring, eliminating ambiguity from dangling-else grammar, classes of parsing, top down parsing - backtracking, recursive descent parsing, predictive parsers, LL(1) grammars.

UNIT - II

BOTTOM UP PARSING: Definition of bottom up parsing, handles, handle pruning, stack implementation of shift-reduce parsing, conflicts during shift-reduce parsing, LR grammars, LR parsers-simple LR, canonical LR(CLR) and Look Ahead LR (LALR) parsers, error recovery in parsing, parsing ambiguous grammars, YACC-automatic parser generator.

UNIT - III

SYNTAX DIRECTED TRANSLATION: Syntax directed definition, construction of syntax trees, S-attributed and L-attributed definitions, translation schemes, emitting a translation.

INTERMEDIATE CODE GENERATION: intermediate forms of source programs– abstract syntax tree, polish notationand three address code, types of three address statements and its implementation, syntax directed translation into three-address code, translation of simple statements, boolean expressions and flow-of-control statements.

UNIT - IV

TYPE CHECKING: Definition of type checking, type expressions, type systems, static and dynamic checking of types,specification of a simple type checker, equivalence of type expressions, type conversions, overloading of functions and operators.

RUN TIME ENVIRONMENTS: Source language issues, Storage organization, storage-allocation strategies, access tonon-local names, parameter passing, symbol tables and language facilities for dynamic storage allocation.

UNIT - V

CODE OPTIMIZATION: Organization of code optimizer, basic blocks and flow graphs, optimization of basic blocks, the principal sources of optimization, the directed a cyclic graph (DAG) representation of basic block, global data flow analysis.

CODE GENERATION: Machine dependent code generation, object code forms, the target machine, a simple codegenerator, register allocation and assignment, peephole optimization.

TEXT BOOKS:

1. Alfred V. Aho, Ravi Sethi, Jeffrey D. Ullman (2007), Compilers Principles, Techniques and Tools, 2nd edition, Pearson Education, New Delhi, India.

REFERENCE BOOKS:

1. Alfred V. Aho, Jeffrey D. Ullman (2001), Principles of compiler design, Indian student edition, Pearson Education, New Delhi, India.
2. Kenneth C. Louden(1997), Compiler Construction– Principles and Practice, 1st edition, PWS Publishing.
3. K. L. P Mishra, N. Chandrashekaran (2003), Theory of computer science- Automata Languages and computation, 2nd edition, Prentice Hall of India, New Delhi, India.
4. Andrew W. Appel (2004), Modern Compiler Implementation C, Cambridge University Press, UK.

LINUX PROGRAMMING LAB
(Common to CSE & IT)

III B. Tech. - I Semester | **L T P C**
Course Code: A3CS24 | **- 3 2**

COURSE OVERVIEW:
In this course basics of shell programming are dealt. Shell programs to understand the operating environment of Linux are practiced. An exposure to system calls types of process and inter process communication issues are dealt with practical exercises.

COURSE OBJECTIVES:
1. To familiarize basic concepts of shell programming
2. To demonstrate use of system calls
3. To demonstrate Inter process communication

COURSE OUTCOMES:
At the end of the course students will be able to:
1. Use shell script to create files and handle text documents
2. Create child processes, background process and zombies

SYLLABUS

LIST OF EXPERIMENTS:
1. Study and Practice on various commands like man, passwd, tty, script, clear, date, cal, cp, mv, ln, rm, unlink, mkdir, rmdir, du, df, mount, umount, find, unmask, ulimit, ps, who, w.
2. Study and Practice on various commands like cat, tail, head , sort, nl, uniq, grep, egrep,fgrep, cut, paste, join, tee, pg, comm, cmp, diff, tr, awk, tar, cpio.
3. a) Write a Shell Program to print all .txt files and .c files.
   b) Write a Shell program to move a set of files to a specified directory.
   c) Write a Shell program to display all the users who are currently logged in after a specified time.
   Write a Shell Program to wish the user based on the login time.
4. a) Simulate **cat** command. b) Simulate **cp** command.
5. a) Simulate **head** command. b) Simulate **tail** command.
6. a) Simulate **mv** command. b) Simulate **nl** command.
7. Write a program to handle the signals like **SIGINT, SIGQUIT, SIGFPE**.
8. Implement the following IPC forms
   a) **FIFO** b) **PIPE**
9. Implement **message queue** form of IPC.
10. Implement **shared memory** form of IPC.
11. Write a Socket program to print system date and time (Using TCP/IP).

DATA MINING AND WAREHOUSING LAB
(Common to CSE & IT)

III B. Tech. - I Semester | **L T P C**
Course Code: A3CS28 | **- - 3 2**

COURSE OVERVIEW:
This course helps the students to practically understand a data warehouse, techniques and methods for data gathering and data pre-processing using OLAP tools. The different data mining models and techniques will be discussed in this course.

COURSE OBJECTIVES:
1. To teach principles, concepts and applications of data warehousing and data mining
2. To introduce the task of data mining as an important phase of knowledge recovery process
3. To inculcate Conceptual, Logical, and Physical design of Data Warehouses OLAP applications and OLAP deployment
4. To inculcate fundamental concepts that provide the foundation of data mining
5. Design a data warehouse or data mart to present information needed by management in a form that is usable for management client

COURSE OUTCOMES:
1. After undergoing the course, Students will be able to understand
2. Design a data mart or data warehouse for any organization
3. Extract knowledge using data mining techniques
4. Adapt to new data mining tools.
5. Explore recent trends in data mining such as web mining, spatial-temporal mining

SYLLABUS

DATA MINING LAB:

1. Associations

Derive associations manually from the following dataset.

Outlook	Temperature	Humidity	Windy	Play
Sunny	Hot	High	False	No
Sunny	Hot	High	True	No
Overcast	Hot	High	False	Yes
Rainy	Mild	High	False	Yes
Rainy	Cool	Normal	False	Yes
Rainy	Cool	Normal	True	No
Overcast	Cool	Normal	True	Yes
Sunny	Mild	High	False	No
Sunny	Cool	Normal	False	Yes
Rainy	Mild	Normal	False	Yes
Sunny	Mild	Normal	True	Yes
Overcast	Mild	High	True	Yes
Overcast	Hot	Normal	False	Yes
Rainy	Mild	High	True	No

2. Clustering

i. Open WEKA and Load the data set editor. Get familiarize with the editor operations.

a. Load the weather. Nominal dataset. Use the filter WEKA. Unsupervised, instance. Remove with Values to remove all instances in which the humidity attribute has the value high. To do this, first make the field next to the Choose button show the text Remove with Values. Then click on it to get the Generic Object Editor window, and figure out how to change the filter settings appropriately.

b. Undo the change to the dataset that you just performed, and verify that the data has reverted to its original state.

ii. Choosing k-means clustering algorithm for clustering use the Cancer data (.arff) perform clustering with a Euclidean distance function and visually inspect the nature of the clusters.

3. Classification

i. Choosing an appropriate filter for classification use the Iris data (.arff) perform classification and visualize the classification tree.

ii. The glass dataset glass.arff from the U.S. Forensic Science Service contains data on six types of glass. Glass is described by its refractive index and the chemical elements that it contains; the aim is to classify different types of glass based on these features. This dataset is taken from the UCI datasets, which have been collected by the University of California at Irvine and are freely available on the Web. They are often used as a benchmark for comparing data mining algorithms. Find the dataset glass.arff and load it into the Explorer interface. For your own information, answer the following exercises. How many attributes are there in the dataset? What are their names? What is the class attribute? Run the classification algorithm IBK (weka.classifiers.lazy.IBk). Use cross-validation to test its performance.

II. DATA WAREHOUSING LAB:

4. Introduction to Informatica Power Center 7.1.1 an Introduction to Oracle 9i.

Adding a Repository

a. Create a Source Definition using source connection and import the employee data from source table.

b. Organize the columns in the table view to the requirement of Data Analysis.

c. Create a Target Definition using target connection to the target table.

d. Create tables for transformation and generate SQL to perform transformation.

5. Mapping

a. Perform an ETL on Employees database. Select the employee table as the source and the same as the target and assume connectivity and delimiters as pipe without any specific transformations.

b. Perform an ETL on Employees database. Select the employee table as the source and the same as the target and assume connectivity and delimiters as pipe using expression transformation, filter transformation, router transformation, aggregator transformation and joiner transformation.

c. Perform and ETL on Employees database, connect the source and target and then perform debug on the filter transformation mapping.

6. Lookup

Using the above mappings perform connected lookup with lookup transformation using natural keys and populate the other keys with default values.

TECHNICAL SEMINAR-II
(MICRO PROJECT / EPICS/CERTIFICATION/MOOCS)
MANDATORY COURSE
(NON-CREDIT)

B. Tech: IT III-I Semester | **L T P C**
Course Code: A3IT08 | **- - 2 -**

OBJECTIVE:
Seminar is an important component of learning in an Engineering College, where the student gets acquainted with preparing a report & presentation on a topic.

PERIODICITY / FREQUENCY OF EVALUATION : Twice
PARAMETERS OF EVALUATION:
1. The seminar shall have topic allotted and approved by the faculty.
2. The seminar is evaluated for 25 marks for internal and 25 marks for external.
3. The students shall be required to submit the rough drafts of the seminar outputs within one week of the commencement of the class work.
4. Faculty shall make suggestions for modification in the rough draft. The final draft shall be presented by the student within a week thereafter.
5. Presentation schedules will be prepared by Department in line with the academic calendar.

The Seminars shall be evaluated in two stages as follows:

B. Rough draft
In this stage, the student should collect information from various sources on the topic and collate them in a systematic manner. He/ She may take the help of the concerned faculty.

The report should be typed in “MS-Word” file with “Calibri” font, with font size of 16 for main heading, 14 for sub-headings and 11 for the body text. The contents should also be arranged in Power Point Presentation with relevant diagrams, pictures and illustrations. It should normally contain 10 to 15 slides, consisting of the followings:

1.	Topic, name of the student & faculty	1 Slide
2.	List of contents	1 Slide
3.	Introduction	1 Slide
4.	Descriptions of the topic (point-wise)	6 - 10 Slides
5.	Conclusion	1 - 2 Slides
6.	References/Bibliography	1 Slide

The soft copy of the rough draft of the seminar presentation in MS Power Point format along with the draft report should be submitted to the concerned faculty, with a copy to the concerned HOD within stipulated time.

The evaluation of the rough draft shall generally be based upon the following.

1	Punctuality in submission of rough draft	2
2	Dress Code	3
3	Resources from which the seminar have been based	2
4	Report , and content of Presentation	5
5	Depth of the students knowledge in the subject	5
6	Reception from Questions	5
7	Time Management, Classroom Dynamic	3
	Total Marks	**25**

After evaluation of the first draft the supervisor shall suggest further reading, additional work and fine tuning, to improve the quality of the seminar work.

Within 7 days of the submission of the rough draft, the students are to submit the final draft incorporating the suggestions made by the faculty.

C. Presentation: (External)

After finalization of the final draft, the students shall be allotted dates for presentation (in the designated seminar classes) and they shall then present it in presence students, HOD, Incharge, faculties of the department and at least one faculty from some department / other department.

The student shall submit 3 copies of the Report neatly bound along with 2 soft copies of the PPT in DVD medium. The students shall also distribute the title and abstract of the seminar in hard copy to the audience. The final presentation has to be delivered with 18-25 slides.

The evaluation of the Presentation shall generally be based upon the following.

1.	Contents	5 Marks
2.	Delivery	5 Marks
3.	Relevance and interest the topic creates	5 Marks
4.	Ability to involve the spectators	5 Marks
5.	Question answer session	5 Marks
	Total	**25 Marks**

5. WHO WILL EVALUATE?

The presentation of the seminar topics shall be made before an internal evaluation committee comprising the Head of the Department or his/her nominee, seminar supervisor and a senior faculty of the department / other department.

III B.TECH II SEMESTER SYLLABUS

ANGULAR JS

B. Tech: IT III-II Semester	L	T	P	C
Course Code: A3IT10	3	1	-	3

Course Overview:

The World Wide Web continues to provide a foundation for the development of a broad range of increasingly influential and strategic technologies, supporting a large variety of applications and services, both in the private and public sectors. There is a growing need for management and decision makers to gain a clearer understanding of the application development process, from planning through to deployment and maintenance.

Course Objectives:

I. To teach students the basics of scripting using AngularJS
II. To explain web application development procedures
III. To impart AngularJS technology for writing business logic
IV. To facilitate students to develop projects using AngularJS
V. To familiarize various concepts of application development using AngularJS

Course Outcomes:

Upon completion of this course, students will be able to:

1. Create web pages using AngularJS
2. Identify the difference between the HTML PHP and XML documents with AngularJS.
3. Identify the engineering structural design of AngularJS
4. Analyze the difference between HTML, CSS, XML & AngularJS.
5. Understand the concept of AngularJS.
6. Identify the difference between the Javascript & AngularJS
7. Design web application using MVC architecture
8. Understand the Html, javascript & AngularJS concepts.

SYLLABUS

Unit- 1

Introduction and Basics of AngularJS, MVC, Data Binding and Your First AngularJS Web Application, Modules, Directives, Built-In Directives, Directives Explained Scopes, Controllers, Expressions,

Unit- 2

Tables, Form Validation, HTML DOM, , Filters, Angular Module Loading, Multiple Views and Routing, Dependency Injection, Services

Unit-3

Communicating with the Outside World: XHR and Server-Side Communication, XHR in Practice, Install NodeJS ,Install Express, Calling APIs , Server-less with Amazon AWS, Starting on Dynamo, AngularFire

Uint-4

Testing, Events Architecture , Angular Animation, The Digest Loop and $apply ,Essential AngularJS Extensions ,Mobile Apps, Localization ,Caching

Unit-5

Security, AngularJS and Internet Explorer, Building Angular Chrome Apps, Optimizing Angular Apps, Debugging AngularJS, AngularJS Tools.

Text Books:

1. ng-book The Complete Book on AngularJS Ari Lerner
2. **AngularJS** By Brad Green, Shyam Seshadri Publisher: O'Reilly Media

Reference Books:

1. Pro AngularJS (Expert's Voice in Web Development) 1st Edition, Kindle Edition by Adam Freeman
2. AngularJS: Up and Running: Enhanced Productivity with Structured Web Apps 1st Edition, Kindle Edition by Shyam Seshadri, Brad Green
3. Learning AngularJS Paperback – 1 Jan 2015 by Ken Williamson
4. AngularJS Programming by Example Kindle Edition by Agus Kurniawan

CROSS PLATFORM MOBILE APPLICATION DEVELOPMENT

	L	T	P	C
B. Tech: IT III-II Semester				
Course Code: A3IT11	**4**	**1**	**-**	**4**

Course Overview:

This course is concerned with the development of applications on mobile and wireless computing platforms. Android will be used as a basis for teaching programming techniques and design patterns related to the development of standalone applications and mobile portals to enterprise and m-commerce systems. Emphasis is placed on the processes, tools and frameworks required to develop applications for current and emerging mobile computing devices. Students will work at all stages of the software development life-cycle from inception through to implementation and testing. In doing so, students will be required to consider the impact of user characteristics, device capabilities, networking infrastructure and deployment environment, in order to develop software capable of meeting the requirements of stakeholders.

Course Objectives:

I. To facilitate students to understand android SDK
II. To help students to gain a basic understanding of Android application development
III. To inculcate working knowledge of Android Studio development tool

Course Outcomes:

By the conclusion of this course, students will be able to:

1. Describe those aspects of mobile programming that make it unique from programming for other platforms,
2. Critique mobile applications on their design pros and cons,
3. Utilize rapid prototyping techniques to design and develop sophisticated mobile interfaces,
4. Program mobile applications for the Android operating system that use basic and advanced phone features, and
5. Deploy applications to the Android marketplace for distribution.

SYLLABUS

UNIT –I

HTML5 and JS for iOS: HTML5, CSS3 and iOS Styling, JavaScript and APIs, Mobile Frameworks, Usability, Navigation, and Touch, GPS and Google Maps, Animation and Effects, Canvas, Audio and Video, Integrating with Native Services, Offline Apps and Storage, Mobile Testing**.**

UNIT- II

Introduction to Android and Android Studio – Features of Android-Android Architecture – Structure of Android program –XML layout file-Build and run first Android program in Emulator- Android Manifest file.Introduction to Basic Android building blocks – Activity and Activity life cycle-Service-Intent-broadcast receiver-content provider.

UNIT - III

UI Layouts-Linear Layout-Relative layout-Table Layout-Frame Layout-Grid Layout-Example Programs.- Basic UI Controls-Auto Complete Text View-spinner-ListView-Image Switcher-Text Switcher- ListView with Custom Adapter-Gallery and GridView-Web View-Fragments-Example programs. Introduction to Location based services in Android and Google Maps-Getting Google Map key-Install Google play services.

UNIT - IV

OpenGL ES 2.0: Benefits of the API, Implementation Prerequisites, ES 2.0 Fundamentals, 3D Modeling, Texturing and Shading.

UNIT - V

Phonegap. MOBILE HCI- Mobile Ecosystem: Platforms, Application frameworks- Types of Mobile Applications: Widgets, Applications, Games- Mobile Information Architecture, Mobile 2.0, Mobile Design: Elements of Mobile Design, Tools.

TEXT BOOKS:

1. Learn HTML5 and JavaScript for iOS: Web Standards-based Apps for iPhone, iPad, and iPod touch 1st ed. Edition by Scott Preston
2. Beginning Android Programming with Android Studio, 4ed 2016 by J. F. DiMarzio
3. OpenGL ES 2 for Android (Pragmatic Programmers)26 July 2013 by Kevin Brothaler

REFERENCE BOOKS:

1. HTML5 for iOS and Android: A Beginner's Guide (Beginner's Guide (McGraw Hill)) 1st Edition by Robin Nixon
2. Phonegap 4 Mobile Application Development Cookbook30 October 2015 by Zainul Setyo Pamungkas

MACHINE LEARNING
(Common to CSE/IT)

III B. Tech. -II Semester | **L T P C**
Course Code: A3CS32 | **4 1 - 4**

COURSE OVERVIEW
This course covers fundamental concepts and methods of computational data analysis, including pattern classification, prediction, visualization, and recent topics in deep learning. The course will give the student the basic ideas and intuition behind modern machine learning methods as well as a bit more formal understanding of how, why, and when they work. The underlying theme in the course is statistical inference as it provides the foundation for most of the methods covered.

COURSE OBJECTIVES:
1. To understand pattern classification algorithms to classify multivariate data
2. To understand the Implementation of genetic algorithms
3. To gain knowledge about Q-Learning
4. To create new machine learning techniques.

COURSE OUTCOMES:
Upon completion of the course, the students will be able to:
1. Develop and apply pattern classification algorithms to classify multivariate data.
2. Develop and apply regression algorithms for finding relationships between data variables.
3. Develop and apply reinforcement learning algorithms for learning to control complex systems.
4. Write scientific reports on computational machine learning methods, results and conclusions.

SYLLABUS

UNIT I:
BASICS Learning Problems Perspectives and Issues Concept Learning Version Spaces and Candidate eEliminations – Inductive bias – Decision Tree learning – Representation – Algorithm – Heuristic Space Search

UNIT II:
NEURAL NETWORKS AND GENETIC ALGORITHMS: Neural Network Representation Problems Perceptions Multilayer Networks and Back Propagation Algorithms – Advanced Topics – Genetic Algorithms Hypothesis Space Search– Genetic Programming – Models of Evolutions and Learning.

UNIT III:
BAYESIAN AND COMPUTATIONAL LEARNING: Bayes Theorem Concept Learning Maximum Likelihood Minimum Description Length Principle Bayes Optimal Classifier Gibbs Algorithm Naïve Bayes Classifier Bayesian Belief Network EM Algorithm Probability Learning Sample Complexity Finite and Infinite Hypothesis Spaces – Mistake Bound Model.

UNIT IV
INSTANT BASED LEARNING: K- Nearest Neighbor Learning Locally weighted Regression Radial Bases Functions – Case Based Learning.

UNIT V
ADVANCED LEARNING: Learning Sets of Rules Sequential Covering Algorithm Learning Rule Set First Order Rules Sets of First Order Rules Induction on Inverted Deduction Inverting Resolution Analytical Learning Perfect Domain Theories Explanation Base Learning – FOCL Algorithm - Reinforcement Learning Task Learning Temporal Difference Learning

TEXT BOOKS:

1. Tom M. Mitchell, “Machine Learning”, McGraw-Hill, 2010
2. Bishop, Christopher. *Neural Networks for Pattern Recognition*. New York, NY: Oxford University Press, 1995

REFERENCES BOOKS:

1. Ethem Alpaydin, (2004) “Introduction to Machine Learning (Adaptive Computation and Machine Learning)”, The MIT Press
2. T. astie, R. Tibshirani, J. H. Friedman, “The Elements of Statistical Learning”, Springer(2nd ed.), 2009

SOFTWARE TESTING AND QUALITY ASSURANCE
(Professional Elective-I)

B. Tech: IT III-II Semester **L T P C**

Course Code: A3IT15 **3 1 - 3**

Course Overview:

Study the basics of software testing and quality assurance, including terminology, documentation practices, control processes and methods. Understand the role of a tester in software development and the testing cycle. Practice a wide array of testing techniques, and examine test development models such as Agile and Waterfall. Explore software testing processes within a variety of industry contexts, and study practices applicable to cloud, mobile and Web environments

Software Testing and Quality Assurance studies the state-of-the-art and main research challenges of two important aspects of software engineering: testing and quality. The course also examines various approaches and methodologies used in software testing and quality assurance. Course topics are defined and illustrated by examples and papers from current peer-reviewed research literature in the area under study. The course will prepare students to independently conduct research in software testing and quality assurance, and to apply that knowledge in their future research and practice.

Course Objectives:

i. Study the state-of-the-art and main research challenges of selected topics in software testing and quality assurance.
ii. Introduce various approaches, techniques, technologies, and methodologies used in software testing and quality assurance.
iii. Illustrate the above-mentioned topics with examples and papers from current peer-reviewed research literature on software testing and quality assurance
iv. Prepare students to conduct independent research on software testing and quality assurance and to apply that knowledge in their future research and practice

Course Outcomes:

After completing the course, students should will be able to

- research the state-of-the-art, and apply their findings to software testing and quality assurance;
- analyze different approaches to software testing and quality assurance, and select optimal solutions for different situations and projects;
- conduct independent research in software testing and quality assurance and apply that knowledge in their future research and practice;
- evaluate the work of peers constructively by following proven methods of peer-review, and by using the principles of research ethics.

SYLLABUS

UNIT - I

INTRODUCTION AND THE TAXONOMY OF BUGS: Purpose of testing, some dichotomies, a model for testing, the consequences of bugs, taxonomy for bugs, some bug statistics.

FLOW GRAPHS AND PATH TESTING: Path testing basics, predicates, path predicates and achievable paths, path sensitizing, path instrumentation, implement and application of path testing.

UNIT - II

TRANSACTION FLOW TESTING AND DATA FLOW TESTING: Transaction flows, transaction flow testing techniques, dataflow testing basics, data flow testing strategies, application, tools and effectiveness.

DOMAIN TESTING: Domains and paths, nice and ugly domains, domain testing, domains and interfaces testing, domains and testability.

UNIT - III

PATHS, PATH PRODUCTS AND REGULAR EXPRESSIONS: Path products and path expressions, a reduction procedure, applications, regular expressions and flow anomaly detection.

LOGIC BASED TESTING: Motivational overview, decision tables, path expressions again, KV charts, specifications.

UNIT - IV

STATES, STATE GRAPHS AND TRANSITION TESTING: State graphs, good state graphs and bad, state testing, testability tips.

GRAPH MATRICES AND APPLICATIONS: Motivational overview, the matrix of a graph, relations, the powers of a matrix, node reduction algorithm, building tools.

UNIT - V

AN OVERVIEW OF SOFTWARE TESTING TOOLS: Overview of win runner and QTP testing tools for functional / regression testing, testing an application using win runner and QTP, synchronization of test cases, data driven testing, testing a web application.

TEXT BOOKS:

1. Boris Beizer (2004), Software Testing Techniques, 2nd edition, Dreamtech Press, New Delhi, India.
2. Dr. K. V. K. K. Prasad (2005), Software Testing Tools, Dreamtech Press, India.

REFERENCE BOOKS:

1. William E. Perry (2006), Effective methods of Software Testing, 3rd edition, John Wiley Edition, USA.
2. Meyers (2004), Art of Software Testing, 2nd edition, John Wiley, New Jersey, USA.

INTELLECTUAL PROPERTY RIGHTS
(Professional Elective-I)

B. Tech: IT III-II Semester | **L T P C**
Course Code: A3IT16 | **3 1 - 3**

Course Objectives:

I. Memorize and recognize Intellectual Property and its rights on Nationally and Internationally.
II. Classify Intellectual Property and prepares strategies, process in acquisition of rights against those Intellectual Property.
III. Identify and examine issues of infringement of rights against Intellectual Property and comply with Intellectual Property Law.
IV. Analyze and formulate the steps involved in Intellectual Property.

Course Outcomes:

Upon successful completion of the course, the student should be familiar with and be able to:
1. Understands the legal issues on Intellectual Property Rights
2. An Ability to register a trade mark, copyrights, patents.
3. Predict issues related to Intellectual property rights on trademarks, copyrights and patents.
4. Summarize and evaluate trade secrets, unfair competition which is being adopted by various firms.
5. Acknowledge the Institutions and agencies that grants, protects and works compliance of Intellectual properties in India and abroad.

SYLLABUS

UNIT - I:

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

UNIT - II:
Trade Marks: Purpose and function of trade marks, acquisition of trade mark rights, protectable matter, selecting and evaluating trade mark, trade mark registration processes.

UNIT - III:
Law of copy rights: Fundamental of copy right law, originality of material, rights of reproduction, rights to perform the work publicly, copy right ownership issues, copy right registration, notice of copy right, international copy right law.
Law of patents: Foundation of patent law, patent searching process, ownership rights and transfer

UNIT - IV:
Trade Secrets: Trade secrete law, determination of trade secrete status, liability for misappropriations of trade secrets, protection for submission, trade screte litigation.
Unfair competitiion: Misappropriation right of publicity, False advertising.

UNIT - V:
New development of intellectual property: new developments in trade mark law; copy right law, patent law, intellectual property audits.
International overview on intellectual property, international - trade mark law, copy right law, international patent law, international development in trade secrets law.

TEXT BOOKS & REFERENCES:

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

INTRODUCTION TO ANALYTICS
(Associate Analytics – 1)
(Professional Elective – I)

	L	T	P	C
III B. Tech. - II Semester				
Course Code: A3CS37	**3**	**1**	**-**	**3**

COURSE OVERVIEW:

Data analysis is the process of data analyzing and extracting useful information which can help in making useful business decisions. As part of this course basics of data analytics are discussed and statistical analysis tools are introduced.

COURSE OBJECTIVES:

1. To introduce the terminology, technology and its applications
2. To introduce the concept of Analytics for Business
3. To introduce the tools, technologies & programming languages this is used in day to day analytics cycle.

COURSE OUTCOMES:

At the end of the course students will able to:

1. Identify basic terminology of Data Analytics
2. Analyze the importance of Analytics in business perspective

SYLLABUS

UNIT - I

Introduction to Analytics and R programming (NOS 2101): Introduction to R, R Studio (GU): R Windows Environment, introduction to various data types, Numeric, Character, date, data frame, array, matrix etc., Reading Datasets, Working with different file types, txt, csv etc. Outliers, Combining Datasets, R Functions and loops.

Manage your work to meet requirements (NOS 9001): Understanding Learning objectives, Introduction to work & meeting requirements, Time Management, Work management & prioritization, Quality & Standards Adherence.

UNIT - II

Summarizing Data & Revisiting Probability (NOS 2101): Summary Statistics – Summarizing data with R, Probability, Expected, Random, Bivariate Random variables, Probability distribution. Central Limit Theorem etc.

Work effectively with Colleagues (NOS 9002): Introduction to work effectively, Team Work, Professionalism, Effective Communication skills, etc.

UNIT – III

SQL using R: Introduction to NoSQL, Connecting R to NoSQL databases. Excel and R integration with R connector.

UNIT – IV

Correlation and Regression Analysis (NOS 9001): Regression Analysis, Assumptions of OLS Regression, Regression Modeling. Correlation, ANOVA, Forecasting, Heteroscedasticity, Autocorrelation, Introduction to Multiple Regression etc.

UNIT – V

Understand the Verticals – Engineering, Financial and others (NOS 9002): Understanding system viz. Engineering Design, Manufacturing, Smart Utilities, Production lines, Automotive, Technology etc. Understanding Business problems related to various businesses.

Requirements Gathering: Gathering all the data related to Business objective

TEXT BOOKS:

1. Student's Handbook for Associate Analytics.

REFERENCE BOOKS:

1. Introduction to Probability and Statistics Using R, ISBN: 978-0-557-24979-4, is a textbook written for an undergraduate course in probability and statistics.
2. An Introduction to R, by Venables and Smith and the R Development Core Team. This may be downloaded for free from the R Project website (http://www-r-project.org/, see Manuals). There are plenty of other free references available from the R Project website.
3. Montgomery, Douglas C., and George C. Runger, Applied statistics and probability for engineers. John Wiley & Sons, 2010
4. The **Basic Concepts of Time Series Analysis.**http://anson.ucdavis.edu/~azari/sta137/AuNotes.pdf
5. **Time Series Analysis and Mining with R,** Yanchang Zhao.

INFORMATION SECURITY MANAGEMENT
(SECURITY ANALYST – 1)
(Professional Elective – I)

III B. Tech. - II Semester | **L T P C**
Course Code: A3CS38 | **3 1 - 3**

COURSE OVERVIEW:
Digital Information stored anywhere is prone to security threats and security management becomes a important part of information industry. As part of this course basic security threats, attacks and mechanisms of information security are discussed and also the responsibility of a security analyst.

COURSE OBJECTIVES:
1. To introduce the terminology, technology and its application
2. To familiarize the concepts of Security Analyst
3. To introduce the tools, technologies & programming languages which is used in day to day
4. Security analyst job role.

COURSE OUTCOMES:
At the end of the course students will be able to
1. Identify and differentiate various types of security attacks and vulnerabilities
2. Analyze various security issues and its consequences
3. Outline the role of security analyst

SYLLABUS

UNIT - I
Information Security Management: Information Security Overview, Threats and Attack Vectors, Types of Attacks, Common Vulnerabilities and Exposures (CVE), Security Attacks, Fundamentals of Information Security, Computer Security Concerns, Information security Measures etc.
Manage your work to meet requirements (NOS 9001):

UNIT - II
Fundamentals of Information Security: Key Elements of Networks, Logical Elements of Network, Critical Information Characteristics, Information States etc.
Work effectively with Colleagues (NOS 9002).

UNIT - III
Data Leakage: What is Data Leakage and statistics, Data Leakage Threats, Reducing the Risk of Data Loss, Key Performance indicators (KPI), Database Security etc.

UNIT - IV
Information Security Policies, Procedure and Audits: Information Security Policies-necessity-key elements & characteristics, Security Policy Implementation, Configuration Security Standards-Guidelines & Framework etc.

UNIT - V
Information Security Management – Roles and Responsibilities: Security Roles & Responsibilities, Accountability, Roles and Responsibilities of Information Security Management, team-responding to emergency situation-risk analysis process etc.

TEXT BOOK:
1. Management of Information Security by *Michael E.Whitman and Herbert J.Mattord*

REFERENCE BOOKS:
1. http://www.iso.org/iso/home/standards/management-standards/iso27001.htm
2. http://csrc.nist.gov/publications/nistpubs/800-55-Rev1/P800-55-rev1.pdf

ADVANCED ENGLISH COMMUNICATION SKILLS LAB

B. Tech: IT III-II Semester **L T P C**
Course Code: A3HS13 **- - 3 2**

Course Overview:

The introduction of the Advanced Communication Skills Lab is considered essential at 3rd year level. At this stage, the students need to prepare themselves for their careers which may require them to listen to, read, speak and write in English both for their professional and interpersonal communication in the globalised context.

The proposed course should be a laboratory course to enable students to use 'good' English and perform the following:

1. Gathering ideas and information to organize ideas relevantly and coherently.
2. Engaging in debates.
3. Participating in group discussions.
4. Facing interviews.
5. Writing project / research reports/technical reports.
6. Making oral presentations.
7. Writing formal letters.
8. Transferring information from non-verbal to verbal texts and vice-versa.
9. Taking part in social and professional communication.

Course Objectives:

This Lab focuses on using multi-media instruction for language development to meet the following targets:

I. To improve the students' fluency in English, through a well-developed vocabulary and enable them to listentoEnglishspokenatnormalconversationalspeedbyeducatedEnglish speakers and respond appropriately in different socio-cultural and professional contexts.

II. Further, they would be required to communicate their ideas relevantly and coherently in writing.
To prepare all the students for their placements

SYLLABUS

The following course content to conduct the activities is prescribed for the Advanced Communication Skills (ACS) Lab:

1. Listening for writing short answers, identifying topic, context, function, etc.
2. Activities on Fundamentals of Inter-personal Communication and Building Vocabulary-Starting a conversation - responding appropriately and relevantly - using the right body language - Role Play in different situations & Discourse Skills- using visuals - Synonyms and antonyms, word roots, one-word substitutes, prefixes and suffixes, study of word origin, business vocabulary, analogy, idioms and phrases, collocations & usage of vocabulary.
3. Activities on Reading Comprehension-General Vs Local comprehension, reading for facts, guessing meanings from context, scanning, skimming, inferring meaning, critical reading & effective googling, understanding sentence structure/ error identification.
4. Functional/Communicative Task e.g. giving instructions, explaining a development, asking for comments, requesting information, agreeing to requests Correspondence: e.g. explaining, apologizing, reassuring, and complaining. Report: describing, summarizing. Proposal: describing summarizing, recommending, persuading. Activities on Writing Skills - Structure and presentation of different types of writing - letter writing/Resume writing/ e-correspondence/ Technical report writing/ Portfolio writing - planning for writing - improving one's writing.
5. Format and Focus on Conversation between the interlocutor and each candidate-Giving personal information. Talking about present circumstances, past experiences and future plans, expressing opinions, speculating etc.-A 'mini presentation' by each candidate on a business theme- Organizing a larger unit of discourse-Giving information and expressing and justifying opinions-Two-way conversation between candidates followed by further

prompting from the interlocutor -Expressing and justifying opinions, speculating, comparing and contrasting agreeing and disagreeing etc.

6. Activities on Presentation Skills - Oral presentations (individual and group) through JAM sessions/seminars/PPTs and written presentations through posters/projects/reports/e-mails/assignments etc.
7. Activities on Group Discussion and Interview Skills - Dynamics of group discussion, intervention, summarizing, modulation of voice, body language, relevance, fluency and organization of ideas and rubrics for evaluation- Concept and process, pre-interview planning, opening strategies, answering strategies, interview through tele-conference & video-conference and Mock Interviews.

Minimum Requirement:

The Advanced Communication Skills (ACS) Laboratory shall have the following infra-structural facilities to accommodate at least 35 students in the lab:

- Spacious room with appropriate acoustics.
- Round Tables with movable chairs
- Audio-visual aids
- LCD Projector
- Public Address system
- P - IV Processor, Hard Disk - 80 GB, RAM-512 MB Minimum, Speed - 2.8 GHZ
- T. V, a digital stereo & Camcorder
- Headphones of High quality

Suggested Software:

The software consisting of the prescribed topics elaborated above should be procured and used.

- Oxford Advanced Learner's Compass, 3rd Edition
- DELTA's key to the Next Generation TOEFL Test: Advanced Skill Practice.
- Lingua TOEFL CBT Insider, by Dreamtech
- TOEFL & GRE (KAPLAN, AARCO & BARRONS, USA, Cracking GRE by CLIFFS)
- The following software from 'train2success.com'~ Preparing for being Interviewed ~ Positive Thinking ~ Interviewing Skills ~ Telephone Skills ~ Time Management

Books Recommended:

1. Technical Communication by Meenakshi Raman & Sangeeta Sharma, Oxford University Press 2009.
2. Advanced Communication Skills Laboratory Manual by Sudha Rani, D, Pearson Education 2011.
3. Technical Communication by Paul V. Anderson. 2007. Cengage Learning pvt. Ltd. New Delhi.
4. Business and Professional Communication: Keys for Workplace Excellence. Kelly M. Quintanilla & Shawn T. Wahl. Sage South Asia Edition. Sage Publications. 2011.
5. The Basics of Communication: A Relational Perspective. Steve Duck & David T. McMahan. Sage South Asia Edition. Sage Publications. 2012.
6. English Vocabulary in Use series, Cambridge University Press 2008.
7. Management Shapers Series by Universities Press(India)Pvt Ltd., Himayatnagar, Hyderabad 2008.
8. Handbook for Technical Communication by David A. McMurrey & Joanne Buckley. 2012. Cengage Learning.
9. Communication Skills by Leena Sen, PHI Learning Pvt Ltd., New Delhi, 2009.
10. Handbook for Technical Writing by David A McMurrey & Joanne Buckely CENGAGE Learning 2008.
11. Job Hunting by Colm Downes, Cambridge University Press 2008.
12. Master Public Speaking by Anne Nicholls, JAICO Publishing House, 2006.
13. English for Technical Communication for Engineering Students, Aysha Vishwamohan, Tata Mc Graw-Hi 2009.
14. Books on TOEFL/GRE/GMAT/CAT/ IELTS by Barron's/DELTA/Cambridge University Press.
15. International English for Call Centres by Barry Tomalin and Suhashini Thomas, Macmillan Publishers, 2009.

DISTRIBUTION AND WEIGHT AGE OF MARKS:

Advanced Communication Skills Lab Practical's:

1. The practical examinations for the ACS Laboratory practice shall be conducted as per the University norms prescribed for the core engineering practical sessions
2. For the English Language lab sessions, there shall be continuous evaluation during the year for 25 sessional marks and 50 End Examination marks. Of the 25 marks, 15 marks shall be awarded for day to-day work and 10 marks to be awarded by conducting Internal Lab Test(s). The End Examination shall be conducted by the teacher concerned, by inviting the External Examiner from outside. In case of the non-availability of the External Examiner, other teacher of the same department can act as the External Examiner

Mini Project: As a part of Internal Evaluation.

1. Seminar/ Professional Presentation
2. A Report on the same has to be prepared and presented

* Teachers may use their discretion to choose topics relevant and suitable to the needs of students.
* Not more than two students to work on each mini project.
* Students may be assessed by their performance both in oral presentation and written report.

Learning Outcomes:

~ Accomplishment of sound vocabulary and its proper use contextually.
~ Flair in Writing and felicity in written expression.
~ Enhanced job prospects.
~ Effective Speaking Abilities

ANGULAR JS LAB

B. Tech: IT III-II Semester | **L T P C**
Course Code: A3IT17 | **- - 3 2**

Course Overview:

The World Wide Web continues to provide a foundation for the development of a broad range of increasingly influential and strategic technologies, supporting a large variety of applications and services, both in the private and public sectors. There is a growing need for management and decision makers to gain a clearer understanding of the application development process, from planning through to deployment and maintenance.

Course Objectives:

I. To teach students the basics of scripting using AngularJS
II. To explain web application development procedures
III. To impart AngularJS technology for writing business logic
IV. To facilitate students to develop projects using AngularJS
V. To familiarize various concepts of application development using AngularJS

Course Outcomes:

Upon completion of this course, students will be able to:

1. Create web pages using AngularJS
2. Identify the difference between the HTML PHP and XML documents with AngularJS.
3. Identify the engineering structural design of AngularJS
4. Analyze the difference between HTML, CSS, XML & AngularJS.
5. Understand the concept of AngularJS.
6. Identify the difference between the Javascript & AngularJS
7. Design web application using MVC architecture
8. Understand the Html, javascript & AngularJS concepts.

SYLLABUS

1. Write a simple Hello program using AngularJS library.
2. Write a program that the AngularJS application consists of following three important parts:
   1. ng-app
   2. ng-model
   3. ng-bind
3. write a program that include AngularJS directives?
4. write a program whenever you type anything in first name and last name input boxes, you can see the full name getting updated automatically by using ng-controller directive.
5. write a program by using filters to convert the following
   1. uppercase
   2. lowercase
   3. currency
   4. orderBy
   5. filter
   6. date
   7. json
   8. limitTo
6. write a program to develop a table.
7. write a program to develop a simple calculator in AngularJS

8. write a program using AngularJs is a javascript based framework to create powerful and dynamic web applications.With the help of AngularJs we can extend the capabilities of HTML and use functions
9. Write a program to perform all arithmetic operation of numbers as an expression.
10. Write a program to define an array which is going to hold the marks of a student in 3 subjects.
11. Write a program when you change the name in the input field, the changes will affect the model, and it will also affect the name property in the controller.
12. Write a program Change the name inside the input field, and the model data will change automatically, and therefore also the header will change its value.
13. Write a program to custom service with a method that converts a given number into a hexadecimal number.
14. Write a program to response object has many properties. Demonstrate the value of the data, status, and statusText properties.
15. Write a program to shows how to fill a dropdown list using the ng-options, ng-repeat directive
16. Write a program that can display both the model and the color of the selected element using ng-options directive.
17. Write a program to increase the count variable when the mouse moves over the element & display the value of clientX and clientY from the event object.
18. Write a program to increase AngularJS code that will be executed when the element is being clicked.
19. Write a program that the directive binds AngularJS application data to the disabled attribute of HTML elements.
20. Write a program to to display the student registration form using AngularJS code
21. Write a program to display the student registration form with validation using AngularJS code
22. Write a program HTML example, with all AngularJS directives and W3.CSS classes
23. Write a program that the CSS Animations allows you to change CSS property values smoothly, from one value to another, over a given duration
24. Write a program to navigate to different pages in your application using ngRoute
25. Write a program to AngularJS features to make a shopping list, where you can add or remove items

CROSS PLATFORM MOBILE APPLICATION DEVELOPMENT LAB

	L	T	P	C
B. Tech: IT III-II Semester				
Course Code: A3IT18	-	-	3	2

Course Overview:

This course is concerned with the development of applications on mobile and wireless computing platforms. Android will be used as a basis for teaching programming techniques and design patterns related to the development of standalone applications and mobile portals to enterprise and m-commerce systems. Emphasis is placed on the processes, tools and frameworks required to develop applications for current and emerging mobile computing devices. Students will work at all stages of the software development life-cycle from inception through to implementation and testing. In doing so, students will be required to consider the impact of user characteristics, device capabilities, networking infrastructure and deployment environment, in order to develop software capable of meeting the requirements of stakeholders.

Course Objectives:

I. Produce apps for iOS platform devices (iPhone/iPad/iPod Touch)
II. Gain a basic understanding of computer architecture and object-oriented programming
III. Develop a working knowledge of Apple's Xcode app development tool
IV. Understand mobile design principles
V. Identify need and opportunity in app markets

Course Outcomes:

By the conclusion of this course, students will be able to:

1. Describe those aspects of mobile programming that make it unique from programming for other platforms,
2. Critique mobile applications on their design pros and cons,
3. Utilize rapid prototyping techniques to design and develop sophisticated mobile interfaces, Program mobile applications for the Android operating system that use basic and advanced phone features, and Deploy applications to the Android marketplace for distribution

SYLLABUS

1. Set up ANDROID STUDIO using ECLIPSE IDE
2. Build and Run first ANDROID program in Emulator
3. Create an APP for currency converter
4. Create an APP to registration form
5. Create a calculator using ANDROID APP
6. Create an APP to insert data from registration form into database
7. Crete an APP to conduct online quiz
8. Create Slide show of multiple images using ANDROID APP
9. Develop an APP which plays video files.
10. Create an App to identify the current location using GOOGLE MAP API

IV B.TECH I SEMESTER SYLLABUS

CRYPTOGRAPHY AND INFORMATION SECURITY
(Common to CSE&IT)

IV B. Tech. - I Semester **L T P C**
Course Code: A3CS30 **3 1 - 3**

COURSE OVERVIEW:
This course will emphasise on principles and practice of cryptography and network security: classical systems, symmetric block ciphers (DES, AES, other contemporary symmetric ciphers), linear and differential cryptanalysis, perfect secrecy, public-key cryptography algorithms for factoring and discrete logarithms, cryptographic protocols, hash functions, authentication, key management, key exchange, signature schemes, email and web security, viruses, firewalls, digital right management, and other topics. In this course students will learn as aspects of network security and cryptography.

COURSE OBJECTIVES:
1. To provide deeper understanding into cryptography, its application to network security, threats/vulnerabilities to networks and countermeasures.
2. To explain various approaches to Encryption techniques, strengths of Traffic Confidentiality, Message Authentication Codes.
3. To familiarize Digital Signature Standard and provide solutions for their issues.
4. To familiarize with cryptographic techniques for secure (confidential) communication of two parties over an insecure (public) channel; verification of the authenticity of the source of a message.

COURSE OUTCOMES:
At the end of this course students will be able to:
1. Identify basic security attacks and services
2. Use symmetric and asymmetric key algorithms for cryptography
3. Design a security solution for a given application
4. Analyze Key Management techniques and importance of number Theory.
5. Understanding of Authentication functions the manner in which Message Authentication Codes and Hash Functions works.
6. To examine the issues and structure of Authentication Service and Electronic Mail Security

SYLLABUS

UNIT - I
INTRODUCTION: Security trends, The OSI Security Architecture, Security Attacks, Security Services and Security Mechanisms, A model for Network security.
CLASSICAL ENCRYPTION TECHNIQUES: Symmetric Cipher Modes, Substitute Techniques, Transposition Techniques, Rotor Machines, Stenography.

UNIT - II
BLOCK CIPHER AND DATA ENCRYPTION STANDARDS: Block Cipher Principles, Data Encryption Standards, the Strength of DES, Differential and Linear Crypt Analysis, Block Cipher Design Principles.
ADVANCED ENCRYPTION STANDARDS: Evaluation Criteria for AES, the AES Cipher.
MORE ON SYMMETRIC CIPHERS: Multiple Encryption, Triple DES, Block Cipher Modes of Operation, Stream Cipher and RC4.
INTRODUCTION TO NUMBER THEORY: Prime Numbers, Fermat's and Euler's Theorem, Testing for Primality, The Chinese Remainder Theorem, Discrete logarithms,

UNIT - III
PUBLIC KEY CRYPTOGRAPHY AND RSA: Principles Public key crypto Systems, Diffie Hellman Key Exchange, the RSA algorithm, Key Management, , Elliptic Curve Arithmetic, Elliptic Curve Cryptography.
MESSAGE AUTHENTICATION AND HASH FUNCTIONS: Authentication Requirement, Authentication Function, Message Authentication Code, Hash Function, Security of Hash Function

and MACs.
HASH AND MAC ALGORITHM: Secure Hash Algorithm, Whirlpool, HMAC, CMAC.
DIGITAL SIGNATURE: Digital Signature, Authentication Protocol, Digital Signature Standard.

UNIT - IV
AUTHENTICATION APPLICATION: Kerberos, X.509 Authentication Service, Public Key Infrastructure.
EMAIL SECURITY: Pretty Good Privacy (PGP) and S/MIME.
IP SECURITY: Overview, IP Security Architecture, Authentication Header, Encapsulating Security Payload, Combining Security Associations and Key Management.

UNIT - V
WEB SECURITY: Requirements, Secure Socket Layer (SSL) and Transport Layer Security (TLS), Secure Electronic Transaction (SET), Intruders, Viruses and related threats.
FIREWALL: Firewall Design principles, Trusted Systems.

TEXT BOOKS:
1. William Stallings (2006), Cryptography and Network Security: Principles and Practice, 4th edition, Pearson Education, India.
2. William Stallings (2000), Network Security Essentials (Applications and Standards), Pearson Education, India.

REFERENCE BOOKS:
1. Charlie Kaufman (2002), Network Security: Private Communication in a Public World, 2nd edition, Prentice Hall of India, New Delhi.
2. Atul Kahate (2008), Cryptography and Network Security, 2nd edition, Tata Mc Grawhill, India.
3. Robert Bragg, Mark Rhodes (2004), Network Security: The complete reference, Tata Mc Grawhill, India.

DISTRIBUTED SYSTEMS
(Common to CSE&IT)

IV B. Tech. - I Semester | **L T P C**
Course Code: A3CS31 | **4 1 - 4**

SYLLABUS

UNIT-I

Characterization of Distributed Systems: Introduction, Examples of Distributed Systems, Resource Sharing and the Web, Challenges.
System Models: Introduction, Architectural Models, Fundamental Models.

UNIT-II

Time and Global States: Introduction, Clocks Events and Process States, Synchronizing Physical Clocks, Logical Time and Logical Clocks, Global States, Distributed Debugging.
Coordination and Agreement: Introduction, Distributed Mutual Exclusion, Elections, Multicast Communication, Consensus and Related Problems.

UNIT-III

Inter Process Communication: Introduction, The API for the Internet Protocols, External Data Representation and Marshalling, Client-Server Communication, Group Communication, Case Study: IPC in UNIX.
Distributed Objects and Remote Invocation: Introduction, Communication between Distributed Objects, Remote Procedure Call, Events and Notifications, Case Study: JAVA RMI.

UNIT-IV

Distributed File Systems: Introduction, File Service Architecture, Case Study 1: Sun Network File System, Case Study 2: The Andrew File System.
Name Services: Introduction, Name Services and the Domain Name System, Directory Services, Case Study of the Global Name Services.
Distributed Shared Memory: Introduction, Design and Implementation Issues, Sequential Consistency and IVY case study, Release Consistency, Munin Case Study, Other Consistency Models.

UNIT- V

Transactions and Concurrency Control: Introduction, Transactions, Nested Transactions, Locks, Optimistic Concurrency Control, Timestamp Ordering, Comparison of Methods for Concurrency Control.
Distributed Transactions: Introduction, Flat and Nested Distributed Transactions, Atomic Commit Protocols, Concurrency Control in Distributed Transactions, Distributed Deadlocks, Transaction Recovery.

TEXT BOOK

1. Distributed Systems, Concepts and Design, George Coulouris, J Dollimore and Tim Kindberg, Pearson Education, 41″ Edition. 2009.

REFERENCE BOOKS

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

OUTCOMES

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

For more information about all JNTU updates please stay connected to us on FB and don't hesitate to ask any questions in the comment.

HUMAN COMPUTER INTERACTION

B. Tech: IT IV-I Semester | **L T P C**
Course Code: A3IT20 | **4 1 - 4**

Course Overview:

Concepts, human information processing (cognition, perception, movement, culture, communication, human diversity, motivation for computer interaction, human performance models, etc.), user interface design principles, information presentation, visual, auditory and tactile displays, speech communication, data entry, controls, tools and feedback, human factors in computer programming, workspace design, environmental and legal on side rations.

Course Objectives:

After completing this course students must be able to understand and make use of :

I. The human components functions.
II. The Computer components functions. .
III. The Interaction between the human and computer components.
IV. Paradigms
V. Interaction design basics
VI. HCI in the software process
VII. Design rules
VIII. Implementation supports
IX. Evaluation techniques

Course Outcomes:

After completing this course students must be able to demonstrate the knowledge and ability to:

1. Explain the human components functions regarding interaction with computer
2. Explain Computer components functions regarding interaction with human
3. Demonstrate Understanding of Interaction between the human and computer components.
4. Use Paradigms
5. Implement Interaction design basics
6. Use HCI in the software process
7. Apply Design rules
8. Produce Implementation supports
9. Use Evaluation techniques

SYLLABUS

UNIT - I

Introduction: Importance of user Interface – definition, importance of good design. Benefits of good design.A brief history of Screen design.

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 - II

Design process – Human interaction with computers, importance of human characteristics human consideration, Human interaction speeds, understanding business junctions.

Screen Designing : Design goals – Screen planning and purpose, organizing screen elements, ordering of screen data and content – screen navigation and flow – Visually pleasing composition – amount of information – focus and emphasis – presentation information simply and meaningfully – information retrieval on web – statistical graphics – Technological consideration in interface design.

UNIT - III

Windows – New and Navigation schemes selection of window, selection of devices based and screen based controls.

Components – text and messages, Icons and increases – Multimedia, colors, uses problems, choosing colors.

UNIT - IV
Software tools – Specification methods, interface – Building Tools.

UNIT - V
Interaction Devices – Keyboard and function keys – pointing devices – speech recognition digitization and generation – image and video displays – drivers.

TEXT BOOKS:

1. The essential guide to user interface design, Wilbert O Galitz, Wiley Dreamtech.
2. Designing the user interface. 3rd Edition Ben Shneidermann , Pearson Education Asia.

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.

PHP SCRIPTING LANGUAGE
(Professional Elective – II)

	L	T	P	C
B. Tech: IT IV-I Semester				
Course Code: A3IT24	**3**	**1**	**-**	**3**

Course Overview:
This course is designed to know about the Scripting languages that require very different style of programming than system programming languages such as C or Java. Scripting languages are typically used for "gluing" applications together. Scripting languages are often type less and usually provide methods for higher level of programming and more rapid development of applications than typical system programming languages. This course provides an introduction to the script programming paradigm, and introduces and compares a range of scripting languages used for UNIX and Web-based applications.

Course Objective:
This course enables to student to know:

I. Enabling Knowledge: effectively apply knowledge of Perl and Python to new situations. Critical Analysis: examine and consider accurately and objectively any topic, evidence, or situation.
II. Analyze requirements of software systems for the purpose of determining the suitability of implementing in Perl or Python;
III. Analyze and model requirements and constraints for the purpose of designing and implementing software systems in Perl and Python;
IV. Evaluate and compare designs of such systems on the basis of specific requirements and constraints.
V. Problem Solving: analyze problems and synthesize suitable solutions.

Course Outcomes:
At the end of the course, students will

1. Understand process of executing a PHP-based script on a webserver.
2. 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.
3. Understand basic PHP syntax for variable use, and standard language constructs, such as conditionals and loops.
4. Understand the syntax and use of PHP object-oriented classes.
5. Understand the syntax and functions available to deal with file processing for files on the server as well as processing web URLs.
6. 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.

SYLLABUS

UNIT 1:
Programming with PHP
Origins pf PHP in the open source community,Why we use PHP?, Some of PHP's strength: Some of PHP's main competitors are PERL. Ms- ASP.NET, Java Server Page (JSP) and cold fusion. In comparison to these product PHP has much strength,-Availability across multiple platforms ,Installing as module for Apache Web server and Microsoft Internet Information server.
PHP Language building blocks: Comparing PHP with other Web Scripting languages or technology, PHP delimiters, Variable initialization with PHP, Investigating PHP data types

UNIT 2:
Writing PHP scripts
Storing values in scalar variables, Employing Arrays, Building complete scripts incorporating loops and conditional; expressions, Operators Writing Web Pages with PHP Interacting with the server,

Outlining Web protocols • Embedding PHP code into HTML pages, Employing shortcuts to display single PHP value, Determining how data is sent from forms to PHP scripts Manipulating user input,• Presenting the user with input options via different HTML form elements,• Retrieving form data with $_POST, $_GET and $_REQUEST [] arrays,• Validating retrieved data
• Strategies for handling invalid input • Storing state information using cookies,• Tracking users identification Applying Advanced Scripting Techniques Exploiting the built-in functionality of PHP, Formatting date & time information,• Manipulating String data, Reading and writing using file I/O function, Investigating other built-in features Structuring PHP Code, Writing user defined functions to structure your code,• Passing arguments and default values to functions, Returning Data from functions, Accessing global variables, Building code libraries for reusability
• Incorporating external PHP scripts with include, include_once, require and require_once.

UNIT 3:
Building Complete Web Application
Managing error, Investigating the HTTP header, Suppressing on screen error messages on production servers Configuring the php.ini file to control error message

UNIT 4:
Handling problematic situation
Troubleshooting problems when manipulating data,• Redirecting the browser to other pages,
Modifying the PHP configuration file to suit your needs,• Developing debugging strategies

UNIT 5 :
Establishing database connectivity
My sql,, Creating and managing database connections, Sending queries to the database server employing the most efficient methods, Retrieving query results as associative arrays, Looping through database Displaying returned data on Web pages, Avoiding potential problems by managing quotes and backslashes in data, Closing the database connect

Text Books:

1. Build Your Own Database Driven Web Site Using PHP & MySQL by Kevin Yank, available from Sitepoint.
2. PHP Solutions by David Powers, available from Friends of Ed.
3. Learning PHP, MySQL, and JavaScript by Robin Nixon, available from O'Reilly

BUILDING INTERNET OF THINGS
(Professional Elective – II)

IV B. Tech. - I Semester	L	T	P	C
Course Code: A3CS39	3	1	-	3

OBJECTIVES:

1. To understand the fundamentals of Internet of Things.
2. To build a small low cost embedded system using Arduino / Raspberry Pi or equivalent boards.
3. To apply the concept of Internet of Things in the real world scenario

SYLLABUS

UNIT I

FUNDAMENTALS OF IOT : Introduction-Characteristics-Physical design - Protocols – Logical design – Enabling technologies – IoT Levels – Domain Specific IoTs – IoT vs M2M.

UNIT II

IOT DESIGN METHODOLOGY: IoT systems management – IoT Design Methodology – Specifications Integration and Application Development.

UNIT III

BUILDING IOT WITH RASPBERRY PI : Physical device – Raspberry Pi Interfaces – Programming – APIs / Packages – Web services –

UNIT IV

BUILDING IOT WITH GALILEO/ARDUINO: Intel Galileo Gen2 with Arduino- Interfaces - Arduino IDE – Programming - APIs and Hacks

UNIT V

CASE STUDIES and ADVANCED TOPICS : Various Real time applications of IoT- Connecting IoT to cloud – Cloud Storage for Iot – Data Analytics for IoT – Software & Management Tools for IoT T

OUTCOMES:

1. Upon the completion of the course the student should be able to Design a portable IoT using Arduino/ equivalent boards and relevant protocols.
2. Develop web services to access/control IoT devices.
3. Deploy an IoT application and connect to the cloud.
4. Analyze applications of IoT in real time scenario

REFERENCES:

1. Arshdeep Bahga, Vijay Madisetti, “Internet of Things – A hands-on approach”, Universities Press, 2015. 2. Manoel Carlos Ramon, “Intel® Galileo and Intel® Galileo Gen
2. API Features and Arduino Projects for Linux Programmers”, Apress, 2014.
3. Marco Schwartz, “Internet of Things with the Arduino Yun”, Packt Publishing, 2014

BIG DATA ENGINEERING
(ASSOCIATE ANALYTICS – 2)
(Professional Elective – II)

IV B. Tech. - I Semester	L	T	P	C
Course Code: A3CS42	3	1	-	3

COURSE OVERVIEW:
Data analysis is the process of data analyzing and extracting useful information which can help in making useful business decisions. As part of this course Big Data tools and Data Visualization tools are introduced.

COURSE OBJECTIVES:
1. To introduce the terminology, technology and its applications
2. To introduce the concept of Analytics and Visualization
3. To demonstrate the usage of various Big Data tools and Data Visualization tools

COURSE OUTCOMES:
At the end of the course students will able to:
- Identify basic terminology of HADOOP,SPARK,IMPALA etc
- Analyze the importance of Analytics in business perspective
- Apply Big Data tools and Visualization tools

SYLLABUS

UNIT - I

INTRODUCATION TO BIG DATA: Data and its importance, BigData-definication,implications of BigData,addressing Big Data implications using Hadoop,Hadoop Ecosystem

HADOOP ARCHITECTURE

Hadoop Storage : HDFS, Hadoop
Processing : MapReduce Framework
HadooServer Roles : NameNode,Secondry NameNode and DataNode,JobTracker,TaskTracker

HDFS-HADOOP DISTRIBUTED FILE SYSTEM

Design of HDFS, HDFS Concepts,HDFS Daemons,HDFS High Availability, Block Abstraction, FUSE-File System in User Space.HDFS Command Line Interface (CLI),Concept of File Reading and Writing in HDFS.

UNIT – II

MAPREDUCE PROGRAMMING MODEL: Introduction to Map Reduce Programming model to process BigData,key features of MapReduce,MapReduce Job skeleton, Introduction to MapReduce API,Hadoop Data Types,Develop MapReduce Job using Eclipse,bulip a MapReduce Job export it as a java archive(.jar file).

MAPREDUCE JOB LIFE CYCLE: How Mapreduce Works? Understanding Mapper ,Combiner,Partitioner ,Shuffle & Sort and Reduce phases of MapReduce Application,Developing Map Reduce Jobs based on the requirement using given datasets like weather dataset.

MAPREDUCE API: Understanding new MapReduce API from org.apache.hadoop.maoreduce and its sub packages to develop MapReduce applications ,key difference between old MapReduce API and the new MapReduce API.

UNIT –III

INTRODUCTION TO PIG

Understanding pig and pig Platform, introduction to Pig Latin Language and Execution engine, running pig in different modes, Pig Grunt Shell and its usage.

PIG LATIN LANGUAGE –SEMATICCS –DATA TYPES IN PIG
Pig Latin Basics,Key words ,Pig Data types ,Understanding Pig relation,big,tuple and writing pig relations or statements using Grunt Shell ,expressions, Data processing operators, using Built in functions.
WRITING PIG SCRIPTS USING PIG LATIN: Writing pig scripts and saving them text editor ,running pig scripts from command line.

UNIT - IV
INTRODUCATION TO HIVE: Understanding Hive Shell ,Running Hive ,Understanding Schema on read and Schema on write.

HIVE QL DATA TYPES, SEMANTICS: Introduaction to Hive QL(Query Language),Language semantics, Hive Data Types.

HIVE DDL, DML AND HIVE SCRIPTS: Hive Statements ,Understanding and working with Hive Data Definition Languages and Manipulation Language statements, Creating Hive Scripts and running them from hive terminal and commands line.

UNIT-V
SQOOP: Introducation to Sqoop tool, commands to connect databases and list databases and tables, command to import data from RDBMS into HDFS,Command to export data from HDFS into required tables of RDBMS.

FLUME: Introducation to Flume agent ,understanding Flume components Source, Channel and Sink,Writing flume configuration file ,running flume configuration file to ingest the data into HDFS.

OOZIE: Introduction to Oozie, Understanding work flow and how to Work flow using Work Flow definition language in XML, running a basic Oozie workflow to run a MapReduce job.

TEXT BOOK:
1. Hadoop: The Definitive Guide, 4th Edition - O'Reilly Media

INFORMATION SECURITY ASSESSMENTS AND AUDITS
(SECURITY ANALYST – 2)
(Professional Elective – II)

IV B. Tech. - I Semester	L	T	P	C
Course Code: A3CS43	3	1	-	3

COURSE OVERVIEW:
Digital Information stored anywhere is prone to security threats and security management becomes a important part of information industry. As part of this course basic security performance auditing is introduced. Audit report generation and vulnerability management is discussed.

COURSE OBJECTIVES:
1. To introduce the terminology, technology of Information security audits.
2. To familiarize the concepts of Vulnerability management
3. To introduce the risk assessment, risk management tools.

COURSE OUTCOMES:
At the end of the course students will be able to
- Identify and differentiate various types of audits
- Analyze various security vulnerabilities and can do preliminary assessment
- Perform vulnerability testing, risk identification and risk management

SYLLABUS

UNIT - I
Information Security performance metrics and audit: Security metrics and reporting , common issues and variances of performance metrics , introduction to security audit , servers and storage device. infrastructure and Networks , communication routes, information security methodologies (Black-box, white-box, grey-box), phases of information security audit and Strategies, Ethics of an information security auditor etc.
Maintain Healthy, safe & secure working environment (NOS 9003).

UNIT - II
Information security Audit Tasks reports and posts auditing Actions: Pre-audit checklist, information gathering vulnerability analysis, External Security Audit, Internal Network Security Audit, firewall Security Audit, IDS Security Auditing, social engineering security auditing , web Application security auditing , information security Audit Deliverables & writing report, result Analysis, post Auditing Actions , report Retention etc.
Provide data/information in Standard Formats (NOS9004).

UNIT - III
Vulnerability Management: Information security Vulnerability-Threats and Vulnerability, human-based social engineering , computer-based social engineering ,social media counter measures, Vulnerability management- Vulnerability Scanning, testing, threat management , Remediation etc.

UNIT - IV
Information Security Assessments: Vulnerability Assessment, classification, types of Vulnerability Assessment, Vulnerability Assessment phases, Vulnerability Analysis stages ,characteristics of a good Vulnerability Assessment solutions & considerations, Assessment reports-Tools and choosing a right tool, information security risk Assessment, risk Treatment, residual risk ,risk Acceptance, Risk management feedback loops etc.

UNIT - V

Configuration reviews: Introduction to configuration management, configuration management requirements-plan -control, Development of Configuration control policies, testing configuration management etc.

TEXT BOOK:

1. Assessing information security (strategies, tactics,logic and framework) by a vladimirov, k.Gavrilenko, and A. Michajlowski
2. "The Art of computer virus research and defence by Peter Szor".

REFERENCES:

1. http://www.snas.org/redaing-room/whitepapers/threats/implementing-vulnerability-Management-procee-34180.
2. http://crcs.nist.gov/publications/nistpubs/800-40-Ver2/SP800-40V2.pdf.

CRYPTOGRAPHY AND INFORMATION SECURITY LAB
(Common to CSE&IT)

IV B. Tech. - I Semester | **L T P C**
Course Code: A3CS33 | **- - 3 2**

COURSE OVERVIEW:
To give practical exposure on basic security attacks, encryption algorithms, authentication techniques. Apart from security algorithms, firewall configuration is also introduced.

COURSE OBJECTIVES:
1. To provide deeper understanding into cryptography, its application to network security, threats/vulnerabilities to networks and countermeasures.
2. To explain various approaches to Encryption techniques, strengths of Traffic Confidentiality, Message Authentication Codes.
3. To familiarize symmetric and asymmetric cryptography

COURSE OUTCOMES:
At the end of this course students will be able to:
1. Identify basic security attacks and services
2. Use symmetric and asymmetric key algorithms for cryptography
3. Make use of Authentication functions

SYLLABUS

LIST OF EXPERIMENTS:

Lab 1: Implementation of Caesar Cipher technique

Lab 2: Implement the Play fair Cipher

Lab 3: Implement the Pure Transposition Cipher

Lab 4: Implement DES Encryption and Decryption

Lab 5: Implement the AES Encryption and decryption

Lab 6: Implement RSA Encryption Algorithm

Lab 7: Implementation of Hash Functions

CLOUD APPLICATIN DEVELOPMENT LAB
(Common to CSE&IT)

	L	T	P	C
IV B. Tech. - I Semester				
Course Code: A3CS34	-	-	3	2

COURSE OUTCOMES:

At the end of the course the student shall be able to:

CO1: Understand Cloud service models - PaaS, IaaS and SaaS
CO2: Understand how to work with Platform as a Service using CLI
CO3: Understand and Develop Applications in Google Cloud
CO4: Understand and Develop IOT applications
CO5: Understand and Develop Cognitive applications

SYLLABUS

WEEK 1:
Cloud fundamentals, Cloud Service Models (IaaS, PaaS & SaaS), Cloud Deployment Models, Introduction to Google Cloud Account for an instance & Creating a Project.

WEEK 2: Google Cloud Overview: Dashboard, Demonstrate Flask in App Engine,

WEEK 3:
Describe elasticity and scalability, Define virtualization, Define hypervisors, Google Compute Engine in cloud computing,

WEEK 4:
Understanding how to create Runtimes, Container Engine & Services. App development for Google cloud (GIT Hub, Eclipse).

WEEK 5:
Configuring Eclipse for Google Cloud, Develop and deploy simple app from eclipse to Google cloud, Install & Configure CLI (Command Line Interface), Deploy apps through CLI.

WEEK 6:
Database services in Google Cloud. Adding Database to Java Application, Integrating Cloud Database to java Application.

WEEK 7:
Monitoring and Scaling web application using Google Cloud App Engine.

WEEK 8:
Introduction to IoT, different IoT boards to work with, Google cloud IoT ,Understanding NODE RED using a Temperature sensor.

WEEK 9:
Home Automation, Connecting IoT board to Google Cloud IoT Foundation and switching on/off light using twitter msg.

WEEK 10:
Integrating push notification using mobile service Twilio for Week 8 & 9 experiments.

WEEK 11:
What is Cognitive computing. Exploring Google Cloud AI, Large Scale Machine Learning Service, Powerful Video Analysis.

WEEK 12:
Implement demos Powerful Speech Recognition, Fast Dynamic Translation of CLOUD AI.

BIG DATA ENGINEERING LAB USING HADOOP
(Common to CSE&IT)

IV B. Tech. - I Semester | **L T P C**
Course Code: A3CS35 | **- - 3 2**

WEEK 1
- i) Basic Linux Commands
- ii) Understanding how to connect to remote Linux server using putty kind of tool.

WEEK 2
- i) Understanding VMware player setup and configuring Cloudera Bundle using player.
- ii) Basic HDFS commands

WEEK 3
- i) HDFS commands in detail
- ii) Hadoop File System navigation and manipulation using commands

WEEK 4
- i) MapReduce Job submission to Hadoop Cluster from command line
- ii) WordCount MapReduce Job Development using eclipse IDE, packing and testing

WEEK 5
- i) Undersating weather dataset.
- ii) MapReduce Job to process weather datasets of different years.

WEEK 6
- i) Using pig grunt shell.
- ii) Practicing pig commands from grunt shell.

WEEK 7
- i) Writing pig scripts and running them.
- ii) Processing different datasets using pig.

WEEK 8
- i) Hive shell Writing basic Hive queries
- ii) Hive DDL and DML.

WEEK 9
- i) Using Hive to perform CRUD operations-Databases,Tables,Views,Functions and Indexes.

WEEK 10
- i) Working with sqoop commands to import and export data between HDFS and RDBMS.
- ii) Working with sqoop to import data directly into hive tables

WEEK 11
- i) Working with Flume to ingset data from webserver logs or Social Media site like twitter.

WEEK 12
- i) **Working with Oozie to create workflow and run them.**

IV B.TECH II SEMESTER SYLLABUS

MANAGEMENT SCIENCE

B. Tech: IT IV-II Semester	L	T	P	C
Course Code: A3HS15	3	1	-	3

Course Overview:

This course covers many approaches to solving business problems from managerial point of view. Various optimization techniques are surveyed with an emphasis on the why and how of these types of models as opposed to a detailed theoretical approach. Students develop optimization models which relate to their areas of interest. Spreadsheets are used extensively to accomplish the mathematical manipulations. Emphasis is placed on input requirements and interpretation of results

Course Objectives:

I. Familiarize & obtain Knowledge with the process of management and to provide basic insights into management practices.
II. Understand the structure & Designing of an Organization.
III. Knowledge on the aspects of Production.
IV. Analyze the market and the strategies involved in Marketing.
V. Knowledge on concepts related to Human Resources.
VI. Understand the techniques used in Project Management.
VII. Familiarize with strategies used for analysis of an Organization.
VIII. Understand the Contemporary Management Issues.
IX. Familiarize with the management skills which can be applied in the Organizational context to achieve Organizational goals.

Course Outcomes:

Upon completion of this course, students will be able to:

1 Knowledge on management theories and practices.
2 Understanding designing organizational structure.
3 Understanding on the methods & charts used in operations management.
4 Ability to understand the market and its environment.
5 Understand the processes, functions etc in Human Resources Management.
6 Ability to solve problems in managing the Project.
7 Knowledge on Strategic alternatives.
8 Familiar with the practices implemented in management.
9 Understand the social responsibilities of Management.
10 Understand the basic concepts of Management.

SYLLABUS

UNIT - I

INTRODUCTION TO MANAGEMENT AND ORGANIZATION: Concepts of Management and organization- nature, importance and Functions of Management, Systems Approach to Management- Taylor's Scientific Management Theory- Fayal's Principles of Management- Maslow's theory of Hierarchy of Human Needs- Douglas McGregor's Theory X and Theory Y - Hertzberg Two Factor Theory of Motivation - Leadership Styles, Social responsibilities of Management, Designing Organizational Structures: Basic concepts related to Organization - Departmentation and Decentralization, Types and Evaluation of mechanisticand organic structures of organization and suitability.

UNIT - II

OPERATIONS AND MARKETING MANAGEMENT: Principles and Types of Plant Layout-Methods of Production(Job, batch and Mass Production), Work Study - Basic procedure involved in Method Study and Work Measurement - Business Process Reengineering(BPR) - Statistical Quality Control: control charts for Variables and Attributes (simple Problems) and Acceptance Sampling, TQM, Six Sigma,

Deming's contribution to quality, Objectives of Inventory control, EOQ, ABC Analysis, Purchase Procedure, Stores Management and Store Records - JIT System, Supply Chain Management, Functions of Marketing, Marketing Mix, and Marketing Strategies based on Product Life Cycle, Channels of distribution.

UNIT - III

HUMAN RESOURCES MANAGEMENT(HRM): Concepts of HRM, HRD and Personnel Management and Industrial Relations (PMIR), HRM vs PMIR, Basic functions of HR Manager: Manpower planning, Recruitment, Selection, Training and Development, Placement, Wage and Salary Administration, Promotion, Transfer, Separation, Performance Appraisal, Grievance Handling and Welfare Administration, Job Evaluation and Merit Rating - Capability Maturity Model (CMM) Levels - Performance Management System.

UNIT - IV

PROJECT MANAGEMENT (PERT/ CPM): Network Analysis, Programme Evaluation and Review Technique (PERT), Critical Path Method (CPM), Identifying critical path, Probability of Completing the project within given time, Project Cost Analysis, Project Crashing (simple problems).

UNIT - V

STRATEGIC MANAGEMENT AND CONTEMPORARY STRATEGIC ISSUES: Mission, Goals, Objectives, Policy, Strategy, Programmes, Elements of Corporate Planning Process, Environmental Scanning, Value Chain Analysis, SWOT Analysis, Steps in Strategy Formulation and Implementation, Generic Strategy alternatives. Bench Marking and Balanced Score Card as Contemporary Business Strategies.

TEXT BOOKS:

1. A.R.Aryasri : Management Science, TMH, (Latest edition)
2. Stoner, Freeman, Gilbert, Management, 6th Ed, Pearson Education, New Delhi, 2004.

REFERENCE BOOKS:

1. Kotler Philip and Keller Kevin Lane: Marketing Management, Pearson, 2012.
2. Koontz and Weihrich: Essentials of Management, McGraw Hill, 2012.
3. Thomas N. Duening and John M. Ivancevich Management - Principles and Guidelines, Biztantra, 2012.
4. Kanishka Bedi, Production and Operations Management, Oxford Uiversity Press, 2012.
5. Samuel C. Certo: Modern Management, 2012.
6. Schermerhorn, Capling, Poole and Wiesner: Management, Wiley, 2012.
7. Parnell: Strategic Management, Cengage, 2012.
8. Lawrence R Jauch, R. Gupta and William F. Glueck: Business Policy and Strategic Management Science, McGraw Hill, 2012.

SOFT COMPUTING
(Professional Elective-III)

B. Tech: IT IV-II Semester | **L T P C**
Course Code: A3IT26 | **3 1 - 3**

Course Overview:
This course is designed to give students knowledge of soft computing theories fundamentals, i.e. of fundamentals of non-traditional technologies and approaches to solving hard real-world problems, namely of fundamentals of artificial neural networks, fuzzy sets and fuzzy logic and genetic algorithms.

Course Objective:
The objective of this course is

I. To teach basic neural networks, fuzzy systems, and optimization algorithms concepts and their relations
II. To provide knowledge of Neuron model, and Applications of NN to discuss their work.
III. To provide the graduate the better understanding of Fuzzy Logic and Evolutionary Computations.

Course Outcomes:
On completion of this Subject/Course the student shall be able to

- To understand neural network (NN) paradigms
- To learn fuzzy logic To have a knowledge of evolutionary computations, genetic algorithm(GA), evolutionary programming, classifier systems, genetic programming parse trees, mathematical foundation of GA variants of GA.

SYLLABUS

UNIT - I
BASICS OF ARTIFICIAL NEURAL NETWORK: Characteristics of Neural Networks, Structure and working of a biological neural network, Artificial neural network: terminology, models of neurons: McCulloch Pitts model, Perceptron model, Adaline model, topology, Basic learning laws.
FUNCTIONAL UNITS FOR ANN FOR PATTERN RECOGNITION TASK: Pattern recognition problem, Basic functional units, PR by functional units.

UNIT - II
FEEDFORWARD NEURAL NETWORKS:
SUPERVISED LEARNING - I: Perceptrons - Learning and memory, Learning algorithms, Error correction and gradient decent rules, Perceptron learning algorithms.
SUPERVISED LEARNING-II: Backpropogation, Multilayered network architectures, Back propagation learning algorithm, Example applications of feed forward neural networks.

UNIT - III
FEEDBACK NEURAL NETWORKS & SELF ORGANIZING FEATURE MAP: Introduction, Associative learning, Hopfield network, Error performance in Hopfield networks, simulated annealing, Boltzmann machine and Boltzmann learning, state transition diagram and false minima problem, stochastic update, simulated annealing, Boltzmann machine, bidirectional associative memory, bam stability analysis. Self organization, generalized learning laws, competitive learning, vector quantization, self organizing feature map, applications of self organizing feature map.

UNIT - IV
FUZZY LOGIC: Fuzzy set theory, crisp sets, operations on crisp set, fuzzy sets, fuzzy versus crisp, operations, fuzzy relations, crisp relations, properties. Fuzzy logic Application: Fuzzy Control of Blood Pressure.

UNIT - V

FUZZY LOGIC IN DATABASE AND INFORMATION SYSTEMS: Fuzzy Information, Fuzzy Logic in database Systems, Fuzzy Relational data Models, operations in Fuzzy Relational data Models, Design theory for Fuzzy Relational databases, Fuzzy information Retrieval and Web search, Fuzzy Object Oriented databases.

GENETIC ALGORITHMS: Introduction to Genetic Algorithms, Evolutionary Algorithms.

TEXT BOOKS:

1. Satish Kumar (2004), Neural Networks A classroom Approach, Tata McGraw Hill Publication, New Delhi.
2. Lotfi A. Zadeh(1997), Soft computing and Fuzzy Logic, World Scientific Publishing Co., Inc. River Edge, NJ, USA.

REFERENCE BOOKS:

1. B. Yegnanarayana (2006), Artificial Neural Networks, Prentice Hall of India, New Delhi, India.
2. John Yen, Reza Langari(2006), Fuzzy Logic, Pearson Education, New Delhi, India.
3. S. Rajasekaran, Vijaylakshmi Pari (2003), Neural networks, Fuzzy Logic and Genetic Algorithms Synthesis and Applications, Prentice Hall of India, New Delhi, India.

INFORMATION RETRIEVAL SYSTEM
(Professional Elective – IV)
(Common to CSE & IT)

B. Tech: IT IV-II Semester | **L T P C**
Course Code: A3CS50 | **3 1 - 3**

Course Overview:
This course is designed to learn about the techniques used to retrieve useful information from repositories such as the Web. The course first introduces standard concepts in information retrieval such as documents, queries, collections, and relevance. Efficient indexing, to allow for the quick identification of candidate answer documents, is considered. To find the best answers, a range of querying approaches (such as Boolean and Ranked retrieval) are studied. The course then covers a selection of application areas such as music search, document summarization, cross-lingual retrieval, and image retrieval.

Course Objectives:
I. To impart the important concepts, algorithms, and data/file structures that are
II. To facilitate design, and implementation of Information Retrieval (IR) systems.

Course Outcomes:
On completion of this Course the student shall be able to
1. Recognize the Boolean Model, Vector Space Model, and Probabilistic Model.
2. Use retrieval utilities.
3. Analyse different formatting tags

SYLLABUS

UNIT - I
INTRODUCTION TO INFORMATION RETRIEVAL SYSTEMS: Definition, Objectives, Functional Overview, Relationship to Database Management Systems, Digital Libraries and Data Warehouses.
INFORMATION RETRIEVAL SYSTEM CAPABILITIES: Search, Browse and Miscellaneous

UNIT - II
CATALOGING AND INDEXING: Objectives, Indexing Process, Automatic Indexing, Information Extraction.
DATA STRUCTURES: Introduction, Stemming Algorithms, Inverted file structures, N-gram data structure, PAT data structure, Signature file structure, Hidden Markov Models.
AUTOMATIC INDEXING: Classes of Automatic Indexing, Statistical Indexing, Natural Language, Concept , Indexing, Hypertext Linkages.

UNIT - III
DOCUMENT AND TERM CLUSTERING: Introduction, Thesaurus Generation, Item Clustering, Hierarchy of Clusters.
USER SEARCH TECHNIQUES: Search Statements and Binding, Similarity Measures and Ranking, Relevance Feedback, Selective Dissemination of Information Search, Weighted Searches of Boolean Systems, Searching the Internet and Hypertext.
INFORMATION VISUALIZATION: Introduction, Cognition and Perception, Information Visualization Technologies.

UNIT - IV
TEXT SEARCH ALGORITHMS: Introduction, Software Text Search Algorithms, Hardware Text Search Systems.
INFORMATION SYSTEM EVALUATION: Introduction, Measures used in System Evaluation,

Measurement Example -TREC results.

UNIT - V

MULTIMEDIA INFORMATION RETRIEVAL: Models and Languages, Data Modeling Query Languages, Indexing and Searching.

LIBRARIES AND BIBLIOGRAPHICAL SYSTEMS: Online IR Systems, OPACs, Digital Libraries.

TEXT BOOKS:

1. *Gerald J. Kowalski, Mark T. Maybury* (2000), Information Storage and Retrieval Systems: Theory andImplementation, 2nd edition, Springer International Edition, USA.
2. *Ricardo Baeza Yates, Berthier Ribeiro Neto* (2009), Modern Information Retrieval, Pearson Education, India.

REFERENCE BOOKS:

1. *Robert R. Korfhage* (1997), Information Storage and Retrieval, John Wiley & Sons, India Edition, India.

PREDICTIVE ANALYTICS
(ASSOCIATE ANALYTICS – 3)
(Professional Elective – III)

B. Tech: IT IV-II Semester | **L T P C**
Course Code: A3CS47 | **3 1 - 3**

Course Overview:

This course is primarily focused to provide awareness on predictive analysis and the tools and techniques involved. As part of this course linear regression, time series and decision trees are introduced.

Course Objectives:

I. To introduce the terminology, technology and its applications
II. To introduce the concept of predictive analysis
III. To introduce linear regression, time series concepts

Course Outcomes: At the end of the course students will able to:

1. Identify basic terminology of Data Analytics
2. Analyze the importance of Analytics in business perspective

SYLLABUS

UNIT - I

Introduction to Predictive Analytics & Linear Regression (NOS 2101): What and Why Analytics, Introduction to Tools and Environment, Application of Modelling in Business, Databases & Types of data and variables, Data Modelling Techniques, Missing imputations etc.
Need for Business Modelling, Regression— Concepts, Blue property- assumptions- Least Square Estimation, Variable Rationalization, and Model Building etc.

UNIT - II

Logistic Regression (NOS 2101): Model Theory, Model fit Statistics, Model Conclusion, Analytics applications to various Business Domains etc.
Regression Vs Segmentation --- Supervised and Unsupervised Learning , Tree Building --- Regression, Classification, Overfitting, pruning and complexity, Multiple Decision Trees etc.

UNIT - III

Objective Segmentation (NOS 2101): Regression Vs Segmentation -- Supervised and Unsupervised Learning , Tree Building --- Regression, Classification, Overfitting, pruning and complexity, Multiple Decision Trees etc.
Develop Knowledge, Skill and Competences (NOS 9005): Introduction to Knowledge skills & competences, Training & Development, Learning & Development, Policies and Record keeping, etc.

UNIT - IV

Time Series Methods /Forecasting, Feature Extraction (NOS 2101): ARIMA, Measures of Forecast Accuracy, STL approach, Extract features from generated model as Height, Average, Energy etc and Analyze for prediction.

UNIT - V

Working with Documents (NOS 0703): Standard Operating Procedures for documentation and knowledge sharing, Defining purpose and scope documents, Understanding structure of documents – case studies, articles, white papers, technical reports, minutes of meeting etc., Style and format, Intellectual Property and Copyright, Document preparation tools – Visio, PowerPoint, Word, Excel etc., Version Control, Accessing and updating corporate knowledge base, Peer review and feedback.

TEXT BOOK:

1. Student's Handbook for Associate Analytics-III

REFERENCE BOOK:

1. *Gareth James Daniela Witten Trevor Hastie Robert Tibshirani*. An Introduction to Statistical Learning with Applications in R

INFORMATION SECURITY INCIDENT RESPONSE AND MANAGEMENT
(SECURITY ANALYST – 3)
(Professional Elective – III)

B. Tech: IT IV-II Semester | **L T P C**
Course Code: A3CS48 | **3 1 - 3**

Course Overview:

This course will introduce security incident management. As part of this course security incident monitoring and response management techniques are explored.

Course Objectives:

I. To introduce the terminology, technology and its application
II. To familiarize the concepts of Security incident and response management
III. To introduce the tools, technologies useful in Security incident and response management.

Course Outcomes: At the end of the course students will be able to

1. Identify and differentiate various types of security attacks and vulnerabilities
2. Analyze various security issues and its consequences
3. Outline the role of security analyst

SYLLABUS

UNIT - I

Managing Information Security Services: Configuring Network Devices, Identifying Unauthorized Devices, Testing the Traffic Filtering Devices, Configuring Router, Configuring Modes – Router/Global/Interface/Line/Privilege EXEC/ROM/User EXEC, Configuring a banner/Firewall/Bastion Host/VPN server etc.

UNIT - II

Troubleshooting Network Devices and Services: Introduction & Methodology of Troubleshooting of Network Communication-Connectivity-Network Devices-Network Slowdowns-Systems-Modems etc.

UNIT - III

Information Security Incident Management & Data Backup: Information Security Incident Management overview-Handling-Response, Incident Response Roles and Responsibilities, Incident Response Process etc .

Data Back introduction, Types of Data Backup and its techniques, Developing and Effective Data Backup Strategy and Plan, Security Policy for Back Procedures.

UNIT - IV

Log Correlation: Computer Security Logs, Configuring & Analyzing Windows Logs, Log Management-Functions & Challenges, Centralized Logging and Architecture, Time Synchronization---NTP/NIST etc .

Develop Knowledge Skill and competences (NOS 9005)

UNIT - V

Handling Network Security Incidents: Network Reconnaissance Incidents, Network Scanning Security Incidents, Network Attacks and Security Incidents, Detecting DOS Attack, DOS Response Strategies, Preventing/stopping a DOS Incident etc .

Handling Malicious Code Incidents: Incident Handling Preparation, Incident Prevention, Detection of Malicious Code, Containment Strategy, Evidence Gathering and Handling, Eradication and Recovery, Recommendations etc .

TEXT BOOKS:

1. Managing Information Security Risks, The Octave Approach by *Christopher Alberts, and Audrey Dorofee*
2. "Cryptography and Network Security (4th Edition) by (Author) *William Stallings*."

REFERENCES:

1. https://www.sans.org/reading-room/whitepapers/incident/security-incident-handling-small-organizations-32979

COMPUTER GRAPHICS
(Professional Elective – IV)

B. Tech: IT IV-II Semester	L	T	P	C
Course Code: A3IT27	3	1	-	3

Course Overview:
Computer Graphics I is a study of the hardware and software principles of interactive raster graphics. Topics include an introduction to the basic concepts, 2-D and 3-D modeling and transformations, viewing transformations, projections, rendering techniques, graphical software packages and graphics systems. Students will use a standard computer graphics API to reinforce concepts and study fundamental computer graphics algorithms.

Course Objectives:
I. To provide comprehensive introduction to computer graphics leading to the ability to understand contemporary terminology, progress, issues, and trends.
II. To provide thorough introduction to computer graphics techniques, focusing on 3D modelling, image synthesis, and rendering.
III. To familiarize topics cover: geometric transformations, geometric algorithms, software systems (Open GL, shaders), 3D object models (surface, volume and implicit), visible surface algorithms, image synthesis.
IV. To explain Shading and mapping, ray tracing, radiosity, global illumination, Monte Carlo path tracing, photon mapping, and anti-aliasing.
V. To explain interdisciplinary nature of computer graphics is emphasized in the wide variety of examples and applications.
VI. Aiming at conducting Tutorial, seminars and remedial classes.

Course Outcomes:
1. Students will have an appreciation of the history and evolution of computer graphics, both hardware and software. Assessed by written homework assignment.
2. Students will have an understanding of 2D graphics and algorithms including: line drawing, po lygon filling, clipping, and transformations. They will be able to implement these. Assessed by tests and programming assignments.
3. Students will understand the concepts of and techniques used in 3D computer graphics, including viewing transformations, hierarchical modeling, color, lighting and texture mapping. Students will be exposed to current computer graphics research areas. Assessed by tests, homework and programming assignments.
4. Students will be able to use a current graphics API (Open GL). Assessed by programming assignments.
5. Students will be introduced to algorithms and techniques fundamental to 3D co mputer graphics and will understand the relationship between the 2D and 3D versions of such algorithms. Students will be ab le to reason about and apply these algorithms and techniques in new situations. Assessed by tests and programming assignments.

SYLLABUS

UNIT - I
INTRODUCTION: Application areas of computer graphics, overview of graphics systems, video-display devices and raster-scan systems, random scan systems, graphics monitors, work stations and input devices, graphics standards.

UNIT - II
OUTPUT PRIMITIVES: Points and lines, line drawing algorithms, midpoint circle and ellipse algorithms. Filled area primitives - scan line polygon fill algorithm, boundary fill and flood fill algorithms.

UNIT - III

2D - GEOMETRICAL TRANSFORMS: Translation, scaling, rotation, reflection and shear transformations, matrix representations and homogeneous coordinates, composite transforms transformations between coordinate systems.

2D - VIEWING: The viewing pipeline, viewing coordinate reference frame, window to view-port coordinate transformation, viewing functions, Cohen-Sutherland and Cyrus-beck line clipping algorithms, Sutherland– Hodgeman polygon clipping algorithm.

UNIT - IV

3D - GEOMETRIC TRANSFORMATIONS: Translation, rotation, scaling, reflection and shear transformations, composite transformations.

3D - VIEWING: Viewing pipeline, viewing coordinates, view volume and general projection transforms and clipping.

3D - OBJECT REPRESENTATION: Polygon surfaces, quadric surfaces, spline representation, Hermite curve, Bezier curve and B-spline curves, Bezier and B-spline surfaces.

UNIT - V

VISIBLE SURFACE DETECTION METHODS: classifications, back face detection, depth buffer, scan line and depth sorting.

COMPUTER ANIMATION: Design of animation sequence, general computer animation functions, raster animation, computer animation languages, key frame systems, motion specifications.

TEXT BOOKS:

1. Donald Hearn, M. Pauline Baker (2011), Computer Graphics with Open GL, 3rd edition, Pearson Education, India.

REFERENCE BOOKS:

1. David F. Rogers (1998), Procedural elements for Computer Graphics, 2nd edition, Tata Mc Graw Hill, New Delhi, India.
2. Steven Harrington (1987), Computer Graphics, 2nd edition, Tata Mc Graw Hill, New Delhi, India.
3. Zhigand xiang, Roy Plastock (2000), Computer Graphics, 2nd edition, Schaum's outlines, Tata Mc Graw Hill Edition, USA.

MAP REDUCE PROGRAMMING
(Professional Elective – IV)

B. Tech: IT IV-II Semester | **L T P C**
Course Code: A3IT28 | **3 1 - 3**

SYLLABUS

UNIT I
MAP REDUCE
Developing Map Reduce Application-Phases in Map Reduce Framework-Map Reduce Input and Output Formats-Advanced Concepts-Sample Applications-Combiner-Joining datasets in Map reduce jobs-Map-side join-Reduce-Side join-Map reduce – customization

UNIT II
MAP REDUCE PROGRAM
Introduction to Writing a Map Reduce Program-The Map Reduce Flow-Examining a Sample Map Reduce Program-Basic Map Reduce API Concepts-The Driver Code-The Mapper-The Reducer-Hadoop's Streaming API-Using Eclipse for Rapid Development-Hands-on exercise-The New Map Reduce API

UNIT III
COMMON MAP REDUCE ALGORITHMS
Sorting and Searching-Indexing-Machine Learning With Mahout-Term Frequency – Inverse Document Frequency-Word Co-Occurrence-Hands-On Exercise

UNIT IV
HBASE
What is HBase?-HBase Architecture-HBase API- Managing large data sets with HBase- Using HBase in Hadoop applications- Working Hive With Hbase(Integration)- Sqoop Exports and Imports- Hands-on exercise

UNIT V
MAP REDUCE – USER INTERFACES
Payload -Mapper -Reducer -Partitioner -Reporter -OutputCollector -Job Configuration-Task Execution & Environment -Memory Management -Map Parameters -Shuffle/Reduce Parameters -Directory Structure -Task JVM Reuse -Configured Parameters -Task Logs -Distributing LibrariesJob Submission and Monitoring -Job Authorization -Job Control -Job Credentials -Job Input -InputSplit -RecordReader -Job Output -OutputCommitter -Task Side-Effect Files -RecordWriterOther Useful Features -Submitting Jobs to Queues -Counters -DistributedCache -Tool -IsolationRunner -Profiling -Debugging -JobControl -Data Compression -Skipping Bad Records

TEXT BOOKS:

1. David Loshin, "BigDataAnalytics: From Strategic Planning to Enterprise Integration with Tools, Techniques, NoSQL, and Graph",Morgan Kaufmann Publishers, 2013
2. SunilaGollapudi, "Getting Started with Greenplum for BigDataAnalytics",Packt Publishing , 2013
3. Michael Minelli, Michele Chambers, AmbigaDhiraj, Jim Stogdill, "BigDataBigAnalytics : Emerging Business Intelligence and Analytic Trends for Today's Businesses", 1st Edition,Wiley Publications,2013
4. Bill Franks, Tom Davenport, "Taming the BigData Tidal Wave: Finding Opportunities in Huge Data Streams with Advanced Analytics", 1st Edition,Wiley Publisher, 2013

SERVICE ORIENTED ARCHITECTURE
(Professional Elective – IV)
(Common to CSE & IT)

B. Tech:IT IV - II Semester | **L T P C**
Course Code: A3CS45 | **3 1 - 3**

Course Overview:
This course designed to give the student an understanding of the strengths and weaknesses of a service-based architecture, informed by an ability to implement and deploy simple web services using a suitable development platform. They will also learn to define and design applications as combinations of services, and be able to discuss the emergent properties of those compositions; and to understand the research context and potential future directions for these technologies.

Course Objectives:
I. To provide fundamental concepts of Service Oriented Architecture.
II. To inculcate knowledge about SOAP, UDDI and XML to create web services.
III. To teach Cloud Computing architecture and services with respect to SOA

Course Outcomes: At the end of this course students will be able to:
1. Apply the principles of service oriented architecture
2. Adopt the standards and technologies of modern web services implementations
3. Effectively use market-leading development tools to create and consume web services
4. Identify and select the appropriate framework components in the creation of web service solutions
5. Apply object-oriented programming principles to the creation of web service solutions
6. Analyze the requirements of a medium-difficulty programming task, and create software that meets the requirements

SYLLABUS

UNIT - I
SOA AND WEB SERVICES FUNDAMENTALS: Introducing SOA, Fundamental SOA, Common Characteristics of Contemporary SOA, Common tangible benefits of SOA, The roots of SOA, Web Services and primitive SOA, The Web Services frame work, Services, Service descriptions, Messaging.

UNIT - II
SOA AND WS--* EXTENSIONS: Web Services and Contemporary SOA (Part-I: Activity management and Composition),Message exchange patterns, Service Activity Coordination, Atomic transactions, Business Activities, Orchestration, Choreography. Web Services and Contemporary SOA (Part-II: Advanced Messaging, Metadata, and Security), Addressing, Reliable messaging, Correlation, Policies, Metadata exchange, Security, Notification and Eventing.

UNIT - III
SOA AND SERVICES ORIENTATION: Principles of Service Orientation, Service Orientation and the enterprise, Anatomy of SOA, Common Principles of Service Orientation, interrelation between Principles of Service Orientation.
SERVICE LAYERS: Service Orientation and Object Orientation, Native Web Services support for principles of Service Orientation, Service Layers, Business Service Layer, Orchestration Service Layer, Agnostics Services, and Service Layer Configuration Scenarios.

UNIT - IV
BUILDING SOA (PLANNING AND ANALYSIS): SOA Delivery Strategies, SOA delivery lifecycle phases, the top down strategy, the bottom up strategy, the agile strategy Service- Oriented Analysis (Part-I: Introduction) – Introduction to Service Oriented Analysis. Benefits of a Business Centric SOA. Deriving Business Services, Service Oriented Analysis(Part-II: Service Modeling) – Service Modeling, Service Modeling guidelines, Classifying Service model logic, Contrasting Service modelling approaches.

UNIT - V

BUILDING SOA (TECHNOLOGY AND DESIGN): Service Oriented Design (Part-I: Introduction) – Introduction to Service Oriented design, WSDL related XML Schema language basics, WSDL language basics, Service interface design tools, Service – Oriented Design (Part- II: SOA Composition Guidelines) – SOA composing steps, Considerations for choosing service layers, Considerations for positioning core SOA standards, Considerations for choosing SOA extensions. Service Oriented Design (part- III: Service Design) – Service Design Overview, Service Design guidelines Service Oriented Design (Part-IV: Business Process Design). WS-BPEL Extensions, WS Coordination overview, Service Oriented Business process Design. Fundamental WS- * extensions, SOA Platforms – SOA platform basics, SOA support in J2EE and .NET, Integration considerations.

TEXT BOOKS:

1. *Thomas Erl* (2005), Service Oriented Architecture – Concepts, Technology and Design, Pearson Education, South Asia.

REFERENCE BOOKS:

1. *Jeff Davies & others* (2008), The Definitive guide to SOA, Dreamtech, India.
2. *N. M. Josuttis* (2007), SOA in Practice, SPD, O'Reilly Media, Inc, India.
3. *Shankar. K* (2008), SOA for Enterprise Applications, Wiley India Edition, India.
4. *Eric Newcomes, Greg Lomow* (2005), Understanding SOA with Web Services, Pearson Education, India.

COGNITIVE COMPUTING
(Professional Elective – IV)

B. Tech: IT IV-II Semester | **L T P C**
Course Code: A3IT29 | **3 1 - 3**

Course Overview:
This course is an introduction to computational theories of human cognition. Drawing on formal models from classic and contemporary artificial intelligence, students will explore fundamental issues in human knowledge representation, inductive learning and reasoning. What are the forms that our knowledge of the world takes? What are the inductive principles that allow us to acquire new knowledge from the interaction of prior knowledge with observed data? What kinds of data must be available to human learners, and what kinds of innate knowledge (if any) must they have?

Course objectives:
Computational modeling is one of the central methods in brain and cognitive science research, and recent developments in computational neuroscience, artificial intelligence, machine learning, and statistics have provided a wealth of new tools for developing computational accounts of human cognition and perception. The objective of this course is to provide **advanced** students in cognitive and computer science a toolkit (concepts, mathematical techniques, computational methods) for modeling human cognition. At the end of this course, students should at least be able to identify which type of model would be best to use to fit a given experimental problem, and evaluate the quality of such models.

Course Outcomes:
Students who complete a major in Cognitive Science:

- Are eager to work across disciplinary fields creatively to address questions about the mind/brain and mental life of human beings.
- Demonstrate understanding of the methodologies, concepts and theories used by psychologists, philosophers, linguists, computer scientists and cognitive neuroscientists to address questions of mind/brain and information processing.
- Demonstrate competence in the techniques commonly used in the fields that comprise cognitive science, including: Computational tools, Statistical methods, Experimental design and Linguistic analyses.
- Are able to synthesize research findings from two or more disciplines in the cognitive sciences, formulating and evaluating questions involving the mind/brain or information processing.
- Can construct a readable, well-supported research report.

SYLLABUS

Unit 1:
Foundations of Cognitive science , Fundamentals of Cognitive Psychology , Computational models of Cognition , Philosophy of Mind,Biology of Neural & Cognitive Processes

Unit 2:
Cognition & Emotion, Perception & Experience , Attention and Perception , Human Computer Interaction & Affective Computing .

Unit 3:
Learning & Decision making, Computational Neuroscience ,Neuroimaging Methods

Unit 4:
Introduction to Paleoneuropsychology , Cognition and Culture – Anthropological Perspectives on the Human Mind

Unit 5:

Learning and Memory , Behavioural Economics

Text Books:

1. Ron Sun, ed. (2008). The Cambridge Handbook of Computational Psychology. Series: Cambridge Handbooks in Psychology. Cambridge University Press. ISBN: 9780521674102, 768 pages.
2. Jerome R. Busemeyer and Adele Diederich (2010). Cognitive Modeling. SAGE Publications, Inc. ISBN: 9780761924500, 22

OPEN ELECTIVES
OFFERED BY
MECHANICAL DEPARTMENT

OE1		OE2		OE3	
A3ME25	Fundamentals of Mechatronics	A3ME34	Fundamentals of Operation Research	A3ME46	Introduction to Material Handling
A3ME26	Basics of Thermodynamics	A3ME35	Economics for Engineers	A3ME47	Non-Conventional Energy Sources
A3ME27	Fundamentals of Engineering Materials	A3ME36	Basics of Robotics	A3ME48	Aspects of Heat & Mass Transfer

FUNDAMENTAL OF MECHATRONICS
(OPEN ELECTIVE – I)

III B. Tech. - I Semester **L T P C**
Course Code: A3ME25 **3 1 - 3**

Course Overview
Introduction to mechatronics with emphasis on analog electronics, digital electronics, sensors and transducers, actuators, and microprocessors. Lectures are intended to provide the student with foundational concepts in mechatronics and practical familiarity with common elements making up mechatronic systems. Laboratory experiments are designed to give the student hands-on experience with components and measurement equipment used in the design of mechatronic products. (3units; lecture/lab)

Course Objectives
The goals of this course are to help you:
I. Develop an understanding of the basic elements underlying mechatronic systems: analog electronics, digital electronics, sensors, actuators, microcontrollers, and embedded software.
II. Understand how to interface electromechanical systems to microcontrollers.
III. Gain hands-on experience with commonly used electronic test and measurement instrumentation.
IV. Improve written communication skills through laboratory and project reports.
V. Gain practical experience in applying knowledge gained in the course through a hands-on project.

Course Outcomes
The student who successfully completes the course will be able to:
1. Articulate what the essence of mechatronics is and provide examples of mechatronic systems.
2. Explain the concepts of input and output impedance, voltage division, and circuit loading
3. Explain the concept and characteristics of a signal source.
4. Design and analyze the performance of RC low-pass and high-pass filter circuits.
5. Explain the basic structure of a microcontroller, the nature of IO ports, and the common peripheral subsystems found in most microcontrollers.
6. Write embedded software to successfully interact with sensors, power interfaces, analog and digital IO ports, and other peripheral elements in the control of a mechatronic system.
7. Explain what analog-to-digital-conversion (A/D) is and how to implement it using a microcontroller.
8. Select and configure operational amplifier circuits to achieve desired interfacing requirements between a signal source and a downstream device such as a microcontroller or data acquisition system.
9. Explain the practical limitations of operational amplifiers and quantitatively estimate the effects of these limitations on output voltage and current of the op-amp.
10. Explain the basic operation of bipolar and MOS field-effect transistors and design with them to activate solenoids, relays, motors, etc. from signal sources.
11. Explain the input/output characteristics of digital logic devices and design a logic circuit to accomplish a given task.
12. Explain the underlying operational principles and construction of electromagnetic actuators such as DC, AC, and stepping motors.
13. Determine the torque and speed requirements for a given motion control application considering system inertia, external forces or torques, and motion profiles and select an appropriate motor.
14. Function effectively as part of a team in carrying out laboratory experiments and open-ended projects.
15. Document a laboratory experiment and open-ended projects clearly and completely in written form.

SYLLABUS

UNIT- I

Introduction to Mechatronics Introduction to Mechatronics – Conventional and Mechatronics approach in designing products - Mechatronics design process - Mechatronics in Manufacturing – Adoptive and distributed control systems – Modeling and simulation of mechatronics systems.

UNIT -II

Sensors and actuators Overview of sensors and transducers – Microsensors - Signal conditioning – Operational amplifiers – Protection – Filtering - Analog and Digital converters. Electro – pneumatics and Electro – hydraulics - Solenoids – Direct Current motors – Servomotors – Stepper motors - Micro actuators; Drives selection and application.

UNIT- III

Microprocessor based Controllers Architecture of microprocessor and microcontroller – System interfacing for a sensor, keyboard, display and motors - Application cases for temperature control, warning and process control systems.

UNIT- IV

Programmable Logic Controllers Architecture of Programmable Logic Controllers – Input/Output modules – programming methods – Timers and counters – Master control – Branching – Data handling – Analog input/output – Selection of PLC and troubleshooting.

UNIT- V

Intelligent Mechatronics and Case Studies Fuzzy logic control and Artificial Neural Networks in mechatronics – Algorithms – Computer – based instrumentation - Real-time Data Acquisition and Control – Software integration - ManMachine interface -Vision system – Mechatronics system case studies.

TEXT BOOKS

1.Bolton .W, (2008), Mechatronics, 4rd Edition, Pearson Education.
2. B.P. Singh (2002), “Advanced Microprocessor and Microcontrollers”, New Age International Publisher.

REFERENCE BOOKS

1. DevdasShetty, Richard A. Kolk (2011), “Mechatronics System Design”, PWS Publishing Company.
2. Dan Necsulescu, (2002), “Mechatronics”, 3rd Edition, Pearson Education.
3. Michael B. Histand and David G. Alciatore (2005), “Introduction to Mechatronics and Measurement systems”, McGraw-Hill.

BASICS OF THERMODYNAMICS
(OPEN ELECTIVE-I)

III B. Tech. - I Semester **L T P C**
Course Code: A3ME26 **3 1 - 3**

Course Overview

Course Overview: Thermodynamics is the field of physics that deals with the relationship between heat and work in a substance during a thermodynamic process. Specifically, thermodynamics focuses largely on how a heat transfer is related to various energy changes within a physical system undergoing a thermodynamic process. Such processes usually result in work being done by the system and are guided by the laws of thermodynamics.viz Laws of Thermodynamics: Zeroth Law of Thermodynamics-Two systems each in thermal equilibrium with a third system are in thermal equilibrium to each other. First Law of Thermodynamics - The change in the energy of a system is the amount of energy added to the system minus the energy spent doing work. Second Law of Thermodynamics - It is impossible for a process to have as its sole result the transfer of heat from a cooler body to a hotter one. Third Law of Thermodynamics - It is impossible to reduce any system to absolute zero in a finite series of operations. This means that a perfectly efficient heat engine cannot be created. Power cycles and refrigeration cycle based on thermodynamic system is studied.

Course Objectives

I. To get the basic concepts of thermodynamics, temperature measurement ,first law and also ability to determine the heat , work in various flow & non-flow processes.
II. To gain the knowledge about second law of thermodynamics and determine the change in entropy, availability in various processes.
III. To get the knowledge various phases of pure substance and calculate its properties using steam tables and to determine properties of perfect gases in various processes.
IV. To develop to learn the concepts of mixture of gases and to calculate the property values during a any process.
V. To get the knowledge about the working of different types of cycles and their performance

Course Outcomes

1. Demonstrate knowledge of energy transfer and work done and heat equation in different processes, power cycles and thermodynamic laws.
2. Demonstrate knowledge of ability to identify & apply fundamentals to solve problems like system properties, amount of work transfer and heat during various processes, steam properties at different temperatures and pressures using steam tables.
3. Demonstrate their knowledge & ability to design the thermal related components in various fields of energy transfer equipments.
4. An ability to design a system, component or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, and safety manufacturability and sustainability related thermal fields like I.C engines, different types of power plants etc.
5. The ability to use modern engineering tools, software and equipment to analyze energy transfer in required applications.
6. A knowledge of impact of engineering solutions on the society and also on contemporary issues related to different types of power cycles.
7. Recognition of the need for, and an ability to engage in self education and life-long learning.

SYLLABUS

UNIT – I

INTRODUCTION: Basic Concepts: System, Control Volume, Surrounding, Boundaries, Universe, Types of Systems, Macroscopic and Microscopic viewpoints, Concept of Continuum, Thermodynamic Equilibrium, State, Property, Process, Cycle, Reversibility, Quasi static Process, Irreversible Process, Causes of Irreversibility, Various flow and non flow processes, Energy in State and in Transition, Types-Work and Heat, Point and Path function, 0 th Law of Thermodynamics, Concept of quality of Temperature, Principles of Thermometry, Reference Points, Constant Volume gas Thermometer, Ideal Gas Scale, PMMI - Joule's Experiments, First law of Thermodynamics, Corollaries First law applied to a Process, Applied to a flow system, Steady Flow Energy Equation.

UNIT - II

LIMITATIONS OF THE FIRST LAW: Thermal Reservoir, Heat Engine, Heat pump, Parameters of performance, Second Law of Thermodynamics, Kelvin Planck and Clausius Statements and their Equivalence / Corollaries, PMM of Second kind, Carnot's principle, Carnot cycle and its specialties, Thermodynamic scale of Temperature, Clausius Inequality, Entropy, Principle of Entropy Increase, Availability and Irreversibility, Thermodynamic Potentials, Gibbs and Helmholtz Functions, Maxwell Relations, Elementary Treatment of the Third Law of Thermodynamics.

UNIT - III

PURE SUBSTANCES: Phase Transformations, T-S and h-s diagrams, P-V-T- surfaces, Triple point at critical state properties during change of phase, Dryness Fraction, Mollier charts, Various Thermodynamic processes and energy Transfer, Steam Calorimetry. PERFECT GAS LAWS: Equation of State, Specific and Universal Gas constants, Throttling and Free Expansion Processes, Deviations from perfect Gas Model, Vander Waals Equation of State.

UNIT - IV

MIXTURES OF PERFECT GASES: Mole Fraction, Mass friction, Gravimetric and volumetric Analysis, Volume fraction, Dalton's Law of partial pressure, Avogadro's Laws of additive volumes, and partial pressure, Equivalent Gas constant, Internal Energy, Enthalpy, sp. Heats and Entropy of Mixture of perfect Gases .

UNIT - V

POWER CYCLES: Otto, Diesel, Dual Combustion cycles, Description and representation on PV and T-S diagram, Thermal Efficiency, Mean Effective Pressures on Air standard basis, comparison of Cycles, Introduction to Brayton cycle and Bell Coleman cycle.

TEXT BOOKS

1. P. K. Nag (2008,Third Reprint), Engineering Thermodynamics, 4th edition, Tata McGraw-Hill, New Delhi, India.
2. Yunus Cengel, Boles (2011), Thermodynamics - An Engineering Approach, 7 th edition, Tata McGraw-Hill, New Delhi, India.

REFERENCE BOOKS

1. J. B. Jones, R. E. Dugan (2009), Engineering Thermodynamics, 1st edition, Prentice Hall of India Learning, New Delhi, India.
2. Y. V. C. Rao (2013), An introduction to Thermodynamics, 3rd Edition, Universities Press, Hyderabad, India.
3. K. Ramakrishna (2011), Engineering Thermodynamics, 2nd edition, Anuradha Publishers, India.

FUNDAMENTALS OF ENGINEERING MATERIALS
(OPEN ELECTIVE-I)

III B. Tech. - I Semester **L T P C**
Course Code: A3ME27 **3 1 - 3**

Course Overview
The aim is to introduce students the overview of the properties of materials used in engineering manufacturing process. The course covers basic concept of ferrous, non-ferrous metals and its alloys. It emphasizes on transformation of iron at various temperatures. It briefly describe the heat treatment given to iron and its alloys. It gives the general overview idea of composite materials.

Course Objectives
This course has the basic idea of the properties of steal and ferrous metals. The objectives aim to:
I. Identify the basic crystalline structure of steal.
II. Understand the concept of TTT.
III. Describe the various heat treatment methods to obtain the desired properties.
IV. Describe the composition of carbon contents in steel.
V. Analyze the different forms of iron obtained during heating of steel.
VI. Understand the properties of non-ferrous alloys.
VII. Understand requirement.

Course Outcomes
At the end of the course the students are able to:

1 This subject gives student a technical knowledge about behavior of matals.
2 Identify the crystalline structure of steel.
3 Understand the theory of time temperature and transformation.
4 Determination of different uses of heat treatment in steel.
5 Distinguish between the various forms of steel.
6 Understand the properties of non-ferrous alloys.
7 Describe the various uses of composite materials..

SYLLABUS

UNIT – I
STRUCTURE OF METALS: Crystallography, Miller's indices, Packing Efficiency, Density calculations. Grains and Grain Boundaries. Effect of grain size on the properties. Determination of grain size by different methods. Constitution of Alloys: Necessity of alloying, Types of solid solutions, Hume - Rothery rules, Intermediate alloy phases.

UNIT –II
PHASE DIAGRAMS: Construction and interpretation of phase diagrams, Phase rule. Lever rule. Binary phase Diagrams, Isomorphous, Eutectic and Eutectoid transformations with examples. **UNIT –III**
STEELS: Iron-Carbon Phase Diagram and Heat Treatment: Study of Fe-Fe3C phase diagram. Construction of TTT diagrams. Annealing, Normalizing, Hardening and Tempering of steels, Hardenability. Alloy steels.

UNIT –III
CAST IRONS: Structure and properties of White Cast iron, Malleable Cast iron, Grey cast iron. Engineering Materials-III: Non-ferrous Metals and Alloys: Structure and properties of copper and its alloys, Aluminium and its alloys, Al-Cu phase diagram, Titanium and its alloys.

UNIT – IV
CERAMICS, POLYMERS AND COMPOSITES: Crystalline ceramics, glasses, cermets: structure, properties and applications. Classification, properties and applications of composites. Classification, Properties and applications of Polymers.

TEXT BOOKS

1. Material Science and Metallurgy/ Kodgire
2. Essentials of Materials Science and engineering / Donald R.Askeland / Thomson.

REFERENCE BOOKS

1. Introduction to Physical Metallurgy / Sidney H. Avner.
2. Materials Science and engineering / William and callister.
3. Elements of Material science / V. Rahghavan

FUNDAMENTALS OF OPERATION RESEARCH
(OPEN ELECTIVE-2)

III B. Tech. - II Semester **L T P C**
Course Code: A3ME34 **3 1 - 3**

Course Overview
Operation Research facilitates the comparison of every possible alternatives (courses of action or acts) to know the potential outcomes, permits examination of the sensitivity of the solution to changes or errors in numerical values, and encourage rational decision-making based on the best available approaches or techniques.

Course Objectives
I. The objectives of the course are to enable the student; I. Explain optimum utilization of resources, effort and implement the decision effectively.
II. Understand scientific systematic approach involved and provide a good intellectual support for decision making.
III. Discuss substantial experience in taking timely management decisions and for corrective measures.
IV. Analyzing the behavior of the system for the purpose of improving its performance.
V. Demonstrate reliability of solution obtained from a model depends on the validity of the model in representing the real systems.
VI. Generate solutions for the problems, what method should be adopted so that the total cost is minimum or total profit maximum.

Course Outcomes
After completing this course the student must demonstrate the knowledge and ability to:
1. Applying a different linear programming problem technique which has a broad experience in finding the optimum profit.
2. Apply the knowledge of the course in solving real life problems.
3. Identify areas for research-oriented work based on the course content.
4. Calculate the knowledge that tries to optimize total return by maximizing the profit and minimizing the cost or loss.
5. Recognize the best (optimum) decisions relative to largest possible portion of the total organization.
6. Discuss towards the development of better working procedure and systematic approach in problem analysis, modeling and implementation of solutions at the workplace.

SYLLABUS

UNIT- I
Linear Programming - Simplex methods, primal 8 & dual problem sensitivity analysis.

UNIT- II
Transportation & Assignment problems. Dynamic Programming – Multi stage decision 8 problems & solution, Principle of optimality.

UNIT- III
Decision theory - Decision under various conditions. Game Theory - Minimum & maximum 8 strategies. Application of linear programming.

UNIT- IV
Stochastic inventory models-Single & multi period models with continuous & discrete 8 demands.

UNIT- V
Simulations -Monte Carlo simulation, generation of random numbers & simulation 8 languages. Queuing models-M.M.1 & M/M/S system cost consideration

TEXT BOOKS
1 H.A. Taha, “Operations Research ", Prentice Hall of India, 1999, Sixth Edition.
2 S.Bhaskar, “Operations Research ", Anuradha Publishers, Tamil Nadu, 1999

REFERENCE BOOKS
1. M.J. Bazara, Jarvis, H. Sherali, " Linear Programming and Network Flows ", John Wiley, 1990
2 .Philip and Ravindran, “Operational Research ", John Wiley, 1992
3 .Hillier and Lieberman, “Operations Research ", Holden Day, 1986

ECONOMICS FOR ENGINEERS
(OPEN ELECTIVE-2)

III B. Tech. - II Semester | **L T P C**
Course Code: A3ME35 | **3 1 - 3**

Course Overview
Provide a broad based introduction to economics for engineers with a micro environment in which markets operate how price determination is done under different kinds of competitions. Financial Analysis gives clear idea about concepts, conventions and accounting procedures along with introducing students to fundamentals of ratio analysis and interpretation of financial statements.

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

Course Outcomes
At the end of the course,the student will understand the market dynamics namely,demand and supply,demand forecasting,elasticity of demand and supply,pricing methods and pricing in different market structures.

SYLLABUS

UNIT-I
INTRODUCTION & DEMAND ANALYSIS: Definition, Nature and Scope of Managerial Economics. Demand Analysis: Demand Determinants, Law of Demand and its exceptions. Elasticity of Demand: Definition, Types, Measurement and Significance of Elasticity of Demand. Demand Forecasting, Factors governing demand forecasting, methods of demand forecasting.

UNIT-II
PRODUCTION & COST ANALYSIS: Production Function— lsoquants and lsocosts, MRTS, Least Cost Combination of Inputs, Cobb-Douglas Production function, Laws of Returns, Internal and External Econornie's of Scale. Cost Analysis: Cost concepts. Break-even Analysis (BEA)-Determination o7 Break-Even Point (simple problems) - Managerial Significance.

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

UNIT-IV
CAPITAL BUDGETING: Capital and its significance, Types of Capital, Estimation of Fixed and Working capital requirements. Methods and sources of raising capital - Trading Forecast, Capital Budget, Cash Budget. Capital Budgeting: features of capital budgeting proposals. Methods of Capital Budgeting: Payback Method, Accounting Rate of Return (ARR) and Net Present Value Method (Simple Problems)

UNIT-V

INTRODUCTION TO FINANCIAL ACCOUNTING & FINANCIAL ANALYSIS: Accounting concepts and Conventions - IntrodOction IFRS Double-Entry Book Keeping' Journal, Ledger, Trial Balance-Final Accounts (Trading Account, Profit ar;(Loss Account and Balance Sheet with simple adjustments). Financief Analysis: Analysis and Interpretation of Liquidity Ratios, Activity Ratios, ana Capital structure Ratios and Profitability ratios. Du Pont Chart.

TEXT BOOKS

1. Varshney 8, Maheswari: Managerial Economics, Sultan Chand, 2009
2. S.A. Siddiqui &A.8. Siddiqui, Managerial Economics and Financial Analysis, New Age international Publishers Hyderabad 2013
3. M. Kasi Reddy & Saraswathi, Managerial Economics and Financial Analysis: PHI New Delhi, 2012.

REFERENCE BOOKS

1. Ambrish Gupta, Financial Accounting for Management, Pearson Education, New Delhi.2012.
2. H. Craig Peterson & W. Cris Lewis, Managerial Economics, Pearson, 2012.
3. Lipsey & Chrystel, Economics, Oxford University Press, 2012.
4 . Domnick Salvatore: Managerial Economics in a Global Economy, Thomson, 2012, 5
5. Narayanaswamy: Financial Accounting—A Managerial Perspective, Pearson, 2012.
6. S.N.Maheswari & S./K. Maheswari„ Financial Accounting, Vikas, 2012.
7. Truet and Truet: Managerial Economics: Analysis, Problems and Cases. Wiley, 2012.
8. Dwivedi: Managerial Economics, Vikas, 2012.
9. Shailaja & Usha MEFA, University Press, 2012.
10. Aryasri: Managerial Economics and Financial Analysis, TMH, 201.2.
11. Vijay Kumar & Appa Rao, Managerial Economics & Financial AnalYs6 Cengage 2011.
12. J. V. Prabhakar Rao & F!\(Rao. Managerial Economics & Financial Analysis, Maruthi Publishers, 2011.

BASICS OF ROBOTICS
(OPEN ELECTIVE-2)

III B. Tech. - II Semester | **L T P C**
Course Code: A3ME36 | **3 1 - 3**

Course Overview

To provide a basic understanding of the wide range of activities encompassed by personnel working in standards and calibration laboratories. It covers the measurement process, types and correct use of measurement and test equipment, and measurement standards. It provides an opportunity for students to learn about measurement uncertainty and risk analysis. The course includes the procedures necessary to set up and to have knowledge on calibration. At the end of

Course objectives

I. To be familiar with the different instruments those are available for linear, angular, roundness and roughness measurements.
II. To be able to select and use the appropriate measuring instrument according to a specific requirement (in terms of accuracy, etc.)
III. It is the aim of this course to provide students with practical skills associated with each of these areas. Metrology activities include precision measurement of component features, form and geometry utilizing specialized measuring instruments and equipment.
Effectively designing product processing methods

Course Outcomes

1. Graduates will demonstrate basic knowledge in mathematics, science and engineering
2. Graduates will demonstrate an understanding of their professional and ethical responsibilities
3. Graduates will demonstrate the ability to function on engineering and science laboratory teams, as well as on multidisciplinary design teams
4. Graduates will demonstrate the ability to identify, formulate and solve mechanical engineering problems
5. Graduates will have the confidence to apply engineering solutions in global and societal contexts. Graduates should be capable of self-education and clearly understand the value of life-long learning. Graduates will have ability to communicate in written, oral and graphical forms.

SYLLABUS

UNIT-I
INTRODUCTION: Automation and Robotics. An Over view of Robotics. Classification by coordinate system and control systems. Components of the Industrial robotics: Degrees of freedomend effectors: Mechanical gripper. Magnetic. Vacuum and other types of grippers. General consideration on gripper selection and design

UNIT – II
MOTION ANALYSIS: Basic rotation matrices. Composite rotation matrices. Euler Angles. Equivalent angle and Axis. Homogeneous transformation. Problems.

UNIT - III MANIPULATOR KINEMATICS :
D-H notations. Joint coordinates and world coordinates. Forward and inverse kinematics. Problems.

UNIT-IV
ROBOT ACTUATORS AND FEED BACK COMPONENTS : Actuators: Pneumatic and Hydraulic actuators, Electric Actuators, DC servo motors, stepper motors. Feedback Components: Position Sensors, Potentiometers. Resolves and encoders

UNIT-V
ROBOT APPLICATION IN MANUFACTURING: Material handling. Assembly and Inspection.

TEXT BOOKS

1: Industrial Robotics / Groover M P/Pearson Edu.
2: Introduction to Robotic Mechanics and Control by JJ Craig, Pearson,3rd edition.

REFERENCE BOOKS

1: Robotics and Control / Mittal RK & Nagrath I J/TMH
2.Robotics/ Fung 3. Robotics Engineering/ Klaftez Richard D

INTRODUCTION TO MATERIALS HANDLING
(Open Elective – 3)

IV B. Tech. - I Semester **L T P C**
Course Code: A3ME46 **3 - - 3**

Course Overview
Course covers a systems approach to managing activities associated with traffic, transportation, inventory management, warehousing, packaging, order processing, and materials handling.This course is designed to give students a comprehensive understanding of the issues involved in the design of an industrial production system. It will cover the problems in plant location, product analysis, process design, equipment selection, materials handling, and plant layout.

Course Objectives
I. To develop competency for system visualization and design.
II. To enable student to design cylinders and pressure vessels and to use IS code.
III. To enable student select materials and to design internal engine components.
IV. To introduce student to optimum design and use optimization methods to design mechanical components.
V. To enable student to design machine tool gearbox.
VI. To enable student to design material handling systems.
VII. Ability to apply the statistical considerations in design and analyze the defects and failure modes in

Course Outcomes
1. Demonstrate ability to successfully complete Fork Lift Certification to safely and effectively operate in the manufacturing environment.
2. Demonstrate proficiency in supply chain operations, utilizing appropriate methods to plan and implement processes necessary for the purchase and conveyance of goods in a timely and cost-effective manner
3. It explains about the different types of material handling, advantages and disadvantages. It also suggests the selection procedure for the material handlinng along with its specifications.
4. Need for Material handling also explained with different techniques like Automated Material handling Design Program, Computerized material handling Planning will be dealt.
5. The Material handling are explained with models, selection procedure of material handling is depending on different function oriented systems.This also related with plant layout by which the minimization of the handling charges will come down.
6. The ergonomics related to material handling equipment about design and miscellaneous equipments.

UNIT – I
Types of intraplant transporting facility, principal groups of material handling equipments, choice of material handling equipment, hoisting equipment, screw type, hydraulic and pneumatic conveyors, general characteristics of hoisting machines, surface and overhead equipments, general characteristics of surface and overhead equipments and their applications. Introduction to control of hoisting equipments.

UNIT – II
Flexible hoisting appliances like ropes and chains, welded load chains, roller chains, selection of chains hemp rope and steel wire rope, selection of ropes, fastening of hain sand ropes , different types of load suspension appliances, fixed and movable pulleys, different types of pulley systems, multiple pulley systems . Chain and rope sheaves and sprockets.

UNIT – III

Load handling attachments, standard forged hook, hook weights, hook bearings, cross piece and casing of hook, crane grab for unit and piece loads, carrier beams and clamps, load platforms and side dump buckets, electric lifting magnets, grabbing attachments for loose materials, crane attachments for handling liquid materials.

UNIT – IV

Arresting gear, ratchet type arresting gear, roller ratchet, shoe brakes and its different types like electromagnetic, double shoe type, thruster operated, controller brakes, shoe brakes, thermal calculations of shoe brakes and life of linings, safety handles, load operated constant force and variable force brakes general theory of band brakes, its types and construction.

UNIT – V

Different drives of hosting gears like individual and common motor drive for several mechanisms, traveling gear, traveling mechanisms for moving trolleys and cranes on runway rails, mechanisms for trackless, rubber-tyred and crawler cranes motor propelled trolley hoists and trolleys, rails and traveling wheels, slewing, jib and luffing gears. Operation of hoisting gear during transient motion, selecting the motor rating and determining braking torque for hoisting mechanisms, drive efficiency calculations, selecting the motor rating and determining braking torque for traveling mechanisms, slewing mechanisms, jib and luffing mechanisms . (Elementary treatment is expected)

TEXT BOOKS

1. Materials Handling Equipment – N. Rudenko , Envee Publishers, New Delhi
2. Materials Handling Equipment – M.P. Alexandrov. Mie publications, Maskow

REFERENCE BOOKS

1. Aspects of Material handling - Arora
2. Introduction to Material Handling- Ray
3. Plant Layout and Material Handling- Chowdary RB

NON-CONVENTIONAL ENERGY SOURCES
(OPEN ELECTIVE – 3)

IV B. Tech. - I Semester | **L T P C**
Course Code: A3ME47 | **3 - - 3**

Course Overview

Non Conventional resources include solar energy, wind, falling water, the heat of the earth (geothermal), plant materials (biomass), waves, ocean currents, temperature differences in the oceans and the energy of the tides. Non Conventional energy technologies produce power, heat or mechanical energy by converting those resources either to electricity orto motive power. The policy maker concerned with development of the national grid system will focus on those resources that have established themselves commercially and are cost effective for on grid applications. Such commercial technologies include hydroelectric power, solar energy, fuels derived from biomass, wind energy and geothermal energy. Wave, ocean current, ocean thermal and other technologies that are in the research or early commercial stage, as well as non-electric Non Conventional energy technologies, such as solar water heaters and geothermal heat pumps, are also based on Non Conventional resources, but outside the scope of this Manual.

Course Objectives

I. Graduates will demonstrate the ability to use basic knowledge in mathematics, science and engineering and apply them to solve problems specific to mechanical engineering (Fundamental engineering analysis skills).
II. Graduates will demonstrate the ability to design and conduct experiments, interpret and analyze data, and report results (Information retrieval skills).
III. Graduates should be capable of self-education and clearly understand the value of life-long learning (Continuing education awareness).
IV. Graduates will develop an open mind and have an understanding of the impact of engineering on society and demonstrate awareness of contemporary issues (Socialawareness).
V. Graduate will be able to design a system to meet desired needs within environmental, economic, political, ethical health and safety, manufacturability and management knowledge and techniques to estimate time, resources to complete project (Practical engineering analysis skills).

Course Outcomes

1. Introduction to Renewable Energy Sources,Principles of Solar Radiation, Different Methods of Solar Energy Storage and its Applications,Concepts of Solar Ponds, Solar Distillation and Photo Voltaic Energy Conversion
2. Introduction to Flat Plate and Concentrating Collectors ,Classification of Concentrating Collectors
3. Introduction to Wind Energy,Horizontal and Vertical Access Wind Mills, Bio-Conversion
4. Types of Bio-Gas Digesters andUtilization for Cooking Geothermal Energy Resources
5. Types of Wells and Methods of Harnessing the Energy,Ocean Energy and Setting of OTEC Plants
6. Tidal and Wave Energy and Mini Hydel Power Plant,Need and Principles of Direct Energy Conversion
7. Concepts of Thermo-Electric Generators and MHD Generators

SYLLABUS

UNIT-I

Statistics on conventional energy sources and supply in developing countries, Definition-Concepts ofNCES, Limitations of RES, Criteria for assessing the potential ofNCES. Classification of NCES-Solar, Wind, Geothermal, Bio-mass, Ocean Energy Sources, comparison of these energy sources.

UNIT-II

Solar Energy-Energy available form Sun, Solar radiation data, Solar energy conversion into heat, Flat plate and Concentrating collectors, Mathematical analysis of Flat plate collectors and collector efficiency, Principle of Natural and Forced convection, Solar engines-Stirling, Brayton engines, Photovoltaic, p-n junction, solar cells, PV systems, Stand-alone, Grid connected solar power satellite.

UNIT-III

Wind energy conversion, General formula -Lift and Drag- Basis of wind energy conversion -Effect of density, frequency variances, angle of attack, and wind speed. Windmill rotors- Horizontal axis and vertical axis rotors. Determination of torque coefficient, Induction type generators- working principle.

UNIT-IV

Nature of Geothermal sources, Definition and classification of resources, Utilization for electric generation and direct heating, Well Head power generating units, Basic features- Atmospheric exhaust and condensing, exhaust types of conventional steam turbines.
Pyrolysis of Biomass to produce solid, liquid and gaseous fuels, Biomass gasification, Constructional details of gasifier, usage of biogas for chulhas, various types of chulhas for rural energy needs.

UNIT-V

Wave, Tidal and OTEC energy- Difference between tidal and wave power generation, Principles of tidal and wave power generation, OTEC power plants, Operational of small cycle experimental facility, Design of 5 Mw OTEC pro-commercial plant, Economics of OTEC, Environmental impacts of OTEC. Status of multiple product OTEC systems.

TEXT BOOKS

1.Ashok V Desai, *Non-Conventional Energy,* Wiley Eastern Ltd, New Delhi, 2003.
2.Mittal K M, *Non-Conventional Energy Systems,* Wheeler Publishing Co. Ltd, New Delhi, 2003.

REFERENCE BOOKS

1. Ramesh R & Kumar K U, *Renewable Energy Technologies,* Narosa Publishing House, New Delhi, 2004.
2. Wakil MM, *Power Plant Technology,* Mc Graw Hill Book Co, New Delhi, 2004.
3. Non - Conventional Energy Sources. Rai.

ASPECTS OF HEAT AND MASS TRANSFER
(OPEN ELECTIVE – 3)

IV B. Tech. - I Semester **L T P C**
Course Code : A3ME48 **3 - - 3**

Course Overview

This course will emphasize the modes of heat and mass transport in energy engineering systems. Students will know, understand, and solve heat transfer problems that involve conduction, convection, and radiation. The course will provide an integrated treatment of heat, mass and momentum transfer by convection and mass transfer by diffusion. Students will also learn and use software that will enable them to solve problems that involve exploratory, what-if, and parameter sensitivity considerations. The course will also assist students to understand the design and operation of different types of heat exchangers. This course also enables students to identify and describe the energy transformations in energy systems. The examples of the processes we would be applying energy conservation principles to include power plant, geothermal energy systems, and industrial reactors and combustors. This is an essential and required thermal science course in the BS in Mechanical engineering degree program.

Course Objectives

I. To introduce a basic study of the phenomena of heat and mass transfer.
II. To develop methodologies for solving a wide variety of practical engineering problems.
III. To provide useful information concerning the performance and design of particular systems and processes. To provide knowledge-based design problem requiring the formulations of solid conduction and fluid convection and the technique of numerical computation progressively elucidated in different chapters will be assigned and studied in detail.
IV. To gain experience in designing experiments for thermal systems, the design, fabrication, and experimentation of a thin film heat flux gage will be attempted as part of laboratory requirements

Course Outcomes

1. Students are able to model the given heat transfer problem mathematically, categorize the heat transfer problems
2. Students are able to derive the equation for temperature distribution in fins, to estimate the rate of heat transfer through conduction through slabs, cylindrical and spherical surface objects.
3. Students are capable to design the thickness of insulation based on the requirement of heat transfer
4. Students are able to estimate the rate of heat transfer heat transfer coefficients for forced and free convection Heat transfer problems
5. Students are able to perform the LMTD & NTU analysis to the heat exchanger problems, to analyze and design the boiling heat transfer problems.

SYLLABUS

UNIT-I

CONDUCTION -Basic Concepts – Mechanism of Heat Transfer – Conduction, Convection and Radiation

Fourier Law of Conduction - General Differential equation of Heat Conduction Cartesian and Cylindrical Coordinates – One Dimensional Steady State HeatConduction – Conduction through Plane Wall, Cylinders and Spherical systems Composite Systems – Conduction with Internal Heat Generation – Extended SurfacesUnsteady Heat Conduction – Lumped Analysis –UseofHeislersChart.

UNIT-II

CONVECTION -Basic Concepts –Heat Transfer Coefficients – Boundary Layer Concept – Types of Convection – Forced Convection – Dimensional Analysis – External Flow – Flow over Plates, Cylinders and Spheres – Internal Flow – Laminar and Turbulent Flow –Combined Laminar and Turbulent – Flow over Bank of tubes – Free Convection –Dimensional Analysis – Flow over Vertical Plate, Horizontal Plate, Inclined Plate, Cylinders and Spheres.

UNIT-III

HEAT EXCHANGERS-Nusselts theory of condensation-pool boiling, flow boiling, correlations in boiling and condensation. Types of Heat Exchangers – Heat Exchanger Analysis – LMTD Method and NTU - Effectiveness – Overall Heat Transfer Coefficient – Fouling Factors.

UNIT-IV

RADIATION

Basic Concepts, Laws of Radiation – Stefan Boltzman Law, Kirchoffs Law –Black Body Radiation – Grey body radiation -Shape Factor Algebra – Electrical Analogy – Radiation Shields –Introduction to Gas Radiation

UNIT- V

MASS TRANSFER

Basic Concepts – Diffusion Mass Transfer – Fick's Law of Diffusion – Steady state Molecular Diffusion – Convective Mass Transfer – Momentum, Heat and Mass Transfer Analogy – Convective Mass Transfer Correlations

TEXT BOOKS

1. Sachdeva R C, "Fundamentals of Engineering Heat and Mass Transfer" New Age International, 1995.
2. Frank P. Incropera and David P. DeWitt, "Fundamentals of Heat and Mass Transfer",John Wiley and Sons, 1998.

REFERENCE BOOKS

1. Yadav R "Heat and Mass Transfer" Central Publishing House, 1995.
2. Ozisik M.N, "Heat Transfer", McGraw-Hill Book Co., 1994.
3. Nag P.K, " Heat Transfer", Tata McGraw-Hill, New Delhi, 2002

OPEN ELECTIVES
OFFERED BY
CSE DEPARTMENT

OPEN ELECTIVES: — OE1		OE2		OE3	
A3CS54	Fundamentals of Databases	A3CS57	Elements of Cloud Computing	A3CS60	Soft Computing
A3CS55	Software Engineering Principles	A3CS58	Computer Organization and Operating Systems	A3CS61	Problem solving Techniques
A3CS56	Core Java Programming	A3CS59	Fundamentals of Artificial Intelligence	A3CS62	Discrete Structures

FUNDAMENTALS OF DATABASES
(Open Elective – I)
(Common to CSE & IT)

III B. Tech. - I Semester | **L T P C**
Course Code: A3CS54 | **3 - - 3**

COURSE OVERVIEW:
This course introduces the core principles and techniques required in the design and implementation of database systems. This introductory application-oriented course covers the relational database systems RDBMS - the predominant system for business, scientific and engineering applications at present. It includes Entity-Relational model, Normalization, Relational model, Relational algebra, and data access queries as well as an introduction to SQL. It also covers essential DBMS concepts such as: Transaction Processing, Concurrency Control and Recovery. It also provides students with theoretical knowledge and practical skills in the use of databases and database management systems in information technology applications.

COURSE OBJECTIVES:
1. Discuss the basic database concepts, applications, data models, schemas and instances.
2. Design Entity Relationship model for a database.
3. Demonstrate the use of constraints and relational algebra operations.
4. Describe the basics of SQL and construct queries using SQL.
5. Understand the importance of normalization in databases.
6. Demonstrate the basic concepts of transaction processing and concurrency control.
7. Understand the concepts of database storage structures and identify the access techniques.

COURSE OUTCOMES:
At the end of the course the students are able to:
1. Learn the basic concepts of Database Systems and Applications.
2. Master the basics of SQL and construct queries using SQL.
3. Be familiar with a commercial relational database system (Oracle, MySQL) by writing SQL using the system.
4. Be familiar with the storage and recovery techniques of database system..

SYLLABUS

UNIT - I
Introduction to DBMS: File Systems Organization - Sequential, Pointer, Indexed, Direct,- Data, Information, Database and DBMS- Purpose of Database System- File System Vs DBMS, Database applications, View of data- Data Abstraction, Instances and Schemas, Database System architecture-levels, users and DBA, Transaction Management-ACID Properties.

UNIT - II
Database Design: Introduction to Data base design, ER diagrams, Beyond ER Design, Entities, Attributes and Entity sets, Types of attributes, Relationships and Relationship sets, Additional features of ER Model, Conceptual Design with the ER Model, Case Studies on ER Model.

UNIT - III
Logical Database Design: Relational Model-Introduction to Relational Model- Codd's Rule, Integrity Constraint over Relations, Enforcing Integrity Constraints, Querying relational data, Logical database design, Introduction to Views-Destroying /altering tables and views.

UNIT - IV

Structured Query Language (SQL): SQL Standards - Data types , DDL-DML-DCL-TCL, Form of Basic SQL Query - Examples of Basic SQL Queries, Introduction to Nested Queries, Correlated Nested Queries, Set - Comparison Operators, Aggregate Operators, NULL values - Comparison using Null values – Logical connectives - AND. OR and NOT ,JOINS, Disallowing NULL values, Complex integrity Constraints in SOL Triggers and Active Databases.

UNIT - V

Schema Refinement: Introduction to Schema Refinement - Problems Caused by redundancy, Decompositions - Problem related to decomposition, Functional Dependencies - Reasoning about FDS, Normal Forms - FIRST, SECOND, THIRD Normal Forms - BCNF -Properties of Decompositions- Loss less join Decomposition, Dependency preserving Decomposition.

TEXT BOOKS:

1. Data base Management Systems, Raghu Ramakrishnan, Johannes Gehrke, TMH, 3rd Edition, 2003.
2. Data base System Concepts, A.Silberschatz, H.F. Korth, S.Sudarshan, McGraw hill, Vl edition, 2006.

REFERENCE BOOKS:

1. Database Systems, 6th edition, RamezElmasri, ShamkantB.Navathe, Pearson Education, 2013.
2. Introduction to Database Systems, C.J.Date, Pearson Education.
3. Fundamentals of Relational Database Management Systems, S.Sumathi, S.Esakkirajan, Springer.

SOFTWARE ENGINEERING PRINCIPLES
(Open Elective – I)
(Common to CSE & IT)

III B. Tech. - I Semester | **L T P C**
Course Code: A3CS55 | **3 - - 3**

Course Overview:

Software Engineering comprises the core principles consistent in software construction and maintenance: fundamental software processes and life-cycles, mathematical foundations of software engineering, requirements analysis, software engineering methodologies and standard notations, principles of software architecture and re-use, software quality frameworks and validation, software development, and maintenance environments and tools. An introduction to object-oriented software development process and design.

Course Objectives:

1. Be familiar with basic Software engineering methods and practices, and its applications.
2. Master the implementation of software engineering layered technology and Process frame work.
3. Be familiar with software measurement and software risks.
4. Be familiar with software requirements and the SRS documents.
5. Be familiar with role of project management including planning, scheduling, risk management.
6. Master the implementation of different software architectural styles.

Course Outcomes:

At the end of the course the students are able to:

1. Explain fundamental knowledge in mathematics, programming and computer systems.
2. Apply basic knowledge and understanding of the analysis, synthesis and design of complex systems.
3. Apply software engineering principles and techniques.
4. Design and evaluate large-scale software systems.
5. Apply the notations used to analyze the performance of algorithms.
6. Demonstrate ethical standards and legal responsibilities.
7. Explain to communicate and coordinate competently by listening, speaking, reading and writing.
8. Explain the principles, tools and practices of IT project management.
9. Illustrate the managing time, processes and resources effectively by prioritizing competing demands.
10. Apply the fundamental knowledge of science in emerging technologies.
11. Develop as an effective member or leader of software engineering teams.
12. Experiment different testing methods

SYLLABUS

UNIT - I

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

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

UNIT – III

System models: Context Models, Behavioral models, Data models, Object models structured methods.
Design Engineering: Design process and Design quality, Design concepts, the design model.
Creating an architectural design: Software architecture, Data design, Architectural stylesand patterns, Architectural Design.

UNIT- IV
Object-Oriented Design: Objects and object classes, An Object-Oriented design process Design evolution.
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 conventionalsoftware, Black-Box and White-Box testing, Validation testing, System testing, the art of Debugging.

UNIT-V
Risk management: Reactive vs. Proactive Risk strategies, software risks, Risk identification Risk projection, Risk refinement, RMMM, RMMM Plan.
Quality Management: Quality concepts, Software quality assurance, Software Reviews.
Formal technical reviews, Statistical Software quality Assurance, Software reliability, The ISO 9000 quality standards.

TEXT BOOKS:
1. Software Engineering a practitioner's Approach, *Roger S Pressman*, 6th edition. McGraw-Hill International Edition.
2. Software Engineering, *Ian Somerville*, 7th edition, Pearson education.

REFERENCE BOOKS:
1. Software Engineering, *A Precise Approach, Pankaj Jalote*, Wiley India, 2010.
2. Software Engineering: *A Primer, Waman S Jawadekar*, Tata McGraw-Hill, 2008
3. Fundamentals of Software Engineering, *Rajib Mall*, PHI, 2005

CORE JAVA PROGRAMMING
(Open Elective – I)

III B. Tech. - I Semester | **L T P C**
Course Code: A3CS56 | **3 - - 3**

COURSE OVERVIEW:

This course explains the fundamental ideas behind the object oriented approach to programming. Knowledge of java helps to create the latest innovations in programming. Like the successful computer languages that came before, java is the blend of the best elements of its rich heritage combined with the innovative concepts required by its unique environment. This course involves OOP concepts, java basics, inheritance, polymorphism, interfaces, inner classes, packages, Exception handling, multithreading, collection framework, files, JDBC and GUI components. This course is presented to students by power point projections, course handouts, lecture notes, course handouts, assignments, objective and subjective tests.

COURSE OBJECTIVES:

1. Learning principles of object oriented programming paradigm including abstraction, encapsulation, inheritance and polymorphism.
2. Understand fundamentals of programming such as variables, conditional and iterative execution, methods etc.
3. Understand fundamentals of object-oriented programming in Java, including defining classes, invoking methods, using class libraries, etc.
4. Learning the concept of inheritance to create new classes from existing one & Design the classes needed given a problem specification;
5. Understand the concept of packages and interfaces.
6. Learning how to detect exceptions and to handle strings &Implement the designed classes using the object oriented programming language
7. Learn how to test, verify, and debug object-oriented programs; and Learning about multithreading and multitasking.
8. Learn & demonstrate the concept of event handling, JDBC Connectivity used in GUI.
9. Create Applications using object-oriented principles with concepts of JAVA

COURSE OUTCOMES:

1. Analyze the necessity for Object Oriented Programming paradigm over structured programming and become familiar with the fundamental concepts in OOP like encapsulation, Inheritance and Polymorphism
2. Demonstrate an ability to design and develop java programs, analyze, and interpret object oriented data and report results.
3. Demonstrate an ability to design an object oriented system, AWT components and multithreaded processes as per needs and specifications..
4. Demonstrate an ability to visualize and work on laboratory and multidisciplinary tasks like console and windows applications both for stand alone and Applets programs.
5. Demonstrate skills to use latest object oriented programming language and software like java to analyze OOP problems
6. Develop confidence for self education and ability for life-long learning needed for advanced java technologies
7. Able to participate and succeed in competitive examinations like GATE, Engineering services, recruitment interviews etc.

SYLLABUS

UNIT- I

Oops concepts- Data abstraction, encapsulation, inheritance, benefits of inheritance, polymorphisms, classes and objects, Procedural and objects oriented programming paradigms.

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

UNIT- II

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

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

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

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

UNIT- III

Packages- Defining, Creation and Accessing a Packages, Understanding CLASSPATH, importing packages.

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

UNIT- IV

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

Files- streams- byte streams, character streams, text input/output, binary input/output, random access file operation, File management using file class.

UNIT- V

GUI Programming with Java- The AWT class hierarchy, Introduction to Swing, Swing vs.AWT, Hierarchy for Swing components, Containers- JFrame, JApplet, JDialog, JPanel, Overview of some swing components- JButton,JLabel, JTextField,JTextArea, simple swing applications, Layout management- Layout manager types- border, grid and flow.

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

TEXT BOOKS:

1. Java Complete Reference- *Herbert Schildt*, TMH,

REFERENCE BOOKS:

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

ELEMENTS OF CLOUD COMPUTING
(Open Elective – 2)
(Common to CSE & IT)

III B. Tech. - II Semester **L T P C**
Course Code: A3CS57 **3 - - 3**

COURSE OVERVIEW:
The course is designed to give a practical introduction to modern distributed computing. It describes in detail two methods of accessing computing resource across the internet: Cloud computing. The course will also explain the relevance of these forms of computing to business models for enterprises that require large amounts of computation but do not necessarily wish to purchase and maintain large amounts of specialist computing systems.

COURSE OBJECTIVES:
The objectives of this course are to
1. present the principles underlying the function of distributed systems and their extension to cloud computing and virtualization techniques
2. create an awareness of the fundamental technical challenges in advanced distributed systems design and implementation;
3. expose students to current technology used to build architectures to enhance distributed computing infrastructures with various computing principles and paradigms, including cloud computing;
4. enhance students' understanding of key issues related to multi-level interoperability across a distributed infrastructure and across multiple heterogeneous and distributed resources in a dynamically changing computing environment;
5. Expose students to past and current research issues in the field of distributed systems and new challenges in cloud computing.
6. Provide experience in analyzing a distributed computing model and implementing typical algorithms used in distributed systems and distributed applications in cloud infrastructure.

COURSE OUTCOMES:
Student who successfully completes this course should be able to
1. Understand the fundamental principles of distributed computing
2. Understand how the distributed computing environments known as can be built from lower level services.
3. Understand the importance of virtualization in distributed computing and how this has enabled the development of Cloud Computing
4. Understand the business models that underlie Cloud Computing.

SYLLABUS

UNIT - I
Emergence of Cloud Computing, Global Nature of Cloud, and Cloud based service offerings, Benefits of Using Cloud Model, Key Characteristics of Cloud Computing, Challenges for the Cloud, Virtualization, Server Virtualization, Types of Cloud.

UNIT - II
The Evolution from the MSP model to Cloud, Infrastructure-as-a-service, Platform-as-a-service, Software-as-a-service, Cloud Data Center, Data Center Virtualization, Cloud Service Providers.

UNIT – III
Service Oriented Architecture (SOA), SOA as a step towards Cloud Computing, Data Center-Based SOA, Role of Open source software in Data Centers.

UNIT - IV

Virtualization Practicum, Downloading SUN xVM Virtual Box, Installing SUN xVM Virtual Box, Adding Guest OS to Virtual Box, Adding a Linux-Based Guest Operating System to Virtual Box.

UNIT – V

Cloud Security Challenges, Software-as-a-Service Security, Policies, Standards, and Guidelines, Security Monitoring and Incident Response, Security Architecture Design, Vulnerability Assessment, Virtual Machine Security.Common Standards in Cloud Computing, Open Cloud Consortium, Standards for Application Developers, and Standards for Messaging.

TEXT BOOKS:

1. Cloud Computing Implementation, Management and Security, John W. Rittinghouse, James F. Ransome, CRC PRESS.

REFERENCE BOOKS:

1. Anthony T. Velte, Toby J. Velte, Robert Elsenpeter (2010), Cloud Computing, A Practical Approach, McGraw Hill Edition, New Delhi.
2. Cloud Computing Concepts, Techniques and Architecture by Thomas Erl, PRENTICE HALL

COMPUTER ORGANIZATION AND OPERATING SYSTEMS
(Open Elective – 2)
(Common to CSE&IT & ECE)

III B. Tech. - II Semester	L	T	P	C
Course Code: A3CS58	3	-	-	3

COURSE OVERVIEW:
This course introduces the principles of computer organization and the basic operating system concepts. The course emphasizes on memory technology, memory hierarchy, virtual memory management, and I/O systems. It also deals with fundamental concepts of Operating system. The main objective of this course is to examine how a computer operates at the machine level and to provide in-depth knowledge on hierarchy of memories. It provides essential knowledge that is needed from engineering professionals to measure a simple PC performance. This course is presented to students by power point projections, lecture notes, course handouts, Assignments, Objective and subjective tests.

COURSE OBJECTIVES:
1. To understand the basic structure and operation of a digital computer.
2. To discuss in detail the operation of the arithmetic unit including the algorithms & implementation of fixed-point and floating-point addition, subtraction, multiplication & division.
3. To study different ways of communicating with I/O devices and standard I/O interfaces.
4. To study hierarchical memory system including cache memories and virtual memory.
5. To demonstrate the knowledge of functions of operating system memory management scheduling, file system and interface, distributed systems, security and dead locks.
6. To implement a significant portion of an Operating System

COURSE OUTCOMES:
1. Explain different types of Addressing modes
2. Explain different synchronous and asynchronous data transfer techniques?
3. Explain different I/O data transfer techniques with performance comparison?
4. Differentiate I/O mapped I/O and memory mapped I/O?
5. Explain the communication between I/O devices and IOP and Processor?
6. Explain the Memory Hierarchy and performance and cost comparison of different types of memory?
7. Describe how the data is transferred from virtual memory to Cache memory?
8. Explain cache memory mapping techniques and compare?

SYLLABUS

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. Register Transfer Language and Micro Operations: Register Transfer Language, Register Transfer Bus and Memory Transfers, Arithmetic Micro Operations, Logic Micro Operations, Shift Micro Operations, Arithmetic Logic Shift Unit, Instruction Codes, Computer Registers Computer Instructions - Instruction Cycle.Memory - Reference Instructions, Input - Output and Interrupt, STACK Organization, Instruction Formats, Addressing Modes, Data Transfer and Manipulation, Program Control, Reduced Instruction Set Computer.

UNIT - II

Micro Programmed Control: Control Memory, Address Sequencing, Microprogram Examples, Design of Control Unit, Hard Wired Control, Microprogrammed Control.

The Memory System: Basic Concepts of Semiconductor RAM Memories, Read-Only Memories, Cache Memories Performance Considerations, Virtual Memories secondary Storage, Introduction to RAID.

UNIT - III

Input-Output Organization: Peripheral Devices, Input-Output Interface, Asynchronous Data Transfer Modes, Priority Interrupt, Direct Memory Access, Input-Output Processor (IOP), Serial Communication; Introduction to Peripheral Components, Interconnect (PCI) Bus, Introduction to Standard Serial Communication Protocols like RS232, USB, IEEE1394.

UNIT - IV

Operating Systems Overview: Overview of Computer Operating Systems Functions, Protection and Security, Distributed Systems, Special Purpose Systems, Operating Systems Structures-Operating System Services and Systems Calls, System Programs, Operating System Generation. Memory Management: Swapping, Contiguous Memory Allocation, Paging, Structure of the Page Table, Segmentation, Virtual Memory, Demand Paging, Page-Replacement Algorithms, Allocation of Frames, Thrashing Case Studies -UNIX, Linux, Windows.
Principles of Deadlock: System Model, Deadlock Characterization, Deadlock Prevention, Detection and Avoidance, Recovery from Deadlock.

UNIT - V

File System Interface: The Concept of a File, Access Methods, Directory Structure, File System Mounting, File Sharing, Protection.File System Implementation: File System Structure, File system Implementation, Directory Implementation, Allocation Methods, Free-Space Management.

TEXT BOOKS:

1. Computer Organization - *Carl Hamacher, Zvonks Vranesic, SafeaZaky*, 5th Edition, McGraw Hill.
2. Computer System Architecture - *M. moris mano*, 3rd edition, Pearson
3. Operating System Concepts - *Abreham Silberchatz, Peter B. Galvin, Greg Gagne*, 8th Edition, John Wiley.

REFERENCE BOOKS:

1. Computer Organization and Architecture - *William Stallings* 6th Edition, Pearson
2. Structured Computer Organization - *Andrew S. Tanenbaum*, 4th Edition, PHI
3. Fundamentals of Computer Organization and Design - *Sivaraama Dandamudi*, Springer Int. Edition
4. Operating Systems - Internals and Design Principles, *Stallings*, 6th Edition - 2009, Pearson Education.
5. Modern Operating Systems, *Andrew S Tanenbaum* 2nd Edition, PHI
6. Principles of Operating System, *B. L. Stuart*, Cengage Learning, India Edition

FUNDAMENTALS OF ARTIFICIAL INTELLIGENCE
(Open Elective – 2)

	L	T	P	C
III B. Tech. - II Semester				
Course Code: A3CS59	**3**	**-**	**-**	**3**

COURSE OVERVIEW:

Artificial Intelligence (AI) technology is increasingly prevalent in our everyday lives. It has uses in a variety of industries from gaming, journalism/media, to finance, as well as in the state-of-the-art research fields from robotics, medical diagnosis, and quantum science. In this course you'll learn the basics and applications of AI, including: machine learning, probabilistic reasoning, robotics, computer vision, and natural language processing.

COURSE OBJECTIVES:

1. Show knowledge of facts and concepts
2. Summarize the semester's learning
3. Carry out documented research on AI
4. Participate in class activities throughout the semester
5. Solve problems as part of a team 0f Present

COURSE OUTCOMES:

1. Able to describe the design of a compiler and the phases of program translation from source code to executable code and the files produced by these phases.
2. Able to explain lexical analysis phase and its underlying formal models such as finite state automata, push-down automata and their connection to language definition through regular expressions and grammars.
3. Able to explain the syntax analysis phase and identify the similarities and differences among various parsing techniques and grammar transformation techniques.
4. Able to use formal attributed grammars for specifying the syntax and semantics of programming languages.
5. Able to identify the effectiveness of optimization and explain the differences between machine dependent and machine -independent translation.
6. Able to use the powerful compiler generation tools such as Lex and YACC.

SYLLABUS

UNIT - I

INTRODUCTION TO ARTIFICIAL INTELLIGENCE: Problem and search- what is AI technique, criteria for success, Problem space and search - defining the problem as a state space search, production systems problem characteristics, production system characteristics.

PROBLEM SPACE AND SEARCH: Defining the problem as a state space search, production systems problem characteristics, production system characteristics.

HEURISTIC SEARCH TECHNIQUES: Generate test, Hill Climbing, BFS, Problem Reduction Constraint Satisfaction.

UNIT - II

KNOWLEDGE REPRESENTATION ISSUE: Representation and mapping, Issues in knowledge Representation.

USING PREDICATE LOGIC: Representation simple facts in logic, Representation Instance, Computable Function and Predicates, Resolution, conversion to clause form, the unification Algorithm.

REPRESENTING KNOWLEDGE USING RULES: Procedural verses Declarative knowledge, logic programming. Forward and backward, Matching, Control Knowledge.

SYMBOLIC REASONING UNDER UNCERTAINTY: Introduction to non-monotonic reasoning, Logic for non-monotonic Reasoning. Implementation Issue, Augmenting a problem solver, Implementation of DFS, Implementation of BFS.

UNIT - III

WEAK SLOT AND FILTER STRUCTURE: Semantic nets-Intersection search, representing non binary predicates, partitioned semantic nets, Frame-Frames as sets and instances, slots.

STRONG SLOT AND FILTER STRUCTURE: conceptual dependency-the dependencies of conceptual dependency, Scripts

GAME PLAYING: Overview, The minimax search Procedure, Adding alpha-beta Cutoffs.

UNIT - IV

UNDERSTANDING: what is understanding-the conceptual dependency of a paragraph, what makes understanding, Understanding as constraint Satisfaction-applying constraints in analysis problems, Algorithm: waltz.

NATURAL LANGUAGE PROCESSING: Introduction, Syntactic processing-grammars and parsers, top down vs. bottom up, finding one interpretation or many, ATN, Semantic Analysis-lexical processing, sentence level processing, semantic grammars, case grammars.

LEARNING: What is learning, Rote learning, Learning by taking Advice, Learning in problem solving, learning from examples.

UNIT - V

EXPERT SYSTEMS: Representing and using domain Knowledge, expert system skills, Explanation, knowledge Acquisition.

PERCEPTION AND ACTION: Real -Time search, Perception-vision, speech recognition, Action.

TEXT BOOKS:

1. Rich knight (2002), Artificial Intelligence, 2nd edition, Tata McGraw-Hill, New Delhi.
2. Simon Haykin (1999), Neural Networks: a comprehensive Foundation, 2nd edition, Pearson Education, India.

REFERANCE BOOKS:

1. Patrick Henry Winston (2001), Artificial Intelligence, 3rd edition, Pearson Education Private Limited, India.
2. B. Yegnanarayana (2001), Artificial Neural Networks, Prentice Hall of India, New Delhi.

SOFT COMPUTING
(Open Elective – III)

IV B. Tech. - I Semester	L	T	P	C
Course Code: A3CS60	3	-	-	3

COURSE OVERVIEW:
This course is designed to give students knowledge of soft computing theories fundamentals, i.e. of fundamentals of non-traditional technologies and approaches to solving hard real-world problems, namely of fundamentals of artificial neural networks, fuzzy sets and fuzzy logic and genetic algorithms.

COURSE OBJECTIVES:
The objective of this course is
1. To teach basic neural networks, fuzzy systems, and optimization algorithms concepts and their relations
2. To provide knowledge of Neuron model, and Applications of NN to discuss their work.
3. To provide the graduate the better understanding of Fuzzy Logic and Evolutionary Computations.

COURSE OUTCOMES:
On completion of this Subject/Course the student shall be able to
1. To understand neural network (NN) paradigms
2. To learn fuzzy logic To have a knowledge of evolutionary computations, genetic algorithm(GA), evolutionary programming, classifier systems, genetic programming parse trees, mathematical foundation of GA variants of GA.

SYLLABUS

UNIT - I
BASICS OF ARTIFICIAL NEURAL NETWORK: Characteristics of Neural Networks, Structure and working of a biological neural network, Artificial neural network: terminology, models of neurons: McCulloch Pitts model, Perceptron model, Adaline model, topology, Basic learning laws.
FUNCTIONAL UNITS FOR ANN FOR PATTERN RECOGNITION TASK: Pattern recognition problem, Basic functional units, PR by functional units.

UNIT - II
FEEDFORWARD NEURAL NETWORKS:
SUPERVISED LEARNING - I: Perceptrons - Learning and memory, Learning algorithms, Error correction and gradient decent rules, Perceptron learning algorithms.
SUPERVISED LEARNING-II: Back propagation, Multilayered network architectures, Back propagation learning algorithm, Example applications of feed forward neural networks.

UNIT - III
FEEDBACK NEURAL NETWORKS & SELF ORGANIZING FEATURE MAP: Introduction, Associative learning, Hopfield network, Error performance in Hopfield networks, simulated annealing, Boltzmann machine and Boltzmann learning, state transition diagram and false minima problem, stochastic update, simulated annealing, Boltzmann machine, bidirectional associative memory, bam stability analysis. Self organization, generalized learning laws, competitive learning, vector quantization, self organizing feature map, applications of self organizing feature map.

UNIT - IV

FUZZY LOGIC: Fuzzy set theory, crisp sets, operations on crisp set, fuzzy sets, fuzzy versus crisp, operations, fuzzy relations, crisp relations, properties. Fuzzy logic Application: Fuzzy Control of Blood Pressure.

UNIT - V

FUZZY LOGIC IN DATABASE AND INFORMATION SYSTEMS: Fuzzy Information, Fuzzy Logic in database Systems, Fuzzy Relational data Models, operations in Fuzzy Relational data Models, Design theory for Fuzzy Relational databases, Fuzzy information Retrieval and Web search, Fuzzy Object Oriented databases.

GENETIC ALGORITHMS: Introduction to Genetic Algorithms, Evolutionary Algorithms.

TEXT BOOKS:

1. *Satish Kumar* (2004), *Neural Networks A classroom Approach*, Tata McGraw Hill Publication, New Delhi.
2. *Lotfi A. Zadeh* (1997), *Soft computing and Fuzzy Logic*, World Scientific Publishing Co., Inc. River Edge, NJ, USA.

REFERENCE BOOKS:

1. *B. Yegnanarayana* (2006), *Artificial Neural Networks*, Prentice Hall of India, New Delhi, India.
2. *John Yen, Reza Langari* (2006), *Fuzzy Logic*, Pearson Education, New Delhi, India.

PROBLEM SOLVING TECHNIQUES
(Open Elective – III)

IV B. Tech. - I Semester	L	T	P	C
Course Code: A3CS61	3	-	-	3

COURSE OVERVIEW:

Most people, once they leave the formal education system, do not focus on any further learning or on continuing to develop their thinking skills. As their careers progress, they become more expert in a few things, but less capable in dealing with or understanding things outside their domain of expertise. Research shows that most people only use a fraction of their cognitive abilities yet the ongoing exercise of the brain function can reduce mental debilitation throughout life. This challenging, but entertaining, course revisits many of the thinking skills that lie dormant in the average person. The course explores various kinds of individual and group problem solving approaches and various thinking styles. Delegates will go away with a fresh outlook on organisational problem solving, and be motivated to expand their cognitive horizons.

COURSE OBJECTIVES:

1. To develop problem solving abilities using mathematical theories;
2. To apply algorithmic strategies while solving problems;
3. To develop time and space efficient algorithms;
4. To study algorithmic examples in distributed concurrent and parallel environments.

COURSE OUTCOMES:

1. To solve problem in the UG projects;
2. To develop SRS in the UG projects;
3. To solve problems for multi-core or distributed or concurrent/Parallel/Embedded environments;

SYLLABUS

UNIT - I

Problem solving and Algorithmic Analysis Problem solving principles: Classification of problem, problem solving strategies, classification of time complexities (linear, logarithmic etc.) problem subdivision – Divide and Conquer strategy. Asymptotic notations, lower bound and upper bound: Best case, worst case, average case analysis, amortized analysis. Performance analysis of basic programming constructs. Recurrences: Formulation and solving recurrence equations using Master Theorem.

UNIT - II

Greedy Method Principle, control abstraction, time analysis of control abstraction, knapsack problem, scheduling algorithms-Job scheduling and activity selection problem.

UNIT - III

Dynamic Programming Principle, control abstraction, time analysis of control abstraction, binomial coefficients, OBST, 0/1 knapsack, Chain Matrix multiplication.

UNIT - IV

Backtracking Control abstraction, time analysis of control abstraction, 8-queen problem, graph coloring problem, sum of subsets problem.

UNIT - V

Branch-n-Bound and Complexity theory

Branch-n-Bound: Principle, control abstraction, time analysis of control abstraction, strategies – FIFO, LIFO and LC approaches, TSP, knapsack problem, P class, NP class & NP complete problems-vertex cover and 3-SAT and NP–hard problem – Hamiltonian cycle

TEXT BOOKS:

1. Horowitz and Sahani," Fundamentals of Computer Algorithms", 2ND Edition. University Press, ISBN: 978 81 7371 6126, 81 7371 61262.
2. Gilles Brassard and Paul Bartley, "Fundamental of Algorithms", PHI, New Delhi.
3. Algorithms, Kenneth Berman and Jerome Paul, Cenage Learning, ISBN-13 978-81-315-0521-2 Reference Books: Sl.

REFERENCE BOOKS:

1. Algorithms and Parallel Computing, Fayez Gebali, Willy, ISBN 978-0-470-90210-3 (Indian Paperback Edition)
2. Anany Levitin,"Introduction to the Design and Analysis of Algorithms" Pearson Education
3. Thomas H Cormen and Charles E.L Leiserson,"Introduction to Algorithm" PHI
4. BoS Content Development: Prof. Sarang Joshi, Dr. ParikshitMahalle,"Design and Analysis of Algorithms: A Problem Solving Approach", Cambridge University Press, 2015

DISCRETE STRUCTURES
(Open Elective – III)
(Common to CSE & IT)

IV B. Tech. - I Semester | **L T P C**
Course Code: A3CS62 | **3 - - 3**

COURSE OVERVIEW:

On completion of the course, students will be able to explain and apply the basic methods of discrete (noncontiguous) mathematics in Computer Science. They will be able to use these methods in subsequent courses in the design and analysis of algorithms, computability theory, software engineering, and computer systems.

COURSE OBJECTIVES:

In particular, students will be able to

1. **Reason mathematically about basic data types and structures** (such as numbers, sets, graphs, and trees) used in computer algorithms and systems; distinguish rigorous definitions and conclusions from merely plausible ones; synthesize elementary proofs, especially proofs by induction.
2. **Model and analyze computational processes** using analytic and combinatorial methods.
3. **Apply principles of discrete probability** to calculate probabilities and expectations of simple random processes.
4. **Work in small teams** to accomplish all the objectives above.

COURSE OUTCOMES:

Students will be able to:

1. Use **logical notation** to define and reason about **fundamental mathematical concepts** such as sets, relations, functions, and integers.
2. **Evaluate elementary mathematical arguments** and identify fallacious *reasoning* (not just fallacious conclusions).
3. **Synthesize induction hypotheses and simple induction proofs**.
4. Prove **elementary properties of modular arithmetic** and explain their applications in Computer Science, for example, in cryptography and hashing algorithms.
5. **Apply graph theory models** of data structures and state machines to solve problems of connectivity and constraint satisfaction, for example, scheduling.
6. Apply the method of invariants and well-founded ordering to **prove correctness and termination of processes** and state machines.
7. **Derive closed-form and asymptotic expressions** from series and recurrences for growth rates of processes.
8. **Calculate numbers of possible outcomes** of elementary combinatorial processes such as permutations and combinations.
9. **Calculate probabilities** and discrete distributions for simple combinatorial processes; calculate expectations.
10. Problem solves and **study in a small team** with fellow students.

SYLLABUS

UNIT – I

MATHEMATICAL LOGIC: Statements and Notations, Connectives, Statement Formulas and Truth Tables, Well formed formulas, Tautologies, Equivalence of Formulas, Normal Forms: Disjunctive Normal Forms (DNF), Conjunctive Normal Forms (CNF), Principle Disjunctive Normal Forms (PDNF), Principle Conjunctive Normal Forms (PCNF) .

UNIT – II

PREDICATES: The Predicate calculus, Free and Bound Variables, Rules of Inference, Consistency of Premises and Indirect Method of Proof, Automatic Theorem Proving.

UNIT – III

RELATIONS AND ORDERING: Relations, Properties of Binary Relations in a Set, Equivalence Relations, Compatibility Relations, Partial Ordering, Partial Ordered Set – Representation and Associated Terminology.

FUNCTIONS: Definition and Introduction, Composition of Functions, Inverse Functions, Recursive Functions.

UNIT - IV

Trees, Properties of trees, Representation of trees, Binary tress, Tree traversals, Spanning trees, DFS, BFS, Minimal spanning trees, Prim's algorithm and Kruskal's algorithm.

UNIT - V

Representation of Graphs, Planar Graphs, Graph theory and applications. Basic concepts of Isomorphism and sub graphs, Multi graph and Euler circuits, Hamiltonian Graphs, chromatic number.

TEXT BOOKS:

1. *J. P. Trembly, R. Manohar* (1997), Discrete Mathematical Structures with Applications to Computer Science, Tata McGraw Hill, India.
2. *Joe L. Mott, Abraham Kandel, Theodore P. Baker* (2011), Discrete Mathematics for Computer Scientists andMathematicians, 2ndedition, Prentice Hall of India Learning Private Limited, New Delhi, India.

REFERENCE BOOKS:

1. *Kenneth H. Rosen* (2007), Discrete Mathematics and its Applications, 6th edition, Tata McGraw Hill, India.
2. *C.L. Liu, D.P. Mohapatra* (2008), Elements of Discrete Mathematics, 3rdedition, McGraw Hill, India.
3. *Ralph P. Grimaldi, B.V.Ramana* (2006), Discrete and Combinatorial Mathematics - An Applied Introduction, 5th Edition, Pearson Education, India.

OPEN ELECTIVES
OFFERED BY
IT DEPARTMENT

OPEN ELECTIVES: — OE1		OE2		OE3	
A3IT06	Fundamentals of Information Technology	A3IT12	Principles of Programming Languages	A3IT21	Software Testing Fundamentals
A3IT07	Basics of Mobile Application Development	A3IT13	Human Computer Interface Design Basics	A3IT22	Basics of Multimedia Systems
A3IT08	Fundamentals of E-Commerce	A3IT14	Computer and Network Security Fundamentals	A3IT23	Introduction to Game Development

FUNDAMENTALS OF INFORMATION TECHNOLOGY
(Open Elective -1)

B. Tech IT III-I Semester **L T P C**
Course Code: A3IT06 **3 - - 3**

Course Overview
This course is designed to provide the students with a working knowledge of the terminology, processes, and components associated with information technology. Students will receive experience with the Internet, World Wide Web, current versions of hardware and software, networking, security, maintenance, information systems, and the application development process.

Course Objective
The objective of the course is to:

I. Obtain understanding of the concepts of Information Technology and its applications.
II. Become familiar with the use of Information Technology tools.

Course Outcomes
Upon Successful completion of this course, the student should be able to:

- Define information technology and information systems
- Describe the role of information technology and information systems within organizations
- Describe job opportunities and career paths
- Identify popular classes of organizational information technology systems and discuss the role of each: networks, client-server, enterprise, web-based
- Identify basic approaches to developing application software
- Describe computer programming and its role in the software world
- Describe data organization, databases, and their role in computer applications
- Explain network topologies and how the Internet works
- Describe website construction
- Identify and briefly describe components and applications associated with Website development. Explain requirements analysis, system development, and project management

SYLLABUS

Unit I
Introduction to System Hardware Logical organization of Computer - primary Memory - Organization, addressing Data representation - Integer, floating point, character. Central processing Unit - Arithmetic and Logical Unit, Registers, Control unit. Data and control paths between memory and CPU, Instruction set, Instruction format. Instruction Execution, RISC vs. CISC. Memory technologies, memory access time. Cache Memory Input Output devices. Secondary storage media and devices. Communication Ports. Types of computers - PCs, Main Frames, Parallel. Hardware Standards, Standard Busses, their bandwidths and comparison.

Unit II
Software Concepts Programming Languages - evolution, features and applications. Language processors. Operating Systems - User's view - evolution, services, operating systems interfaces. Command Line, GUI, Windowing. OS as Resource Manager - Process or Task, File management. Security and Protection. OS Utilities - Features of Popular OS such as Windows, UNIX, OS/2. General Software features and trends - GUI, Object Linking and Embedding, Portability. Network Capabilities. Compatibility with other software, compatibility with peripherals, Wizard and Agents, Hardware requirements. Application Program Libraries.

Unit III
Communication and Network Technologies Communications- Data Communications - Methods of Data Communications - Digital vs. Analog, Synchronous vs. Asynchronous, Simplex, Half-duplex, full-duplex, circuit switching, packet switching. Communication media - speed and capacity, twisted pair, coaxial, fiber optics, wireless. Common Network Components. Hosts and Servers, Work Stations,

Protocol Converters, Modems, Terminal Controllers, Routers. Network Typologies - LAN, WAN, Enterprise. Communication Standards. Distributed Systems, Processing, Databases, Client-Server, EDI.

Unit IV

Database Management File Concepts - Structures - Sequential, Indexed Sequential, Direct Processing,- Batch, On-line and Real Time. Database Concepts DBMS - Features, Architecture, Views, DDL,DML Functions of DBA, Modles, Query Languages, Advantages and Disadvantages of DBMS, Problems in DBMS. Database Design - Entity Relationship models. Primary key. Coding, Normalization (upto 3 rd NF), Integrity constraints. Table Design Form Design Report Design, Query Languages, Sorting and Filtering.

Unit V

IT Applications IT Applications - Business and Industry, Home, Education and Training, Entertainment, Science and Engineering, Medicine. Multimedia - Introduction, Applications, Tools, Data Presentation, Virtual Reality : Introduction and Applications Internet: World Wide Web, addressing Domain Names, Services, W3C. Intranet: Office Communications. Electronic Mail, Tele conferencing. Group Ware, Work flow.

Text Books:

1. Information Technology, The breading wave: Dennis P. Curtin, Kim Folley etal, McGraw Hill, 1998.
2. Fundamentals of Information Technology - Jaiswal S, Galgotia Publications, New Delhi.

BASICS OF MOBILE APPLICATION DEVELOPMENT
(Open Elective -1)

B. Tech IT III-I Semester | **L T P C**
Course Code: A3IT07 | **3 - - 3**

Course Overview

This course is concerned with the development of applications on mobile and wireless computing platforms. Android will be used as a basis for teaching programming techniques and design patterns related to the development of standalone applications and mobile portals to enterprise and m-commerce systems.Emphasis is placed on the processes, tools and frameworks required to develop applications for current and emerging mobile computing devices. Students will work at all stages of the software development life-cycle from inception through to implementation and testing. In doing so, students will be required to consider the impact of user characteristics, device capabilities, networking infrastructure and deployment environment, in order to develop software capable of meeting the requirements of stakeholders.

Course Objective

I. Produce apps for iOS platform devices (iPhone/iPad/iPod Touch)
II. Gain a basic understanding of computer architecture and object-oriented programming
III. Develop a working knowledge of Apple's Xcode app development tool
IV. Understand mobile design principles
V. Identify need and opportunity in app markets

Course Outcomes

By the conclusion of this course, students will be able to:

- Describe those aspects of mobile programming that make it unique from programming for other platforms,
- Critique mobile applications on their design pros and cons,
- Utilize rapid prototyping techniques to design and develop sophisticated mobile interfaces,
- Program mobile applications for the Android operating system that use basic and advanced phone features, and
- Deploy applications to the Android marketplace for distribution.

SYLLABUS

UNIT I
Introduction to Android: The Android Platform, Android SDK, Eclipse Installation, Android Installation, Building you First Android application, Understanding Anatomy of Android Application, Android Manifest file.

UNIT II
Android Application Design Essentials: Anatomy of an Android applications, Android terminologies, Application Context, Activities

UNIT III
Android User Interface Design Essentials: User Interface Screen elements, Designing User Interfaces with Layouts,

UNIT IV
Testing Android applications, Publishing Android application, Using Android preferences, Managing Application resources in a hierarchy, working with different types of resources.

UNIT V
Using Common Android APIs: Using Android Data and Storage APIs, Managing data using SQLite, Sharing Data between Applications with Content Providers

TEXT BOOKS:

1. Lauren Darcey and Shane Conder, “Android Wireless ApplicationDevelopment”, Pearson Education, 2nd ed. (2011)

REFERENCE BOOKS:

1. R1. Reto Meier, “Professional Android 2 Application Development”, Wiley India Pvt Ltd
2. R2. Mark L Murphy, “Beginning Android”, Wiley India Pvt Ltd
3. R3. Android Application Development All in one for Dummies by Barry Burd, Edition:

FUNDAMENTALS OF E-COMMERCE
(Open Elective -1)

B. Tech IT III-I Semester | **L T P C**
Course Code: A3IT08 | **3 - - 3**

Course Overview
This course is designed to understand issues that companies need to address when moving from being offline to online and learn how companies can craft business models where IT is embedded as an integral part of products, processes and customer interactions. Student would get to appreciate how IT is changing the way companies create value through networks and coopetition.

Course Objective
The objectives of the course are to introduce the concept of electronic commerce, and to understand how electronic commerce is affecting business enterprises, governments, consumers and people in general. In addition, we will study the development of websites using relevant software tools.

I. Acquaint students with a fundamental understanding of the environment and strategies in the New Economy.
II. Provide analytical tools to understand opportunities in unserved or underserved New Economy markets.
III. Provide a fundamental understanding of the different types and key components on business models in the New Economy.
IV. Provide guiding principles behind the design and strategy of the customer web interface.
V. Understand the traditional and new communication/marketing approaches that create competitive advantage in the New Economy.
VI. Provide insights on how to implement strategy in the New Economy.
VII. Understand the metrics that New Economy firms to use to measure progress, customer satisfaction, and financial performance.
VIII. Understand the fundamentals of financially valuing New Economy companies.
IX. Provide an overview of the hardware, software, servers, and the parts that make up the enabling “railroad” for the New Economy.

Course Outcomes:
After completion of this course, the students would be able to

1. Defining and analyzing the principles of E-commerce and basics of World Wide Web.
2. Defining and analyzing the concept of electronic data interchange and its legal, social and technical aspects.
3. Defining and analyzing the security issues over the web, the available solutions and future aspects of e-commerce security.
4. Defining and analyzing the concept of E-banking, electronic payment system

SYLLABUS

Unit I
Introduction Overview of Electronic Commerce - Definition of Electronic Commerce - E Business - Potential Benefits of E Commerce - The Internet as enablcrs of E Commerce - Impact of E Commerce on Business Models - E Commerce Applications - Market Forces influencing highway - The global information distribution networks - The regulatory environment for E Commerce.

Unit II
Electronic Data Interchange (EDI), Electronic Commerce and the Internet Introduction - traditional EDI systems - Benefits - Data Transfer and Standards - Financial EDI – EDI Systems and the Internet - Legal, Security and Private Concerns - Authentication - Internet Trading Relationships Consumer to Business (B2C) Business to Business (B2C), Consumer to Consumer (C2C) Government to Citizen -

Features and Benefits - Portal Vs. Websiie. Impact. - Intra Organizational E Commerce - Supply Chain Management.

Unit III

Cryptography and Authentication Introduction - Messaging Security Issues - Confidentiality - Integrity - Authentication. Encryption Techniques - Integrity Check Values and Digital Signatures - Good Encryption Practices – Key Management - key management tasks - Additional Authentication Methods. Firewalls -Definition - component - Functionality - securing the firewall - factors considered in securing the firewall - Limitations.

Unit IV

Electronic Payment Mechanisms Introduction r- The SET protocol - SET vs. SSL - Payment Gateway - Certificate Issuance – Certificate Trust Chain - Cryptography Methods - Dual Signatures - SET Logo - Compliance Testing - Status of Software - Magnetic Strip Cards - Smart Cards - Electronic Cheques - Electronic Cash - Third party Processors and Credit Cards - Risk and electronic payment system - Designing Electronic payment systems.

Unit V

E-Commerce Strategy and Implementation Strategic Planning for E-Commerce, Strategy in Action, Competitive Intelligence on the Internet, Implementation; Plans and Execution, Project and Strategy assessment - Managerial Issues – Global Electronic Commerce - Future of Electronic Commerce.

Text Books:

1. Electronic Commerce - Security, Risk Management and Control, Greenstein and Feinman, Irwin Mc.Gra-Hill, 2000.

PRINCIPLES OF PROGRAMMING LANGUAGES
(Open Elective – 2)

B. Tech IT III-II Semester	L	T	P	C
Course Code: A3IT12	3	-	-	3

Course Overview:

This course is designed about principles, concepts, and ideas that underly programming languages. The course covers many aspects of using, understanding, and reasoning about programming languages (e.g., syntax, scoping, induction, data types, and typing). We will build up a set of mathematical tools for careful discourse. A significant part is devoted to abstraction, that is, how languages help programming in the large (e.g., sub typing polymorphism, parametric polymorphism, modules, and objects).

Course Objectives:

The course objective is to

I. Improve the background for choosing appropriate programming languages for certain classes of programming problems
II. Be able in principle to program in an imperative (or procedural), an object-oriented, a functional, and a logical programming language
III. Understand the significance of an implementation of a programming language in a compiler or interpreter
IV. Increase the ability to learn new programming languages
V. Increase the capacity to express programming concepts and choose among alternative ways to express things
VI. Simulate useful features in languages that lack them
VII. Be able in principle to design a new programming language Make good use of debuggers and related tools

Course Outcomes:

After completing this course students will be able to:

1. Analyze fundamental concepts of most programming languages & the tradeoffs Programming Languages between language design and implementation.
2. Compare programming languages, assess programming languages critically and scientifically.
3. Use formal description for a programming language and the essence of program execution by evaluators: interpreter, compiler.
4. Apply different programming paradigms: analyze the principles of imperative, object-oriented, functional and logic programming.
5. Design a new programming language in principle.

SYLLABUS

UNIT I

Preliminary Concepts: Reasons for studying concepts of programming languages, programming domains, Language evaluation criteria, influences on language design, Language categories, Programming paradigms, Programming language implementation, programming environments, Syntax and Semantics.

UNIT II

Data Types : Introduction, primitive, character , user defined, array, associative, record, union, pointer and reference types, design and implementation uses related to these types, Names, variable, concept of binding, type checking, strong typing, type compatibility, named constants, variable initialization. Expressions and Statements : Arithmetic, relational and Boolean expressions, short-circuit evaluation, mixed mode assignment, Assignment statements, control structures- statement level, compound statements, selection, iteration, unconditional statements, guarded commands.

UNIT III

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

UNIT IV

Abstract Data Types : Abstractions and encapsulation, introduction to data abstraction, design issues, language examples, C++ parameterized ADT, object oriented programming in small talk, C++, Java.

Concurrency : Subprogram level concurrency, semaphores, monitors, message passing, java threads

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

UNIT V

Functional Programming Languages: Introduction, fundamentals of FPL, LISP, ML, Haskell, applications of functional programming languages and comparison of functional and imperative languages. Scripting Language: Pragmatics, key concepts, Case study: Python

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 Hom Pearson Education.
4. Programming in PROLOG – W.F. Clocksin and C.S.Mellish, Fifth Edition, Springer.
5. Programming Python, M.Lutz, Third Edition, O'reilly, SPD, rp-2007.
6. Core Python Programming, Chun, Second Edition, Pearson Education, 2007.
7. Guide to Programming with Python, Michael Dawson, Thomson, 2008.

HUMAN COMPUTER INTERFACE DESIGN BASICS
(Open Elective – 2)

B. Tech IT III-II Semester | **L T P C**
Course Code: A3IT13 | **3 - - 3**

Course Overview:

This course is designed to perform analysis, establish requirements, design and evaluate interactive computer-based systems and products. The purpose of this course is to give the student basic knowledge about human-computer interaction. It will discuss how to understand human cognition and human perspective by working with computers. Designing interactive computer systems to be efficient, easy, and enjoyable to use is important. The course will cover a broad knowledge regarding the human-friendly interface design.

Course Objective

The objective of the course is to

I. Demonstrate an understanding of guidelines, principles, and theories influencing human computer interaction.
II. Recognize how a computer system may be modified to include human diversity.
III. Select an effective style for a specific application.
IV. Design mock ups and carry out user and expert evaluation of interfaces.
V. Carry out the steps of experimental design, usability and experimental testing, and evaluation of human computer interaction systems.
VI. Use the information sources available, and be aware of the methodologies and technologies supporting advances in HCI.

Course Outcomes:

After completing this course students must be able to demonstrate the knowledge and ability to:

• Explain the human components functions regarding interaction with computer
• Explain Computer components functions regarding interaction with human
• Demonstrate Understanding of Interaction between the human and computer components.
• Use Paradigms
• Implement Interaction design basics
• Use HCI in the software process
• Apply Design rules
• Produce Implementation supports
• Use Evaluation techniques

SYLLABUS

UNIT 1:

Introduction- Importance of user Interface definition, importance of good design. Benefits of good design. A brief history of Screen design, The graphical user interface popularity of graphics, the concept of direct manipulation, graphical system, Characteristics, Web user ñ Interface popularity, characteristics- Principles of user interface.

UNIT 2:

Design process - Human interaction with computers, importance of human characteristics human consideration, Human interaction speeds, and understanding business junctions.

UNIT 3:

Screen Designing- Design goals ,Screen planning and purpose, organizing screen elements, ordering of screen data and content - screen navigation and flow - Visually pleasing composition - amount of information - focus and emphasis ñ presentation information simply and meaningfully - information retrieval on web - statistical graphics - Technological consideration in interface design.

UNIT 4:

Windows - New and Navigation schemes selection of window, selection of devices based and screen based controls.

Components - text and messages, Icons and increases ñ Multimedia, colors, uses problems, choosing colors,

UNIT5:

Software tools - Specification methods, interface - Building Tools. Interaction Devices - Keyboard and function keys pointing devices ñ speech recognition digitization and generation ñ image and video displays ,drivers.

TEXT BOOKS :

1. The essential guide to user interface design, Wilbert O Galitz, Wiley DreamTech.
2. Designing the user interface. 3rd Edition Ben Shneidermann , Pearson Education Asia.

REFERENCE BOOKS:

1. Human Computer Interaction. Alan Dix, Janet Fincay, Gre Goryd, Abowd, Russell Bealg, Pearson Education
2. Interaction Design Prece, Rogers, Sharps. Wiley Dreamtech,
3. User Interface Design, Soren Lauesen , Pearson Education.

COMPUTER AND NETWORK SECURITY FUNDAMENTALS
(Open Elective –2)

	L	T	P	C
B. Tech IT III-II Semester				
Course Code: A3IT14	3	-	-	3

Course Overview:
This course is designed to explore the International Standards Organizations Open System Interconnect (ISO OSI) network stack and discuss common security weaknesses, vulnerabilities, attack methods, and mitigation approaches. This course will provide a comprehensive list of security issues related to general networking design and development.

Course Objective
The objective of the course is to

I. Understand security concepts, Ethics in Network Security.
II. Understand security threats, and the security services and mechanisms to counter them Comprehend and apply relevant cryptographic techniques
III. Comprehend security services and mechanisms in the network protocol stack
IV. Comprehend and apply authentication services and mechanisms
V. Comprehend and apply relevant protocol like SSL, SSH etc.
VI. Comprehend and apply email security services and mechanisms
VII. Comprehend and apply web security services and mechanisms
VIII. Comprehend computer and network access control

Course Outcomes
By the end of the course, student:

- Should be able to identify network security threats and determine efforts to counter them
- Should be able to write code for relevant cryptographic algorithms.
- Should be able to write a secure access client for access to a server
- Should be able to send and receive secure mails
- Should be able to determine firewall requirements, and configure a firewall.

SYLLABUS

UNIT 1
Basics
Control hijacking attacks: exploits and defenses , Dealing with legacy code: sandboxing and isolation, Tools for writing robust application code , Principle of least privilege, access control, and operating systems security, Exploitation techniques and fuzzing

UNIT 2-
Web Security
Basic web security model, Web application security, Content Security Policies (CSP), Web workers, and extensions , Session management and user authentication, Overview of cryptography , HTTPS: goals and pitfalls

UNIT 3
Network Security
Security issues in Internet protocols: TCP, DNS, and routing,

UNIT -4
Network defense tools
Firewalls, VPNs, Intrusion Detection, and filters , Unwanted traffic: denial of service attacks

UNIT 5

Security of mobile platforms

Mobile platform security models: Android and iOS , Mobile threats and malware, More on malware: viruses, Spyware and key-loggers

TEXT BOOKS:

1. William Stallings (2006), Cryptography and Network Security: Principles and Practice, 4th edition, Pearson Education, India.
2. William Stallings (2000), Network Security Essentials (Applications and Standards), Pearson Education, India.

REFERENCE BOOKS:

1. Charlie Kaufman (2002), Network Security: Private Communication in a Public World, 2nd edition, Prentice Hall of India, New Delhi.
2. Atul Kahate (2008), Cryptography and Network Security, 2nd edition, Tata Mc Grawhill, India.
3. Robert Bragg, Mark Rhodes (2004), Network Security: The complete reference, Tata Mc Grawhill, India.

SOFTWARE TESTING FUNDAMENTALS
(Open Elective –3)

B. Tech IT IV-I Semester | **L T P C**
Course Code: A3IT21 | **3 - - 3**

Course Overview:
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 sees that 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.

Course Objective
I. To study fundamental concepts in software testing, including software testing objectives, process, criteria, strategies, and methods.
II. To discuss various software testing issues and solutions in software unit test; integration, regression, and system testing.
III. To learn how to planning a test project, design test cases and data, conduct testing operations, manage software problems and defects, generate a testing report.
IV. To expose the advanced software testing topics, such as object-oriented software testing methods, and component-based software testing issues, challenges, and solutions.
V. To gain software testing experience by applying software testing knowledge and methods to practice-oriented software testing projects.
VI. To understand software test automation problems and solutions.
VII. To learn how to write software testing documents, and communicate with engineers in various forms.

Course Outcomes
By the end of the course, student should:
1. Have an ability to apply software testing knowledge and engineering methods.
2. Have an ability to design and conduct a software test process for a software testing project.
3. Have an ability to identify the needs of software test automation, and define and develop a test tool to support test automation.
4. Have an ability understand and identify various software testing problems, and solve these problems by designing and selecting software test models, criteria, strategies, and methods.
5. Have an ability to use various communication methods and skills to communicate with their teammates to conduct their practice-oriented software testing projects.
6. Have basic understanding and knowledge of contemporary issues in software testing, such as component-based software testing problems
7. Have an ability to use software testing methods and modern software testing tools for their testing projects.

SYLLABUS

Unit-I:
Basics of software testing, Testing objectives, Principles of testing, Test Life Cycle, Types of testing, Software defect tracking.

Unit-II:
White Box and Black Box Testing, White box testing, static testing, static analysis tools, Structural testing: Unit/Code functional ,testing, Code coverage testing, Code complexity testing, Black Box testing, Requirements based testing, Boundary value analysis, Equivalence partitioning, state/graph based testing.

Unit-III:
Integration, System, and Acceptance Testing Top down and Bottom up integration, Functional versus Non-functional testing, Design/Architecture verification, Deployment testing, Beta testing, Scalability testing, Reliability testing, Stress testing, Acceptance testing

Unit-IV: Test Selection & Minimization for Regression Testing Regression testing, Regression test process, Initial Smoke or Sanity test, Selection of regression tests, Execution Trace, Dynamic Slicing, Test Minimization, Tools for regression testing, Ad hoc Testing: Pair testing, Exploratory testing, Iterative testing, Defect seeding.

Unit-V:
Test Management and Automation Test Planning, Management, Execution and Reporting,
Software Test Automation: Scope of automation, Design & Architecture for automation, Generic requirements for test tool framework, Test tool selection.

Text Books:
1. S. Desikan and G. Ramesh, “Software Testing: Principles and Practices”, Pearson Education.
2. Aditya P. Mathur, “Fundamentals of Software Testing”, Pearson Education.
3. Naik and Tripathy, “Software Testing and Quality Assurance”, Wiley
4. K. K. Aggarwal and Yogesh Singh, “Software Engineering”, New Age International Publication.

BASICS OF MULTIMEDIA SYSTEMS
(Open Elective –3)

B. Tech IT IV-I Semester	L	T	P	C
Course Code: A3IT22	3	-	-	3

Course Overview:
This course is designed to describe the ways in which multimedia information is captured, processed, and rendered, to introduce multimedia quality of service (QoS) and to compare subjective and objective methods of assessing user satisfaction, to discuss the ways in which multimedia data is transmitted across networks, and to discuss privacy and copyright issues in the context of multimedia
.

Course Objective
The objective of the course is to

I. To understand the definition of multimedia
II. To understand and differentiate text, image, video & audio.
III. To describe the ways in which multimedia information is captured, processed, and rendered
IV. introduce multimedia quality of service (QoS) and to compare subjective and objective methods of assessing user satisfaction and multicast protocols to provide QoSguarantees
V. discuss privacy and copyright issues in the context of multimedia

Course Outcomes
Upon successful completion of the course student will get the ability to:

- describe different realizations of multimedia tools and the way in which they are used;
- analyze the structure of the tools in the light of low-level constraints imposed by the adoption of various QoS schemes (ie bottom up approach);
- analyze the effects of scale and use on both presentation and lower-level requirements (i.e. top down approach);
- state the properties of different media streams;
- Compare and contrast different network protocols and to describe mechanisms for providing QoS guarantees in the network.

SYLLABUS

Unit 1
Introduction:
Definitions - Brief history of Multimedia; its market; content and copyright –public Domain, establishment of Copyright, fair use, multimedia copyright issues; resources for multimedia developers – Uses of multimedia - Making multimedia : Stages of a project

Unit 2
Hardware
Macintosh Versus Windows Platform – Connections – SCSI – IDE – EIDE – ULTRA – IDE – ATA – ULTRA - ATA - Memory and Storage Devices - Input Devices - Output Hardware - Communication Devices
Basic Software Tools :
Text Editing - Word Processing - OCR Software - Painting and Drawing Tools - 3D Modeling and Animation Tools - Image Editing - Sound Editing – Animation – Video - Digital Movie tools - Movie Editors - Compressing Movie Files

Unit 3:
Text :Fonts – Designing – Choosing -Menus for Navigation - Buttons for Interaction - Fields for Readings - HTML Documents - Symbols and Icons – Animating - Fonts Foundries - Managing Fonts -

Character sets and Alphabets - Mapping Text – Fontographer - Hypermedia Structures – Hypertext tools

Sound : Power of sound - Multimedia System Sound - MIDI Versus Digital Audio - Preparing Digital Audio Files - Making MIDI Audio - Audio File Formats - Sound for the World Wide Web – Adding Sound to Your Multimedia Project - Toward Professional Sound - The Red Book Standard - Space Considerations - Production Tips - Audio Recording - Keeping Track of Your Sounds - Testing and Evaluation

Unit4:

Introduction:

The Bandwidth Bottleneck - Internet Services - MIME-Types - World Wide Web and HTML - Dynamic Web Pages and XML - Multimedia on the Web.

Tools for the World Wide Web:

Web Servers - Web Browsers - Web Page Makers and Site Builders - Plug ins and Delivery Vehicles - Text – Images –Sound - Animation, Video and Presentation - Beyond HTML - 3D Worlds,designing for the World Wide Web..

Unit5:

Multimedia File Handling:

Compression & De compression - Data & file formats standards - Digital voice, Audio, video – Video image and Animation - Full motion video - storage and retrieval Technologies

Text Books:

1. Multimedia making it work Tay Vaughan Tata McGrawHill, Delhi
2. Multimedia – Technology and applications David Hillman Galgotia Publications, Delhi

INTRODUCTION TO GAME DEVELOPMENT

(Open Elective –3)

B. Tech: IT IV-I Semester | **L T P C**
Course Code: A3IT23 | **3 - - 3**

Course Overview

This course is designed to give an overview of the games development process including important historical perspective, content creation strategies, production techniques, and a look into the future. The course covers game development history, platforms, goals and genres, player elements, story and character development, gameplay, levels, interface, audio, development team roles, game development process, and marketing and maintenance . Students will play games, analyze them, and complete portions of game designs with appropriate documentation.

Course Objective

The objective of the course is that student will able

I. Discuss the history of electronic game development.
II. Distinguish between the different game platforms and player modes.
III. Distinguish between the different game goals and genres.
IV. Define elements related to game strategy, theory, and game play.
V. Apply story and character development to games.
VI. Discuss various aspects of game play that can be used to design game interaction.
VII. Discuss the design and use of levels.
VIII. Discuss the use of the interface for game design.
IX. Use audio to enrich the game atmosphere.
X. Identify the distinct roles and responsibilities of game development team members.
XI. Discuss the production and management of the game design process

Course Outcomes

Upon a successful completion of this course the students should be able to:

- Understand the properties and architectural specifics of modern technology;
- Have hands-on knowledge of the basic principles of software development;
- Have hands-on knowledge of the basic principles of game programming.

SYLLABUS

UNIT - I

INTRODUCTION AND HISTORY: GPUs as Parallel Computers, Architecture of a Modem GPU, Why More Speed or Parallelism, Parallel Programming Languages and Models, Overarching Goals, Evolution of Graphics Pipelines, The Era of Fixed-Function, Graphics Pipelines, Evolution of Programmable Real-Time Graphics, Unified Graphics and Computing Processors, GPGPU, An Intermediate Step, GPU Computing, Scalable GPUs, Recent Developments, Future Trends.

UNIT - II

INTRODUCTION TO CUDA: Data Parallelism, CUDA Program Structure, A Matrix-Matrix Multiplication Example, Device Memories and Data Transfer, Kernel Functions and Threading, Function declarations, Kernel launch, Predefined variables,

UNIT - III

CUDA MEMORIES: Importance of Memory Access Efficiency, CUDA Device Memory Types, a Strategy for Reducing Global Memory Traffic, Memory as a Limiting Factor to Parallelism, Global Memory Bandwidth.

UNIT - IV

INTRODUCTION TO OPENCL: Introduction to OPENCL, Background, Data Parallelism Model, Device Architecture, Kernel Functions, Device Management and Kernel Launch, Electrostatic Potential Map in OpenCL.

UNIT - V

GAME DESIGN AND DEVELOPMENT: Concept of Game Design and Development and case studies.

TEXT BOOKS:

1. David B Kirk, Wen Mei W Hwu (2010), Programming Massively Parallel Processors: A Hands - on Approach, Elsevier India Private Limited, India.

REFEERENCE BOOKS:

1. Jason Sanders, Edward Kandrot (2010), Cuda by Example: An Introduction to General-Purpose GPU Programming, Addison-Wesley Professional, USA.
2. Steve Rabin (2010), Introduction to Game Development, Volume 2, 2nd edition, Course Technology, Cengage Learning, USA

WEB REFERENCES:

1. http://www.nvidia.co.in/object/cuda_home_new_in.html

OPEN ELECTIVES
OFFERED BY
ECE DEPARTMENT

OE1		OE2		OE3	
A3EC22	Logic Design	A3EC30	Fundamentals of Integrated Circuits	A3EC42	Introduction of Microprocessors and Microcontrollers
A3EC23	Principles of Communications	A3EC31	Signals Transmission Through Linear Systems	A3EC43	Fundamentals of Image Processing
A3EC24	Measurements And Instrumentation	A3EC32	Fundamentals of VLSI Design	A3EC44	TV Engineering

LOGIC DESIGN
(OPEN ELECTIVES-I)

III B.Tech- I Semester	L	T	P	C
Course Code: A3EC22	3	-	-	3

Course Overview:

This course provides a modern introduction to logic design and the basic building blocks used in digital systems, in particular digital computers. It starts with a discussion of combinational logic: logic gates, minimization techniques, arithmetic circuits, and modern logic devices such as field programmable logic gates. The second part of the course deals with sequential circuits: flip-flops, synthesis of sequential circuits, and case studies, including counters, registers, and random access memories. State machines will then be discussed and illustrated through case studies of more complex systems using programmable logic devices. Different representations including truth table, logic gate, timing diagram, switch representation, and state diagram will be discussed.

Course Objectives:

The objective of the course is to

1. Explain how digital circuit of large complexity can be built in a methodological way, starting from Boolean logic and applying a set of rigorous techniques.
2. Create minimal realizations of single and multiple output Boolean functions.
3. Design and analyze combinational circuits using medium scale integrated (MSI) components, including arithmetic logic units.
4. Derive state diagrams and state transition tables for synchronous systems.
5. Study the characteristics and performance of digital circuits built using various MOS technologies.

Learning Outcomes:

On successful completion of this course students will be able to

1. Design and analyze combinational and sequential circuits for various practical problems using basic gates and flip flops
2. Implement LSI and MSI circuits using programmable logic devices (PLDs)
3. Demonstrate knowledge of hazards and race conditions generated within asynchronous circuits.
4. Understand the process of integration and characteristics of different logic families.

Course Contents:

SYLLABUS

UNIT I

Boolean Algebra: Axiomatic Definition of Boolean Algebra, Basic Theorems and Properties of Boolean Algebra, Boolean Functions, Canonical and Standard Forms, Digital Logic Gates, IC Digital Logic Families.

UNIT II

Simplification of Boolean Functions: The Map Method, Two & Three Variable Maps, Four Variable Map, Five & Six Variable Maps, Product of Sum Simplification, NAND & NOR Implementation, Two-Level Implementations, Don't-Care Conditions, Tabulation Method, Determination of Prime Implicants, Selection of Prime Implicants.

UNIT III

Combinational Logic: Design Procedure, Adders, Subtractors, Code Conversion, Multilevel NAND Circuits, Multilevel NOR Circuits, Exclusive-Or and Equivalence Functions.

Combinational Logic with MSI And LSI: Binary Parallel Adder, Decimal Adder, Magnitude Comparator, Decoders, Multiplexers, ROM, PLA.

UNIT IV

Sequential Logic: Flip-Flops, Triggering of Flip Flops, Analysis of Clocked Sequential Circuits, State Reduction and Assignment, Flip-Flop Excitation Tables, Design Procedure Design Of Counters.

Registers and Counters: Registers, Shift Registers, Ripple Counters, Synchronous Counters, Timing Sequences

UNIT V

Digital Integrated Circuits: Introduction**,** Bi-Polar Transistor Characteristics, Integrated Injection Logic, Transistor-Transistor Logic (TTL), Emitter-Coupled Logic(ECL), MOS, Complementary MOS.

Learning Resources:

Text Books:

1. M.Morris Mano, ―Digital Design‖, 2nd Edition, 1997, PHI. (Unit I,II,III& IV).

Reference Books:

1. Zvi Kohavi, ―Switching and Automata Theory‖, 2nd Edition, 1978, McGraw-Hill.
2. Thomas L. Floyd ―Digital Fundamentals‖, 10th Edition, Pearson Education India.
3. Stephen Brown, Zvonko Vrsaniec, ‖Fundamentals of Digital Logic with Verilog Design‖, 2nd Edition, McGraw-Hill.

PRINCIPLES OF COMMUNICATION
(OPEN ELECTIVE-I)

III B.Tech- I Semester | **L T P C**
Course Code: A3EC23 | **3 - - 3**

Course Description:

Communication Principles is a foundational course for those majoring in the communication option in final year. This course introduces students to: (i) the essential approaches, fundamental concepts and design issues in communication engineering. The course emphasizes the understanding of engineering principles. Mathematics is used only at a level that is absolutely necessary; (ii) basic concepts of modulation techniques including amplitude modulation (AM), frequency modulation (FM) and phase modulation (PM) that are widely used in analogue communication systems, and basic techniques for analyzing such systems in the time and frequency domains; (iii) basic concepts of a digital communication system including sampling theorem, pulse code modulation (PCM) and principles of digital data transmission, and basic techniques for analyzing such systems in the time and frequency domains.

Course Objectives:

1. Describe the basic concepts of Communication technology
2. Explain the Models of Communication
3. Discourse Analog and Digital Signal transmission
4. Discourse Computer Networking
5. Explain the types of Communication Media
6. Explain the Application of computer in data transmission and Security

Learning Outcomes:

1. Basic working of communication system
2. Analog Modulation Techniques and their comparative analysis and applications suitability.
3. Process of Modulation and Demodulation.
4. Types, characterization and performance parameters of transmission channels.
5. Analog to digital conversion and Digital data transmission.
6. Multiplexing Techniques.
7. Basic working principles of existing and advanced communication technologies.

SYLLABUS

UNIT I

FUNDAMENTALS OF ANALOG COMMUNICATION : Principles of amplitude modulation, AM envelope, frequency spectrum and bandwidth, modulation index and percent modulation, AM Voltage distribution, AM power distribution, Angle modul ation FMand PM waveforms, phase deviation and modulation index, frequency deviation and percent modulation,Frequency analysis of angle modulated waves. Bandwidth requirements for Angle modula ted waves.

UNIT –II

DIGITAL COMMUNICATION: Introduction, Shannon limit for information capacity, digital amplitude modulation, frequency shift keying, FSK bit rate and baud, FSK transmitter, BW consideration of FSK, FSK receiver, phase shift keying binary phase shift keying QPSK, Quadrature Amplitude modulation, bandwidth efficiency, carrier recovery – squaring loop, Costas loop, DPSK.

UNIT-III

DIGITAL TRANSMISSION: Introduction, Pulse modulation, PCM,PCM sampling, sampling rate, signal to quantization noise rate, companding analog and digital percentage error, delta modulation,

adaptive delta modulation,differe ntial pulse code modulation, pulse transmission – Intersymbol interference, eye patterns.

UNIT -IV

SPREAD SPECTRUM AND MULTIPLE ACCESS TECHNIQUES: Introduction, Pseudonoise sequence, DS spread spectrum with coherent binary PSK, processing gain,FH spread spectrum, multiple access techniques wirelesscommunication, TDMA and CDMA in w ireless communication systems, source coding of speech for wireless communications.

UNIT-V

SATELLITE AND OPTICALCOMMUNICATION : Satellite Communication Systems ,Keplers Law, LEO and GEO Orbits, footprint, Link model Optical Communication Systems-Elements of Optical Fiber Transmission link, Types, Losses, Sources and Detectors.

PERIODS TEXTBOOKS:

1. Wayne Tomasi, —Advanced Electronic Communication Systems‖, 6/e, Pearson Education, 2007.

2. Simon Haykin, —Communication Systems‖, 4th Edition, John Wiley & Sons., 2001.

REFERENCES:

1. H.Taub,D L Schilling ,G Saha ,‖Principles of Communication‖3/e,2007.
2. B.P.Lathi,‖Modern Analog And Digital Communication systems‖, 3/e, Oxford University Press, 2007
3. Blake, —Electronic Communication Systems‖, Thomson Delmar Publications, 2002.
4. Martin S.Roden, —Analog and Digital Communication System‖, 3rd Edition, PHI, 2002.
5. B.Sklar,‖Digital Communication Fundamentals and Applications‖2/e Pearson Education 2007.

MEASUREMENTS AND INSTRUMENTATION
(OPEN ELECTIVE-I)

III B.Tech- I Semester **L T P C**
Course Code: A3EC24 **3 - - 3**

Course Description:

This is a one-semester course in electronic instrumentation. Along with an overview of instrumentation principles, the physical principles and electrical characteristics for several common instrument transducers are studied. The electronic signal-conditioning circuits required to convert the electrical changes in the transducers to signal which can be interpreted accurately by a microprocessor or embedded controller, are analyzed and designed. A complete topic list is shown below. The laboratory is project oriented with each student required to design and implement weather station instrumentation. The weather station will measure and display atmospheric parameters such as humidity, temperature, and barometric pressure. An embedded controller, the Motorola HC11, is constructed and programmed by each student

Objective:

1. To understand the measuring methods and instruments of electrical quantities.
2. To understand, design aspects and performance criterion of measuring instruments.
3. To understand the working principle of various transducers.
4. To aware the students about the advances in instrumentation.

Outcome:

At the end of the course the student will be able to:

1. Apply knowledge of electronic instruments for measurement of electrical quantities.
2. Apply the principles and practices for instrument design.
3. Select and use latest hardware for measurements.

SYLLABUS

UNIT I - MEASUREMENT CONCEPTS
Measurement systems – Static and dynamic characteristics – units and standards of measurements – error :- accuracy and precision, types, statistical analysis – moving coil, moving iron meters – multimeters

UNIT II - ELECTRONIC MEASUREMENTS
Electronic multimeters – Cathode ray oscilloscopes – block schematic – applications –special oscilloscopes :– delayed time base oscilloscopes, analog and digital storage oscilloscope, sampling oscilloscope – Q meters – Vector meters – RF voltage and power measurements – True RMS meters.

UNIT III- SIGNAL GENERATORS AND ANALYZERS
Function generators – pulse and square wave generators, RF signal generators –Sweep generators – Frequency synthesizer – wave analyzer – Harmonic distortion analyzer – spectrum analyzer :- digital spectrum analyzer, Vector Network Analyzer –Digital L,C,R measurements, Digital RLC meters.

UNIT IV- DIGITAL INSTRUMENTS
Comparison of analog and digital techniques – digital voltmeter – multimeters –frequency counters – measurement of frequency and time interval – extension of frequency range – Automation in digital instruments, automatic ranging, automatic zeroing, fully automatic digital instruments, Computer

controlled test systems, Virtual instruments.

UNIT V- DATA ACQUISITION SYSTEMS

Elements of a digital data acquisition system – interfacing of transducers – multiplexing –data loggers –computer controlled instrumentation – IEEE 488 bus.

TEXT BOOKS

1. Albert D.Helfrick and William D.Cooper – Modern Electronic Instrumentation and Measurement Techniques, Pearson / Prentice Hall of India, 2007.
2. Ernest O. Doebelin, Measurement Systems- Application and Design, TMH, 2007.

REFERENCES

1. Joseph J.Carr, Elements of Electronics Instrumentation and Measurement, Pearson Education, 2003.
2. Alan. S. Morris, Principles of Measurements and Instrumentation, 2nd Edition,Prentice Hall of India, 2003.
3. David A. Bell, Electronic Instrumentation and measurements, Prentice Hall of India Pvt Ltd, 2003.
4. B.C. Nakra and K.K. Choudhry, Instrumentation, Meaurement and Analysis, 2nd Edition, TMH, 2004.
5. James W. Dally, William F. Riley, Kenneth G. McConnell, Instrumentation for Engineering Measurements, 2nd Edition, John Wiley, 2003.

FUNDAMENTALS OF INTEGRATED CIRCUITS
(OPEN ELECTIVES-II)

III B.Tech- II Semester **L T P C**

Course Code: A3EC30 **3 - - 3**

Course Overview:

VLSI design course gives the knowledge about the fabrication of NMOS, PMOS, CMOS and their application in the present electronics world. The present course gives knowledge about different processes used for fabrication of an IC. The electrical properties of MOS transistor and analysis of CMOS, Bi CMOS inverters is carried out. This course gives detail study on design rules, stick diagrams, logic gates, types of delays, fan-in, fan-out which effects the action of a MOS. It also gives information on data path subsystem and array subsystems, and several PLD's like PLA, PAL, CPLD and FPGA's and also to the CMOS testing principles system level and chip level.

Prerequisite(s): Electronic Devices and circuits, Switching Theory and Logic Design

Course Objectives:

1. To understand the Basic NMOS, CMOS & Bi CMOS circuits and their process technology.
2. To understand the Designing of stick diagrams and layouts for OS transistors.
3. To learn the concepts of modelling of Delay techniques and MOS layers.
4. To learn the concepts of Technology Scaling of MOS transistors.
5. To understand the concepts of testing of combinational and sequential circuits and also the scan of design techniques.

Course Outcomes:

After going through this course the student will be able to

1. Learn IC Fabrication process steps required for MOS and Ids- Vds relationship.
2. Understand VLSI Design flow for fabrication of a chip, layout design rules, Stick diagrams and scaling of MOS transistor.
3. Learn the time delays, driving large capacitive loads. wiring capacitance, Choice of layers
4. Able to learn different data path subsystems design of combinational circuits.
5. Understand CMOS testing, Design Strategies for Testing.

SYLLABUS

UNIT I

Introduction: Semiconductor materials, Semiconductor Devices, Semiconductor process technology, Basic fabrication steps.

Crystal Growth: Silicon Crystal Growth from melt, Silicon Float-Zone Process, GaAs Crystal Growth Techniques, Material Characterization.

UNIT II

Silicon Oxidation: Thermal oxidation, Impurity Redistribution during oxidation, masking properties of silicon dioxide, oxide quality, oxide thickness characterization, Photolithography.

UNIT III

Etching: Wet chemical etching, Dry etching. **Diffusion:** Basic Diffusion Process, Extrinsic Diffusion, Lateral Diffusion.

UNIT IV

Ion Implantation: Range of Implanted ions, Implant Damage and annealing, Implantation-related Process.

Film Deposition: Epitaxial growth techniques, Structures and defects in epitaxial layers, Dielectric deposition, Polysilicon deposition, Metallization.

UNIT V

Process Integration: Passive Components, Bipolar Technology, MOSFET technology, MESFET technology, MEMS technology. **IC Manufacturing:** Electrical testing, Packaging.

Text Books:

1. Gary S. May, Simon M. Sze, Fundamentals of Semiconductor Fabrication, John Wiley Inc., 2004.

Reference Books:

1. C.Y. Chang and S.M.Sze (Ed), ULSI Technology, McGraw Hill Companies Inc, 1996.

2. S.K. Ghandhi, VLSI Fabrication Principles, John Wiley Inc., New York, 1983.

3. S.M. Sze (Ed), VLSI Technology, 2nd Edition, McGraw Hill, 1988

4. The Science and Engineering of Microelectronic Fabrication, Stephen Cambell, Oxford University Press, 2001.

SIGNAL STRANSMISSION THROUGH LINEAR SYSTEMS (OPEN ELECTIVE-II)

III B.Tech- II Semester	L	T	P	C
Course Code: A3EC31	3	-	-	3

Course Overview:

This course is an introductory course to study analog and digital signal processing, a topic that forms an integral part of engineering systems in many diverse areas including seismic data processing, communications, speech processing, image processing, defense electronics, consumer electronics and consumer products. The course presents and integrates the basic concepts for both continuous-time and discrete time signals and systems. Signal and system representations are developed for both time and frequency domains. This course also emphasizes on MATLAB basics with applications to signals and systems.

Course Objectives:

1. To understand various fundamental characteristics of signals and systems.
2. To study the importance of transform domain.
3. To analyze and design various systems.
4. To study the effects of sampling.

Course Outcomes:

After going through this course the student will be able to

1. Design solutions for complex input signals
2. Analyze statistical parameters for a given signal.
3. Apply transform domain knowledge for design of systems.
4. Apply the mathematical modeling to LTI systems

SYLLABUS

UNIT-I:

Signal Analysis and Fourier series Signal Analysis: Analogy between Vectors and Signals, Orthogonal Signal Space, Signal approximation usingOrthogonal functions, Mean Square Error, Closed or complete set of Orthogonal functions, Orthogonality inComplex functions, Exponential and Sinusoidal signals, Concepts of Impulse function, Unit Step function, Signumfunction.

Fourier Series: Representation of Fourier series, Continuous time periodic signals, Properties of Fourier Series, Dirichlet‘s conditions, Trigonometric Fourier Series and Exponential Fourier Series,Complex Fourier spectrum.

UNIT-II:

Fourier Transforms and Sampling Fourier Transforms: Deriving Fourier Transform from Fourier Series, Fourier Transform of arbitrary signal, FourierTransform of standard signals, Fourier Transform of Periodic Signals, Properties of Fourier Transform, FourierTransforms involving Impulse function and Signum function, Introduction to Hilbert Transform.

Sampling: Sampling theorem – Graphical and analytical proof for Band Limited Signals, Typers of Sampling - Impulse Sampling, Natural and Flat top Sampling, Reconstruction of signal from its samples, Effect of undersampling – Aliasing, Introduction to Band Pass sampling.

UNIT-III:

Signal Transmission Through Linear Systems: Linear System, Impulse response, Response of a Linear System, Linear Time Invariant (LTI) System, Linear Time Variant (LTV) System, Transfer function of a LTI system, Filter characteristics of Linear Systems, Distortion less transmission through a system, Signal bandwidth, System bandwidth, Ideal LPF, HPF and BPF characteristics, Causality and Paley-Wiener criterion for physical realization, Relationship between Bandwidth and Rise time.

UNIT-IV:

Convolution and Correlation of Signals: Concept of convolution in Time domain and Frequency domain, Graphical representation of Convolution, Convolution property of Fourier Transforms, Cross Correlation and Auto Correlation of functions, Properties of Correlation function, Energy density spectrum,

UNIT-V:

Laplace Transforms and Z-Transforms : Review of Laplace Transforms (L.T) , Partial fraction expansion, Inverse Laplace Transform, Concept of Region of Convergence (ROC) for Laplace Transforms, Constraints on ROC for various classes of signals, Properties of L.T, Relation between L.T and F.T of a signal. Concept of Z- Transform of a Discrete Sequence, Distinction between Laplace, Fourier and Z Transforms, Region of Convergence in Z-Transform, Constraints on ROC for various classes of signals, Inverse Z-transform, Properties of Z-transforms.

TEXTBOOKS:

1. Oppenheim A. V, Willisky (2009), *Signals and Systems*,2nd edition, PrenticeHallof India, India.
2. B. P. Lathi (2001), *Signals, Systems & Communications*,BS Publications, NewDelhi.

REFERENCE BOOKS:

1. Simon Haykin ,VanVeen (2007),*Signals&Systems*,2nd edition, Wiley publications,India.
2. Hwei Piao Hsu, Schaums (2003),*OutlineofTheoryProblemsofSignalsandSystems*,McGrawHi ll, India.
3. CharlesL.Phillips,JohnM.Parr,EveA.Riskin(2007),*Signals,SystemsandTransforms*, PrenticeHallof India,NewDelhi

FUNDAMENTALS OF VLSI DESIGN
(OPEN ELECTIVE-II)

	L	T	P	C
III B.Tech- II Semester				
Course Code: A3EC32	**3**	**-**	**-**	**3**

Course Overview:

VLSI design course gives the knowledge about the fabrication of NMOS, PMOS, CMOS and their application in the present electronics world. The present course gives knowledge about different processes used for fabrication of an IC. The electrical properties of MOS transistor and analysis of CMOS, BiCMOS inverters is carried out**.** This course gives detail study on design rules, stick diagrams, logic gates, types of delays, fan-in, fan-out which effects the action of a MOS. It also gives information on data path subsystem and array subsystems, and several PLD's like PLA, PAL, CPLD and FPGA's and also to the CMOS testing principles system level and chip level.

Prerequisite(s): Electronic Devices and circuits, Switching Theory and Logic Design

Course Objectives:

1. To understand the Basic NMOS, CMOS & BiCMOS circuits and their process technology.
2. To understand the Designing of stick diagrams and layouts for MOS transistors.
3. To learn the concepts of modeling of Delay techniques and MOS layers.
4. To learn the concepts of Technology Scaling of MOS transistors.
5. To understand the concepts of testing of combinational and sequential circuits and also the scan of design techniques.

Course Outcomes:

1. Learn IC Fabrication process steps required for MOS and Ids- Vds relationship.
2. Understand VLSI Design flow for fabrication of a chip , layout design rules , Stick diagrams and scaling of MOS transistor.
3. Learn the time delays, driving large capacitive loads. wiring capacitance, Choice of layers
4. Able to learn different data path subsystems design of combinational circuits.
5. Understand CMOS testing, Design Strategies for Testing.

SYLLABUS

UNIT I

Review of microelectronics and Introduction to MOS technology: Introduction MOS and related VLSI technology – NMOS-CMOS-BICMOS-GaAas Technologies – thermal aspects of processing – production of E beam masks.

UNIT II

MOS and BICMOS circuit design process:MOS layers – stick diagrams – design rules and layout – 2m meter – 1.2 m meter CMOS rules – Layout diagrams – Symbolic diagrams.

UNIT III

Basic Circuit Concepts: Sheet resistance – Area capacitance of layers – delay unit – wiring capacitances – choice of layers.

UNIT IV

Scaling of MOS circuits: Scaling modesl – Scaling function for device parameters – Limitation of Scaling.

Subsystem design process: Architectural issues – switch logic – examples of structural design (Combinational logic)– design of ALU subsystem – commonly used storage elements – aspects of design rules.

UNIT V

Test and Testability: Design for testability built in self test (BIST) – teaching combinational logic – testing sequential logic – practical design for test guide lines – scan design techniques – etc.

Text Books:

1. Basic VLSI design by Douglas A, Pucknell, Kamran Eshraghian, Prantice Hall, 1996 3rd edition.

Reference book:

1. Mead, C.A and Conway, L.A., Introduction to VLSI Systems, Wesley – Wesley.

INTRODUCTION OF MICROPROCESSORS AND MICROCONTROLLERS (OPEN ELECTIVES-III)

IV B. Tech: I SEMESTER	L	T	P	C
Course Code: A3EC42	3	-	-	3

Course Overview:

Introduction to Microprocessors course is intended to introduce the architecture, programming of microprocessors and interfacing of various hardware circuits to microprocessors. The topics covered are architecture, addressing modes, instruction set of 8086,minimum and maximum mode operation of 8086, 8086 INSTRUCTION SET, Assembly language programming fundamentals, interfacing of static Ram, EPROM, DMA Controller, keyboard, display, 8279,8255, stepper motor, A/D and D/A converter, data transmission,8251 USART, 8259 interrupt controller..

Course Objectives:

1. To study the architecture of microprocessors.
2. To understand the assembly language and write programs using concepts like assembler directives, procedures, macros, and software interrupts etc.
3. To familiarise with peripherals, programming and its interfacing techniques
4. To understand the concept of Microcontroller.

Course Outcomes:

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

1. Understand the architecture, memory organization and modes of operation of 8086 microprocessors / 8051 microcontrollers.
2. Understand the addressing modes and the instruction set of the processor / microcontroller and write programs for real time application using.
3. Use design tools for microprocessor system design and verification.
4. Interface peripheral devices with 8086 microprocessor.
5. The students will be able to design ,program and interface external devices with microcontroller.

SYLLABUS

UNIT I

THE 8086 MICROPROCESSOR : Introduction to 8086 – Microprocessor architecture – Addressing modes - Instruction set and assembler directives – Assembly language programming – Modular Programming - Linking and Relocation - Stacks - Procedures – Macros – Interrupts and interrupt service routines – Byte and String Manipulation.

UNIT II

8086 SYSTEM BUS STRUCTURE : 8086 signals – Basic configurations – System bus timing – System design using 8086 – IO programming – Introduction to Multiprogramming – System Bus Structure – Multiprocessor configurations – Coprocessor, Closely coupled and loosely Coupled configurations – Introduction to advanced processors.

UNIT III

I/O INTERFACING : Memory Interfacing and I/O interfacing - Parallel communication interface – Serial communication interface – D/A and A/D Interface - Timer – Keyboard /display controller – Interrupt controller – DMA controller – Programming and applications Case studies: Traffic Light control, LED display , LCD display, Keyboard display interface andAlarmController.

UNIT IV

MICROCONTROLLER: Architecture of 8051 – Special Function Registers(SFRs) - I/O Pins Ports and Circuits - Instruction set - Addressing modes - Assembly language programming.

UNIT V

INTERFACING MICROCONTROLLER: Programming 8051 Timers - Serial Port Programming - Interrupts Programming – LCD & Keyboard Interfacing - ADC, DAC & Sensor Interfacing - External Memory Interface- Stepper Motor and Waveform generation

TEXT BOOKS:

1. Yu-Cheng Liu, Glenn A.Gibson, “Microcomputer Systems: The 8086 / 8088 Family - Architecture, Programming and Design”, Second Edition, Prentice Hall of India, 2007.

2. Mohamed Ali Mazidi, Janice Gillispie Mazidi, Rolin McKinlay, “The 8051 Microcontroller and Embedded Systems: Using Assembly and C”, Second Edition, Pearson education, 2011.

References Book:

1. Doughlas V.Hall, “Microprocessors and Interfacing, Programming and Hardware”, TMH, 2012

FUNDAMENTALS OF IMAGE PROCESSING
(OPEN ELECTIVE-III)

IV B. Tech: I SEMESTER **L T P C**

Course Code: A3EC43 **3 - - 3**

Course Overview:

It gives comprehensive study of basic Image fundamentals, types of Image Transforms, properties of image transforms, Image Enhancement using spatial domain and Frequency domain. Student will come to know how the spatial domain enhancement using Histogram processing, Gray Level transformation median filtering and in the frequency domain smoothing and sharpening of the filter. In Image Restoration, Image degradation model, Image segmentation thresholding, Region oriented Segmentation. Image Compression restoration.

Prerequisite(s): Knowledge of differential equations and integration, Basics of Signals and Systems

Course Objectives:

1. Provide the student with the Fundamentals of Digital Image Processing.
2. Give the students a taste of the applications of the theories taught in the subject. This will be achieved through the project and some selected lab sessions.
3. Introduce the students to some advanced topics in digital image processing.
4. Give the students a useful skill base that would allow them to carry out further study should they be interested and to work in the field

Course Outcomes:

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

1. Understand image formation and the role human visual system plays in perception of gray and color image data.
2. Get broad exposure to and understanding of various applications of image processing in industry, medicine, and defense.
3. Learn the signal processing algorithms and techniques in image enhancement and image restoration.
4. Acquire an appreciation for the image processing issues and techniques and be able to apply these techniques to real world problems.
5. Be able to conduct independent study and analysis of image processing problems and techniques.

SYLLABUS

UNIT I- DIGITAL IMAGE FUNDAMENTALS

Introduction – Origin – Steps in Digital Image Processing – Components – Elements of Visual Perception – Image Sensing and Acquisition – Image Sampling and Quantization – Relationships between pixels - color models

UNIT-II

IMAGE TRANSFORMS: 2-DFourierTransform, Properties, FFT, Walsh Transform, Hadamard Transform, Discrete Cosine Transform, Haar transform, Slant transform, Hotelling transform.

UNIT III IMAGE ENHANCEMENT

Spatial Domain: Gray level transformations – Histogram processing – Basics of Spatial Filtering– Smoothing and Sharpening Spatial Filtering – Frequency Domain: Introduction to Fourier Transform – Smoothing and Sharpening frequency domain filters – Ideal, Butterworth and Gaussian filters

UNIT IV IMAGE RESTORATION AND SEGMENTATION

Noise models – Mean Filters – Order Statistics – Adaptive filters – Band reject Filters – Band pass Filters – Notch Filters – Optimum Notch Filtering – Inverse Filtering – Wiener filtering Segmentation: Detection of Discontinuities–Edge Linking and Boundary detection – Region based segmentation- Morphological processing- erosion and dilation

UNIT V IMAGE COMPRESSION

Fundamentals – Image Compression models – Error Free Compression – Variable Length Coding – Lossy Compression – Lossy Predictive Coding – Compression Standards

TEXTBOOKS:

1. R.C.Gonzalez,R.E.Woods(2002),*Digital Image processing*,3rdedition,Addison Wesley/ Pearson education, NewDelhi, India.

REFERENCE BOOKS:

1. K. Jain(1997),*Fundamentals of Digital Image processing*,Prentice Hall of India, New Delhi.

2. Rafael C.Gonzalez, Richard E.Woods and Steven (2004),*Digital Image processing using MATLAB*, Pearson Education Asia,India.

3. WilliamK. Pratt, (2004),*Digital Image Processing*,3rdedition,JohnWiley & Sons, New Delhi, India.

4. Arthur R. Weeks, Jr. (1996), *Fundamentals of Electronic Image Processing,* SPIE Optical Engineering Press, New Delhi, India

TV ENGINEERING
(OPEN ELECTIVES-III)

IV B. Tech: I SEMESTER **L T P C**

Course Code: A3EC44 **3 - - 3**

Course overview:

The course covers the most relevant aspects of TV communications, with emphasis on recent applications and developments. The course begins with a review on the history and basic concepts of

Course Objectives

1. To familiarize the students with Television transmitters and receive, and TV signal transmission.
2. To make them understand different signal processing step monochrome television,
3. To introduce colour television transmitters and receivers.

Course Outcomes

1. Upon completion of the course, the students will be able to:
2. Understand TV standards and picture tubes for monochrome TV.
3. Distinguish between monochrome and colour Television transmitters and receivers.
4. Analyze and Evaluate the NTSC and PAL colour systems.

SYLLABUS

UNIT -I

Introduction: TV transmitter and receivers, synchronization. Geometric forn and aspect ratio, image continuity, interlaced scanning, picture resolution Composite video signal, TV standards. Camera tubes: image Orthicon Plumbicon, vidicon, silicon Diode Array vidicon, Comparison of camera tubes Monochrome TV camera,

TV Signal Transmission and Propagation: Picture Signal transmission positive and negative modulation, VSB transmission, sound signal transmission, standard channel BW,TV transmitter, TV signal propagation interference, TV broadcast channels, TV transmission Antennas.

UNIT —II

Monochrome TV Receiver: RF tuner, IF subsystem, video amplifier, sound section, sync separation and processing, deflection circuits, scanning circuits, AGC, noise cancellation, video and inter carrier sound signal detection, vision IF subsystem of Black and White receivers, Receiver sound system: FM detection, FM Sound detectors, and typical applications.

UNIT -III

Sync Separation and Detection: TV Receiver Tuners, Tuner operation, VHF and UHF tuners, digital tuning techniques, remote control of receiver functions. Sync Separation, AFC and Deflection Oscillators: Synchronous separation, k noise in sync pulses, separation of frame and line sync pulses.

AFC, single ended AFC circuit, Deflection Oscillators, deflection drive lOs, Receiver Antennas, Picture Tubes.

UNIT -IV

Color Television: Colour signal generation, additive colour mixing, video signals for colours, colour difference signals, encoding, Perception of brightness and colours luminance signal, Encoding of colour difference signals, formation of chrominance signals, color cameras, Colour picture tubes.

Color Signal Encoding and Decoding: NTSC colour system PAL colour system, PAL encoder, PAL-D Decoder, chrome signal amplifiers, separation of U and V signals, colour burst separation, Burst phase discriminator, ACC amplifier, Reference oscillator, Indent and colour killer circuits, U& V demodulators.

UNIT—V

Color Receiver: Introduction to colour receiver, Electron tuners, IF subsystem, Y-signal channel, Chroma decoder, Separation of U & V Color, Phasors, synchronous demodulators, Sub carrier generation, raster circuits.

Digital TV: Introduction to Digital TV, Digital Satellite TV, Direct to Home Satellite TV, Digital TV Transmitter, Digital TV Receiver, Digital Terrestrial TV, LCD TV, LED TV, CCD Image Sensors, HDTV.

TEXT BOOKS

1. Television and Video Engineering- A.M.Dhake, 2nd Edition.
2. Modern Television Practice Principles, Technology and ServiceR .R.Gallatin, New Age International Publication, 2002.
3. Monochrome and Colour TV- R.R. Gulati, New Age International Publication, 2002.

REFERENCE BOOKS

1. Colour Television Theory and Practice-S.P.Bal, TMH, 1994.
2. Basic Television and Video Systems-B.Grob and C.E.Herndon, McGraw Hill, 1999.

OPEN ELECTIVES
OFFERED BY
AERONAUTICAL DEPARTMENT

OE1		OE2		OE3	
A3AE17	Fabrication Processes	A3AE27	Introduction to Aircraft Industry	A3AE39	Guidance and Control of Aerospace Vehicles
A3AE18	Fundamentals of Avionics	A3AE28	Non destructive Testing Methods	A3AE40	Wind tunnel Techniques
A3AE19	Introduction to Jets And Rockets	A3AE29	Fundamentals of Finite Element Method	A3AE41	Introduction to Aerospace Technology

FABRICATION PROCESSES
(OPEN ELECTIVE-I)

III B. Tech-I Semester | **L T P C**
Course Code: A3AE17 | **3 1 - 3**

COURSE OVERVIEW:

To introduce basic Fabrication Process and to develop theoretical skill of students. Metal casting processes, fabrication process, bulk deformation processes, bulk deformation processes, sheet metal forming processes, forming and shaping of plastics

COURSE OBJECTIVES:

The course should enable the students to
1. Learn casting processes
2. LearnMetal joining processes
3. Learn Metal forming/ high energy rate forming.
4. Learn the processing of plastics

COURSE OUTCOMES:

The students should be able to
1. Understand the various manufacturing methods employed in the industry.
2. Get knowledge in Basic welding & finishing operations
3. Get knowledge in Hot & Cold working of metals including High Energy Rate forming.
4. Get knowledge in Plastic manufacturing

SYLLABUS

UNIT – I

METAL CASTING PROCESSES

Sand casting – Sand moulds – Types of patterns – Pattern materials – Pattern allowances – Types of Moulding sand- Properties – Core making – Moulding machines – Types of moulding machines – Melting furnaces – Working principle of Special casting processes – Shell, investment casting – Lost Wax process –Centrifugal casting –Sand Casting defects.

UNIT – II

FABRICATION PROCESS

Fusion welding processes – Types of Gas welding – Equipments used – Flame characteristics – Filler and Flux materials – Arc welding equipments – Electrodes – Coating and specifications – Principles of Resistance welding – Spot/butt, seam welding – Percusion welding – Gas metal arc welding – Flux cored – Submerged arc welding –Electro slag welding – TIG welding – Principle and application of special welding processes – Plasma arc welding – Thermit welding – Electron beam welding – Friction welding –Weld defects – Brazing and soldering process.

UNIT – III

BULK DEFORMATION PROCESSES

Hot working and cold working of metals – Forging processes – Open and close die forging – Characteristics of the process – Types of Forging Machines – Typical forging operations – Rolling of metals –Types of Rolling mills –Tube piercing – Defects in rolled parts – Principles of Extrusion – Types of Extrusion – Hot and Cold extrusion – Principle of rod and wire drawing – Equipments used

UNIT–IV

SHEET METAL FORMING PROCESSES

Sheet metal characteristics – Typical shearing operations, bending and drawing operations – Formability of sheet metal –Working principle and application of special forming processes – Hydro forming –Explosive forming – Magnetic pulse forming – Peen forming – Super plastic forming – Process characteristics

UNIT – V

FORMING AND SHAPING OF PLASTICS

Types of plastics – Characteristics of forming and shaping processes – Moulding of Thermoplastics – Working principles and typical applications of – Injection moulding – Plunger and screw machines – Blow moulding –Extrusion – Typical industrical applications – Thermoforming – Processing of Thermosets – Working principles and typical applications – Compression moulding – Transfer moulding – Bonding of Thermoplastics –Induction and Ultrasonic methods.

TEXT BOOKS

1. *Hajra Choudhury ,* Elements of Workshop Technology, Vol. I and II, Media Promotors Pvt. Ltd., Mumbai, 2007
2. *Serope Kalpak Jain, Steven R, Schmid*, Manufacturing Engineering and Technology, Pearson Education , Inc. 4th Edition, 2009

REFERENCES

1. Elements of Manufacturing Processes*, B.S. Magendran Parashar & R.K. Mittal*, Prentice Hall of India,
2008
2. Manufacturing Technology, *P.N. Rao, Tata Mc Graw-Hill* Publishing Limited, 2010.
3. A text book of production technology, *P.c. Sharma, S. Chand and Company, 2010*
4. Manufacturing Process – *Begman,* John Wilely &Sons , VIII Edition, 1999

FUNDAMENTALS OF AVIONICS
(OPEN ELECTIVE -I)

III B. Tech-I Semester | **L T P C**
Course Code: A3AE18 | **3 1 - 3**

COURSE OVERVIEW:

The purpose of this course have acquired a good understanding of the major airborne avionic functions and systems and will be able to select appropriate technologies and products for a broad range of functional requirements.

COURSE OBJECTIVES:

The Course has a set of learning objectives which you should always keep in your thoughts as the semester progresses. The entire course is structured to (hopefully) help the students achieve the following objectives:

1. Avionics gives an overview on Aviation using Electronics
2. Various electronics systems used for communication
3. Devices ,Display, Flight controls can be determined
4. Every unit gives good information above advancements
5. History of various and technologies in 19^{th}-20^{th} century
6. Student can understand Airplane as a real time usage
7. Engineering aspects on Electronics to Aeronautical Engineers

COURSE OUTCOMES:

Upon successful completion of this course, the student will be able to know :

1 Technical & practical understanding about Airplane
2 Communication from ground and others means to the airplanes
3 Network systems, controlling parts & surfaces, Memory, Black box
4 Pilots control facility and communication to engine can be defined
5 Navigation aids and methods can be understood
6 Control systems, Astrionics can be processed
7 Advancements in Navigation and it techniques

SYLLABUS

UNIT - I

BASICS: Basic principles of Avionics, Typical avionics sub system in civil/ military aircraft and space vehicles.

FLIGHT DECK AND DISPLAY SYSTEMS: Flight deck display technologies, CRT, LED, LCD, Touch screen, Head up display,Electronic instrumentation systems.

UNIT - II

AUDIO AND COMMUNICATION SYSTEMS: Aircraft audio systems, basic audio transmitter and receiver principles, VHFcommunication system, UHF communication systems.

UNIT - III

RANGING AND LANDING SYSTEMS:VHF Omnirange, VOR receiver principles, distance maturity equipment, principlesof operation, Instrument landing system, localizer and glide slope.

POSITIONG SYSTEM: Global positioning system principles, triangulation, position accuracy, applications in aviation.

UNIT - IV

INERTIAL NAVIGATION SYSTEM: Principle of Operation of INS, navigation over earth, components of inertialNavigation systems, accelerometers, gyros and stabilized platform.

SURVELLIENCE SYSTEM:ATC surveillance systems principles and operation interrogation and replay standards,Collision avoidance system, ground proximity warning system.

UNIT - V

AUTO FLIGHT SYSTEM: Automatic flight control systems fly by wire and fly by light technologies, flight directorsystems, flight management systems.

TEXT BOOKS:

2. *N. S. Nagaraja(1996),Elements of electronic navigation*, 2nd edition, Tata McGraw Hill, New Delhi.
3. *Janes W. Wasson, Jeppesen Sandersen(1994*), *Avionic systems Operation and maintenance*, Sterling Book House, Mumbai.

REFERENCE BOOKS:

1. *Albert Hel Frick (2010),*Principle of Avionics, 6th edition, Avionics Communications Inc, India.
2. *E. H. J. Pallet (2010*), Aircraft Instrumentation and Integrated systems, Pearson Education, New Delhi.
3. *J. Powell (1998)*, Aircraft Radio Systems, Pitman publishers, London.

INTRODUCTION TO JETS AND ROCKETS
(OPEN ELECTIVE -I)

III B. Tech-I Semester **L T P C**
Course Code: A3AE19 **3 1 - 3**

COURSE OVERVIEW

The course is intended to serve as an introduction to air breathing propulsion systems and Rocket Propulsion Systems. Students are given a review of the first and second laws of thermodynamics, thermodynamics of OTTO, Diesel and Brayton cycles conservation equations of momentum; and derivation and application of the rocket equation. Students are provided a basic background cycle and performance analysis of ramjets, turbojets, and turbofans; propellers; Students are introduced to the main components of gas turbine engines and rockets, including inlets, turbo machinery, thrust chambers, and nozzles Introduces liquid- and solid-propellant rockets and other propulsion concepts; Various Aviation fuels and their characteristics. Students also learn about the environmental impact of propulsion systems and fuels

OBJECTIVES

1. To provide students with an overview of various aerospace propulsion systems.
2. To provide students with a sound foundation in the fundamentals of thermodynamics
3. To teach students the elementary principles of thermodynamic cycles as applied to propulsion analysis.
4. To provide students with an introduction to combustion.
5. To provide students with an introduction to Rocket theory.
6. To provide students with a working knowledge to analyze various flight propulsion systems such as turbojets, turbofans, ramjets, rockets propulsion systems.
7. To Provide Students the Knowledge of Propellers
8. To provide students with the opportunity to form teams which design aerospace propulsion system.

OUTCOMES:

1. To determine work of the OTTO, DIESEL, and BRAYTON cycles
2. To make connections between these cycles and aerospace propulsion systems
3. Calculate the key fluid properties at each component of an air-breathing and rocket engine.
4. Perform an analysis of the turbine and Compressor
5. V's required for space missions and relate these to total propellant consumption using the rocket equation.
6. Calculate thrust, throat and exit areas, and nozzle profile of a rocket engine.

SYLLABUS

UNIT-I

INTRODUCTION TO AEROSPACE PROPULSION

What is Propulsion system? Propulsive Systems – Evolution, Development, Growth and Challenges. Fundamentals of Thermodynamics – Variables, Thermodynamic Process, Introduction to IC Engines and Reciprocating Engines, Propellers and Working of Propellers,

UNIT - II:

PRINCIPLES OF JET PROPULSION

Fundamentals of jet propulsion, Working Principle, Analysis of Ideal Jet Engine cycle,Engine components- merit- significance- ideal component characteristics, Classification – turbo jet, turbo fan, turbo prop and Ramjet engines. Basic Problems based on Engine Cycle.

UNIT - III:

RAMJET, SCRAMJET ENGINES AND NOZZLES

Speed limitations of gas turbines-, Basics of Ramjets, Combustors for liquid fuel ramjet engines, Combustion Instability and its Suppression, Solid fuel Ramjet Engines, SCRAM jet engines, Applications of RAM Jet and SCRAM Jet Engines to Missiles with Examples

Nozzles- Various Nozzles, Converging-Diverging Nozzle, Variable Nozzle and Effects of Pressure Ratios on Engine Performance.

UNIT - IV:

ROCKET THEORY

Applications of Rockets, Types of Rockets, Basics of Thermal Rocket Engine-Thermodynamics and Ideal Performance Analysis, Equations of motion-Rocket Motion in free space, Tsiokovsky's equation, Rocket Parameters, Burnout range, Burnout Velocity. Some Problems

UNIT - V:

PROPELLANT ROCKETS

Solid Propulsion-Solid Propellant Rockets, Basic Configuration and Performance, Propellant Grain and Configuration, Propellant Characteristics Combustion Chamber, Ignition ProcessLiquid Propulsion - Design consideration of liquid rocket combustion chamber, injector, and propellant feed lines, valves, propellant tank outlet and helium pressurized and turbine feed systems-.BIO Fuels and Impact on the Atmosphere,Aviation turbine fuels - Requirements of aviation fuels of kerosene type.

REFERENCES:

1. Mechanics and Thermodynamics of Propulsion – Philip G Hill & Carl R Peterson , Pearson Publication – 2nd Edt
2. Rocket Propulsion Elements, Shutton, G.P., John Wiley, 1993.
3. Fuels and Combustion, Sharma, S.P. and Mohan .C., Tata McGraw Hill Publishing Co, Ltd., 1984
4. The Jet Engine – Rolls Royce
5. Gas Turbines and Jet and Rocket Propulsion, M. L. Mathur, R. P. Sharma, Standard Publishers Distributors.

INTRODUCTION TO AIRCRAFT INDUSTRY
(OPEN ELECTIVE -II)

III B. Tech-II Semester **L T P C**
Course Code: A3AE27 **3 1 - 3**

I. COURSEOVERVIEW:

The aim is to introduce students the overview of the Aircraft Industry. The course covers basic design process, Air craft Stability & control and different mechanical systems. After completion of the course the student gains adequate knowledge to design and the basic requirements of an aircraft to fly.

II. COURSE OBJECTIVES:

1. Familiarize students with the important issues and methodologies of aircraft design.
2. Illustrate the process of aircraft synthesis as an outcome of the integration of the disciplines of stability and control.
3. Illustrate the process of aircraft synthesis as an outcome of the integration of the disciplines of mechanical systems.
4. Illustrate the process of aircraft synthesis as an outcome of the integration of the disciplines of electrical systems
5. Develop the ability to function as a member of a team in a design setting; including the ability to conduct a peer review of the other team members.
6. Familiarize students with Federal Aviation Regulations as a means for ensuring passenger safety.
7. Further enhance and develop technical communication skills.

III. COURSE OUTCOMES:

1. Discuss the importance of conceptual design process and studying the different phases of designing process involved in the design.
2. Understand the Integrated product development and principles of baseline design– stability & control, performance and constraint analysis
3. Understand the working process of a electrical systems.
4. Demonstrate on direct energy conversion and their principles.
5. Understand the working process of mechanical systems.

SYLLABUS

UNIT – I

AIRCRAFT INDUSTRY OVERVIEW: Evolution and History of Flight, Types Of Aerospace Industry, Introduction to agesof engineering, Aerospace Manufacturing, Introduction to the space environment & human space exploration.

UNIT – II

INTRODUCTION TO AIRCRAFTS, DURATION: Basic components of an Aircraft, Structural members, Aircraft AxisSystem, Aircraft Motions, Control surfaces and High lift Device. Types of Aircrafts: Lighter than Air/Heavier than Air Aircrafts Conventional Design Configurations based on Power Plant Location, Wing vertical location, intake location, Tail Unit Arrangements, Landing Gear Arrangements. Unconventional Configurations-Biplane, Variable Sweep, Canard Layout, Twin Boom Layouts, Span loaders, Blended Body Wing Layout, STOL and STOVL Aircraft, Stealth Aircraft. Advantages and disadvantages of these Configurations.

UNIT - III

INTRODUCTION TO AIRCRAFT SYSTEMS: Types of Aircraft Systems. Mechanical Systems. Electrical and ElectronicSystems. Auxiliary systems.

MECHANICAL SYSTEMS: Introduction to Environmental control systems (ECS), Pneumatic systems, Hydraulic systems, Fuel systems,Landing gear systems, Engine Control Systems, Ice and rain protection systems, Cabin Pressurization and Air Conditioning Systems, Steering and Brakes Systems Auxiliary Power Unit.

ELECTRICAL SYSTEMS: Basics Avionics, Flight controls, Autopilot and Flight Management Systems, Navigation Systems,Communication, Information systems, Radar System.

UNIT - IV

BASIC PRINCIPLES OF FLIGHT: Significance of speed of Sound, Air speed and Ground Speed, Properties ofAtmosphere, Bernoulli's Equation, Forces on the airplane, Airflow over wing section, Pressure Distribution over a wing section, Generation of Lift, Drag, Pitching moments, Types of Drag, Lift curve, Drag Curve, Lift/Drag Ratio Curve, Factors affecting Lift and Drag, Center of Pressure and its effects. Aerofoil Nomenclature, Types of Aerofoil, Wing Section- Aerodynamic Center, Aspect Ratio, Effects of lift, Drag, speed, Air density on drag.

UNIT - V

BASICS OF FLIGHT MECHANICS: Mach Angles, Sonic and Supersonic Flight and its effects.

STABILITY AND CONTROL: Degree of Stability- Lateral, Longitudinal and Directional Stability and controls of Aircraft.

TEXT BOOKS:

1. *Anderson J.D. (2012),*Introduction to Flight, 7th edition, McGraw Hill, New York.
2. *Anderson J.D.(2011),*Aircraft Performance and Design, Tata McGraw Hill Education Private Limited, New Delhi
3. *Shevell (2004),*Fundamentals of Flight, 2nd edition, Pearson Education Limited, New Delhi
4. *Allan Seabridge, Ian Moir (2008),*Aircraft Systems: Mechanical, Electrical and Avionics Subsystems Integration,3rd edition, John Willey & Sons, New York.

REFERENCES BOOKS:

1. *A.C. Kermode (2012),*Mechanics of Flight, 12th edition, Pearson Education Limited, New Delhi.
2. *Kermode, A.C. (1989*), Flight without Formulae, 5th edition, Pearson Education Limited, New Delhi.
3. *Raymer Daniel (2002),*Aircraft Design: A Conceptual Approach, AIAA Publisher, USA.

NON DESTRUCTIVE TESTING METHODS

(OPEN ELECTIVE -II)

III B. Tech-I Semester **L T P C**
Course Code: A3AE28 **3 1 - 3**

COURSE OVERVIEW:

The aim is to introduce students the overview of the non destructive testing methods of materials. The course covers NDE, Ultrasonic, MPI testing of metal parts. It gives an idea about selection of the testing criteria. It briefly describe the thermo-graph and radio graph methods of testing and provide selection properties for different tests.

COURSE OBJECTIVES:

This course has the basic idea of the properties of steal and ferrous metals. The objectives aim to:

1. **Identify** the basic methods of testing.
2. **Understand** the concept of non destructive testing.
3. **Describe** the various types of NDT tests carried out on components.
4. **Describe** ultrasonic method of testing the materials.
5. **Analyze** the different types of test carried out on components and surfaces.
6. **Understand** the properties of materials suitable for NDT test.
7. **Understand** the radiography uses in engineering.

COURSE OUTCOMES:

At the end of the course the students are able to:

1 This subject gives student a technical knowledge about different types of tests carried out on components or material.
2 Identify the requirements of testing criteria as per material composition.
3 Understand the theory of non destructive testing methods are used.
4 Determine the type of requirement of non destructive test.
5 Distinguish between the various NDT test as Ultrasonic and Eddy current methods.
6 Understand the properties of radiation used in engineering.
7 Describe the various types of non destructive test used to determine the surface cracks.

SYLLABUS

UNIT I

OVERVIEW OF NDT - NDT Versus Mechanical testing, Overview of the Non Destructive Testing Methods for the detection of manufacturing defects as well as material characterization. Relative merits and limitations, various physical characteristics of materials and their applications in NDT, Visual inspection.

UNIT II

SURFACE NDE METHODS-Liquid Penetrant Testing – Principles, types and properties of liquid penetrants, developers, advantages and limitations of various methods, Testing Procedure, Interpretation of results. Magnetic Particle Testing- Theory of magnetism, inspection materials Magnetisation methods, Interpretation and evaluation of test indications.

UNIT III

THERMOGRAPHY AND EDDY CURRENT TESTING- Principles, Contact and non contact inspection methods, Techniques for applying liquid crystals, Advantages and limitation – infrared radiation and infrared detectors, applications. Eddy Current Testing-Generation of eddy currents, Properties of eddy currents, Eddy current sensing elements, Probes, Instrumentation, Types of arrangement, Applications, advantages, Limitations.

UNIT IV

ULTRASONIC TESTING AND ACOUSTIC EMISSION - Ultrasonic Testing-Principle, Transducers, transmission and pulse-echo method, straight beam and angle beam, instrumentation, data representation, A/Scan, B-scan, C-scan. Phased Array Ultrasound, Time of Flight Diffraction. Acoustic Emission Technique ¡VPrinciple, AE parameters, Applications

UNIT V

RADIOGRAPHY - Principle, interaction of X-Ray with matter, imaging, film and film less techniques, types and use of filters and screens, geometric factors, Inverse square, law, characteristics of films – graininess, density, speed, contrast, characteristic curves, Penetrameters, Exposure charts, Radiographic equivalence. Fluoroscopy- Xero-Radiography, Computed Radiography, Computed Tomography

TEXT BOOKS:

1. *Baldev Raj, T.Jayakumar, M.Thavasimuthu* ¡§Practical Non-Destructive Testing¡¨, Narosa Publishing House, 2009.
2. *Ravi Prakash,* ¡§Non-Destructive Testing Techniques¡¨, 1st revised edition, New Age International Publishers, 2010

REFERENCES:

1. *ASM Metals* Handbook,¡¨Non-Destructive Evaluation and Quality Control¡¨, American Society of Metals, Metals Park, Ohio, USA, 200, Volume-17.
2. *Paul E Mix,*Introduction to Non-destructive testing: a training guide¡¨, Wiley, 2nd Edition New Jersey, 2005
3. *Charles, J. Hellier*Handbook of Non-destructive evaluation¡¨, McGraw Hill, New York 2001.

FUNDAMENTALS OF FINITE ELEMENT METHOD
(OPEN ELECTIVE -II)

III B. Tech-I Semester **L T P C**
Course Code: A3AE29 **3 1 - 3**

COURSE OVERVIEW:

Finite element and modeling methods is used for finding approximate solutions of partial differential equations as well as of integral equations. The solution approach is based either on eliminating the differential equation completely (steady state problems), or rendering the PDE into an approximating system of ordinary differential equations, which are then numerically integrated using standard techniques such as Euler's method, Runga-Kutta, etc.The Finite Element Method is a good choice for solving partial differential equations over complicated domains (like cars and oil pipelines), when the domain changes (as during a solid state reaction with a moving boundary), when the desired precision varies over the entire domain, or when the solution lacks smoothness.

COURSE EDUCATIONAL OBJECTIVES:

Upon the completion of the course, students should be able to:

1. Macro and Micro mechanical models
2. Generalized coordinates
3. Discretization
4. Properties and derivation
5. Approximations and error control
6. Mathematical tools and fem tools
7. Mesh generation Techniques

COURSE OUTCOMES:

This course uses lectures, assignments and Home works to enable the students:

1. Know the Macro and Micro mechanical models
2. Understand the Generalized coordinates
3. Understand the concepts of Discretization
4. Know the properties and derivations
5. Understand the concepts of Approximations and error control
6. Understand the concepts of Mathematical tools and fem tools
7. Understand the Symmetries in fields
8. Understand the Mess generation Techniques

SYLLABUS

UNIT - I

INTRODUCTION TO FEM: Basic concept, historical background, application of FEM, general description, comparison ofFEM with other methods. Basic equations of elasticity, Stress, strain relations, Strain, Displacement relations.

ONE DIMENSIONAL PROBLEM: Finite element modeling coordinates and shape functions. Potential Energy approach:Assembly of Global stiffness matrix and load vector. Finite element equations, Treatment of boundary conditions.

UNIT - II

ANALYSIS OF BEAMS: Hermite shape functions-Element stiffness matrix for two nodes, two degrees of freedom pernode beam element, load vector, deflection, stresses.

UNIT - III

2-D PROBLEMS:CST-Stiffness matrix and load vector, Isoparametric element representation, Shape functions,convergence requirements, Problems.

UNIT - IV

STEADY STATE HEAT TRANSFER ANALYSIS: one dimensional analysis of a fin and two dimensional analysis of thinplate.

UNIT - V

DYNAMIC ANALYSIS: Formulation of finite element model, element matrices, Lumped and consistent mass matrices-evaluation of Eigen values and Eigen vectors for a stepped bar.

TEXT BOOKS:

1. *R. Tirupathi Chandrapatla (2011),*Introduction to Finite Elements in Engineering, 4rd edition, Pearson Education, India.
2. *S. S. Rao (2012*), The Finite Element Methods in Engineering, 5th edition, Elsevier, USA.
3. *V. David. Hutton (2010*), Fundamentals of finite elements analysis, 1st edition, Tata McGraw-Hill education (P) Ltd, New Delhi, India.

REFERENCE BOOKS:

1. *Chennakesava R. Alavala (2009),Finite elements methods*, 1st edition, second reprint, Prentice Hall of India publishers, New Delhi, India.
2. J*. N. Reddy (2010*), An introduction to Finite Element Method, 3rd edition, Tata McGraw hill education (P) Ltd, New Delhi, India.
3. *Kenneth H. Huebner, Donald L. Dewhir*st, Douglas *E. Smith , Ted G. Byrom (2009),*The Finite Element Methodfor Engineers, 3rdedition, *John Wiley & sons* (ASIA) Pvt. Ltd., New York.
4. Finite Element and Modelling Methods, *KSRK Prasad*

GUIDANCE AND CONTROL OF AEROSPCAE VEHICLES
(OPEN ELECTIVE -III)

IV B. Tech-I Semester **L T P C**
Course Code: A3AE39 **3 1 - 3**

COURSE OVERVIEW:

Aircraft flight control system design and analysis using classical and modern control design methods. Aircraft flying qualities and design of flight control systems to satisfy flying qualities dynamic objectives**.**

COURSE OBJECTIVE:

1. To introduce the concepts of Navigation, guidance and control
2. To familiarize with various ways in which aerospace vehicles are guided and controlled
3. the dynamic objectives which students also learn to acheive by designing flight control systems. The unique aspect of the course is that students come to appreciate the interrelationships between control design methodology (each with its own mechanisms for adjustment of closed-loop dynamic properties) with both achieved and desired aircraft flying qualities.
4. Aircraft Handling Qualities (classical modal properties, equivalent systems, bandwidth criterion, Neal-Smith criterion, Smith-Geddes criterion)
5. Design of Stability Argumentation Systems and Command Augmentation Systems using root locus
6. Design of multi-input-multi-output control systems using eigen-space assignment and the linear quadratic regulator.

COURSE OUT COMES

1. To derive models of dynamic systems and obtain transfer functions;
2. To analyze stability of linear time-invariant systems;
3. To perform time domain analysis and design a controller to meet time-domain specifications;
4. To apply the root locus method to the analysis of systems and design of controllers;
5. To apply frequency response methods to the analysis of systems and design of controllers; and
6. To analyze simple modern multiple-input multiple output systems using state-space methods.
7. To Appreciate how complex aerospace vehicles navigate in air and space
8. To Analyse the control systems which assist in maneuvering these vehicles

SYLLABUS

UNIT I

NAVIGATION: Introduction, Basic Principles and Definitions; Dead reckoning and Position Fixing, Celestial, Radio, Inertial Navigation; Principle and Construction of Accelerometers, Mechanical Gyros and Ring Laser Gyros, Inertial Measurement Units, Navigation Equations, Sensor Error Models, Kalman Filter, Attitude Heading Reference System, GPS, Terrain Reference Navigation

UNIT II

GUIDANCE: Optimal Terminal Guidance of Interceptors, Optimal Terminal Guidance - planar and non-planar, Robust and Adaptive Guidance, Guidance with State Feedback , Guidance with Normal Acceleration Input , Minimum Energy Orbital Transfer

UNIT III

GUIDANCE AND CONTROL OF AIRCRAFT: Powered Flying Controls, Helicopter Flight Controls, Fly-by-Wire Flight Control, Control laws, Redundancy and Failure Survival, Digital Implementation, Fly-by-Light Flight Control, Auto Pilot, Flight Management Systems, Unmanned Aerial Vehicles

UNIT IV

CONTROL TECHNIQUES/ CONTROL OF ROCKETS AND MISSILES: Open-loop and Closed Loop Control Systems, Multi-variable Optimization, Optimal Control of Dynamic Systems, Hamiltonian and Minimum Principle and Jacobi-Bellman Equation, Linear Time-Varying System with Quadratic Performance Index.

UNIT V

CONTROL OF SPACECRAFT: Launch of Satellite/ Spacecraft, Terminal Control of Spacecraft Attitude, Optimal Single-Axis Rotation of Spacecraft, Multi-axis Rotational Maneuvers of Spacecraft, Spacecraft Control Torques, Rocket Thrusters, Reaction Wheels, Momentum Wheels and Control Moment Gyros, Torques.

TEXT BOOKS

1. *Tewari, A*.“Advanced Control of Aircraft, Spacecraft and Rockets”, John Wiley & Sons, Ltd, Chichester, UK, 2011
2. R.*P.G Collinson*, “Introduction to Avionics Systems”, Springer; 3rd ed. edition, 2011

REFERENCE BOOKS

1. *Noton,M*. “Spacecraft navigation and Guidance”, Springer-Verlag, Germany, 1998.
2. *Richard H. Battin* “An Introduction to the Mathematics and Methods of Astrodynamics”, AIAA, 1999.
3. *Nagrath. M. and Gopal. I.J.* “Control Systems Engineering”, Wiley eastern Ltd.,.2001
4. *Nagoorkani.A* “Control Systems”, RBA publications, first edition ninth reprint 2002

WIND TUNNEL TECHNIQUES
(OPEN ELECTIVE -III)

IV B. Tech-I Semester **L T P C**
Course Code: A3AE40 **3 1 - 3**

COURSE OVERVIEW:

This course is to develop the understanding of the various types of wind tunnel and researching in the current field for calculation of flow over aerofoil or aircraft or model /prototype. In this course, various types of techniques used for flow visualization and computer data acquisition, pressure transducer techniques for calculation of flow properties using different types of equipments for different types of flow with respect to models.

COURSE OBJECTIVE

1. Define Lift and Drag.
2. Describe the different types of wind tunnels.
3. Describe the major wind tunnel facilities.
4. Summarize the difference between high speed and low speed wind tunnels.
5. Demonstrate the boundary layer profile.

COURSE OUTCOMES

1. Ability to develop and understand basic of aerodynamics
2. Ability to develop and understand flow visualization techniques over model
3. Ability to understand concepts of low speed and high speed wind tunnels
4. Ability to understand measurement and balancing of loads on model
5. Ability to understand the different types of equipments for measuring pressure and velocity
6. Ability to design and consideration of wind tunnels

SYLLABUS

UNIT I

WIND TUNNELS: Wind Tunnel, layouts and nomenclature, Types of Wind Tunnels – continuous and intermittent -closed circuit and open circuit - closed jet and open jet test section – application. Special purpose tunnels - Smoke Tunnels – Water Tunnels – Spin tunnel, automobile wind tunnel and environmental wind tunnel Important parameters of flow similarity. types of flow similarities for compressible and incompressible flows Model power consideration.

UNIT II

FLOW VISUALIZATION TECHNIQUES: Path – Streak – Stream and Timelines; Techniques: Smoke, Tuft, Streaks, Surface oil flow. Pressure measurements: Manometers – U-Tube, Inclined and Precession. Bourdon Gauge and Pressure Transducer – Strain Gauge, Semi conductor - Absolute and Differential. Velocity Measurements: Pivot Tube – Static and Total. Calibration of test section: Test section flow calibration and Boundary Layers.

UNIT III

MEASUREMENTS OF FORCES AND MOMENTS: Forces, moments and Reference Frames – Balances – Internal and External - Requirements and Specifications – Fundamentals off Model Installations. Boundary correction types of blockages: 2-d.

UNIT IV

HIGH SPEED WIND TUNNELS: Supersonic Wind Tunnels and - Classification - Runtime - Compressors - Charging Times - nozzle Mass Flows - Starting Loads - Model Size – Calibration. Hypersonic Wind Tunnels: Classification – Runtime – Vacuum Tanks – Vacuum pumps – Evacuation Times. Shock Tube: Driver – driven – Vacuum Pumps – Diaphragm.

UNIT V

HIGH SPEED FLOW VISUALIZATIONS AND MEASUREMENTS: Schlieren and Shadow Graph – Pressure sensitive Paints – Temperature sensitive Paints – Force Measurements – Strain Gauge Balances – Pressure Measurements.

TEXT BOOKS

1. *Rae, W.H. and Pope,* A. “Low Speed Wind Tunnel Testing”, *John Wiley* Publication, 1999
2. *Pope, A., and Goin, L.,* “High Speed wind Tunnel Testing”, *John Wiley*Publication , 1999
3. *Pope, J B BARLOW* “LOW SPEED WIND TUNNEL TESTING “ 3 EDITION J.W PUBLICATION

REFERENCE BOOKS

1. *John D. Anderson,* Jr., "Fundamentals of Aerodynamics", Third edition, McGraw-Hill publications, 2001
2. *E L Houghton* and PW Carpenter, "Aerodynamics for Engineering students", Fourth edition, Edward Arnold publications, 1993.
3. *L.M Miline Thomson,* “Theoretical Aerodynamics”, 1996

INTRODUCTION TO AEROSPACE TECHNOLOGY
(OPEN ELECTIVE -III)

IV B. Tech-I Semester **L T P C**
Course Code: A3AE41 **3 1 - 3**

COURSE OVERVIEW:

Introduction to Aerospace technology subject is essential for the engineers who start up their career in aeronautical engineering. It gives the concepts of First aeronautical engineers, physical fundamental quantities and the standard atmosphere, the performance of the airplane. It also gives the concepts of satellite systems and the human exploration. The first step in the design process is the identification, classification and understanding the concept of aerospace. These concepts play a crucial role in the present aerospace industry and through understanding of these topics will be help to the airplane industry. This course provides theoretical as well as practical basis for understanding the concepts of engineering.

COURSE OBJECTIVES:

The main objective of the subject is to study the basic concepts on history, space environment, flight mechanics and satellite engineering. The student should be able to know the basic principles for the aircraft to fly and the components of the aircraft. The student should be able to distinguish between the aerodynamics, propulsion systems and flight mechanics of the aircraft. To meet the challenge of ensuring excellence in engineering education, the issue of quality needs to be addressed, debated and taken forward in a systematic manner. The major emphasis of accreditation process is to measure the outcomes of the program that is being accredited. So, all students understand the depth and approach of course to be taught through this question bank, which will enhance learner's learning process.

1. **Understand** the History of aeronautics
2. **Explain** the exploration of solar system
3. **Demonstarte** the Elements of airplane performance
4. **Understand** the Standard atmosphere
5. **Integrate** the sub systems required for a satellite
6. **Explain** the Space flight (Astronautics) dynamics
7. **Explain** the human space exploration

COURSE OUTCOMES:

This course uses lectures, assignments and home works to the students. The teaching methods include regular class work, Problem solving, technical quiz, and seminars to enable the students:

1. Ability to **describe** the air vehicles used in the history
2. Ability to **explain** the commercial use of space
3. Ability to **explain** the Elements of airplane performance
4. Ability to **understand** the Standard atmosphere
5. Ability to **explain** the requirements of a satellite
6. Ability to **determine** the sub systems of a satellite
7. Ability to **explain** the missions sent to explore space

SYLLABUS

UNIT- I

HISTORY OF FLIGHT - Balloons and dirigibles, heavier than air aircraft, commercial air transport, introduction of jet aircraft, helicopters, conquest of Space. Commercial use of Space, exploring Solar system and beyond.

UNIT-II

FLIGHT VEHICLE PERFORMANCE AND STABILITY - Anatomy of the airplane, helicopter, launch vehicles and missiles, space vehicles. Static forces and moments on the vehicle.

UNIT –III

THE SPACE ENVIRONMENT - Earth‘s atmosphere, the standard atmosphere. The temperature extremes of space, laws of gravitation, low earth orbit, microgravity, benefits of microgravity. The near earth radioactive environment. The magnetosphere, environmental impact on spacecraft. Meteoroids and micrometeoroids, space debris. Planetary environments.

UNIT –IV

SATELLITE SYSTEMS ENGINEERING - Satellite missions, an operational satellite system, elements of satellite. Satellite bus subsystems. Satellite structures, mechanisms and materials. Power systems. Communication and telemetry. Thermal control. Space missions. Mission objectives.

UNIT-V

HUMAN SPACE EXPLORATION - Goals of human space flight missions. Historical background. The soviet and US missions. The mercury, Gemini, Apollo (manned flight to the moon), Skylab, Apollo-Soyuz, Space Shuttle. International Space Station, extravehicular activity, The space suit. The US and Russian designs. Life Support systems. Flight safety. Indian effort in aviation, missile and space technology.

TEXT BOOKS

1. Interactive Aerospace Engineering and Design, (with software and re reference material on CD), *Newman , D.*, McGraw-Hill, 2002,ISBN 0-07-112254-0
2. Aircraft Flight, *Barnard, R.H. and Philpot, D.R., Pearson, 3/e, 2004*, ISBN: 81-297-0783-7.
3. Introduction to Flight, Anderson, J.*D., Tata Mc Graw-Hill, 5/e, 2007*, ISBN: 0-07-006082-4

REFERENCE BOOKS

1. Numerous references cited in Newman‘s book
2. *NASA* Education Home page, http:// WWW.ne.nasa.gov/ education.
3. The Wikipedia: Transportation Systems, Air Transportation, and Aviation

OPEN ELECTIVES
OFFERED BY
ELECTRICAL AND ELECTRONICS DEPARTMENT

OE1		OE2		OE3	
A3EE15	Electrical Engineering Materials	A3EE21	Solar Energy and Applications	A3EE32	Energy Audit and Management System
A3EE16	Electrical Wiring and Safety Measures	A3EE22	Non-Conventional Power Generation	A3EE33	Energy Storage Systems

ELECTRICAL ENGINEERING MATERIALS
(OPEN ELECTIVE – 1)

III B. Tech-I Semester **L T P C**
Course Code: A3EE15 **3 - - 3**

COURSE OVERVIEW:
In almost every case, the work of engineers finds application through materials. The future of Electrical Engineering itself is squarely dependent upon the ability to understand, exploit and apply ever-new electronic, photonic and magnetic properties of materials and with the advent of "nanotechnology" the richness of new properties and the impact of materials on electrical engineers has, arguably, never been more significant. With a greater understanding of materials, electrical engineers are already leaders in the most pressing societal issues, from renewable energy and environmental sustainability to ultra-portable communication and biocompatible medical devices.

PREREQUISITES:
Knowledge on engineering physics

COURSE OBJECTIVES:
To understand about various electrical engineering materials

COURSE OUTCOMES:
1. Analyze the various engineering materials.
2. Application of various engineering materials.

SYLLABUS

UNITI:CONDUCTORS
Classification: High conductivity, high resistivity materials, fundamental requirements of high conductivity materials and high resistivity materials, mobility of electron in metals, commonly used high conducting materials, copper, aluminum, bronze brass, properties, characteristics, constantan, platinum, nichrome, properties, characteristics and applications, materials used for contacts.

UNIT II: SEMICONDUCTORS
General concepts, energy bands, types of semiconductors, Fermi Dirac distribution, intrinsic Semi-conductors, extrinsic Semi-conductors, hall effect, drift, mobility, diffusion in Semiconductors, Semi-conductors and their applications, superconductors.

UNIT III: DIELECTRICS AND INSULATORS
Properties of gaseous, liquid and solid dielectric, dielectric as a field medium, electric conduction in gaseous, liquid and solid dielectric, breakdown in dielectric materials, mechanical and electrical properties of dielectric materials, effect of temperature on dielectric materials, polarization, loss angle and dielectric loss, petroleum based insulating oils, transformer oil, capacitor oils, properties, solid electrical insulating materials, fibrous, paper boards, yarns, cloth tapes, sleeving wood, impregnation, plastics, filling and bounding materials, fibrous, film, mica, rubber, mica based materials, ceramic materials, classification of insulation (solid) and application in AC and DC machines.

UNIT IV: MAGNETIC MATERIALS

Soft and hard magnetic materials, diamagnetic, paramagnetic and ferromagnetic materials, electric steel, sheet steel, cold rolled grain oriented silicon steel, hot rolled grain oriented silicon steel, hot rolled silicon steel sheet, hysteresis loop, hysteresis loss, magnetic susceptibility, coercive force, curie temperature, magneto-striction.

UNIT V: OPTICAL PROPERTIES OF SOLIDS

Photo emission, photo emission materials, electro luminescence junction diode, photo emitters, photo transistor, photo resistors, injunction lasers, optical properties of semiconductors, application of photo sensitive materials (CRT, Tube light, photo panels etc.).

Text Books:

1. “Electrical Engineering Materials”,Dekker,PHI Pbs.
2. “Electrical Engineering Materials”, Indulkar,S.Chand

Reference Books:

1. “Electrical Engineering Materials”, Tareev
2. “Electrical Engineering Materials”, Yu. Koritsky.
3. “Electrical Engineering Materials”, R.K.Rajput, Laxmi Pbs.

ELECTRICAL WIRING AND SAFETY MEASURES
(OPEN ELECTIVES-1)

IIIB.Tech-ISemester **L T P C**
CourseCode:A3EE16 **3 - - 3**

COURSE OVERVIEW:

The course will be of great interest to all professionals who would like to learn about the electrical wiring system. It will also be of interest to all learners who are interested in developing a career in the field and learning the practical aspects of the trade. If you are interested in a career in construction, you may find this course of general professional interest. If you always thought you would like to know more about electrical systems, then this might just be the opportunity you have been waiting for to learn more.

COURSE OBJECTIVES:

1. To Study the wiring diagram of residential.
2. To understand the Safety measures of Electrical wiring

PRE-REQUISITE(S):

Knowledge of electrical equipments, Electrical units

COURSE OUTCOMES:

The student will be able to:

1. Know safety measures & state safety precautions.

2. Test single phase, three phase transformer, DC & AC machine as per IS.

3. Ascertain the condition of insulation & varnishing if necessary.

4. Identify faults & measures to repair faults.

SYLLABUS

UNIT-1 BASICS OF ELECTRICAL INSTALLATIONS

Electric Supply System, Three phase four wire distribution system, Protection of Electric Installation against over load, short circuit and Earth fault, General requirements of electrical installations, testing of installations, Types of loads, Systems of wiring, Service connections, Service Mains, Sub-Circuits, Location of Outlets, Location of Control Switches, Location of Main Board and Distribution board, Guide lines for Installation of Fittings, Load Assessment, Permissible voltage drops and sizes of wires, estimating and costing of Electric installations.

UNIT II EARTHING

Introduction & importance, Factors affecting Earth Resistance, Methods of earthling Substation and Transmission tower earthling, Neutral and Earth wire, Transformer Neutral Earthling.

UNIT-III SAFETY & PREVENTION OF ACCIDENTS

Definition of terminology used in safety , I.E. Act & statutory regulations for safety of persons & equipments working with electrical installation . Dos & don'ts for substation operators as listed in IS. Meaning & causes of electrical accidents factors on which severity of shock depends.

UNIT-IV RESIDENTIAL BUILDING ELECTRIFICATION

General rules guidelines for wiring of Residential Installation and positioning of equipments. Principles of circuit design in lighting and power circuits. Procedures for designing the circuits and deciding the number of sub- circuits. Method of drawing single line diagram & wiring diagram.

UNIT-V INDIAN ELECTRICITY RULES FOR CONSUMER ENDS& SUBSTATION AND METERS

Rule 28 : Voltage level definitions. Rule 30: Service lines & apparatus on consumer premises.
Rule 31: Cut-out on consumer's premises. Rule46: Periodical inspection & testing of consumer's installation.
Rule 47: Testing of consumer's installation. Rule 54: Declared voltage of supply to consumer.
Rule 55: Declared frequency of supply to consumer.
Rule 56: Sealing of meters & cut-outs.
Rule 77: Clearances above ground of the lowest conductor. Rule 79: Clearances between conductors & trolley wires.
Rule 87: Lines crossing or approaching each other. Rule 88: Guarding.

Text Books:

1. K.B. Raina, S.K. Bhattacharya Electrical Design;Estimating and costing New Age International (p) Limited, New Delhi Surjit Singh.

2. Electrical Estimating and costing Dhanpat Rai and company, New Delhi .J.B.Gupta

3.A course in Electrical Installation, Estimating & costing S.K.Kataria & sons,S.L. Uappal .

4. Electrical wiringEstimating and costing Khanna Publication. ,A.K. Sawhney

5. Electrical Machine Design Danpat Rai & co.

6. The Electricity Rule 2005Universal Law Publishing Co. Pvt. Ltd. N. AlagappanS. Ekambaram

7. Electrical Estimating and costing Tata Mc Graw Hill Publication, New Delhi ,Surjit Singh

8. Tarlok Sibgh Installation, Commissioning & Maintenance of Electrical Equipment S.K. Kataria & Sons

9. B.V.S.Rao Operation & Maintenance of Electrical Machines Vol I & II Media Promoters & Publisher Ltd. Mumbai

SOLAR ENERGY AND APPLICATIONS
(OPEN ELECTIVE – 2)

III B.Tech -II Semester L T P C
CourseCode:A3EE21 3 - - 3

COURSE OVERVIEW:

Introduction to principles and technologies for solar thermal energy collection, conversion, and utilization. Various solar heat collection and conversion systems. Solar heating systems, liquid based solar heating systems for buildings. Simple to complex problems of solar thermal energy conversion and storage identification, formulation and solving

PREREQUISITE(S):

Basic knowledge on photovoltaic cell, p-n junction diode, semi conductors**.**

COURSE OBJECTIVES:

1.To introduce the basic concepts and novel technologies in solar thermal systems; to provide a balance between both frontier technology updates and existing solar thermal energy strategies, in both a quantitative and qualitative way.
2.To develop skills to design, model, analyze and evaluate solar thermal systems.
3.To develop creative thinking and to deal with complex multi-disciplinary solar thermal energy projects that involve the provision of effective and efficient solutions.
4.To provide students for practical training in the design of different solar thermal systems, such as water heating and control, solar collection, solar energy storage and system design.

COURSE OUTCOMES:

A. Be able to understanding of principles and technologies for solar thermal energy collection, conversion and utilization
B. Be able to understanding of solar heating systems, liquid based solar heating systems for buildings.
C. Be able to identify, formulate and solve simple to complex problems of solar thermal energy conversion and storage.
D. Be able to identify and understand solar thermal systems' components and their function.
E. Be able to analyze hot water load and solar resource data and use this information to properly size a solar thermal system.

SYLLABUS

UNIT – I PRINCIPLES OF SOLAR RADIATION:

Role and potential of new and renewable source, the solar energy option, Environmental impact of solar power, physics of the sun, the solar constant, extraterrestrial and terrestrial solar radiation, solar radiation on titled surface, instruments for measuring solar radiation and Sun shine, solar radiation data.

UNIT – II SOLAR ENERGY COLLECTORS:

Flat plate and concentrating collectors, classification of concentrating collectors, orientation and thermal analysis, advanced collectors.

STORAGE AND APPLICATIONS:
Different methods of solar energy storage, Sensible, latent heat and stratified storage, solar ponds. Solar Applications- solar heating /cooling technique, solar distillation and drying.

UNIT – III PHOTO VOLTAICS (PV):
Fundamentals of solar cells, types of solar cells, semiconducting materials, band gap theory, absorption of photons, excitations and photo emission of electrons, band engineering.
PV CELL PROPERTIES:
Solar cell properties and design, p-n junction photodiodes, depletion region, electrostatic field across the depletion layer, electron and holes transports, device physics, charge carrier generation, recombination and other losses, I-V characteristics, output power.

UNIT – IV SOLAR CELL APPLICATIONS:
PV cell interconnection, module structure and module fabrication, Equivalent circuits, load matching, efficiency, fill factor and optimization for maximum power, Design of stand-alone PV systems, system sizing, device structures, device construction, DC to AC conversion, inverters, on-site storage and grid connections.

UNIT – V COST ANALYSIS AND ENVIRONMENTAL ISSUES:
Cost analysis and pay back calculations for different types of solar panels and collectors, installation and operating costs, Environmental and safety issues, protection systems, performance monitoring.

ALTERNATIVE ENERGY SOURCES:
Solar Energy: Types of devices for Solar Energy Collection, Thermal Storage System. Control Systems, Wind Energy, Availability, Wind Devices, Wind Characteristics, Performance of Turbines and systems.

TEXT BOOKS:

1.G. D. Rai (2009), *Non-Conventional Energy Sources*, 4th edition, Khanna Publishers, New Delhi.

2.Martin A. Green (2008), *Solar Cells: Operating Principles, Technology and system Applications*, 1st edition,Prentice Hall, New Delhi.

REFERENCES BOOKS:

1.Sukatme (2008), Solar Energy, 3rd Edition, McGraw Hill Companies, New Delhi.

2.D. Yogi gosuami, Frank Kreith, Jan F. Kreider (2000), Principles of Solar Engineering, 2nd edition, Taylor & Francis, USA.

NON-CONVENTIONAL POWER GENERATION
(OPEN ELECTIVE-2)

III B.Tech -II Semester **L T P C**
Course Code: A3EE22 **3 - - 3**

COURSE OVERVIEW:

Non – Conventional Power Generation deals with knowledge on solar power generation and implementation. It deals with solar energy collection, storage and application.

PREREQUISITE(S): Basic knowledge on photo voltaic cells

COURSE OBJECTIVES:

The course should enable the students to:

I. Demonstrate power generation systems including major subsystems.
II. Understand basic working principles of nuclear power generation systems.
III. Apply knowledge of solar power generation systems in design and implementation to obtain clean energy.

COURSE OUTCOMES:

I. Understand basic working principles of nuclear power generation systems.
II. Apply knowledge of solar power generation systems in design and implementation to obtain clean energy.

SYLLABUS

UNIT – I PRINCIPLES OF SOLAR RADIATION:
Role and potential of new and renewable source, the solar energy option, Environmental impact of solar power, physics of the sun, the solar constant, extraterrestrial and terrestrial solar radiation, solar radiation on titled surface, instruments for measuring solar radiation and Sun shine, solar radiation data.

UNIT – II SOLAR ENERGY COLLECTORS:
Flat plate and concentrating collectors, classification of concentrating collectors, orientation and thermal analysis, advanced collectors.

STORAGE AND APPLICATIONS:
Different methods of solar energy storage, Sensible, latent heat and stratified storage, solar ponds. Solar Applications- solar heating /cooling technique, solar distillation and drying.

UNIT – III PHOTO VOLTAICS (PV):
Fundamentals of solar cells, types of solar cells, semiconducting materials, band gap theory, absorption of photons, excitations and photo emission of electrons, band engineering.

PV CELL PROPERTIES:
Solar cell properties and design, p-n junction photodiodes, depletion region, electrostatic field across the depletion layer, electron and holes transports, device physics, charge carrier generation, recombination and other losses, I-V characteristics, output power.

UNIT – IV SOLAR CELL APPLICATIONS:
PV cell interconnection, module structure and module fabrication, Equivalent circuits, load matching, efficiency, fill factor and optimization for maximum power, Design of stand-alone PV systems, system

sizing, device structures, device construction, DC to AC conversion, inverters, on-site storage and grid connections.

UNIT – V COST ANALYSIS AND ENVIRONMENTAL ISSUES:
Cost analysis and pay back calculations for different types of solar panels and collectors, installation and operating costs, Environmental and safety issues, protection systems, performance monitoring.

ALTERNATIVE ENERGY SOURCES:
Solar Energy: Types of devices for Solar Energy Collection, Thermal Storage System. Control Systems, Wind Energy, Availability, Wind Devices, Wind Characteristics, Performance of Turbines and systems.

TEXT BOOKS:

1. G. D. Rai (2009), *Non-Conventional Energy Sources*, 4th edition, Khanna Publishers, New Delhi.

2. Martin A. Green (2008), *Solar Cells: Operating Principles, Technology and system Applications*, 1st edition, Prentice Hall, New Delhi.

REFERENCES BOOKS:

1. Sukatme (2008), Solar Energy, 3rd Edition, McGraw Hill Companies, New Delhi.

2. D. Yogi gosuami, Frank Kreith, Jan F. Kreider (2000), Principles of Solar Engineering, 2nd edition, Taylor & Francis, USA.

ENERGY AUDIT AND MANAGEMENT SYSTEMS
(OPEN ELECTIVE -3)

IV B.Tech -I Semester **L T P C**
Course Code: A3EE32 **3 - - 3**

COURSE OVERVIEW

Energy management is the proactive, organized and systematic coordination of procurement, conversion, distribution and use of energy to meet the objectives of resource conservation, climate protection and cost savings. In this course students will develop the skills needed to evaluate the energy losses of residential, commercial, or industrial buildings, processes and/or systems to mitigate energy inefficiencies. Learners are taught different levels or types of energy audits and related procedures to residential, commercial, or industrial buildings audits. Students will learn the basic principles of energy management as it relates to energy audit short falls, energy system planning, energy policy development, pre and post deployment system auditing, energy savings and cost reduction strategies for residential, commercial, or industrial buildings, communities and businesses.

PREREQUISITES: Management science and Electrical engineering Fundamentals

COURSE OBJECTIVES:

To understand the energy utilization pattern including wastage and its management.

COURSE OUTCOMES:

1. Student will be able to Carry out the energy audit in any type of building and suggest the relevant and appropriate conservation measures.
2. Suggest the renewable energy systems for the buildings

SYLLABUS

UNIT-1
Introduction: Basic elements and measurements - Mass and energy balances - Scope of energy auditing industries - Evaluation of energy conserving opportunities.

UNIT-2
Energy Audit Concepts: Need of Energy audit - Types of energy audit - Energy management (audit) approach - understanding energy costs - Bench marking - Energy performance - Matching energy use to requirement - Maximizing system efficiencies - Optimizing the input energy requirements - Duties and responsibilities of energy auditors - Energy audit instruments - Procedures and Techniques.

UNIT-3
Principles and Objectives of Energy Management: Design of Energy Management Programmes - Development of energy management systems – Importance - Indian need of Energy Management - Duties of Energy Manager - Preparation and presentation of energy audit reports - Some case study and potential energy savings.

UNIT-4

Thermal Energy Management: Energy conservation in boilers - steam turbines and industrial heating systems - Application of FBC - Cogeneration and waste heat recovery - Thermal insulation - Heat exchangers and heat pumps - Building Energy Management.

UNIT-5

Electrical Energy Management: Supply side Methods to minimize supply-demand gap - Renovation and modernization of power plants - Reactive power management - HVDC - FACTS - Demand side - Conservation in motors - Pumps and fan systems - Energy efficient motors.

*Note: A case study involving audit may be taken up and a report suggesting improvements which can be considered as a part of assignment.

REFERENCES BOOKS:

1. Energy Management: W.R.Murphy, G.Mckay 109
2. Energy Management Principles: C.B.Smith
3. Efficient Use of Energy: I.G.C.Dryden d. Energy Economics A.V.Desai e. Hamies, Energy Auditing and Conservation; Methods Measurements, Management and Case study, Hemisphere, Washington, 1980. f. Guide book for National Certification Examination for Energy Managers and Energy Auditors (Could be downloaded from www.energymanagertraining.com).

ENERGY STORAGE SYSTEMS
(OPENELECTIVE- 2)

IV B.Tech -I Semester **L T P C**
Course Code: A3EE33 **3 - - 3**

COURSE OVERVIEW:

This course is an introductory subject in the field of electric power systems and electrical to mechanical energy conversion. Electric power has become increasingly important as a way of transmitting and transforming energy in industrial, military and transportation uses. Electric power systems are also at the heart of alternative energy systems, including wind and solar electric, geothermal and small scale hydroelectric generation.

PRE-REQUISITIES: Knowledge on renewable and non-renewable energy sources.

COURSE OBJECTIVE:

1. It introduces solar energy its radiation, collection, storage and application.
2. It also introduces the Wind energy, Biomass energy, geothermal energy and ocean energy as alternative energy Sources

COURSE OUTCOME:

1. After going through this course the student gets a thorough knowledge on,various types of renewable energy sources i.e. solar, wind, bio-mass, geothermal, ocean, hybrid energy systems
2. principles of direct energy conversion, with which he/she can able to apply the above conceptual things to real-world electrical and electronics problems and applications.

SYLLABUS

UNIT-I

Principles of solar radiation: Role and potential of new and renewable source, the solar energy option, Environmental impact of solar power, physics of the sun, the solar constant, extraterrestrial and terrestrial solar radiation, solar radiation on titled surface, instruments for measuring solar radiation and sun shine, solar radiation data.

UNIT-II

Solar Energy Collection, Storage & Applications: Collection: Flat plate and concentrating collectors, classification of concentrating collectors, orientation and thermal analysis, advanced collectors.
Storage & Applications: Different methods, Sensible, latent heat and stratified storage, solar ponds. Solar Applications- solar heating/cooling technique, solar distillation and drying, photovoltaic energy conversion.

UNIT-III

Wind Energy: Sources and potentials, horizontal and vertical axis windmills, performance characteristics, Betz criteria. Bio-Mass: Principles of Bio-Conversion, Anaerobic/aerobic digestion, types of Blo-gas digesters, gas yield, combustion characteristics of bio-gas, utilization for cooking, I.C.Engine operation and economic aspects.

UNIT-IV

Geothermal Energy: Resources, types of wells, methods of harnessing the energy, potential in India.
Ocean Energy: OTEC, Principles utilization, setting of OTEC plants, thermodynamic cycles. Tidal and wave energy: Potential and Conversion techniques, mini-hydel power plants, and their economics.

UNIT-V

Direct Energy Conversion: Need for DEC, Carnot cycle, limitations, and principles of DEC.

TEXT BOOKS:

1. Non-Conventional Energy Sources, G.D. Rai, Khanna Publishers.
2. Introduction to renewable energy, Vaughn Nelson, CRC Press (Taylor & Francis).

REFERENCE BOOKS:

1. Renewable Energy Resources, Twidell & Wier, CRC Press (Taylor & Francis).
2. Renewable Energy Sources and Emerging Technologies, D. P. Kothari, K. C. Singal, Rakesh Ranjan, PHI Learning Private Limited.
3. Fundamentals of Renewable Energy Systems, D. Mukherjee, S. Chakrabarti, New Age International.
4. Renewable Energy Power for a sustainable Future, Godfrey Boyle, Oxford University Press.
5. Renewable energy resources, Tiwari and Ghosal, Narosa publications.
6. Renewable Energy Technologies, Ramesh & Kumar, Narosa publications.
7. Non-Conventional Energy Systems, K Mittal, Wheeler publications.