ANURAG ENGINEERING COLLEGE

(An Autonomous Institution)

Ananthagiri (V & M),Suryapet (Dt) Pin: 508 206

Definitions of Key Words:

Academic Year: Two consecutive (one odd + one even) semesters constitute one academic year.

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

Course: Usually referred to, as 'papers' is a component of a programme. All courses need not carry the same weight. The courses should define learning Objectives and learning outcomes. A course may be designed to comprise lectures/ tutorials/laboratory work/ field work/ outreach activities/ project work/vocational training/viva/ seminars/ term papers/assignments/ presentations/ self- study etc. or a combination of some of these.

Credit Based Semester System (CBSS): Under the CBSS, the requirement for awarding a degree or diploma or certificate is prescribed in terms of number of credits to be completed by the students.

Credit Point: It is the product of grade point and number of credits for a course.

Credit: A unit by which the course work is measured. It determines the number of hours of instructions required per week. One credit is equivalent to one hour of teaching (lecture or tutorial) or two hours of practical work/field work per week.

Cumulative Grade Point Average (CGPA): It is a measure of overall cumulative performance of a student over all semesters. The CGPA is the ratio of total credit points secured by a student in various courses in all semesters and the sum of the total credits of all courses in all the semesters. It is expressed up to two decimal places.

Grade Point: It is a numerical weight allotted to each letter grade on a 10- point scale.

Letter Grade: It is an index of the performance of students in a said course.

Grades are denoted by letters O, A+, A, B+, B, C, P and F.

Programme: An educational programme leading to award of a Degree, Diploma or Certificate.

Semester Grade Point Average (SGPA): It is a measure of performance of work done in a semester. It is ratio of total credit points secured by a student in various courses registered in a semester and the total course credits taken during that semester. It shall be expressed up to two decimal places.

Semester: Each semester will consist of 15- 18 weeks of academic work equivalent to 90 actual teaching days. The odd semester may be scheduled from July to December and even semester from January to June.

Transcript or Grade Card or Certificate: Based on the grades earned, a grade certificate shall be issued to all the registered students after every semester. The grade certificate will display the course details (code, title, number of credits, grade secured) along with SGPA of that semester and CGPA earned till that semester.

Types of Courses: The Courses in a programme may be of three kinds: Core, Elective and Foundation.

Core Course:-

There may be a Core Course in every semester. This is the course which is to be compulsorily studied by a student as a core requirement to complete the requirement of a programme in a said discipline of study.

Elective Course:-

Elective course is a course which can be chosen from a pool of papers. It may be:

- Supportive to the discipline of study
- Providing an expanded scope
- Enabling an exposure to some other discipline/domain
- Nurturing student's proficiency/skill.

An elective may be "Generic Elective" focusing on those courses which add generic proficiency to the students. An elective may be "Discipline centric" or may be chosen from an unrelated discipline. It may be called an "Open Elective."

Foundation Course:-

The Foundation Courses may be of two kinds: Compulsory Foundation and Elective foundation. "Compulsory Foundation" courses are the courses based upon the content that leads to Knowledge enhancement. They are mandatory for all disciplines. Elective Foundation courses are value- based and are aimed at man- making education.

ACADEMIC REGULATIONS FOR B. TECH. (REGULAR)

Applicable for the students of B.Tech. (Regular) from the Academic Year 2015- 16 onwards

1. Title and Duration of the Progamme.

1.1 The programme shall be called the degree programme in Bachelor of Technology, abbreviated as B.Tech.

1.2 The programme shall be of four academic years duration divided into eight semesters, each semester having duration of minimum 16 weeks of instruction.

1.3 The calendar of events in respect of the programme shall be fixed by the College from time to time.

1.4 The external examination in all the courses (subjects) shall be conducted at the end of each semester for all the eight semesters.

1.5 Students joining the B.Tech. Programme shall have to complete the programme within a stipulated time frame of 8 years from the year of joining and Students joining the B.Tech. Programme in the third semester directly through Lateral Entry Scheme (LES) shall have to complete the programme within a stipulated time frame of 6 years from the year of joining. Otherwise, they shall forfeit their seat in B.Tech Programme and their admission shall stand cancelled.

2. Admission Procedure

2.1 Admissions will be done as per the norms prescribed by the Government of Telangana State.

2.2 The Government orders in vogue shall prevail.

2.3 The candidate should have passed the prescribed qualifying examination on the date of admission.

3. Award of B. Tech. Degree

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

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

3.2 The candidate shall register for 192 credits and secure all the 192 credits by securing a

minimum CGPA of 5.0.

3.3 The students, who fail to fulfill the academic requirements for the award of the degree within eight academic years from the year of admission, shall forfeit their seats in B.Tech. Programme.

4. Courses of Study

The following B. Tech. Programmes are offered at present:

Branch	Branch Code
Civil Engineering	01
Electrical and Electronics Engineering	02
Mechanical Engineering	03
Electronics and Communication Engineering	04
Computer Science and Engineering	05

and any other course as approved by the Authorities from time to time.

5. Credits

	Semester	
	Contact Periods / week	**Credits**
Theory	04	04
	03	03
	02	02
Practical	03	02
Drawing	00+04	02
	02+02	03
	00+06	03
Mini project	- -	02
Comprehensive Viva Voce	- -	02
Seminar	6	02
Project	15	10

*Note on Tutorials:- No Credits for < 2 periods /week

6. Distribution and Weightage of Marks

6.1 The performance of a student in a semester shall be evaluated course- wise for a maximum of 100 marks each for a theory and practical course. In addition, industry-oriented mini- project, seminar, Comprehensive Viva- Voce and Project work shall be evaluated for 100, 100, 100 and 200 marks respectively.

6.2 For theory courses the distribution shall be 25 marks for Continuous Internal Evaluation (CIE) and 75 marks for the Semester End- Examination (SEE).

6.3 For theory courses, during the semester there shall be 2 midterm examinations. Each mid term examination consists of Part- A (Short Answers) for 5 marks and Part- B (Long Answers) for 15 marks with duration of 90 Minutes and an assignment carrying 5 marks.
Part- B shall contain 3 questions with internal choice, each carries 5 marks. First mid term examination shall be conducted for 2.5 units of syllabus and second mid term examination shall be conducted for remaining 2.5 units. First Assignment should be submitted before the conduct of the first mid term exam, and the second assignment should be submitted

before the conduct of the second mid term exam.

The total marks secured by the student in each mid term examination for 25 marks is considered and the average of the two mid term examinations shall be taken as the final marks secured by each student. If he/she is absent for any test / assignment, he/she is awarded zero marks for that test / assignment.

6.4 The Semester End Examination will be conducted for 75 marks which consist of two parts viz. i). Part- A for 25 marks, ii). Part -B for 50 marks.

6.5 Part- A is compulsory, which consists of ten questions (numbered from 1 to 10) two from each unit carrying 2 / 3 marks each.

6.6 Part- B consists of five questions (numbered from 11 to 15) carrying 10 marks each. Each of these questions is from one unit and may contain sub- questions. For 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).

6.7 For practical courses, there shall be a continuous internal evaluation during a semester for 25 sessional (internal) marks. Out of the 25 marks for internal evaluation, day- to- day work in the laboratory shall be evaluated for 15 marks and midterm practical examination shall be evaluated for 10 marks conducted by the laboratory teacher concerned. Semester End Examinations carries 75 marks.

6.8 The practical Semester End Examination shall be conducted with an external examiner and the laboratory teacher. The external examiner shall be appointed by the Principal from the panel of examiners recommended by Chairman, Board of Studies in respective branches.

6.9 For the courses having design and / or drawing, (such as Engineering Graphics, Engineering Drawing, Machine Drawing) and estimation, the distribution shall be 25 marks for internal evaluation (15 marks for day- to- day work and 10 marks for midterm examination) and 75 marks for end examination. There shall be two midterm examinations in a semester and the average of the two shall be considered for the award of marks for midterm examinations.

6.10 There shall be an industry- oriented mini- Project, to be taken up during the vacation after III year II Semester examination. However, the mini project and its report shall be evaluated in IV year I Semester. The industry oriented mini project shall be submitted in report form and should be presented before the committee, which shall be evaluated for 100 marks. The committee consists of an external examiner, Head of the Department, the Supervisor of Mini Project and a Senior Faculty member of the department. There shall be no internal marks for industry oriented mini project

6.11 There shall be a seminar presentation in IV year II Semester. For the ʾseminar, the student shall collect the information on a specialized topic and prepare a technical report, showing his understanding of the topic, and submit it to the department. It shall be evaluated by the departmental committee consisting of Head of the Department, Supervisor of Seminar and a Senior Faculty member of the department. The seminar report shall be evaluated for 100 marks. There shall be no external examination for the seminar.

6.12 There shall be a Comprehensive Viva- Voce in IV year II semester. ʾThe Comprehensive Viva- Voce will be conducted by a committee consisting of Head of the Department and two Senior Faculty members of the department. The Comprehensive Viva- Voce is intended to assess the students understanding of the courses he studied during the B. Tech. course of study. The Comprehensive Viva- Voce shall be evaluated for 100 marks. There are no external marks for the Comprehensive Viva- Voce.

6.13 Out of a total of 200 marks for the Project work, 50 marks shall be for Internal Evaluation and 150 marks for the Semester End Examination. The Semester End Examination (viva-

voce) shall be conducted by the committee. The committee consists of an external examiner, Head of the Department, the Supervisor of Project and a Senior Faculty member of the department. The topics for industry oriented mini project, seminar and project work shall be different from each other. The evaluation of Project work shall be conducted at the end of the IV year II Semester. The internal evaluation shall be on the basis of two seminars given by each student on the topic of his project.

6.14 The Laboratory marks and the sessional marks awarded by the faculty are subject to scrutiny and scaling by the Institution whenever/wherever necessary. In such cases, the sessional and laboratory marks awarded by the teacher will be referred to a College Standing Committee/ Academic Committee. The Committee will arrive at a scaling factor and the marks will be scaled accordingly. The recommendations of the Committee are final and binding. The laboratory records and internal test papers shall be preserved as per the University rules and produced before the Committees of the University as and when asked for.

6.15 Candidates shall be permitted to apply for recounting/revaluation of SEE scripts within the stipulated period with payment of prescribed fee.

7 . Attendance Requirements

7.1 A student is eligible to write the Semester End Examinations only if he / she acquires a minimum of 75% of attendance in aggregate of all the courses.

7.2 Condonation of shortage of attendance in aggregate up to 10% (65% and above and below 75%) in each semester may be granted on medical grounds with a documentary evidence approved by the Academic Council.

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

7.4 Shortage of attendance below 65% in aggregate shall not be condoned under any circumstances.

7.5 Students whose shortage of attendance is not condoned are not eligible to write Semester End Examinations of that semester. Such students are detained and their registration for examination stands cancelled.

7.6 A student detained due to shortage of attendance in a semester may seek re- admission into that semester, as and when offered, within four weeks from the date of the commencement of class work with the academic regulations of the batch into which he/she gets admitted.

7.7 A student will be promoted to the next semester if he/she satisfies the attendance requirement of the present semester and shall not be eligible for readmission into the same semester.

7.8 For all mandatory, non- credit courses offered in a semester, a "Satisfactory Participation Certificate" shall be issued to the student, only after securing minimum 75% of attendance in such a course. No marks or Letter Grade shall be allotted for these activities.

8. Minimum Academic Requirements

The following academic requirements have to be satisfied in addition to the attendance requirements mentioned in item no.7.

8.1 A student is deemed to have satisfied the minimum academic requirements if he has earned the credits allotted to each theory/practical/design/drawing course/project and secured not less 35% marks in Semester End Examination (SEE), and minimum 40% marks when the total of the internal evaluation and semester end examinations taken together.

8.2 The student has to pass the failed course by appearing the supplementary examination as

per the requirement for the award of degree.

8.3 Students who fail to earn 192 credits as indicated in the course structure within eight academic years from the year of their admission, shall forfeit their seat in B. Tech. Programme and their admission stands cancelled.

8.4 A student shall be promoted from I Year to II Year only if he/she fulfills the academic requirements of securing 50% of average credits (24 credits out of 48 credits) upto I year II Semester, from all the examinations, whether or not the candidate takes the examinations.

8.5 A student shall be promoted from II Year to III Year only if he/she fulfills the academic requirements of securing 50% of average credits (36 credits out of 72 credits) up to II year I semester, from all the examinations, whether or not the candidate takes the examinations.

8.6 A student shall be promoted from III year to IV year only if he/she fulfills the academic requirements of securing 50% of average credits (60 credits out of 120 credits) up to III year I semester, from all the examinations, whether or not the candidate takes the examinations.

8.7 A student shall register and put up minimum attendance in all 192 credits and earn all 192 credits for the award of degree.

8.8 When a Student is detained due to shortage of attendance in any semester, no Grade Allotments or SGPA/CGPA calculations will be done for that entire Semester in which he got detained.

8.9 When a Student is detained due to lack of Credits in any year, he may be readmitted after fulfillment of the Academic Requirements, with the Academic Regulations of the Batch into which he gets readmitted subject to 3.3.

8.10 For readmitted candidates, if there are any Professional Electives / Open Electives, the same may also be re- registered if offered. However, if those Electives are not offered in later Semesters, then alternate Electives may be chosen from the SAME set of Elective Courses offered under that category.

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

8.12 If a Student registers for some more 'extra courses' (in the parent Department or other Departments/Branches of Engg.) other than those listed courses totalling to 192 Credits as specified in the Course Structure of his Department, the performances in those 'extra courses' (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 courses' 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 7 and 8.1 - 8.11 above.

9 . Program Structure

S. No.	Classification		Course Work - Subject Area	Range of Total Credits (%)	
	AICTE	UGC		Min	Max
1	HS	Foundation Courses	Humanities and Social Sciences including Management; (HS),	5	10
2	BS		Basic Sciences(BS) including Mathematics, Physics, Chemistry, Biology;	15	20
3	ES		Engineering Sciences (ES), including Materials, Workshop, Drawing, Basics of Electrical/ Electronics/	15	20
4	PC	Core Courses	Professional Subjects- Core (PC), relevant to the chosen specialization/branch; (May be split	30	40
5	PW		Project Work, Seminar and/or Internship in Industry or elsewhere.	10	15
6	PE	Elective Courses	Professional Subjects - Electives (PE), relevant to the chosen specialization/ branch;	10	15
7	OE		Open Subjects- Electives (OE), from other technical and/or emerging	5	10

10. Course pattern

10.1 The entire course of study is for four academic years in semester pattern.

10.2 A student eligible to appear for Semester End Examinations in a course, but absent from it or failed in that examination, may write the exam in that course during supplementary exams.

10.3 A student eligible to appear in the Semester End Examination in any Course, but absent at it or failed (thereby failing to secure P Grade or above), may reappear for that Course at the supplementary examination as and when conducted. In such cases, his Continuous Internal Evaluation (CIE) marks assessed earlier for that Course will be carried over, and added to the marks to be obtained in the supplementary examinations, for evaluating his performance in that course.

11. Minimum Instruction Days

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

12. Grade Points

12.1 Marks will be awarded to indicate the performance of each student in each theory course, or Lab/Practicals, or Seminar, or Project, or Mini- Project, Minor Course etc., based on the % of marks obtained in CIE+SEE(Continuous Internal Evaluation + Semester End Examination, both taken together) as specified in Item 6 above, 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 and corresponding percentage of marks shall be followed.

Letter Grade	Grade Points	% of marks Secured (Class Intervals)
O (Out Standing)	10	80% and above (≥80%, ≤100%)
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 55% (≥55%, < 60%)
B (Above Average)	6	Below 55% but not less than 50% (≥50%, < 55%)
C (Average)	5	Below 50% but not less than 45% (≥45%, < 50%)
P (Pass)	4	Below 45% but not less than 40% (≥40%, < 45%)
F (Fail)	0	Below 40% (< 40%)
Ab (Absent)	0	- -

12.3 A student obtaining F Grade in any Course shall be considered 'failed' and will be required to reappear as 'Supplementary Candidate' in the Semester End Examination (SEE), as and when offered. In such cases; his Continuous Internal Evaluation (CIE) marks in those Course(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 Course (s) only for the sake of 'Grade Improvement' or 'SGPA/CGPA Improvement'. However, he has to repeat all the Courses pertaining to that Semester, when he is detained (as listed in items 8.10 - 8.11).
12.6A student earns Grade Point (GP) in each Course, on the basis of the Letter Grade obtained by him in that Course (excluding Mandatory non- credit Courses). Then the corresponding 'Credit Points' (CP) are computed by multiplying the Grade Point with Credits for that particular Course. **Credit Points (CP) = Grade Point (GP) x Credits of that Course.**

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

13. Registration/Dropping

13.1 Each student has to compulsorily register for course work at the beginning of each semester as per the schedule mentioned in the Academic Calendar. It is absolutely necessary for the student to register for courses in time.

13.2 The student has to register for a minimum of 20 credits and may register up to a maximum of 28 credits based on the advice of the Faculty Advisor. On an average, a student is expected to register for 24 credits.

13.3 A student at the end of II year II semester either having the CGPA of ≥ 7.0 or having passed all previous courses in first attempt with a minimum CGPA ≥ 5.0 is allowed to

register an additional course / credits from the offered open electives. However mandatory non credit courses can be register during the course of study with consent of the faculty .

13.4 Open Electives are offered to students in III Year II semester, IV Year I semester and II semester which can be registered by the students during III year and IV year I semester. Prior permission for registration of Open Electives as additional course is compulsory.

13.5 A student would be allowed to register in an additional course only if he/she satisfies the prerequisites.

13.6 Departments will notify at the time of registration about the minimum number of students to be enrolled for a particular open elective to be offered.

13.7 Any student may be barred from registering for any course for specific reasons like disciplinary reasons, non- payment of fees, etc.

13.8 Dropping of Courses: Within four weeks after the commencement of the semester, the student may, in consultation with his / her faculty advisor, can drop one or more courses without prejudice to the minimum number of credits as specified in 13.2. The dropped courses are not recorded in the Grade Card.

13.9 After Dropping, minimum credits registered shall be 20.

14   Earning of Credit

A student shall be considered to have completed a Course successfully and earned the credits if he/she secures an acceptable letter grade in the range 'O' to 'P'. Letter grade 'F' in any Course implies failure of the student in that Course and no credits earned.

15   Passing Standards:

15.1 A student shall be declared successful or 'passed' in a Semester, only when he/she gets a SGPA ≥ 5.00 (at the end of that particular Semester); and a student shall be declared successful or 'passed' in the entire UGP, only when he/she gets a CGPA ≥ 5.00; subject to the condition that he/she secures a GP ≥ 4 (P Grade or above) in every registered Course in each Semester (during the entire UGP) for the award of Degree, as required.

15.2 In spite of securing P Grade or above in some (or all) Courses in any Semester, if a Student receives a SGPA < 5.00 and/ or CGPA < 5.00 at the end of such a Semester, then he 'may be allowed' (on the 'specific recommendations' of the Head of the Department and subsequent approval from the Principal) -

(i) to go into the next subsequent Semester (subject to fulfilling all other attendance and academic requirements as listed under Items 7- 8);

(ii) to 'improve his SGPA of such a Semester (and hence CGPA) to 5.00 or above', by reappearing for ONE or MORE (as per Student's choice) of the same Course(s) in which he has secured P Grade(s) in that Semester, at the Supplementary   Examinations to be held in the next subsequent Semester(s). In such cases, his Continuous Internal Evaluation Marks (CIE Marks) in those Course(s) will remain same as those he obtained earlier.

In these considerations, the newly secured Letter Grades will be recorded and taken into account for calculation of SGPA and CGPA, only if there is an improvement.

15.3 A Student shall be declared successful or 'passed' in any Non- Credit Course, if he secures a 'Satisfactory Participation Certificate' for that Mandatory Course.

15.4 After the completion of each Semester, a Grade Card or Grade Sheet (or Transcript) (are all theses 3 are same?) shall be issued to all the Registered Students of that Semester, indicating the Letter Grades and Credits earned. It will show the details of the Courses Registered (Course Code, Title, No. of Credits, Grade Earned etc.), Credits earned, SGPA, and CGPA.

16 Vertical Progression

It shall also be necessary to lay down uniform minimum standards for SGPA and CGPA together with the minimum number of credits to be earned in a semester for the vertical progression of students. This shall be used in facilitating the mobility of students from one College to another and also in avoiding any confusion among the students. The

a) Minimum Standard for SGPA =5.0;

b) Minimum Standard for CGPA =5.0; (at the end of each semester)

However, failure to secure a minimum CGPA = 5.0 at the end of any semester for the first time, shall **attract a warning** before approval of the student to continue in the following semester and will be required to register for courses having a GPA of 4.0 to improve the SGPA to 5.0 or above.

17 Eligibility for Award of B.Tech. Degree

A student shall be eligible for award of the B.Tech degree if he/she fulfils all the following conditions;

17.1 Registered and successfully completed all the components prescribed in the Programme of study (Course of study mentioned in all earlier occasions) to   which he/she is admitted,

17.2   Obtained CGPA greater than or equal to 5.0 (Minimum requirements for Pass),

17.3   Has no dues to the College, hostels, Libraries, NCC / NSS etc., and

17.4   No disciplinary action is pending against him/her.

18. Award of Class

After a student has satisfied the requirements prescribed for the completion of the program and is eligible for the award of B. Tech. Degree, he shall be placed in one of following 4 classes:

CGPA	Class Awarded	
≥8.00	First Class with Distinction	**From the CGPA secured from 192 credits**
≥6.50 - <8.00	First Class	
≥5.50 - <6.50	Second Class	
≥5.00 - <5.50	Pass Class	

18.1 The marks obtained in Continuous Internal Evaluation (CIE) and Semester End Examination (SEE) will not be shown in the memorandum of marks.

18.2 For the purpose of awarding First Class with Distinction (CGPA ≥ 8.0), the student must obtain the minimum required CGPA within 4 academic years or within 3 academic years in case of Lateral Entry candidates by clearing all the courses.

18.3 Candidates detained / prevented from writing the Semester End Examinations due to any reason in any semester are not eligible for the award of First Class with Distinction. Such candidates even if the CGPA ≥ 8.0, shall be placed in first class.

18.4 For the purpose of awarding First, Second and Pass Class, CGPA obtained in the examinations appeared within the maximum period allowed for the completion of Programme shall be considered as per the regulations.

18.5 A student with final CGPA < 5.00 (at the end of the UGP) will not be eligible for the Award of the Degree.

18.6 The CGPA can be converted to equivalent percentage of marks by using the following equation:

$$(CGPA - 0.5) \times 10$$

19 Consolidated Grade Card

A consolidated grade card containing credits & grades obtained by the candidates will be issued after completion of the four years B. Tech Programme.

20 Withholding of Results

If the student has not paid the dues, if any, to the College or if any case of indiscipline is pending against him, the result of the student will be withheld and he will not be allowed into the next semester. His degree will be withheld in such cases the matter will be referred to the Academic Council. The decision of the Academic Council is final.

21 Transitory Regulations

21.1 Discontinued, detained, or failed candidates are eligible for readmission as and when next offered as per the college admission procedure.

21.2 Students on transfer shall complete the prescribed courses of the concerned programme not covered earlier and however he/she should take the remaining programme along with others.

21.3 There shall be no branch transfers after the cut off date of admissions in the academic year.

22 Transcripts

After successful completion of the total Programme of study, 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.

23 Supplementary Examinations

In addition to the Regular Final Examinations held at the end of each semester, Supplementary Final Examinations will be conducted during the academic year. Candidates taking the Regular / Supplementary examinations as Supplementary candidates may have to take more than one Semester End Examination per day. A student can appear for any number of supplementary examinations till he/she clears all courses which he/she could not clear in the first attempt. However the maximum stipulated period cannot be relaxed under any circumstances.

24 Graduation Ceremony

24.1 The College shall have its own annual Graduation Ceremony for the award of degree to students completing the prescribed academic requirements in each case, in consultation with the University and by following the provisions in the Statute.

24.2 The College shall institute Prizes and Awards to meritorious students, for being given away annually at the Graduation Ceremony.

25 Termination from the Program

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

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

25.2 The student fails to satisfy the norms of discipline specified by the College from time to time.

26 Non- Credit Courses (Mandatory Courses)

26.1 All the courses designated as mandatory course is a compulsory requirement for all students for the award of degree.

26.2 These activities carry no credits and are evaluated as Satisfactory/ Unsatisfactory.

26.3 Minimum attendance requirement as per the regulations is compulsory for completing the mandatory courses.

27   Amendments

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

28   General

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

28.2 The academic regulation should be read as a whole for the purpose of any interpretation.

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

ACADEMIC REGULATIONS FOR B. TECH. (LATERAL ENTRY SCHEME)

Applicable for the students admitted into II year B. Tech. (Lateral Entry Scheme) from the Academic Year 2016- 17 and onwards

1. Eligibility for award of B. Tech. Degree (LES)

1.1 The LES candidates shall pursue a course of study for not less than three academic years and not more than six academic years.

1.2 The candidate shall register for 144 credits and secure 144 credits by securing a minimum CGPA of 5.0 from II to IV year B.Tech. Program (LES) for the award of B.Tech. degree.

1.3 The students, who fail to fulfill the requirement for the award of the degree in **six** academic years from the year of admission, shall forfeit their seats.

1.4 The attendance regulations of B. Tech. (Regular) shall be applicable to B.Tech.(LES).

2. Promotion Rule

A student shall be eligible for promotion in B.Tech programme, if he/she acquires the minimum number of credits as given below:

2.1 A student shall be promoted from II Year to III Year only if he/she fulfills the academic requirements of securing 50% of average credits (12 credits out of 24 credits) up to II year I semester, from all the examinations, whether or not the candidate takes the examinations.

2.2 A student shall be promoted from III year to IV year only if he/she fulfills the academic requirements of securing 50% of average credits (36 credits out of 72 credits) up to III year I semester, from all the examinations, whether or not the candidate takes the examinations.

2.3 A student shall register and put up minimum attendance in all 144 credits and earn all 144 credits to be eligible for award of degree.

2.4 Students, who fail to earn 144 credits as indicated in the course structure within six academic years, shall forfeit their seat in B.Tech. Programme and their admission stands cancelled.

3. Award of Class

After a	Class Awarded	
≥8.00	First Class with Distinction	**From the CGPA secured from 144 credits**
≥6.50 - <8.00	First Class	
≥5.50 - <6.50	Second Class	
≥5.00 - <5.50	Pass Class	

4 . All the other regulations as applicable to B. Tech. 4- year degree course (Regular) will hold good for B.Tech. (Lateral Entry Scheme).

ANNEXURE - I

1 Grade Point Average

1.1 SGPA and CGPA

The credit index can be used further for calculating the Semester Grade Point Average (SGPA) and the Cumulative Grade Point Average (CGPA), both of which being important performance indices of the student. While SGPA is equal to the credit index for a semester divided by the total number of credits registered by the student in that semester, CGPA gives the sum total of credit indices of all the previous semesters divided by the total number of credits registered in all these semesters. Thus,

The Grade Point Average (GPA) will be calculated according to the formula:

$$GPA = \frac{\sum c_i G_i}{\sum c_i}$$

Where Ci = number of credits for the course i,

Gi = grade points obtained by the student in the course.

1.2 Semester Grade Point Average (SGPA) is awarded to candidates considering all the courses of the semester. Zero grade points are also included in this computation. SGPA is rounded off to TWO Decimal Places.

SGPA will be computed as follows;

$$\frac{\sum [(\text{Course credits}) \times (\text{Grade points})] \text{ (for all Courses passed in that semester)}}{\sum [(\text{Course credits})] \text{ (for all courses registered in that semester)}}$$

1.3 To arrive at Cumulative Grade Point Average (CGPA), the formula is used considering the student's performance in all the courses taken in all the semesters completed up to the particular point of time. CGPA is rounded off to TWO Decimal Places.

CGPA will be computed as follows:

$$\frac{\sum [(\text{Course credits}) \times (\text{Grade points})] \text{ (for all Courses passed upto that semester)}}{\sum [(\text{Course credits})] \text{ (for all Courses registered until that semester)}}$$

CGPA is thus computed from the I Year First Semester onwards, at the end of each Semester, as per the above formula. However, the SGPA of I year I Semester itself may be taken as the CGPA, as there are no cumulative effects

1.4 Illustrative Example

An illustrative example given in below Table below indicates the use of the above two equations in calculating SGPA and CGPA, both of which facilitate the declaration of academic performance of a student, at the end of a semester and at the end of successive semesters respectively . Both of them shall be normally calculated up to the second decimal position, so that the CGPA, in particular, can be made use of in rank ordering the student's performance in a class. If two students get the same CGPA, the tie should be resolved by considering the number of times a student has obtained higher SGPA; But, if it is not resolved even at this stage, the number of times a student has obtained higher grades like O, A, B etc shall be taken into account in rank ordering of the students in a class.

Year and Semester	Course No.	Credits	Grade	Grade Points	Credit Points
I Year I sem	XX101	5	A	8	40
I Year I sem	XX102	4	F	0	00
I Year I sem	XX103	3	A+	9	27
I Year I sem	XX104	4	F	0	00
I Year I sem	XX105	5	C	5	25
I Year I sem	XX106	5	P	4	20
Total		**26 (18*)**			**112**
SGPA = 112/26 = 4.31			**CGPA = 4.31**		
I Year II Sem	XX107	5	B+	7	35
I Year II Sem	XX108	4	A	8	32
I Year II Sem	XX109	3	C	5	15
I Year II Sem	XX110	5	P	4	20
I Year II Sem	XX111	4	A+	9	36
I Year II Sem	XX112	2	F	0	00
I Year II Sem	Xx113	2	A	8	16
Total		**25 (23*)**			**154**
SGPA = 154/25 = 6.16			**CGPA = 266/51 = 5.22**		

* Total No. of credits excluding those with 'F'; this is particularly important to keep track of the number of credits earned by a student up to any semester;

MALPRACTICES RULES
DISCIPLINARY ACTION FOR / IMPROPER CONDUCT IN EXAMINATIONS

	Nature of Malpractices/Improper conduct	Punishment
	If the candidate:	
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 course (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 course (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 course 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 course of the examination (theory or practical) in which the candidate is appearing.	Expulsion from the examination hall and cancellation of the performance in that course and all other courses the candidate has already appeared including practical examinations and project work and shall not be permitted to appear for the remaining examinations of the courses of that Semester. The Hall Ticket of the candidate is to be cancelled.
3.	Impersonates any other candidate in connection with the examination.	The candidate who has impersonated shall be expelled from examination hall. The candidate is also debarred and forfeits the seat. The performance of the original candidate who has been impersonated, shall be cancelled in all the courses of the examination (including practicals and project work) already appeared and shall not be allowed to appear for examinations of the remaining courses of that semester. The candidate is also debarred for two consecutive semesters from class work and all END examinations. The continuation of the course by the candidate is course 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 course and all the other courses the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the courses of that semester. The candidate is also debarred for two consecutive semesters from class work and all END examinations. The continuation of the Programme 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 course.
6.	Refuses to obey the orders of the Chief Controllerof Exams/Chief Superintendent / Assistant Superintendent / any officer on duty or misbehaves or creates disturbance of any kind in and around the examination hall or organizes a walk out or instigates others to walk out, or threatens the officer- in charge or any person on duty in or outside the examination hall of any injury to his person or to any of his relations whether by words, either spoken or written or by signs or by visible representation, assaults the officer- in-charge, or any person on duty in or outside the examination hall or any of his relations, or indulges in any other act of misconduct or mischief which result in damage to or destruction of property in the examination hall or any part of the College campus or engages in any other act which in the opinion of the officer on duty amounts to use of unfair means or misconduct or has the tendency to disrupt the orderly conduct of the examination.	In case of students of the college, they shall be expelled from examination halls and cancellation of their performance in that course and all other courses the candidate(s) has (have) already appeared and shall not be permitted to appear for the remaining examinations of the courses of that semester. 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 course and all the other courses the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the courses of that semester. The candidate is also debarred for two consecutive semesters from class work and all END 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 course and all other courses the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the courses of that semester. 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 course and all other courses the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the courses of that semester. 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 course and all other courses the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the courses of that semester.
11.	Copying detected on the basis of internal evidence, such as, during valuation or during special scrutiny.	Cancellation of the performance in that course and all other courses the candidate has appeared including practical examinations and project work of that semester 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.	

ANURAG ENGINEERING COLLEGE
(An Autonomous Institution)
Computer Science & Engineering

I YEAR I SEMESTER   **COURSE STRUCTURE**

S.No	Course Code	Course	Course Category	L	T/P/D	C	Internal Marks	External Marks	Total Marks
1	A51001	English- I	HS	2	0	2	25	75	100
2	A51002	Mathematics - I	BS	3	1	3	25	75	100
3	A51003	Engineering Physics- I	BS	2	1	2	25	75	100
4	A51005	Computer Programming -I	ES	3	1	3	25	75	100
5	A51010	Engineering Chemistry	BS	3	1	3	25	75	100
6	A51011	Basic Electrical Engineering	ES	3	1	3	25	75	100
7	A51217	English Language Communication Skills Lab - I	HS	0	3	2	25	75	100
8	A51218	Computer Programming - I Lab	ES	0	3	2	25	75	100
9	A51219	Engineering Chemistry Lab	BS	0	3	2	25	75	100
10	A51220	IT Work shop	ES	0	3	2	25	75	100
		Total		16	17	24	250	750	1000

T - Tutorial   **P - Practical**   **D - Drawing**   **L- Lectures**   **C- Credits**

I YEAR II SEMESTER   **COURSE STRUCTURE**

S.No	Course Code	Course	Course Category	L	T/P/D	C	Internal Marks	External Marks	Total Marks
1	A52001	English- II	HS	2	0	2	25	75	100
2	A52002	Mathematics - II	BS	3	1	3	25	75	100
3	A52003	Engineering Physics- II	BS	2	1	2	25	75	100
4	A52006	Computer Programming - II	ES	3	1	3	25	75	100
5	A52008	Mathematics - III	BS	3	1	3	25	75	100
6	A52011	Engineering Graphics	ES	3	3	3	25	75	100
7	A52217	English Language Communication Skills Lab - II	HS	0	3	2	25	75	100
8	A52218	Computer Programming - II Lab	ES	0	3	2	25	75	100
9	A52219	Engineering Physics Lab	BS	0	3	2	25	75	100
10	A52220	Engineering Workshop	ES	0	3	2	25	75	100
		Total		16	19	24	250	750	1000

T - Tutorial   **P - Practical**   **D - Drawing**   **L- Lectures**   **C- Credits**

II YEAR I SEMESTER   COURSE STRUCTURE

S.No	Course Code	Course	Course Category	L	T/P/D	C	Internal Marks	External Marks	Total Marks
1	A53021	Probability & Statistics	BS	4	0	4	25	75	100
2	A53022	Discrete Mathematics	BS	4	0	4	25	75	100
3	A53023	Data Structures	PC	3	0	3	25	75	100
4	A53009	Electronic Devices and Circuits	ES	3	1	3	25	75	100
5	A53024	Digital Logic Design	ES	3	1	3	25	75	100
6	A53025	Object Oriented Programming	PC	3	0	3	25	75	100
7	A53213	Electronic Devices and Electrical Circuits Lab	ES	0	3	2	25	75	100
8	A53214	Data Structures Lab	PC	0	3	2	25	75	100
9	A53215	Gender Sensitization	MC	0	2	0	25	75	100
		Total		20	10	24	225	675	900

T - Tutorial   **P - Practical**   **D - Drawing**   **L- Lectures**   **C- Credits**

II YEAR II SEMESTER   COURSE STRUCTURE

S.No	Course Code	Course	Course Category	L	T/P/D	C	Internal Marks	External Marks	Total Marks
1	A54006	Environmental Studies	HS	3	1	3	25	75	100
2	A54022	Design and Analysis of Algorithms	PC	4	0	4	25	75	100
3	A54023	Computer Organization	PC	3	1	3	25	75	100
4	A54024	Database Management Systems	PC	4	0	4	25	75	100
5	A54025	Software Engineering	PC	3	0	3	25	75	100
6	A54026	Java Programming	PC	3	0	3	25	75	100
7	A54213	Java Programming Lab	PC	0	3	2	25	75	100
8	A54214	Database Management Systems Lab	PC	0	3	2	25	75	100
9	A54215	Human Values and Professional Ethics	MC	0	2	0	25	75	100
		Total		20	10	24	225	675	900

T - Tutorial   **P - Practical**   **D - Drawing**   **L- Lectures**   **C- Credits**

III YEAR I SEMESTER COURSE STRUCTURE

S.No.	Course Code	Course	Course Category	L	T / P / D	C	Internal Marks	External Marks	Total Marks
1	A55032	Formal Languages and Automata Theory	PC	3	1	3	25	75	100
2	A55021	Managerial Economics and Financial Analysis	HS	3	1	3	25	75	100
3	A55033	Computer Networks	PC	4	0	4	25	75	100
4	A55034	Operating Systems	PC	4	0	4	25	75	100
5	A55035	Microprocessors and Microcontrollers	PC	3	0	3	25	75	100
6		**Professional Elective- 1**	PE	3	0	3	25	75	100
7	A55209	Advance English Communication Skills Lab	HS	0	3	2	25	75	100
8	A55210	Operating Systems and Computer Networks Lab	PC	0	3	2	25	75	100
		Total		20	8	24	200	600	800

T - Tutorial　　　　**P - Practical**　　　　**D - Drawing**　　　　**L- Lectures**　　　　**C- Credits**

III YEAR II SEMESTER COURSE STRUCTURE

S.No.	Course Code	Course	Course Category	L	T / P / D	C	Internal Marks	External Marks	Total Marks
1	A56028	Compiler Design	PC	3	1	3	25	75	100
2	A56029	Data Warehousing and Data Mining	PC	4	0	4	25	75	100
3	A56030	Object Oriented Analysis and Designing	PC	4	0	4	25	75	100
4	A56031	Web Technologies	PC	3	0	3	25	75	100
5		**Professional Elective - 2**	PE	3	0	3	25	75	100
6		**Open Elective- 1**	OE	3	0	3	25	75	100
7	A56209	Data Warehousing and Data Mining Lab	PC	0	3	2	25	75	100
8	A56210	Web Technologies Lab	PC	0	3	2	25	75	100
		Total		20	7	24	200	600	800

T - Tutorial　　　　**P - Practical**　　　　**D - Drawing**　　　　**L- Lectures**　　　　**C- Credits**

IV YEAR I SEMESTER   **COURSE STRUCTURE**

S.No.	Course Code	Course	Course Category	L	T / P / D	C	Internal Marks	External Marks	Total Marks
1	A57037	Information Security	PC	3	1	3	25	75	100
2	A57038	Unix Programming	PC	4	0	4	25	75	100
3	A57039	Management Science	HS	3	0	3	25	75	100
4		**Professional Elective - 3**	PE	3	0	3	25	75	100
5		**Professional Elective - 4**	PE	3	1	3	25	75	100
6		**Open Elective - 2**	OE	3	0	3	25	75	100
7	A57213	Information Security Lab	PC	0	3	2	25	75	100
8	A57214	UNIX Programming Lab	PC	0	3	2	25	75	100
9	A57215	Mini Project	PW	0	3	2	- -	100	100
		Total		19	11	25	200	700	900

T - Tutorial   **P - Practical**   **D - Drawing**   **L- Lectures**   **C- Credits**

IV YEAR II SEMESTER   **COURSE STRUCTURE**

S.No.	Course Code	Course	Course Category	L	T / P / D	C	Internal Marks	External Marks	Total Marks
1		**Professional Elective - 5**	PE	3	0	3	25	75	100
2		**Professional Elective - 6**	PE	3	1	3	25	75	100
3		**Open Elective- 3**	OE	3	0	3	25	75	100
4	A58213	Seminar	PW	0	6	2	100	- - -	100
5	A58214	Project work	PW	0	15	10	50	150	200
6	A58215	Comprehensive Viva Voce	PW	0	0	2	100	- - -	100
		Total		9	22	23	325	375	700

T - Tutorial   **P - Practical**   **D - Drawing**   **L- Lectures**   **C- Credits**

ANURAG ENGINEERING COLLEGE

(An Autonomous Institution)

Computer Science & Engineering

PROFESSIONAL ELECTIVE - 1:

1. Human Computer Interaction
2. Advanced Databases
3. Mobile Computing

PROFESSIONAL ELECTIVE - 2:

1. Machine Learning
2. Internet of Things
3. Cyber Forensics

PROFESSIONAL ELECTIVE - 3:

1. Software Project Management
2. Cloud Computing
3. Software Testing

PROFESSIONAL ELECTIVE - 4:

1. Predictive Analytics with R Programming
2. Scripting Languages
3. Programming with Python

PROFESSIONAL ELECTIVE - 5:

1. Big Data Analytics
2. Distributed Systems
3. Operations Research

PROFESSIONAL ELECTIVE - 6:

1. Design Patterns
2. Artificial Intelligence
3. Multimedia Computing

OPEN ELECTIVE- I

S.No	Course Code	Subject	Offering Department
1	A56301	Construction Materials	Civil Engineering
2	A56302	Waste Management	
3	A56303	Solar Photovoltaic Systems	Electrical & Electronics Engineering
4	A56304	Maintenance of Electrical Systems	
5	A56305	Advanced Engineering Materials	Mechanical Engineering
6	A56306	Mechatronics	
7	A56307	Principles of Communication Systems	Electronics & Communication Engineering
8	A56308	Electronic Measuring Instruments	
9	A56309	Java Programming	Computer Science & Engineering
10	A56310	Computer Networks	

OPEN ELECTIVE- II

S.No.	Course Code	Subject	Offering Department
1	A57301	Disaster Management and Mitigation	Civil Engineering
2	A57003	Geological Information System & Remote Sensing	
3	A57302	Energy Storage Systems	Electrical & Electronics Engineering
4	A57303	Electrical Engineering Materials	
5	A57022	Power Plant Engineering	Mechanical Engineering
6	A57304	Industrial Robotics	
7	A57305	Computer Organization	Electronics & Communication Engineering
8	A57306	Principle of Signal Processing	
9	A57307	Database Management Systems	Computer Science & Engineering
10	A57308	Web Technologies	

OPEN ELECTIVE- III

S.No	Course Code	Subject	Offering Department
1	A58301	Construction Technology and Project Management	Civil Engineering
2	A58302	Safety Engineering	
3	A58303	Energy conservation and Audit	Electrical & Electronics Engineering
4	A58304	Artificial Neural Networks	
5	A58305	Renewable Energy Sources	Mechanical Engineering
6	A58306	Automobile Engineering	
7	A58307	Nanotechnology	Electronics & Communication Engineering
8	A58308	Biometric System	
9	A58309	Game Theory with Engineering Applications	Computer Science & Engineering
10	A58310	Software Engineering	

ANURAG ENGINEERING COLLEGE

(An Autonomous Institution)

I Year B.Tech. CSE - I Sem

L	T/P/D	C
2	0	2

(A51001) ENGLISH - I

1. **INTRODUCTION:**

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

In the English classes, the focus should be on the skills of reading, writing, listening and speaking and for this the teachers should use the text prescribed for detailed study. For example, the students should be encouraged to read the texts/selected paragraphs silently. The teachers can ask comprehension questions to stimulate discussion and based on the discussions students can be made to write short paragraphs/essays etc. The text for non-detailed study is for extensive reading/reading for pleasure. Hence, it is suggested that they read it on their own the topics selected for discussion in the class. The time should be utilized for working out the exercises given after each section, as also for supplementing the exercises with authentic materials of a similar kind for example, from newspaper articles, advertisements, promotional material etc.. However, the stress in this syllabus is on skill development, fostering ideas and practice of language skills.

2. **OBJECTIVES:**

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

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

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

SYLLABUS:

Listening Skills:

Objectives

1. To enable students to develop their listening skill so that they may appreciate its role in the LSRW skills approach to language and improve their pronunciation

2. To equip students with necessary training in listening so that they can comprehend the speech of people of different backgrounds and regions

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

• Listening for general content
• Listening to fill up information
• Intensive listening
• Listening for specific information.

Speaking Skills:

Objectives

1. To make students aware of the role of speaking in English and its contribution to their success.

2. To enable students to express themselves fluently and appropriately in social and

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

Reading Skills:

Objectives

1. To develop an awareness in the students about the significance of silent reading and comprehension.

2. To develop the ability of students to guess the meanings of words from context and grasp the overall message of the text, draw inferences etc.
- Skimming the text
- Understanding the gist of an argument
- Identifying the topic sentence
- Inferring lexical and contextual meaning
- Understanding discourse features
- Scanning
- Recognizing coherence/sequencing of sentences

NOTE :

The students will be trained in reading skills using the prescribed text for detailed study.
They will be examined in reading and answering questions using 'unseen' passages which may be taken from authentic texts, such as magazines/newspaper articles.

Writing Skills :

Objectives

1. To develop an awareness in the students about writing as an exact and formal skill

2. To equip them with the components of different forms of writing, beginning with the lower order ones.
- Writing sentences
- Use of appropriate vocabulary
- Paragraph writing
- Coherence and cohesiveness
- Narration / description
- Note Making
- Formal and informal letter writing
- Describing graphs using expressions of comparison

UNIT - 1

'Wit and Humour' from 'Skills Annexe' - Functional English for Success, Published by Orient Black Swan, Hyderabad

L- Listening For Sounds, Stress and Intonation

S- Greeting and Taking Leave, Introducing Oneself and

Others (Formal and Informal Situations)

R- Reading for Subject/ Theme

W- Writing Paragraphs

UNIT- 2

Mokshagundam Visvesvaraya' from "Epitome of Wisdom",

Published by Maruthi Publications, Hyderabad.

G- Types of Nouns and Pronouns
V- Homonyms, homophones synonyms, antonyms

UNIT- 3
"Cyber Age" from "Skills Annexe - Functional English for Success" Published by Orient Black Swan, Hyderabad.
L - Listening for themes and facts
S - Apologizing, interrupting, requesting and making polite conversation
R- For theme and gist
W- Describing People, Places, Objects, Events

UNIT- 4
Three Days To See' from "Epitome of Wisdom", Published by Maruthi Publications, HyderabadG- Verb forms
V- noun, verb, adjective and adverb

UNIT- 5
R Management' from "Skills Annexe - Functional English for Success" Published by Orient Black Swan, Hyderabad
L - for main points and sub- points for note taking
S - giving instructions and directions; Speaking of hypothetical situations
R - reading for details
W - note- making, information transfer, punctuation

TEXTBOOKS :
   For Detailed study:
   First Textbook: "Skills Annexe - Functional English for Success", Published by Orient Black Swan, Hyderabad
   For Non- detailed study: Second text book "Epitome of Wisdom", Published by Maruthi Publications, Guntur

REFERENCE BOOKS :

   1. Contemporary English Grammar Structures and Composition by David Green,   MacMillan Publishers, New Delhi.2010.
   2. Innovate with English: A Course in English for Engineering Students, edited by T Samson, Foundation Books.
   3. English Grammar Practice, Raj N Bakshi, Orient Longman.
   4. Technical Communication by Daniel Riordan. 2011. Cengage Publications. New Delhi.
   5. Effective English, edited by E Suresh Kumar, A RamaKrishna Rao**,** P Sreehari,
   6. Handbook of English Grammar& Usage, Mark Lester and Larry Beason,Tata Mc Graw hill
   7. Spoken English, R.K. Bansal & JB Harrison, Orient Longman.
   8. Technical Communication, Meenakshi Raman, Oxford University Press
   9. Objective English Edgar Thorpe & Showick Thorpe, Pearson Education
   10. Grammar Games, Renuvolcuri Mario, Cambridge University Press.
   11. Murphy's English Grammar with CD, Murphy, Cambridge University Press.
   12. Everyday Dialogues in English, Robert J. Dixson, Prentice Hall India Pvt Ltd.,
   13. ABC of Common Errors Nigel D Turton, Mac Millan Publishers.

14. Basic Vocabulary Edgar Thorpe & Showick Thorpe, Pearson Education
15. Effective Technical Communication, M Ashraf Rizvi, Tata Mc Graw -Hill.
16. An Interactive Grammar of Modern English, Shivendra K. Verma and Hemlatha
    Nagarajan , Frank Bros & CO
17. A Communicative Grammar of English, Geoffrey Leech, Jan Svartvik, Pearson Education
18. Enrich your English, Thakur K B P Sinha, Vijay Nicole Imprints Pvt Ltd.,
19. A Grammar Book for You And I, C. Edward Good, MacMillan Publishers

COURSE OUTCOMES:

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

ANURAG ENGINEERING COLLEGE

(An Autonomous Institution)

I Year B.Tech. CSE - I Sem

L	T/P/D	C
3	1/- /-	3

(A51002) MATHEMATICS - I

COURSE OBJECTIVES:

- Able to know the Mean value theorems and determine the maxima and minima for function of several variables.
- Concepts of matrix algebra, methods of solving system of linear equations.
- Determine eigen values and eigen vectors of a matrix, cayeley hamilton theorem and inverse by cayeley Hamilton theorem
- Develop a strategy for finding a solution of given arbitrary differential equation, using different methods.
- Understand the sol of higher order differential equations, application of ODE in Bending of beams, electrical circuits and simple harmonic motion.

UNIT - I
Functions of Single Variable and Functions of several variables

Rolle's Theorem - Lagrange's Mean Value Theorem - Cauchy's mean value Theorem - Generalized Mean Value theorem (all theorems without proof) - Geometrical interpretation of Mean value theorems. Functions of several variables - Partial Differentiation and total differentiation - Functional dependence- Jacobian Determinent- Maxima and Minima of functions of two variables with constraints and without constraints.

UNIT - II
Matrices and Linear System of Equations

Matrices and Linear systems of equations: Real matrices - Symmetric, skew - symmetric, orthogonal, Linear Transformation - Orthogonal Transformation. Complex matrices: Hermitian, Skew - Hermitian and Unitary. Elementary row transformations- Rank- Echelon form, Normal form - Solution of Linear Systems - Direct Methods (Gauss Elimination, Gauss Jordan).

UNIT - III
Eigen Values and Eigen Vectors

Eigen values, Eigen vectors - properties, Cayley- Hamilton Theorem (without Proof) - Inverse and powers of a matrix by Cayley- Hamilton theorem - Diagonolization of matrix

UNIT - IV
Differential Equations of first order and their Applications

Differential equations of first order and first degree: exact, linear and Bernoulli, Applications to Newton's law of cooling, law of natural growth and decay, orthogonal trajectories.

UNIT - V
Higher Order Linear Differential Equations and their Applications

Linear differential equations of second and higher order with constant coefficients, RHS term of the type $f(X) = e^{ax}, \sin ax, \cos ax \ and \ x^k, e^{ax}V(x), x^k V(x)$. Method of variation of parameters. Applications - Bending of beams, Electrical circuits, simple harmonic motion.

TEXT BOOKS:

1. Grewal B.S (2007), Higher Engineering Mathematics, 40th Edition, New Delhi, Khanna Publishers.

2. Iyengar T.K.V., Krishna Gandhi B. & Others (2011), Engineering Mathematics   Vol - I, 10th Revised Edition, New Delhi, S. Chand & Company Limited.

3. Iyengar T.K.V., Krishna Gandhi B. & Others (2011), Mathematical Methods, 10th Revised Edition, New Delhi, S. Chand & Company Limited.

4. Advanced Engineering Mathematics: Erwin Kreyszig, Wiley.

REFERENCE BOOKS:

1. Jain R. K., and Iyengar S. R. K (2008), Advanced Engineering Mathematics, 3rd Edition, New Delhi, Narosa Publication House.

2. Shahanaz Bathul (2007), Engineering Mathematics- I, 3rd Edition, Hyderabad, Right Publishers.

3. Ramana B.V (2010), Engineering Mathematics, New Delhi, Tata McGraw Hill Publishing Co. Limited

4. Mathematical Methods: S.R.K. Iyengar and R.K. Jain, Narosa Publishing House.Mathematical Methods of Science and Engineering (Aided with Matlab) Kanti B.Datta (2012), Seventh E

COURSE OUTCOMES:

- Understand Rolle's and the Mean value theorems and to verify the Mean value theorems
- Apply partial derivatives to study maxima and minima of functions of two variables
- Define rank and elementary transformations of a matrix.
- Discuss Non homogeneous and homogeneous system of equations.
- Compute eigen values and corresponding eigen vectors of a square matrix.
- Specify standard methods for solving differential equations and their applications in geometrical and physical problems.
- Identify different types of higher order differential equations and their applications in engineering problem solving.

ANURAG ENGINEERING COLLEGE

(An Autonomous Institution)

I Year B.Tech. CSE - I Sem

L	T/P/D	C
2	1	2

(A51003) ENGINEERING PHYSICS - I

COURSE OBJECTIVES:

- To impart the knowledge of mathematics and science to determine the working of semiconductor devices.
- Emphasize the study of Quantum mechanics to apply it to solve problems of micro & macro particles.
- To have the knowledge of laser technology to know about the working & applications of laser.
- To inculcate the importance of nanotechnology which has the world wide importance.
- To appraise the students about the importance and role of physics in the field of Engineering by explaining the relevant topics.
- To enable students to apply the knowledge acquired in improving the properties of engineering materials.
- To provide the students with the necessary knowledge to solve the problems and make decisions with regards to the application of materials in a variety of engineering disciplines.
  .

UNIT - I
INTERFERENCE AND DIFFRACTION:
Superposition principle, resultant amplitude, coherence, methods to obtain coherent sources, interference, Young's double slit experiment (Qualitative), interference in thin films by reflection, Newton's rings Experiment, Distinction between Fraunhofer and Fresnel diffraction, Diffraction at single slit, Diffraction grating (Qualitative), Introduction to polarization, Brewster's law and Double refraction.

UNIT - II
CRYSTAL STRUCTURES:
Space lattice - Unit cell - Lattice parameter - Crystal systems - Bravais lattices,Atomic radius - Co-ordination number - Structures d Packaging fractions of Simple Cubic -Body Centered Cubic - Face Centered Cubic crystals.
DIRECTIONS, PLANES AND X- RAY DIFFRACTION:
Miller Indices for Crystal planes and directions - Inter planar spacing of orthogonal crystal systems - Diffraction of X- rays by crystal planes and Bragg's law-Powder method - Applications of X- ray diffraction.

UNIT - III
ELEMENTS OF STATISTICAL MECHANICS:
Introduction, Phase space, Definition of Ensembles, Maxwell- Boltzmann, Bose- Einstein and Fermi- Dirac statistics - Photon gas -Planck's law of black body radiation - Deduction of Wien's law and Rayleigh- Jeans law from Plank's law.

UNIT - IV

MAGNETIC PROPERTIES :

Introduction - Basic definitions - Origin of magnetic moment, Bohr magneton - Classification of magnetic materials (Dia, Para and Ferro)- Domain theory of ferromagnetism, Hysteresis curve - Soft and Hard magnetic materials - properties of Anti ferro and Ferri magnetic materials .

SUPERCONDUCTIVITY: Introduction, Meissner effect - Critical fields, Type I and Type II superconductors- Applications of super conductors.

UNIT - V

DIELECTRIC PROPERTIES:

Electric dipole, Dipole moment, Dielectric constant - Parallel plate Capacitor, Electronic, Ionic and Orientation Polarization - Calculation of Polarizibilities - Internal fields - Claussius - Mossotti equation - concepts of Piezo, Pyro and Ferro electricity

TEXT BOOKS:

   1. Modern Engineering Physics by, Dr.K. Vijay Kumar & Dr.S.Chandralingam:S .Chand.Co
   2. Eengineering Physics by P K Palanisamy :Scietech publication
   3. Solid State Physics by M Armugam; Anuradha Publications

REFERENCE BOOKS:

   1. Introduction to Solid State Physics by Charles Kittel : John Wiley & Sons
   2. Engineering Physics by R.K.Gaur and S.L.Gupta; Dhanpat Rai and Sons
   3. Engineering Physics by V Rajendran; McGraw hill education private ltd.
   4. A Text book of Engineering Physics by M N Avadhanulu, P G Kshirsagar; S Chand
   5. Engineering Physics by K Malik, A K Singh; Tata Mc Graw hill book publishers
   6. Engineering Physics by M.R.Srinivasan, New Age Publishers

COURSE OUTCOMES:

   * Finally the students may be familiar with the topics of crystals, dielectrics, optics etc… which will be useful in various branches of technology.
   * There will be a chance for them use the subject as a mathematical tool to solve their real life problems.

ANURAG ENGINEERING COLLEGE

(An Autonomous Institution)

I Year B.Tech. CSE - I Sem

L	T/P/D	C
3	1/- /-	3

(A51005) COMPUTER PROGRAMMING - I

COURSE OBJECTIVES:

- To explain representation of numbers, alphabets and other characters in computer system
- To understand the basic concepts in C Programming Language
- To explain software development tools like algorithm, pseudo codes and programming structure.
- To explain selection and repetition statements in 'C' Language
- To explain arrays to solve problems
- To explain strings and string operations
- To learn how to write modular programming in 'C' Language.

UNIT - I

Introduction to Computers - Computer Systems, Computing Environments, Computer Languages, operating system functions, language processor concepts.

Overview of C Language : Program structure and simple programs using scanf and printf functions.

Data representations- Binary, octal, hexa number systems, ASCII and EBCDIC, data types, Identifiers, Variables, Constants, declarations.

UNIT - II

Operators, Expressions, Precedence and Associativity, evaluation of expressions, sample programs using expressions, Type conversions, unformatted I/O.

Algorithms- control structure - grouping, selectors, repetitions.Step wise refinement, flowchart.

UNIT - III

Statements- Selection Statements - if and switch statements, algorithm and program example using selectors.

Repetition statements (loops)- while, for, do- while statements, algorithm development using repetition and programs using repetition, break, continue, goto, exit, Simple C Program examples.

UNIT - IV

Arrays - Introduction, declaration, reading and printing arrays , programs using arrays, two - dimensional arrays, Multidimensional arrays, C program examples.

Strings - Concepts, C Strings, String Input / Output functions, arrays of strings, string manipulation functions, C program examples.

UNIT - V

Functions- procedural abstraction, function declarations, function calls and parameter passing, Standard functions, Storage classes- recursion- recursive functions, example C programs.

TEXT BOOKS:

1. Computer Science: A Structured Programming Approach Using C, B.A.Forouzan and R.F. Gilberg, Third Edition, Cengage Learning.
2. Programming in C. P. Dey and M Ghosh , Oxford University Press.

REFERENCE BOOKS:

1. C& Data structures - P. Padmanabham, Third Edition, B.S. Publications.
2. C for All, S. Thamarai Selvi, R.Murugesan, Anuradha Publications.
3. Problem Solving and Program Design in C, J.R. Hanly and E.B. Koffman, 7th Edition, Pearson education.
4. Programming in C, Ajay Mittal, Pearson.
5. Programming with C, B.Gottfried, 3rd edition, Schaum's outlines, TMH.
6. Problem solving with C, M.T.Somasekhara, PHI
7. Programming with C, R.S.Bickar, Universities Press.
8. Computer Programming & Data Structures, E.Balagurusamy, 4th edition, TMH.

COURSE OUTCOMES:

Upon completion of this course the students will have an:
• Ability to design algorithmic solutions to problem
• Ability to convert algorithms to C- Programs
• Ability to write, compile and debug programs in C Language
• Ability to write Programs using selection and repetition statements
• Ability to write programs using Arrays and Strings
• Ability to design structured programming.

ANURAG ENGINEERING COLLEGE

(An Autonomous Institution)

I Year B.Tech. CSE - I Sem

L	T/P/D	C
3	1	3

(A51010) ENGINEERING CHEMISTRY

COURSE OBJECTIVES:

- To appraise the students about the importance and role of chemistry in the field of Engineering by explaining the relevant topics.
- To enable students to apply the knowledge acquired in improving the properties of engineering materials.
- To provide the students with the necessary knowledge to solve the problems and make decisions with regards to the application of materials in a variety of engineering disciplines.
- To equip the students with the required fundamentals of engineering chemistry carry out in the interdisciplinary research such that the findings benefit the common man.
- After the completion of the course, the student would understand about the important chemistry of water, corrosion and its control, polymer chemistry, electrochemistry (including batteries) and advanced engineering materials.

UNIT - I

WATER: Hardness of water, expression of hardness ($CaCO_3$ equivalent), units and types of hardness. Estimation of temporary and permanent hardness of water by EDTA method. Numerical problems based on hardness of water. Potable water: characteristics, treatment of water for domestic supply. Desalination of brackish water: reverse osmosis. Alkalinity of water and its determination. Boiler troubles: priming and foaming, boiler corrosion, scales, sludges and caustic embrittlement. Boiler feed water and its treatment: Internal treatment (colloidal, phosphate calgon conditioning of water). External treatment (zeolite process and ion -exchange process) , Numerical problems on softening of water.

UNIT - II

ELECTRO CHEMISTRY : Conductance and its types . Electrode, electrode potential, galvanic cell , cell reactions and cell notation, cell EMF , types of electrodes (Normal Hydrogen Electrode , calomel electrode, glass electrode and quinhydrone electrode) Nernst equation Numerical problems. Potentiometric titrations. Concentration cells, classification with examples.

BATTERIES: Introduction to cell and battery, characteristics of a cell. Primary (dry cell and lithium cell) and secondary cells, (lead- Acid cell, Ni- Cd cell and Lithium ion cells,). Solar battery, engineering applications of batteries. Fuel cells - Hydrogen - Oxygen fuel cell, advantages and engineering applications of fuel cells.

UNIT - III

CORROSION AND ITS CONTROL Introduction, types of corrosion : chemical and electrochemical corrosion, mechanism of chemical and electrochemical corrosion , galvanic , water line and pitting corrosion, factors affecting the rate of corrosion : nature of the metal , galvanic series, purity of metal, nature of corrosion product , nature of environment : effect of temperature, effect of pH, humidity. Corrosion control methods: Cathodic protection: sacrificial anode method and impressed current cathode method. Protective coatings : metallic coatings (anodic and cathodic), methods of application on metals , hot dipping (galvanizing), cladding, cementation, electroplating(of copper) electroless plating (of nickel) . Organic coatings - paints, its constituents and their functions.

UNIT - IV

POLYMER CHEMISTRY : Introduction, classification of polymers, types of polymerization (addition and condensation, mechanisms not included). Plastics- types of plastics - thermoplastics and thermosetting plastics. Compounding and moulding of plastics. Preparation, properties and engineering applications of PVC, Teflon and

Bakelite. Fibers: Nylon 6, 6 and Terelene (Dacron). Elastomers: natural rubber, structure, vulcanization. Synthetic rubbers: Buna- S, butyl rubber, Thikol rubber. Conducting polymers: classification, mechanism of conduction, Poly acetylene - preparation and effects of doping on conduction. Applications of conducting poly

UNIT - V

ADVANCED ENGINEERING MATERIALS: Biodegradable polymers, types, examples: Polyhydroxy butyrate (PHB) ,Poly- Hydroxybutyrate- co- b- Hydroxy valerate (PHBV) ,Polyglycolic acid (PGA) , Polylactic acid (PLA) ,Poly (Î- caprolactone) (PCL). Applications of biodegradable polymers.
Composite materials: Constituents of composite materials. Types of composite materials. Advantages and engineering applications of composite materials.
Nano materials: Introduction, basic methods of preparation and applications of nano meterials.
Insulators- Classification, characteristics of thermal & electrical insulators and applications.
Biofuels - biodiesel, general methods of preparation and advantages

TEXT BOOKS:

1. Engineering Chemistry by NYS.Murthy, Pearson, India.
2. Engineering Chemistry by P.C Jain & Monica Jain, Dhanpat Rai Publishing Compan

REFERENCE BOOKS:

1. Text Book of Engineering Chemistry by Shasi Chawla, Dhantpat Rai publishing Company,
2. Engineering Chemistry by C.Daniel Yesudian , Anuradha publications

COURSE OUTCOMES:

- Industrious Students and health conscious ones remain inquisitive on potable water its parameter and usage
- Dynamic students indeed capable of explaining the various aspects of electro chemistry work out numerical problems
- Thorough with cells and solar, fuel cells
- gets augmented to the caliber in knowing corrosion and causes going around and capable of suggesting periodical maintenance

ANURAG ENGINEERING COLLEGE

(An Autonomous Institution)

I Year B.Tech. CSE - I Sem

L	T/P/D	C
3	1	3

(A51011) BASIC ELECTRICAL ENGINEERING

COURSE OBJECTIVE:

- This course introduces the basic concept of circuit analysis which is the fundamental for all subjects of the Electrical engineering discipline.

- The emphasis of this course if laid on the basic analysis of circuit which includes single phase circuits, magnetic circuits, theorems, principle and working operation of AC & DC Machines and basic Instruments.

UNIT - I
Introduction to Electrical Engineering:
Basic definitions, types of elements, types of sources, Kirchhoff's Laws**,** resistive networks, inductive networks, series , parallel circuits, Star- Delta and Delta- Star transformation, Network theorems- Super position, Thevenin's, Maximum power transfer theorems and simple problems.
Magnetic circuits: Magnetic circuits, Faraday's laws of Electromagnetic Induction, concept of Self & Mutual Inductance.

UNIT - II
Alternating Quantities:
Principle of AC voltages, waveforms and basic definitions, root mean square and average values of alternating currents and voltages, form factor and peak factor, phasor representation of alternating quantities, the J operator and phasor algebra, analysis of an AC circuits with basic network elements, single phase series circuit. Introduction to 3- Phase Circuits.

UNIT - III
DC Machines:
Principle of operation of D.C machines, types of D.C generators, emf equation in D.C generator. Principle of operation of D.C motors, types of D.C motors, losses and torque equation, losses and efficiency calculation in D.C Machines.

UNIT - IV
A.C. Machines:
Transformers: Principles of operation, Constructional details. Ideal transformer and practical transformer, Losses, OC & SC test, Efficiency (All the above topics are only elementary treatment and simple problems).
Three phase induction motor: Principle of operation, slip and rotor frequency, torque (simple problems).

UNIT - V
Basic Instruments:
Introduction, classification of instruments, operating principles, essential features of measuring instruments Permanent Magnet Moving Coil (PMMC) & Moving Iron(MI) instruments, Ammeters and Voltmeters (elementary Treatment only).

TEXT BOOKS:

1. Basic Electrical Engineering- By M.S. Naidu and S. Kamakshiah- TMH.
2. Basic Electrical Engineering- By T.K. Nagasarkar and M.S. Sukhhija, Oxford University press.
3. Electrical and Electronics technology- By Hughes- Pearson Education.

REFERENCE BOOKS:

1. Theory and problems of Basic Electrical Engineering by D.P.Kothari & I.J. Nagrath, PHI.
2. Principles of Electrical Engineering by V.K Mehta, S. Chand Publications.
3. Essentials of Electrical and Computer Engineering by David V. Kerns, JR. J. David Irwin Pearson.

COURSE OUTCOMES:

- To know about the types of circuit elements, their type of connections and solving techniques of all types of electrical circuits.
- To know about the A.C quantities, their representation and analysis of single phase and three phase circuits.
- To know about the D.C machines principle of operation, types, losses and efficiency calculations.
- To know about the transformers and A.C machines principle of operation, constructional details, losses and efficiency calculations.
- To know about the measuring instruments principle of operation, classifications and simple problems.

ANURAG ENGINEERING COLLEGE

(An Autonomous Institution)

I Year B.Tech. CSE - I Sem

L	T/P/D	C
0	- /3/-	2

(A51217) ENGLISH LANGUAGE COMMUNICATION SKILLS LAB - I

COURSE OBJECTIVES:

- The **Language Lab** focuses on the production and practice of sounds of language and familiarizes the students with the use of English in everyday situations and contexts.
- To facilitate computer- aided multi- media instruction enabling individualized and independent language learning
- To sensitize the students to the nuances of English speech sounds, word accent, intonation and rhythm
- To bring about a consistent accent and intelligibility in their pronunciation of English by providing an opportunity for practice in speaking
- To improve the fluency in spoken English and neutralize mother tongue influence
- To train students to use language appropriately for interviews, group discussion and public speaking

Syllabus: English Language Communication Skills Lab shall have two parts:
a. Computer Assisted Language Learning (CALL) Lab
b. Interactive Communication Skills (ICS) Lab

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

Exercise- I
CALL Lab: Introduction to Sounds of English Language
       Speech Sounds
       Vowels and Consonants

Exercise- II
ICS Lab: Ice- Breaking activity and Articles, Prepositions, Word formation- Prefixes & Suffixes, Synonyms & Antonyms

Exercise- III
CALL Lab: Structure of Syllables
       Past Tense Marker and Plural Marker
       Weak Forms and Strong Forms
       Consonant Clusters.

Exercise- IV
ICS Lab: Situational Dialogues - Role- Play- (Self- introduction and introducing others- Greetings- Apologies- Requests), JAM Session.

Exercise- V
ICS Lab: Social and Professional Etiquette and Telephone Etiquette- Tenses- Non- Verbal Communications.

Minimum Requirement of infra structural facilities for ELCS Lab:

1. Computer Assisted Language Learning (CALL) Lab: the Computer aided Language Lab for 60 students with 60 systems, one master console, LAN facility and English language software for self- study by learners.

System Requirement (Hardware component):
(computers with suitable configuration as per the purchased software demands)
Computer network with Lan with minimum 60 multimedia systems with the following specifications:
i) P - IV Processor
a) Speed - 2.8 GHZ

 b) RAM - 512 MB Minimum
c) Hard Disk - 80 GB
ii) Headphones of High quality

2. Interactive Communication Skills (ICS) Lab:
The Interactive Communication Skills Lab: A Spacious room with movable chairs and audio-visual aids with a Public Address System, a T. V., a digital stereo -audio & video system and camcorder etc.

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

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

COURSE OUTCOMES:

 • Better Understanding of language through audio- visual experience and group activities
   Neutralization of accent for intelligibility
   Speaking with clarity and confidence thereby enhancing employability skills of the students

ANURAG ENGINEERING COLLEGE

(An Autonomous Institution)

I Year B.Tech. CSE - I Sem

L	T/P/D	C
0	- /3/-	2

(A51218) COMPUTER PROGRAMMING LAB - I

COURSE OBJECTIVES:
- To make the student learn Linux commands
- To make the student learn a programming language
- To teach the student to write programs in C to solve the problems
- To make the student to write the programs using control statements
- To make the student to use arrays for solving the problems
- To make the student to write modular programming

Week 1:

1. Familiarity with Linux Commands - Login, Wild Chars, ls, cp, mv, mkdir, wc, chdir.
2. Creation of text files using vi editor.

Week 2:

Using vi editor - perform operations of pattern search, insertion, deletion and substitution operations

Week 3:

Write simple programs using scanf and printf functions and familiarity with format strings.

Week 4 & 5:

Write programs to illustrate the Assignment Operators

Week 6:

Write programs to illustrate the Logical Operators

Week 7:

Write programs to illustrate the Relational Operators

Week 8:

Write programs using If Statement

Week 9:

Write programs using while, do- while loops

Week 10:

Write programs using for loop

Week 11:
Write programs to illustrate one dimensional arrays

Week 12:
Write programs to illustrate two dimensional arrays

Week 13:
Write programs to illustrate String concepts.

Week 14:
Write programs using functions

Week 15:

Review

ANURAG ENGINEERING COLLEGE

(An Autonomous Institution)

I Year B.Tech. CSE - I Sem

L	T/P/D	C
0	- /3/-	2

(A51219) ENGINEERING CHEMISTRY LAB

COURSE OBJECTIVES:

- To impart fundamental knowledge in handling the equipment /glassware and chemicals in the chemistry laboratory.
- To offer hands on experience on the basic equipment related to engineering chemistry.
- For practical understanding of theoretical concepts of chemistry.

(Any <u>ten experiments</u> out of the following fourteen experiments should be performed)
Titrimetry:

1. Fundamentals of volumetric analysis : (a) Determination of strength of an acid (HCl)
2. Estimation of ferrous iron by dichrometry
3. Estimation of hardness of water by EDTA method.
4. Determination of alkalinity of water.
5. Determination of free chlorine or chlorides in water.
6. Determination of iron by permanganometry.
7. Estimation of copper by colorimetric method.
8. Estimation of HCl by conductometry using standard NaOH solution.
9. Estimation of HCl by potentiometry using standard NaOH solution.
10. Determination of viscosity of sample oil by Redwood/Oswald's viscometer
11. Determination surface tension of lubricants.
12. Determination of the rate constant of acid catalyzed hydrolysis of methyl acetate .
13. Preparation of thiokol rubber and nylon 6,6.
14. Preparation of Biodiesel from Waste Vegetable Oil (WVO).

TEXT BOOKS:

1. Vogel's Textbook of Quantitative Chemical Analysis
2. Essentials of experimental engineering chemistry, Shashi Chawla, Dhanpat Rai & Co
3. Laboratory manual of engineering chemistry, S.K.Bhasin and Sudha Rani , Dhanpat Rai & co.
4. A text book on experiments and calculations. S.S. Dara, S. Chand & Co

REFERENCE BOOKS:

1. Instrumental methods of chemical analysis, Chatwal, Anand, Himalaya Publications.

COURSE OUTCOMES:

- As commences with fundamentals which indeed takes the individual students to be more conversant with apparatus and allied .
- gets equipped with the technical importance of knowing the extent of hardness and consciousness of units.
- Students gets augmented the adroitness and keep aware of some industrial determination techniques
- As commences with fundamentals which indeed takes the individual students to be more conversant with apparatus and allied.
- Gets equipped with the technical importance of knowing the extent of hardness and consciousness of units

ANURAG ENGINEERING COLLEGE

(An Autonomous Institution)

I Year B.Tech. CSE - I Sem

L	T/P/D	C
0	- /3/-	2

(A51220) IT WORKSHOP

COURSE OBJECTIVES:

The IT Workshop for engineers is a training lab course spread over 40 hours. The modules include training on PC Hardware, Internet & World Wide Web and Productivity tools including Word, Excel, and Power Point.

PC Hardware introduces the students to a personal computer and its basic peripherals, the process of assembling a personal computer, installation of system software like MS Windows, Linux and the required device drivers. In addition hardware and software level troubleshooting process, tips and tricks would be covered. **The students should work on working PC to disassemble and assemble to working condition and install Windows and Linux on the same PC. Students are suggested to work similar tasks in the Laptop scenario wherever possible.**

Internet & World Wide Web module introduces the different ways of hooking the PC on to the internet from home and workplace and effectively usage of the internet. Usage of web browsers, email.

Productivity tools module would enable the students in crafting professional word documents, excel spread sheets and power point presentations. (**Recommended to use Microsoft office 2007 in place of MS Office 2003)**

PC Hardware

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

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

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

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

Internet & World Wide Web

Exercise 5 - Task 1: Orientation & Connectivity Boot Camp: Students should get connected to their Local Area Network and access the Internet. In the process they configure the TCP/IP setting. Finally students should demonstrate, to the instructor, how to access the websites and email. If there is no internet connectivity preparations need to be made by the instructors to simulate the WWW on

the LAN.

Exercise 6 - Task 3: Search Engines & Netiquette: Students should know what search engines are and how to use the search engines. A few topics would be given to the students for which they

need to search on Google. This should be demonstrated to the instructors by the student.

MS Word

Exercise 7&8: The mentor needs to give an overview of Microsoft (MS) word 2007: Accessing, overview of toolbars, saving files, Using help and resources, rulers, format painter in word. Give a task covering to create project certificate. Features to be covered:- Formatting Fonts in word, Drop Cap in word, Applying Text effects, Using Character Spacing, Borders and Colors, Inserting Header and Footer, Inserting table, using Drawing toolbar in word.

MS Excel

Exercise 9&10: The mentor needs to tell the importance of MS office 2007 Excel as a Spreadsheet tool covering Accessing, overview of toolbars, saving excel files, Using help and resources., Also give a task that is covering the features like Gridlines, Format Cells, Summation, auto fill, Formatting Text.

MS Power Point

Exercise 11&12: Students will be working on MS power point which help them create basic power point presentation. Topic covered during this Exercise includes :- PPT Orientation, Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Auto Shapes, Lines and Arrows in Power point. Students will be given model power point presentation which needs to be replicated (exactly how it's asked).

REFERENCE BOOKS:

1. Comdex Information Technology course tool kit Vikas Gupta, WILEY Dream tech
2. The Complete Computer upgrade and repair book,3rd edition Cheryl A Schmidt, WILEY Dreamtech
3. Introduction to Information Technology, ITL Education Solutions limited, Pearson
4. Education.
5. PC Hardware and A+Handbook - Kate J. Chase PHI (Microsoft)
6. IT Essentials PC Hardware and Software Companion Guide Third Edition by David Anfinson and Ken Quamme. - CISCO Press, Pearson Education.
7. IT Essentials PC Hardware and Software Labs and Study Guide Third Edition by Patrick Regan - CISCO Press, Pearson Education.

ANURAG ENGINEERING COLLEGE

(An Autonomous Institution)

I Year B.Tech. CSE - II Sem

L	T/P/D	C
2	0/-/-	2

(A52001) ENGLISH - II

1. INTRODUCTION:

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

In the English classes, the focus should be on the skills of reading, writing, listening and speaking and for this the teachers should use the text prescribed for detailed study. For example, the students should be encouraged to read the texts/selected paragraphs silently. The teachers can ask comprehension questions to stimulate discussion and based on the discussions students can be made to write short paragraphs/essays etc. The text for non- detailed study is for extensive reading/reading for pleasure. Hence, it is suggested that they read it on their own the topics selected for discussion in the class. The time should be utilized for working out the exercises given after each section, as also for supplementing the exercises with authentic materials of a similar kind for example, from newspaper articles, advertisements, promotional material etc.. However, the stress in this syllabus is on skill development, fostering ideas and practice of language skills.

2. COURSE OBJECTIVES

- To improve the language proficiency of the students in English with emphasis on LSRW skills.
- To equip the students to study academic subjects more effectively using the theoretical and practical components of the English syllabus.
- To develop the study skills and communication skills in formal and informal situations.

SYLLABUS:

Listening Skills:

Objectives

1. To enable students to develop their listening skill so that they may appreciate its role in the LSRW skills approach to language and improve their pronunciation.
2. To equip students with necessary training in listening so that they can comprehend the speech of people of different backgrounds and regions.

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

   i. Listening for general content
   ii. Listening to fill up information
   iii. Intensive listening
   iv. Listening for specific information

Speaking Skills:

Objectives

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

   • Oral practice
   • Describing objects/situations/people

- Role play - Individual/Group activities (Using exercises from the five units of the prescribed text: **Skills Annexe - Functional English for Success)**
- Just A Minute(JAM) Sessions.

Reading Skills:

Objectives

1. To develop an awareness in the students about the significance of silent reading and comprehension.
2. To develop the ability of students to guess the meanings of words from context and grasp the overall message of the text, draw inferences etc.
    - Skimming the text
    - Understanding the gist of an argument
    - Identifying the topic sentence
    - Inferring lexical and contextual meaning
    - Understanding discourse features
    - Scanning
    - Recognizing coherence/sequencing of sentences

NOTE : The students will be trained in reading skills using the prescribed text for detailed study. They will be examined in reading and answering questions using 'unseen' passages which may be taken from authentic texts, such as magazines/newspaper articles.

Writing Skills :

Objectives

1. To develop an awareness in the students about writing as an exact and formal skill
2. To equip them with the components of different forms of writing, beginning with the lower order ones.
    - Writing sentences
    - Use of appropriate vocabulary
    - Paragraph writing
    - Coherence and cohesiveness
    - Narration / description
    - Note Making
    - Formal and informal letter writing
    - Describing graphs using expressions of comparison

TEXTBOOKS:

For Detailed study:
First Textbook: "Skills Annexe - Functional English for Success", Published by Orient Black Swan, Hyderabad
For Non- detailed study:
Second text book "Epitome of Wisdom", Published by Maruthi Publications, Guntur

UNIT - I
Chapter 1:**'Leela's Friend'** by R.K. Narayan from "Epitome of Wisdom", Published by Maruthi Publications, Hyderabad
G - Present Tense
V - Synonyms and Antonyms

UNIT - II
Chapter 2: **'Human Values and Professional Ethics'** from "Skills Annexe - Functional English for Success" Published by Orient Black Swan, Hyderabad
L - Listening for specific details and information

S- Narrating, expressing opinions and telephone interactions

R - Reading for specific details and information

W- Writing formal letters and CVs

UNIT - III

Chapter 3: **'The Convocation Speech'** by N.R. Narayanmurthy' from "Epitome of Wisdom",
Published by Maruthi Publications, Hyderabad

G- Past and future tenses

V- Vocabulary - idioms and Phrasal verbs

UNIT - IV

Chapter 4: **'Sports and Health'** from "Skills Annexe - Functional English for Success" Published by
Orient Black Swan, Hyderabad

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

S- Group discussion and Making presentations

R- Critical reading, reading for reference

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

UNIT - V

Chapter5: '**The Secret of Work'** from "Epitome of Wisdom", Published by Maruthi Publications
Hyderabad.

G- Adjectives, Prepositions and Concord

V- Collocations and Technical Vocabulary

REFERENCE BOOKS :

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

COURSE OUTCOMES:

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

ANURAG ENGINEERING COLLEGE

(An Autonomous Institution)

I Year B.Tech. CSE - II Sem

L	T/P/D	C
3	1/- /-	3

(A52002) MATHEMATICS - II

COURSE OBJECTIVES:

- To introduce some special functions like Gamma, Beta and learn how to evaluate definite integrals with the help of special functions.
- Able to know the Laplace , Inverse Laplace transform and sol of ODE by using Laplace transforms
- Evaluate the multiple integrals and analyze the DEL properties.
- Apply the theorems by using line, surface and volume integrals
- Determine the Fourier coefficients of a given function. Analyze the characteristics and properties of Fourier transforms

UNIT - I

Laplace transform and its applications to Ordinary differential equations

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

UNIT - II

Gamma and Beta Functions:

Gamma and Beta Functions- Relation between them, their properties - evaluation of improper integrals using Gamma / Beta functions.

UNIT - III

Multiple Integrals

Multiple integrals - double and triple integrals - change of order of integration- change of variables. Gradient- Divergence- Curl and their related properties - Potential function - Laplacian and second order operators.

UNIT - IV

Vector Calculus

Line integral - work done --- Surface integrals - Flux of a vector valued function. Vector integrals theorems: Green's - Stoke's and Gauss's Divergence Theorems (Only Statements & their Verifications).

UNIT - V

Fourier Series

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

TEXT BOOKS:

1. Grewal B.S (2007), Higher Engineering Mathematics, 40th Edition, New Delhi, Khanna Publishers.
2. Iyengar T.K.V., Krishna Gandhi B. & Others (2011), Mathematical Methods, 10th Revised Edition, New Delhi, S. Chand & Company Limited.
3. Iyengar T.K.V., Krishna Gandhi B. & Others (2011), Engineering Mathematics Vol - I, 10th Revised Edition, New Delhi, S. Chand & Company Limited.
4. Advanced Engineering Mathematics: Erwin Kreyszig, Wiley.

REFERENCE BOOKS:

1. Shahanaz Bathul (2007), Mathematical Methods, 3rd Edition, Hyderabad, Right Publishers.
2. Jain R. K., and Iyengar S. R. K (2008), Advanced Engineering Mathematics, 3rd Edition, New Delhi, Narosa Publication House.
3. Dass H.K. and Rajnish Verma Er (2007), Higher Engineering Mathematics, First Edition, New Delhi, S. Chand & Company Limited.
4. Integral Transforms by A.R.Vasista
5. Schaum's outline series on Vector Analysis; Linear Algebra.
6. Larry C. Andrews and Bhimsen K. Shivamoggi, Integral Transforms for Engineers, Prentice - Hall of India Private Limited, New Delhi.
7. Mathematical Methods of Science and Engineering (Aided with Matlab) Kanti B.Datta (2012), Seventh Edition, CENGAGE Learning.

COURSE OUTCOMES:

- Apply Beta and Gamma functions to evaluate many integrals which cannot be expressed in terms of elementary functions.
- Apply Laplace transform to solve differential equations which will be converted to algebraic
- Evaluate double integrals by changing variables , changing order and triple integration Calculate line integrals along piecewise smooth paths, interpret such quantities as work done by a force
- 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 Divergence theorem to give physical interpretation of the divergence of a vector field
- Develop Fourier series of periodic functions.

ANURAG ENGINEERING COLLEGE

(An Autonomous Institution)

I Year B.Tech. CSE - II Sem

L	T/P/D	C
2	1	2

(A52003) ENGINEERING PHYSICS - II

COURSE OBJECTIVES:

- To impart the knowledge of mathematics and science to determine the working of semiconductor devices .
- Emphasize the study of Quantum mechanics to apply it to solve problems of micro & macro particles.
- To have the knowledge of laser technology to know about the working & applications of laser.
- To inculcate the importance of nanotechnology which has the world wide importance.

UNIT - I
PRINCIPLES OF QUANTUM MECHANICS:
Waves and particles - De Broglie hypothesis - Matter waves - Davisson and Germer experiment - Schrodinger Wave Equation - Wave function and its Physical Significance - Particle in one dimensional potential box(wave functions, probability densities and energy states).

UNIT - II
FREE ELECTRON THEORY OF METALS:
Classical Theory, Electrical Conductivity and Ohm's Law - Drawbacks, Sommerfield theory (Qualitative), Density of States, Effect of temperature on the Fermi- Dirac distribution.
BAND THEORY OF SOLIDS:
Electron in a periodic potential - Bloch Theorem - Kronig- Penney model (Qualitative) - Origin of energy band formation in solids - Classification of materials into conductors, semiconductors & Insulators - Concept of effective mass of an electron.

UNIT - III
SEMICONDUCTOR PHYSICS:
Fermi level in Intrinsic and Extrinsic semiconductors - Intrinsic semiconductor and carrier concentration - Extrinsic semiconductor and carrier concentration - Characteristics of p- n junction diode - Hall effect, LED, Photodiode.
FIBRE OPTICS
Basic principle of optical fibre, Acceptance angle, Acceptance cone, numerical aperture (Quantitative), Types of optical fibre, applications of optical fibre.

UNIT - IV
LASERS:
Characteristics of Lasers - Spontaneous and Stimulated Emission of radiation, meta stable state, population inversion, lasing action, Einstein's coefficients and relation between them -- Ruby Laser - Helium- Neon Laser -Semiconductor Laser - Applications of lasers.

UNIT - V
BASIC PRINCIPLES OF NANO SCIENCE:
Introduction, surface to volume ratio, quantum confinement - Fabrication of nano materials- Top down fabrication, Bottom up fabrication: sol- gel Technique, CVD method- Characterization (XRD &

TEM) - Applications of nanomaterials.

TEXT BOOKS:

1. Engineering Physics by P K palanisamy :Scietech publication
2. Solid State Physics by M Armugam; Anuradha Publications

REFERENCE BOOKS:

1. Introduction to Solid State Physics by Charles Kittel : John Wiley & Sons
2. Engineering Physics by R.K.Gaur and S.L.Gupta; Dhanpat Rai and Sons
3. Engineering Physics by V Rajendran; McGraw hill education private ltd.
4. A Text book of Engineering Physics by M N Avadhanulu, P G Kshirsagar; S Chand
5. Engineering Physics by K Malik, A K Singh; Tata Mc Graw hill book publishers
6. Engineering Physics by M.R.Srinivasan, New Age Publishers

COURSE OUTCOMES:

- Having the knowledge of semiconductors & fiber optics, there will be a chance to know their applications.
- There will be a chance for them to use the subject as a mathematical tool to solve their real life problems.
- The students will be able to know the working of different lasers & their real life applications.

ANURAG ENGINEERING COLLEGE

(An Autonomous Institution)

I Year B.Tech. CSE - II Sem

L	T/P/D	C
3	1/- /-	3

(A52006) COMPUTER PROGRAMMING - II

COURSE OBJECTIVES:

- To explain various sorting and searching techniques
- To explain structures, unions, and enumeration types and operations on them
- To understand dynamic memory management using pointers.
- To introduce basic data structures such as stacks, queues and linked lists.
- To explain various types of files in 'C' Language.

UNIT - I

Searching and Sorting - Sorting- selection sort, bubble sort, Insertion sort, Quick Sort, Merge sort, Searching- linear and binary search methods.

UNIT - II

Structures -   Declaration, initialization, accessing structures, operations on structures,nested structures, arrays of structures, Unions, Enumerated types, Type Definition(typedef), C programming examples.

UNIT - III

Pointers - Concepts, declarations, usage, pointers to pointers, pointer expressions, Arrays and Pointers, array of pointers,parameter passing of pointers, pointers to void, pointers to functions, structures through pointers, self referential structures, C programming examples

UNIT - IV

Lists- Linear list - singly linked list implementation, insertion, deletion and searching operations on linear list, Stacks- Push and Pop Operations, Queues- Enqueue and Dequeue operations.

UNIT - V

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, command -line arguments, C program examples.

TEXT BOOKS:

1. Computer Science: A Structured Programming Approach Using C, B.A.Forouzan and R.F. Gilberg, Third Edition, Cengage Learning.
2. Programming in C. P. Dey and M Ghosh , Oxford University Press.

REFERENCE BOOKS:

1. C& Data structures - P. Padmanabham, Third Edition, B.S. Publications.
2. C for All, S. Thamarai Selvi, R.Murugesan, Anuradha Publications.
3. Problem Solving and Program Design in C, J.R. Hanly and E.B. Koffman, 7th Edition, Pearson education.
4. Programming in C, Ajay Mittal, Pearson.

5. Programming with C, B.Gottfried, 3rd edition, Schaum's outlines, TMH.
6. Problem solving with C, M.T.Somasekhara, PHI
7. Programming with C, R.S.Bickar, Universities Press.
8. Computer Programming & Data Structures, E.Balagurusamy, 4th edition, TMH.

COURSE OUTCOMES:

- Upon completion of this course the students will have an:
- Ability to design various sorting and searching techniques
- Ability to design user defined data types to solve real world problems
- Ability to manage heap memory
- Ability to implement and use data structures like stacks, queues and linked lists
- Ability to create and use various types of files in 'C' Language.

ANURAG ENGINEERING COLLEGE

(An Autonomous Institution)

I Year B.Tech. CSE - II Sem

L	T/P/D	C
3	1/- /-	3

(A52008) MATHEMATICS- III
(Numerical Techniques and Partial Differential Equations)

COURSE OBJECTIVES:

- Determination of roots of an equation and calculate some simple methods of obtaining approximate roots of algebraic and transdental equations.
- Interpolate the values using the techniques of newtons forward and backward, Gauss forward and backward, lagranges and splines interpolations.
- Analyze and calculate numerical differentiation and numerical integration methods.
- Calculate sol of ODE using Taylor's, Euler's, Picasrd's, Runga Kutta and Predictor- Corrector method.
- Evaluate the sol of PDE and calculate boundary value problems.

UNIT - I
Solution of Non- linear Equations and Linear System of Equations.
Solution of Algebraic and Transcendental Equations - The Bisection Method - The Method of False Position - The Iteration Method - Newton- Raphson Method.
Solving system of non- homogeneous equations by L- U Decomposition method(Crout's Method)Jacobi's and Gauss- Seidel Iteration method,

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

UNIT - III
Numerical Differentiation, Numerical Integration & Curve fitting
Numerical Diferentiation, Generalized Quadrature (Newton's Cote's formula), Trapezoidal, Simson's and Weddle's rules and problems. Curve fitting: Fitting a straight line - Second degree curve - exponential curve- power curve by method of least squares.

UNIT - IV
Numerical solution of IVP's in ODE
Numerical solution of Ordinary Differential equations: Solution by Taylor's series- Picard's Method of successive Approximations- Euler's Method- Runge- Kutta Methods -Predictor- Corrector Methods- Adams- Bashforth Method- Milne Thamson Method.

UNIT - V
Partial differential equations
Introduction and Formation of partial differential equation by elimination of arbitrary constants and arbitrary functions, solutions of first order linear (Lagrange) equation and nonlinear (Standard type)

equations, Charpits Method, Method of separation of Variables for second order equations. Classification of general second order partial differential equations. Applications of Partial Differential Equations- One dimensional wave equation, Heat equation.

TEXT BOOKS:
1. Grewal B.S (2007), Higher Engineering Mathematics, 40th Edition, New Delhi, Khanna Publishers.
2. Iyengar T.K.V., Krishna Gandhi B. & Others (2011), Mathematical Methods, 10th Revised Edition, New Delhi, S. Chand & Company Limited.
3. Advanced Engineering Mathematics: Erwin Kreyszig, Wiley.

REFERENCE BOOKS:
1. Shahanaz Bathul (2007), Mathematical Methods, 3rd Edition, Hyderabad, Right Publishers.
2. Jain R. K., and Iyengar S. R. K (2008), Advanced Engineering Mathematics, 3rd Edition, New Delhi, Narosa Publication House.
3. Introductory Methods of Numerical Analysis. S.S. Sastry, Prentice Hall.
4. Numerical Analysis (Paper IV), First Edition 2010, Telugu Akademi, Hyderabad.
5. Schaum's outline series on Matrices.
6. Mathematical Methods of Science and Engineering (Aided with Matlab) Kanti B.Datta (2012), Seventh Edition, CENGAGE Learning.

COURSE OUTCOMES:

- Determination of roots of an equations of the form f(x)=0 has great importance in the fields of science and engineering. Calculate some simple methods of obtaining approximate roots of algebraic and transcendental equations.
- Solutions of linear system of equations can be found by numerical methods known as direct and indirect methods such as Gauss elimination and its modifications ,Jacobi's and Gauss - seidal iterative methods, made the difference between of those methods.
- Interpolate the values using the techniques of Newton's forward and backward, Gauss forward and backward, Lagrange's interpolation, and spline'sinterpolation..
- Analyze and calculate numerical differentiation and numerical integrations methods.
- Calculate solutions of ODE using Taylor's, Euler's, picard's, Runge- Kutta, Predictor and corrector methods.
- Calculate boundary value problems
- Calculate Solutions of partial differential equation

ANURAG ENGINEERING COLLEGE

(An Autonomous Institution)

I Year B.Tech. CSE - II Sem

L	T/P/D	C
3	3/-/-	3

(A52011) ENGINEERING GRAPHICS

COURSE OBJECTIVES:

- To visualize and communicate geometrical elements like Polygons,Curves,Conic Sections, Cycloids and Involutes
- To understand the fundamentals of geometry like Orthographic Projections and its applications in design and manufacturing of various engineering components.
- To understand the fundamentals of geometry like Principles involved in Planes and Solids and its applications in design and manufacturing of various engineering components.
- To understand the fundamentals of geometry like Isometric Projections and its applications in design and manufacturing of various engineering components.
- To understand the fundamentals of geometry like Conversion of Orthographic Views to Isometric Views and its applications in design and manufacturing of various engineering components.

UNIT - I

Introduction to Engineering Drawing: Drawing Instruments and their uses, types of lines, use of pencils, Lettering, Rules of dimensioning.

Construction of polygons: Inscription and superscription of polygons given the diameter of circle.

Curves used in Engineering Practice and their Constructions:

Conic Sections: Ellipse, Parabola, Hyperbola including the Rectangular Hyperbola - General method only.

Cycloidal curves - Cycloid, Epicycloid and Hypocycloid Involutes

UNIT - II

Drawing of Projections or Views (Orthographic Projection in First Angle Projection Only): Principles of Orthographic Projections - Conventions - First and Third Angle Projections, Projection of Points, Projection of Lines - inclined to both planes, True lengths. (Mid points & Traces are eliminated).

UNIT - III

Projections of Planes: Projections of regular Planes - Inclined to both planes.

Projections of Solids: Projections of Regular Solids - Regular Polyhedra, solids of revolution, Axis inclined to both planes - Change of position.

UNIT - IV

Isometric Projections/views: Principles of Isometric Projection - Isometric Scale - Isometric Views - Conventions - Isometric Views of Lines, Plane Figures, Simple and Compound Solids - Isometric Projection of objects having non- isometric lines.

UNIT - V

Conversion of Orthographic Views to Isometric Views of simple objects.

Transformation of Projections: Conversion of isometric views to orthographic views of simple objects.

TEXT BOOKS:

1. Engineering Drawing, N.D. Bhatt / Charotar publishers
2. Engineering Drawing, K.L.Narayana and Kannaiah / Scietech publishers.

REFERENCE BOOKS:

1. Engineering Drawing, K.Venugopal/G.Sreekanjana, New Age International Publishers.

COURSE OUTCOMES:

- To Know the importance of Engineering Graphics and to represent the various Polygons,Curves,Conic Sections, Cycloids and Involutes used in Engineering Graphics.
- To Draw and understand the Principles involved in Orthographic Projections and to represent the Principles involved in Points, Lines and Traces.
- To Draw and understand the construction Principles involved in Planes and Solids.
- To Draw and understand the construction Principles involved in Isometric Projections.
- To Draw and understand about Conversion of Orthographic Views to Isometric Views and also represent its Transformation of Projections.

ANURAG ENGINEERING COLLEGE

(An Autonomous Institution)

I Year B.Tech. CSE - II Sem

L	T/P/D	C
0	- /3/-	2

(A52217) ENGLISH LANGUAGE COMMUNICATION SKILLS LAB- II

COURSE OBJECTIVES:

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

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

1. **Computer Assisted Language Learning (CALL) Lab**
2. **Interactive Communication Skills (ICS) Lab**

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

Exercise- I

CALL Lab: Minimal Pairs
          Word accent and Stress Shifts
          Listening Comprehension

Exercise- II

ICS Lab: Descriptions- Narrations- Giving Directions and Guidelines

      Question Tags and One- Word Substitutes

      Concord (Subject in agreement with verb) and Words often misspelt- confused/misused

Exercise- III

CALL Lab: Intonation and Common Errors in Pronunciation.**-** Neutralization of Mother Tongue Influence and Conversation Practice.

Exercise- IV

ICS Lab: Extempore - Oral Presentation Skills

      Active and Passive Voice,

      Common Errors in English,

      Idioms and Phrases

Exercise- V

ICS Lab: Information Transfer

Public Speaking

Reading Comprehension

Job Application with Resume preparation.

Minimum Requirement of infra structural facilities for ELCS Lab:

1. Computer Assisted Language Learning (CALL) Lab:

The Computer aided Language Lab for 60 students with 60 systems, one master console, LAN facility and English language software for self- study by learners.

System Requirement (Hardware component):

(computers with suitable configuration as per the purchased software demands)

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

i) P - IV Processor

a) Speed - 2.8 GHZ

b) RAM - 512 MB Minimum

c) Hard Disk - 80 GB

ii) Headphones of High quality

2. Interactive Communication Skills (ICS) Lab:

The Interactive Communication Skills Lab: A Spacious room with movable chairs and audio-visual aids with a Public Address System, a T. V., a digital stereo -audio & video system and camcorder etc.

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

1. Suresh Kumar, E. & Sreehari, P. 2009. A Handbook for English Language Laboratories. New Delhi: Foundation

2. Strengthen Your Steps - Dr. M. Hari Prasad and others, Maruthi Publications

3. Speaking English Effectively 2nd Edition by Krishna Mohan and N. P. Singh, 2011. Macmillan Publishers India Ltd. Delhi.

4. Sasi Kumar, V & Dhamija, P.V. How to Prepare for Group Discussion and Interviews. Tata McGraw Hill

5. Hancock, M. 2009. English Pronunciation in Use. Intermediate. Cambridge: CUP

6. Spoken English: A Manual of Speech and Phonetics by R. K. Bansal & J. B. Harrison. 2013. Orient Blackswan. Hyderabad.

7. Hewings, M. 2009. English Pronunciation in Use. Advanced. Cambridge: CUP

8. Marks, J. 2009. English Pronunciation in Use. Elementary. Cambridge: CUP

9. Nambiar, K.C. 2011. Speaking Accurately. A Course in International Communication. New Delhi: Foundation

10. Soundararaj, Francis. 2012. Basics of Communication in English. New Delhi: Macmillan

11. Spoken English (CIEFL) in 3 volumes with 6 cassettes, OUP.

12. A textbook of English Phonetics for Indian Students by T. Balasubramanian (Macmillan)

13. Lab Manual: A Manual entitled "English Language Communication Skills (ELCS) Lab Manual-cum- Work Book", published by Cengage Learning India Pvt. Ltd, New Delhi. 2013.

COURSE OUTCOMES:

- Better Understanding of nuances of language through audio- visual experience and group activities
- Neutralization of accent for intelligibility
- Speaking with clarity and confidence thereby enhancing employability skills of the students

ANURAG ENGINEERING COLLEGE

(An Autonomous Institution)

I Year B.Tech. CSE - II Sem

L	T/P/D	C
0	- /3/-	2

(A52218) COMPUTER PROGRAMMING LAB - II

COURSE OBJECTIVES:

- To make the student to implement various sorting and searching techniques
- To introduce the student to structures, unions, and enumeration types and operations on them
- To introduce the student dynamic memory management using pointers.
- To introduce basic data structures such as stacks, queues and linked lists.
- To make the student to create various types of files in 'C' Language.

Week 1:
Review of Arrays and functions.
Week 2:
Write programs to illustrate the implementation of Bubble Sort and Selection Sort
Week 3:
Write programs to illustrate the implementation of Insertion Sort and Quick Sort
Week 4:
Write programs to illustrate the implementation of Merge Sort.
Week 5:
Write programs to illustrate the implementation of Binary Search and Linear Search.
Week 6 & 7:
Write programs to illustrate the various concepts of structures
Week 8:
Write programs to illustrate the concepts of accessing variables using pointers
Week 9:
Write programs to illustrate the implementation of call by reference
Week 10:
Write programs to illustrate the implementation of arrays using pointers
Week 11:
Write programs to implement structures using pointers
Week 12:
Write program to illustrate the implementation of Single Linked List
Week 13:
Write programs to illustrate Stack operations using arrays and pointers
Week 14:
Write programs to illustrate Queue operations using arrays and pointers
Week 15:
Write programs to illustrate the various concepts of files.
Week 16:
Review

ANURAG ENGINEERING COLLEGE

(An Autonomous Institution)

I Year B.Tech. CSE - II Sem

L	T/P/D	C
0	- /3/-	2

(A52219) ENGINEERING PHYSICS LAB

COURSE OBJECTIVES:

- To impart the knowledge of mathematics and science to determine the working of semiconductor devices .
- Emphasize the study of Quantum mechanics to apply it to solve problems of micro & macro particles.
- To have the knowledge of laser technology to know about the working & applications of laser.
- To inculcate the importance of nanotechnology which has the world wide importance.

1. Diffraction Grating with sodium vapor lamp
2. Single Slit with laser source
3. Newton's Rings
4. Energy gap of a semiconductor material
5. Torsional Pendulum Expt. to determine the rigidity modulus of material of a wire
6. Seebeck Effect
7. Decay of charge - R C circuit and time constant
8. L C R Series circuits
9. Dispersive Power of the material of a Prism using Spectrometer
10. Stewart & Gee's experiment
11. LED Characteristics
12. Numerical Aperture of an Optical Fibre & Bending losses of an Optical Fibre
13. Diffraction Grating with laser source

ANURAG ENGINEERING COLLEGE

(An Autonomous Institution)

I Year B.Tech. CSE - II Sem

L	T/P/D	C
0	- /3/-	2

(A52220) ENGINEERING WORKSHOP

COURSE OBJECTIVES:

- To impart the knowledge regarding the various techniques, skills and tools necessary for engineering workshop practice.
- To provide the students with hands on experience on different trades of engineering workshop like carpentry, tin- smithy, fitting, welding and house wiring.
- To learn about the machines in view of constructions details, different operations to be performed on the machines and different tools.
- To enhance the practical approach towards machine tools.
- To introduce the concepts of power tools in constructions , wood working, electrical engineering and mechanical engineering in manufacturing application

1. TRADES FOR EXERCISES:

At least two exercises from each trade:

1. Carpentry
2. Fitting
3. Tin- smithy and development of jobs carried out and soldering.
4. House- wiring
5. Welding

2. TRADES FOR DEMONSTRATION&EXPOSURE:

1. Plumbing
2. Machine shop
3. Power tools in construction, wood working, electrical engineering and mechanical engineering.

TEXT BOOKS:

1. Work shop manual - P.Kannaiah/K.L Narayana/scitech publishers.
2. Workshop manual by Venkat Reddy

COURSE OUTCOMES:

- To make a lap joint.
- To make a dovetail- joint.
- To make a T- briddle joint.
- To prepare a flat filing.
- To prepare a step cutting.
- To prepare a angular cutting.
- To prepare a open scoop.
- To prepare a rectangular tray.
- To prepare a square tin.
- To understand and to give the connections for one light point control by one single pole switch.
- To understand and to give the connections for one light point control by two- two way switchs (parallel connections).

- To understand and to give the connections for to- connect a electrical bell by using bell-push.
- To understand and to give the connections for two light point controlled by one single pole switch.
- To prepair a pipe joint,tap and pressing- connections by using pluming.
- To apply different operations to be performed on the lathe machines.
- To prepare a switch boards, wood drilling and threading different various sizes.

ANURAG ENGINEERING COLLEGE

(An Autonomous Institution)

II Year B. Tech. CSE - I Semester

	L	T / P / D	C
	4	0	4

(A53021) PROBABILITY AND STATISTICS

PREREQUISITES: Mathematics - I and II

COURSE OBJECTIVES: To learn

- Understand Chance causes and random variable that describes randomness or an uncertainty in certain realistic situation. It can be of either discrete or continuous type.
- In the discrete case, study of the binomial and the Poisson random variables and the Normal random variable for
- The continuous case predominantly describe important probability distributions. Important statistical properties for these random variables provide very good insight and are essential for industrial applications.
- The types of sampling, Sampling distribution of means ,Sampling distribution of variance, Estimations of statistical parameters, Testing of hypothesis of few unknown statistical parameters.
- Understanding the Experiment and the design of experiment.
- The random processes, The classification of random processes, Markov chain, Classification of states
- Stochastic matrix (transition probability matrix),Limiting probabilities, Applications of Markov chains

UNIT- I

Probability: Sample space and events, Classical and Statistical definition of Probability, The axioms of probability, Some Elementary theorems of Probability, Conditional probability, Baye's theorem. Random variables, Discrete and continuous random variable

UNIT- II

Definitions of Probability Distribution function, Probability mass function, Probability density function and properties. Definitions of Mathematical expectation, Moments (about origin & Centre), Definition of moment generating function for discrete and continuous random variable.

Discrete Distributions: Binomial and Poisson distributions (definition and problems) their mean, variance and moment generating function.

Continuous Distribution: Normal and exponential distributions (definition and problems) related properties

UNIT- III

Sampling distribution: Populations and samples - Sampling distributions of mean (σ known and unknown) Estimation: Concept of Point estimation and its properties (definition only), Concept of interval estimation with examples.

Test of Hypothesis: Null & Alternative Hypothesis, Critical region, Type I and Type II errors, level of significance, one tail, two- tail tests.

UNIT- IV

Large sample test: concerning means - proportions (One and Two samples).Small sample test:

Chi- Square test, Student's t- test (Single mean, Difference of mean and Paired samples) and F-test.

UNIT- V

Design of Experiment: Introduction to ANOVA (one - way, two - way), Principles of Design of Experiment, completely randomized design (CRD), randomized complete block design (RBD), Latin Square Design (LSD).(No Derivations only concept, definitions and problems)

TEXT BOOKS:

1. Probability and Statistics for Engineers and Scientists by Sheldon M. Ross, Academic Press.
2. Probability and Statistics for Engineers by Richard A Johnson, Pearson Education.
3. Introduction to Probability by Charles M Grinstead, J Laurie Snell, American Mathematical Society.

REFERENCE BOOKS :

1. A.V. Skorokhod, Basic Principles and Applications of Probability Theory, Springer.
2. Arnold O. Allen, Probability & Statistics, Academic Press.
3. Hwei P. Hsu, Theory and Problems of Probability, Random Variables, and Random Processes, Schaum's Outline Series, McGraw- Hill.
4. Mendan Hall, Probability & Statistics, Beaver Thomson Publishers.
5. Montgomery: Design and Analysis of Experiments, Wiley.
6. T.T. Soong, Fundamentals of Probability and Statistics for Engineers, John Wiley & Sons, Ltd.
7. Zivorad R. Lazic, Design of Experiments in Chemical Engineering, Wiley- VCH.

COURSE OUTCOMES:

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

ANURAG ENGINEERING COLLEGE

(An Autonomous Institution)

II Year B. Tech. CSE - I Semester

L	T / P / D	C
4	0	4

(A53022) DISCRETE MATHEMATICS

PREREQUISITES: Mathematics - I and II

COURSE OBJECTIVES:

- Define the syntax and semantics of propositional and predicate logic.
- Translate statements from a natural language into its symbolic structures in logic.
- Prove elementary properties of modular arithmetic and explain their applications in Computer Science, for example, in cryptography and hashing algorithms.
- Apply the notion of relations on some finite structures, like strings and databases.
- Analyze algorithms using the concept of functions and function complexity.
- Apply graph theory models of data structures and state machines to solve problems of connectivity and constraint satisfaction, for example, scheduling.

UNIT - I
Foundations: Basics, Sets, Fundamentals of Logic, Logical Inferences, First order logic other methods of Proof, Rules of Inference for Quantified Propositions

UNIT - II
Elementary Combinatorics: Basics of Counting, Combinations and Permutations, Enumerating Combinations and Permutations with &without repetitions, Constrained repetitions.

UNIT - III
Recurrence Relations: Generating Functions, Calculating coefficient of Generating Function, Solving Recurrence relations by substitution method and Generating Functions, The Method of Characteristic Roots, Solutions to inhomogeneous recurrence relations.

UNIT - IV
Relations and Digraphs: Relations and Directed Graphs, Special Properties of Binary Relations, Equivalence Relations, Ordering Relations, Lattice, Paths and Closures, Directed Graphs and adjacency matrices, Topological Sorting.

UNIT - V
Graphs - Basic Concepts, Isomorphism and Sub- graphs, Trees and Their Properties, Spanning Trees, Binary Trees, Planar Graphs, Euler's Formula, Multi- graphs and Euler Circuits, Hamiltonian Graphs, Chromatic Numbers, The Four- Color Problem.

TEXT BOOKS:

1. Joe L. Mott, Abraham Kandel, Theodare P.Baker, Discrete Mathematics for Computer Scientists and Mathematicians, Second Edition, PHI, 2009.

REFERENCE BOOKS:

1. Kenneth H Rosen, Discrete Mathematics and its Applications, Sixth Edition,Tata

McGraw Hill Publishing Company Limited, New Delhi, 2007.

   2.   Tremblay J P and Manohar R, Discrete Mathematical Structures with Applications to Computer Science, Tata McGraw Hill Publishing Company Limited, New Delhi, 2007

COURSE OUTCOMES:

- To evaluate elementary mathematical arguments and   identify fallacious reasoning (not just fallacious conclusions).
- Solve discrete   mathematics   problems   that   involve   computing permutations and combinations of a set
- Analyze and deduce problems involving recurrence relations and generatingfunctions.
- Perform operations on discrete structures such as sets, functions, relations, and sequences.
- Apply graph theory models of data structures and state machines to solve problems of connectivity and constraint satisfaction, for example, scheduling.

ANURAG ENGINEERING COLLEGE
(An Autonomous Institution)

II Year B. Tech. CSE - I Semester

L	T / P / D	C
3	0	3

(A53023) DATA STRUCTURES

PREREQUISITES: Any programming language

COURSE OBJECTIVES:

- Understand various static and dynamic representations of data structures.
- Understand fundamental algorithmic problems of various nonlinear data structures.
- To be familiar with Graph representations and traversals.
- Know the basic concepts of Hashing

UNIT- I
Introduction: What is data structure, Types of data structures, Static and Dynamic representation of data structure and comparison.
Strings: String definition, String built- in functions (strlen(), strcpy(), strcat(), strcmp(), strrev()), Strings and Pointers (Ch- 3,T3)
Stacks: Stacks definition, operations on stacks, Representation and evaluation of expressions using Infix, Prefix and Postfix, Algorithms for conversions and evaluations of expressions from infix to prefix and postfix using stack.

UNIT- II
Trees: Basic terminology, Types of trees: Binary Tree: terminology, Complete and Full Binary Tree, Extended Binary Trees, Threaded Binary Trees and In order Threading. Representation of Trees using Arrays and Linked lists (advantages and disadvantages). Tree Traversal and Representation of Algebraic expressions; Algorithms for Tree Traversals.

UNIT- III
Advanced concepts on trees: Representation and Creation of Binary Search Trees (BST), Algorithm for Inserting, deleting and searching in BST. Representation and advantages of AVL Trees, algorithms on AVL Trees- Insertion, Rotation and Deletion. Definition and advantages of B-trees, B + Trees, Red- Black Trees, M- way trees with examples.

UNIT- IV
Graphs- Basic terminology, Representation of graphs: sequential representation (Adjacency, Path Matrix) Linked representation.
Graph Traversals- Breadth First Search, Depth First Search with algorithms. Definition and properties of Spanning Tree, Minimum Spanning Tree, Dijkstra Algorithms.

UNIT- V
Hashing: General Idea, Hash Functions, Separate Chaining ,Open Addressing- Linear probing, Quadratic Probing, Double Hashing, Rehashing, Extensible Hashing, Collisions in Hashing, Implementation of Dictionaries

TEXT BOOKS:
1. Seymour Lipschutz, Schaum's Outlines ,Data Structures, Special Second Edition,Tata McGraw- Hill,.

2   Richard F.Gillberg&Behrouz A. Forouzan, Data Structures, A Pseudo code Approach with C, Second Edition, Cengage Learning, India Edition, 2005.

REFERENCE BOOKS:

1.   Aaron M. Tenenbaum,Yedidyah Langsam and Moshe J. Augenstein, Data Structures Using C and C++, PHI Learning Private Limited, Delhi India.

2. Horowitz   and Sahani, Fundamentals of   Data Structures, Galgotia Publications Pvt Ltd, Delhi India.

3. A.K. Sharma , Data Structure Using C, Pearson Education India.

COURSE OUTCOMES:

- Analyze the representation of various static, dynamic and, hierarchical data structures.
- Design and implement the mechanism of stacks, general tree data structures with their applications.
- Implement various algorithms on graph data structures, including finding the minimum spanning tree , shortest path with real time applications, etc.,
- Implementation of various advance concepts of binary trees and graphs with real time applications.
- Outline the concepts of hashing, collision and its resolution methods using hash function

ANURAG ENGINEERING COLLEGE
(An Autonomous Institution)

II Year B. Tech. CSE - I Semester

L   T / P / D   C
3   1   3

(A53009) ELECTRONICS DEVICES AND CIRCUITS

PREREQUISITES: Basic electrical engineering

COURSE OBJECTIVES:

- This is a fundamental course, basic knowledge of which is required by all the circuit branch engineers .this course focuses:
- To familiarize the student with the principle of operation analysis and design of junction diode BJT and FET amplifier circuits transistors and field effect transistors.
- To understand diode applications.
- To study basic principle of filter circuits and various types
-

UNIT- I

P- N JUNCTION DIODE AND RECTIFIERS: Quantitative Theory of p- n junction, p- n junction as diode, diode equation, volt- ampere characteristics, temperature dependence of VI characteristic, transition and diffusion capacitances, diode equivalent circuits, breakdown mechanisms in semi-conductor diodes, Zener diode characteristics, Principle of operation and characteristics of Tunnel Diode, Schottky Barrier Diode.

The p- n junction as a rectifier, half wave rectifier, full wave rectifier bridge rectifier harmonic components in a rectifier circuit, inductor filters, capacitor filters, L- section filters, π- section filters, comparison of filters, voltage regulation using zener diode, SCR.

UNIT- II

BIPOLAR JUNCTION TRANSISTOR AND FIELD EFFECT TRANSISTOR: The junction transistor, transistor current components, transistor construction, BJT operation, BJT   symbol, Transistor as an amplifier, common base, common emitter and common collector configurations, limits of operation, BJT specifications.

The junction field effect transistor (construction, principle of operation, symbol)-   pinch -off Voltage - Volt -Ampere characteristics, the JFTE small signal model, MOSFET (construction, principle of operation, symbol) MOSFET characteristics in enhancement and depletion mode

UNIT- III

TRANSISTOR BIASING AND STABILIZATION: Operating point, the DC and AC load lines, need for biasing, fixed bias, collector feedback bias, emitter feedback bias, collector emitter feedback bias, voltage divider bias, bias stability, stabilization factors. Stabilization against variation in v3E and β, bias compensation using diodes and transistors. Thermal runway, stability, biasing FET.

UNIT- IV

BJT AND FET AMPLIFIERS: BJT Hybrid model, determination of h- parameters from transistor characteristics, analysis of a transistor amplifier circuit using h- parameters, comparison of a transistor amplifier circuit using h- parameters comparison of CB, CE and CC Amplifier configurations. FET Common source amplifier, common drain amplifier, generalized FET amplifier, FET, as voltage variable resistor, comparison of BJT and FET, the Unit junction transistor.

UNIT- V

Concepts of feedback Classification of feedback amplifiers, General characteristics of negative feedback

OSCILLATORS: Condition for oscillations, RC and LC type oscillators, Crystal oscillators, Frequency and amplitude stability of oscillators, Generalized analysis of LC oscillators, Quartz (Harltley, Colpitts), RC- phase shift and Wien- bridge oscillators.

TEXT BOOKS:

1. Electronic Devices and Circuits - J.Millman, C.C.Halkias, and SatyabrathaJit Tata McGraw Hill, 2nd Ed., 2007.
2. Electronic Devices and Circuits - R.L. Boylestad and Louis Nashelsky, Pearson/Prentice Hall, 9th Edition,2006.
3. Introduction to Electronic Devices and Circuits- Rober T. Paynter PE

REFERENCE BOOKS:

1. Electronic Devices and Circuits - T.F. Bogart Jr., J.S.Beasley and G.Rico, Pearson Education, 6th edition, 2004.
2. Principles of Electronic Circuits - S.G.Burns and P.R.Bond, Galgotia Publications, 2nd Edn.., 1998.
3. Microelectronics - Millman and Grabel, Tata McGraw Hill, 1988.
4. Electronic Devices and Circuits - Dr. K. Lal Kishore, B.S.

COURSE OUTCOMES:

- Understand and analyze the different types of diodes operation and its characteristics.
- Design and analyze the DC bias circuitry of BJT and FET.
- Design Biasing Circuit Using Diodes and transistors.
- To analyze and design diode application circuits amplifier circuits and oscillators employing BJT, FET devices.

ANURAG ENGINEERING COLLEGE
(An Autonomous Institution)

II Year B. Tech. CSE - I Semester

L	T / P / D	C
3	1	3

(A53024) DIGITAL LOGIC DESIGN

PREREQUISITES: Basic electrical engineering

COURSE OBJECTIVES:

- To understand basic number system code and logic gates.
- To understand the Boolean algebra and minimization logic.
- To understand the design of combinational sequential circuit.
- To understand the basic of various memory.

UNIT- I
Number Systems: Binary, Octal, Hex Decimal, and Conversions, range; Binary additions and subtractions (using 1c, and 2c), concept of overflow; representations of negative numbers using 1's and 2's complement and range;
BCD numbers: Representation of 8421, 2421, Ex- 3, Gray and self complementary codes; additions and subtractions on 8421 codes;
Error detecting codes: even, odd parity, hamming codes;
Error correcting codes: hamming codes, block parity codes; Floating point representation.

UNIT- II
Boolean Algebra and Digital Logic GATES, Basic Boolean LAWs and properties; Boolean functions; canonical and standard forms (SOP, POS); Gate minimization using three and four variable K- Map's with and without don't cares. Encoders, Decoders, Multiplexers, D- Multiplexers;

UNIT- III
Definition of combinational circuits, design procedure for half, full, decimal (8421) adders and sub tractors; Combinational Circuit Design for BCD code converters;

UNIT- IV
Sequential circuits, latches, Flip Flops; Analysis of clocked sequential circuits, State Reduction and Assignment, Register, Ripple Counters, Synchronous Counters, Other Counters.

UNIT- V
Types of Memory - Main memory - random access memory, ROM, Types of ROM; Decoder and RAM interface: Address lines, data lines, chip select signal; Design of large memories using small memories, using decoders; problems in memory design; Cache Memory- design issues, hit and miss ratio related problems; Associative and Auxiliary memory

TEXT BOOKS:
1. Digital Design - Third Edition, M. Morris Mano, Pearson Education/PHI.
2. Fundamentals of Logic Design, Roth, Fifth Edition, Thomson.

REFERENCE BOOKS:
1. John F. Wakerly: Digital Design: Principles and Practices, 4th Edition, Pearson / Prentice

Hall, 2005.

2. Digital Principles and Applications By Malvino& Leach, Seventh Edition, McGraw- Hill Education.

3. Digital Electronics: Principles and Integrated Circuits By A.K. Maini, Wiley India Publications.

4. Digital Design M. Morris Mano and Michael D. Ciletti, Pearson Education.

COURSE OUTCOMES:

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

ANURAG ENGINEERING COLLEGE
(An Autonomous Institution)

II Year B. Tech. CSE - I Semester

	L	T / P / D	C
	3	0	3

(A53025) OBJECT ORIENTED PROGRAMMING

PREREQUISITES: Any programming language

COURSE OBJECTIVES:
- Understand the C++ program structure and also the basics of C++ Programming language.
- Use input and output formatted stream classes and the file streams and file modes to access the files.
- Know the template classes and functions and Runtime error and how to handle that error.

UNIT- I
Concepts of OOP: Introduction to OOP, Procedural versus Object Oriented Programming, Principles, Benefits and applications of OOP.
C++ Basics: Overview, Program structure, namespace, identifiers, variables,constants, enumerations, operators, typecasting, control structures.

UNIT- II
C++ Functions: Simple functions Call and Return by reference, Inline functions, Overloading of functions, default arguments, friend functions, and virtual functions.
Objects and classes: Basics of object and class in C++, Private and public members, static data and function members, constructors and their types, destructors, operator overloading.

UNIT- III
Inheritance: Concept of Inheritance, types of inheritance: single, multiple, multilevel, hierarchical, hybrid, protected members, overriding, virtual base class.
Polymorphism: Pointers in C++, Pointers and Objects, this pointer, virtual and pure virtual functions, implementing polymorphism.

UNIT- IV
I/O Streams: Concept of streams, cin and cout objects, C++ stream classes, Unformatted and formatted I/O, manipulators.
File management: File stream, C++ File stream classes, File management functions,
File modes, sequential and random access files.

UNIT- V
Templates: Function and class templates, overloading of template functions.
Exceptions: Basics of exception handling, exception handling mechanisms, throwing, catching mechanisms, rethrowing an exception.

TEXT BOOKS:
1. Herbert Schlitz , The Complete Reference C++,Fourth Edition, TATA McGraw Hill, 2003.
2. Saurav Sahay, Object Oriented Programming in C++, Second Edition, Oxford University Press, 2012.

REFERENCE BOOKS:

1. E Balagurusamy, Object Oriented Programming with C++, , Sixth Edition, TATA McGraw Hill, 2013.
2. Steven Holzner, C++ Programming, Black Book, Dreamtech
3. Robert Lafore , Object Oriented Programming in Turbo C++,, Galgotia
4. Ashok Kamthane, Object Oriented Programming with ANSI and Turbo C++, Pearso

COURSE OUTCOMES:

- Describe the important concepts of object oriented programming like object and class, Encapsulation, inheritance and polymorphism
- Develop the applications using object oriented programming with C++.
- Implement the concept of inheritance and polymorphism.
- Apply I/O streams and files to develop programs for real time problems.
- Apply advance features like templates and exception handling to make programs supporting reusability and sophistication

ANURAG ENGINEERING COLLEGE
(An Autonomous Institution)

II Year B. Tech. CSE - I Semester   **L   T / P / D   C**
                                          0   3   2

(A53213) ELECTRONIC DEVICES AND ELECTRICAL CIRCUITS LAB

PREREQUISITES:

1. A parallel course on electronic devices, basic circuits and basic electrical engineering

PART- A:

1. Verification of Kirchoff's current law and Kirchoff's voltage law.
2. Verification of Superposition theorem.
3. Verification of maximum power transfer theorem for DC circuits.
4. Verification of Thevenin's theorem.
5. Characteristics of DC shunt generator.
6. Swinburne's test on DC shunt machine.
7. Brake test on DC shunt motor.
8. OC & SC tests on single phase transformer.
9. Brake test on 3 phase induction motor.

PART - B:

1. PN Junction Diode characteristics.
2. Zener diode characteristics.
3. Transistor CE characteristics.
4. Rectifier without filters.
5. Rectifiers with filters.

NOTE:

1. Any 5 experiments from Part - A
2. All 5 experiments from Part - B

ANURAG ENGINEERING COLLEGE

(An Autonomous Institution)

II Year B. Tech. CSE - I Semester

L	T / P / D	C
0	3	2

(A53214) DATA STRUCTURES LAB

PREREQUISITES:

    1. Any programming language

CO-REQUISITE :

    1. course on "data structures."

PART- A

1. Program to illustrate string built in functions
2. Program to evaluate postfix notations
3. Program to convert infix to postfix notation
4. Program to illustrate tree traversals
   - **a)** In order
   - **b)** Preorder
   - **c)** Post order
5. Program to illustrate insertion, deletion and searching in Binary Search Tree.
6. Program to illustrate Graph traversals
   - **a)** Breadth First Search
   - **b)** Depth First Search
7. Program to illustrate Insertion, deletion and Rotation on AVL Trees.

PART- B

1. Program to illustrate Function Overloading to calculate area of a circle, rectangle and square
2. Program to illustrate virtual function
3. Program to illustrate default constructor, parameterized constructor and copy constructors
4. Program to illustrate single Inheritance, multiple inheritance, multilevel inheritance, hybrid inheritance
5. Program to illustrate run time polymorphism, compile time polymorphism
6. Program to illustrate Operator Overloading
   - **a)** Unary Operator
   - **b)** Binary Operator
7. Program to illustrate Exception Handling Mechanisms using try, catch, throw keywords
8. Program to illustrate formatted and unformatted I/O streams

COURSE OUTCOMES:

- Develop the programs on stacks and its applications.
- Demonstrate the operations on trees.
- Demonstrate the implementation of various advanced trees.
- Design and implementation of programs on BST and Graph Traversals.

ANURAG ENGINEERING COLLEGE
(An Autonomous Institution)

II Year B. Tech. CSE - I Semester

L	T / P / D	C
0	2	0

(A53215) GENDER SENSITIZATION
(An Activity- based Course)

COURSE OBJECTIVES:

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

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- 12) Introduction. Preparing for Womanhood. Growing up Male. First lessons in Caste. Different Masculinities.
Just Relationships: Being Together as Equals (Towards a World of Equals: Unit- 12)
Mary Kom and Onler. Love and Acid just do not Mix. Love Letters. Mothers and Fathers. Further Reading: Rosa Parks- The Brave Heart.

UNIT- II
GENDER AND BIOLOGY:
Missing Women: Sex Selection and Its Consequences (Towards a World of Equals: Unit- 4)
Declining Sex Ratio. 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 Economy (Towards a World of Equals: Unit- 7) Facts and Fiction. Unrecognized and Unaccounted work. Further Reading: Wages and Conditions of Work.

UNIT- IV
ISSUES OF VIOLENCE:
Sexual Harassments: Say No! (Towards a World of Equals: Unit- 6)
Sexual Harassments, not 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.

UNIT- V

GENDER STUDIES:

Knowledge: Through the Lens of Gender (Towards a World of Equals: Unit- 5): Point of view gender and structure of knowlwdge. FurtherReading: 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**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

Essential Reading: All the Units in the Textbook." Towards a World of Equals: A Bilingual Textbook on Gender" written by A.Suneetha, Uma Bhrugubanda, Duggirala Vasanta, Rama Melkote, Vasudha Nagaraj, Asma Rasheed, Gogu Shyamala, 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 (20 December 1990). Print. 'We Were Making History...' Life Stories of Women in the Telangana People's Struggle. New Delhi: Kali for Women, 1989.

2. Tripti Lahiri."By the Numbers: Where Indian Women Work," Women's Studies Journal (14 December 2012) Available online at: http:// blogs.wsj.com/ India real time/2012/11/14/by- the- numbers- where- Indan- women- work/**>**

3. K. Satyanarayana and Susie Tharu (Ed.) Steel Nibs Are Sprouting: New Dalit Writing From South India, Dossier 2: Telugu And Kannada http://http://harpercollins.co.in/BookDetail.asp?Book Code=3732

4. Vimala. "Vantillu (The Kitchen)." Women Writting in India: 600 BC to the Present. Volume II: The 20th Centaury. Ed. Susie Tharu and K. Lalita. Delhi: Oxford University Press,1995. 599- 601.

5. Shatrughna, Veena et al. Women's Work and its Impact on Child Health and Nutrition,Hyderabad, National Institute of Nutrition, Indian Council of Medical Research. 1993.

6. Stree Shakti Sanghatana. "We Were Making History ....'Life Stories of Women in the Telangana People's Struggle. New Delhi: Kali for Women,1989.

7. Menon, Nivedita. Seeing like a Feminist. New Delhi: Zubaan- Penguin Books, 2012

8. Jayaprabha, A. 'Chupulu (Stares)". Women Writing in India: 600BC to the Present. Volume II: The 20th Centaury 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". Permanant Black and Ravi Dayal Publishers, New Delhi,2000

13. K.Kapdia. The Violence of Development: The Politics of Identity, Gender and Social Ineualities 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.

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

COURSE OUTCOMES:

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

ANURAG ENGINEERING COLLEGE
(An Autonomous Institution)

II Year B. Tech. CSE - II Semester

L	T / P / D	C
3	1	3

(A54006) ENVIRONMENTAL STUDIES

PREREQUISITES: Engineering chemistry.
COURSE OBJECTIVES:
- To introduce the knowledge about Environment.
- To introduce students to the concepts of pollution, Biodiversity
- To develop an awareness about global Environmental problems.
- To learn to protect environment, legal issues, Sustainable development

UNIT- I

Multidisciplinary nature of Environmental Studies: Definition, Scope and Importance.

(a) **Ecosystems**: Concept of an ecosystem - Classification, structure and function of Forest, Pond, Grass Land ecosystems - Producers, consumers and decomposers. - Energy flow in the ecosystem - Food chains, food webs and ecological pyramids- Ecological succession.

(b) **Biodiversity and its conservation**: Introduction - Definition: genetic, species and ecosystem diversity. - Bio- geographical classification of India - Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values. India as a mega- diversity nation - Hot- spots of biodiversity - Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts. ICUN categories of biodiversity and RED DATA book - Conservation of biodiversity: In- situ and Ex- situ conservation of biodiversity.

UNIT- II

Natural Resources: Renewable and non- renewable - Natural resources and associated problems. Forest resources - Use and over - exploitation, deforestation,- Timber extraction, mining, dams and other effects on forest and tribal people Water resources - Use and over utilization of surface and ground water - Floods, drought, conflicts over water, dams - benefits and problems Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources. Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer- pesticide problems, water logging, salinity. Energy resources: Growing energy needs, renewable and non- renewable energy sources use of alternate energy sources. Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification. Role of an individual in conservation of natural resources: Equitable use of resources for sustainable lifestyles.

UNIT- III

(a) **Environmental Pollution**: Definition, Cause, effects and control measures of different kinds of pollution (Air, Water , Soil , Nuclear, e -Waste)

(b) **Social Issues and the Environment**: From Unsustainable to Sustainable development - Urban problems related to energy - Water conservation, rain water harvesting, and watershed management. - Climate change, global warming, ozone layer depletion, nuclear accidents and holocaust.

UNIT- IV

(a) **Waste management technology:** Solid waste Management: Causes, effects and control

earthquake, cyclone and landslides

Waste water treatment technology: Sewage Water and Effluent Water- primary, secondary and tertiary treatments. Brief account on Bioremediation and Phyto- remediation, R. O technology. Application of GIS and GPS system in environment.

(b) Environmental policy, Rules and regulations. EIA (Environmental Impact Assessment) - Definition, Baseline Data acquisition, Impacts Assessment, EIS(Environment Impact Statement) & EMP (Environment Management Plan) - Environment Protection Act- 1986, - Air (Prevention and Control of Pollution) Act- 1981, - Water (Prevention and control of Pollution) Act- 1974, - Wildlife Protection Act- 1974, -Forest Conservation Act.

UNIT- V

(a) **Towards sustainable future**: concept of sustainable development, threats of sustainability, population and its explosion, over exploitation of resources, strategies for achieving sustainable development. Environmental education, Conservation of resources. Urban sprawl, sustainable cities and sustainable communities, human health. Environmental ethics, concept of green building, Basic principles of Green engineering, clean development mechanism (CDM), Low carbon life cycle, Polluters- pay principle.

(b) **Field work:** Visit to a local area to document environmental assets River/ forest Grassland/ hill/ mountain Visit to a local polluted site- Urban/Rural /industrial/ Agricultural Study of common plants, insects, birds, Visit to effluent treatment Plant/sewage treatment plant Study of simple eco systems pond, river, hill slopes,etc.

Mini pojects by students which is mandatory.

TEXT BOOKS:

1. Textbook of Environmental Studies for Undergraduate Courses by Erach Bharucha for University Grants Commission, University Press.
2. Environmental studies, From Crisis to cure by R.Rajagopalan,2005

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.

COURSE OUTCOMES:

- Conservation of natural resources.
- Understand Requirement to conserve environment.
- Understand the National and international efforts to save globe.
- Know importance of sustainable development.
- Impart basic knowledge, awareness & Skills for solving real life environmental problems in order to improve the quality of life.

ANURAG ENGINEERING COLLEGE

(An Autonomous Institution)

II Year B. Tech. CSE - II Semester

L	T / P / D	C
4	0	4

(A54022) DESIGN AND ANALYSIS OF ALGORITHMS

PREREQUISITES: DATA STRUCTURES AND ANY PROGRAMMING LANGUAGE

COURSE OBJECTIVES:

- Analyze the asymptotic performance of algorithms.
- Paradigms and approaches used to analyze and design algorithms and to appreciate the impact of algorithm design in practice.
- Synthesize efficient algorithms in common engineering design situations.
- To utilize data structures and algorithmic design techniques in solving new problems

UNIT- I
Introduction: Algorithm, Pseudo code for expressing algorithms, Performance Analysis- Space complexity, Time complexity, Asymptotic Notation- Big oh notation, Omega notation, Theta notation and Little oh notation, Probabilistic analysis, Disjoint Sets- disjoint set operations, union and find operations.
Divide and conquer: General method, applications- Binary search, Quick sort, Merge sort, Strassen's matrix multiplication.

UNIT- II
Graphs: breadth first search, depth first search, spanning trees, connected and bi connected components
Greedy method: General method, applications- Job sequencing with deadlines, 0/1 knapsack problem, Minimum cost spanning trees, Single source shortest path problem.

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

UNIT- IV
Backtracking: General method, applications- n- queen problem, sum of subsets problem, graph coloring, Hamiltonian cycles.
Branch and Bound: General method, applications - Travelling sales person problem,0/1 knapsack problem- LC Branch and Bound solution, FIFO Branch and Bound solution
.
UNIT- V
Lower Bound Theory: Comparison Trees, NP- Hard and NP- Complete problems: Basic concepts, non- deterministic algorithms, NP - Hard and NP Complete classes, Clique Decision Problem (CDP), Node cover decision problem.

TEXT BOOKS:

1. Ellis Horowitz, Satraj Sahni and Rajasekharan, Fundamentals of Computer Algorithms,

Galgotia publications pvt. Ltd, Second Edition, 2007.

2 Aho, Ullman and Hopcroft,Design and Analysis of algorithms, Pearson education, Reprint 2002.

REFERENCE BOOKS:

1. R.C.T. Lee, S.S.Tseng, R.C. Chang and T. T sai, Introduction to Design and Analysis of Algorithms A strategic approach, Mc Graw Hill,2005.
2. Allen Weiss, Data structures and Algorithm Analysis in C++,Third edition, Pearson education

COURSE OUTCOMES:

- Acquire the knowledge of algorithm analysis and its notations that are applied on the problems solved by divide and conquer paradigm.
- Apply the major graph algorithms for model engineering problems and knowledge of the greedy paradigm
- Apply the dynamic- programming paradigmand recite algorithms that employ this paradigm.
- Apply the concept of back tracking, branch and bound paradigm for real timeproblems.
- Analyze the complexity of problems and differentiate that in terms of P and NP problems with examples.

ANURAG ENGINEERING COLLEGE
(An Autonomous Institution)

II Year B. Tech. CSE - II Semester

L	T / P / D	C
3	1	3

(A54023) COMPUTER ORGANIZATION

PREREQUISITES: Digital logic design

COURSE OBJECTIVES:

- Understand instruction format, life cycle and CPU Architecture and Organization
- Know the basic Architecture of Microprocessor.
- Understand different types of I/O interfaces.
- Familiar with the concepts of pipelining techniques.
- Understand the Multiprocessor concepts

UNIT- I
Instruction: Instruction Definition, instruction cycle, flow chart for instruction cycle, instruction storage, types of instruction formats (Zero, one, two and three address). Addressing modes: mode field, implied, immediate register, register direct, register indirect, auto increment, decrement, indexed, relative, base address mode, Numerical examples and problems.

UNIT- II
CPU- Organization: 8086 - CPU - Block diagram and pin diagram, concept of pipelining, minimum and maximum mode, General purpose registers; segment register and generation of 20 bits address, segmentation of main memory, Addressing modes, systems bus, Types of flags.

UNIT- III
Memory Hierarchy, Main memory, memory address map, memory connection to CPU; auxiliary memory, Magnetic disks, magnetic tapes; cache memory, hit and miss ratio, direct, associative and set associative mapping; Micro- programmed control: control memory, address sequencing.

UNIT- IV
I/O interface: I/O Bus and Interface modules, I/O versus Memory Bus, isolated vs Memory-mapped I/O. Asynchronous data transfer- strobe control, Hand shaking; Modes of Transfer: Example of programmed I/O, interrupt- initiated I/O, software considerations. Daisy-Chaining priority. DMA: DMA Controller, DMA Transfer, Intel 8089 IOP.

UNIT- V
Multi Processors: Characteristics of Multi- Processor; Interconnection structures: Time shared common bus, multiport memory, crossbar switch, multi- stage switching network; Introduction to Flynn's classification**:** SISD, SIMD, MISD, MIMD (Introduction).

TEXT BOOKS:

1. M. Morris Mano, Computer System Architecture, Third Edition, Pearson/PHI, 2011.
2. Douglas V Hall, Microprocessor and Interfacing, Second Edition, TATA McGraw Hill, 2006.

REFERENCE BOOKS:

1. Carl Hamacher, Zvonks Vranesic, SafeaZaky, Computer Organization, 5th Edition, McGraw

Hill, 2002.

2. William Stallings, Computer Organization and Architecture, 6th Edition, Pearson/PHI, 2007.

COURSE OUTCOMES:

- Understand the basic organization of computer and different instruction formats and addressing modes.
- Analyze the concept of pipelining, segment registers and pin diagram of CPU.
- Understand and analyze various issues related to memory hierarchy.
- Evaluate various modes of data transfer between CPU and I/O devices.
- Examine various inter connection structures of multi processors.

ANURAG ENGINEERING COLLEGE

(**An Autonomous Institution**)

II Year B. Tech. CSE - II Semester

L	T / P / D	C
4	0	4

(A54024) DATABASE MANGEMENT SYSTEMS

PREREQUISITES: Any programming language.

COURSE OBJECTIVES:

- To provide a sound introduction to Database management systems, Databases and its applications,
- To familiarize the participant to give a good formal foundation on the relational model of data
- To present SQL and procedural interfaces to SQL comprehensively
- To give an introduction to systematic database design approaches conceptual design, logical design ,schema refinement and physical design
- To introduce the concepts of transactions and transaction are processing and the issues and techniques relating to concurrency and recovery manager.

UNIT- I

Introduction to Database System Concepts: Database- System Applications, Purpose of Database Systems, View of Data, Database Language, Database Design, Database Architecture, Database Users and Administrators.

Introduction to the Relation Models and Database Design using ER Model: Structure of Relational Databases, Database Schema, Keys, Schema Diagrams, Relational Query Languages, Relational Operations Overview of the Design Process, The Entity- Relationship Model, Constraints, Removing Redundant Attributes in Entity Sets, Entity- Relationship Diagrams, Reduction to Relational Schemas, Entity- Relationship Design Issues, Extended E- R Features.

UNIT- II

Introduction to SQL: Overview of the SQL Query Language, SQL Data Definition, Basic Structure of SQL Queries, Additional Basic Operations, Set Operations, Null Values, Aggregate Functions Nested Sub queries, Modification of the Database.

Intermediate and Advanced SQL: Join Expressions, Views , Integrity Constraints, SQL Data Types, Authorization. Functions and Procedures, Triggers, Advanced Aggregation Features.

UNIT- III

Formal Relational Query Languages: The Relational Algebra, Tuple Relational Calculus, The Domain Relational Calculus.

Relational Database Design: Features of Good Relational Designs, Atomic Domains and First Normal Form, Decomposition Using Functional Dependencies, Decomposition Using Multi valued Dependencies, More Normal Forms.

UNIT- IV

Indexing and Hashing: Basic Concepts, Ordered Indices, B+- Tree Index Files, B+- Tree Extensions, Multiple- Key Access, Static Hashing, Dynamic Hashing, Comparison of Ordered Indexing and Hashing, Bitmap Indices.

Transactions: Transaction Concept, A Simple Transaction Model, Storage Structure, Transaction Atomicity and Durability, Transaction Isolation, Serializability, Transaction Isolation and Atomicity,

Transaction Isolation Levels.

UNIT – V

Concurrency Control: Lock- Based Protocols, Deadlock Handling, Multiple Granularity, Timestamp- Based Protocols, Validation- Based Protocols, Multi version schemes

Recovery System: Failure Classification, Storage, Recovery and Atomicity, Recovery Algorithm, Buffer Management, Failure with Loss of Nonvolatile Storage, ARIES, Remote Backup Systems

TEXT BOOKS:

1. Abraham Silberschatz, Henry F. Korth, S. Sudarshan, Database System Concepts, Sixth Edition, Tata Mc Graw- Hill 2006.
2. Raghu Rama Kirshna, Johannes Gchrke, Database Management System, Third Edition, TATA MC Graw Hill, 2003

REFERENCE BOOKS:

1. Peter Rob & Carlos Coronel, Data base Systems design, Implementation and Management, 7th Edition, 2007.
2. Ramez Elmasri, Shamkanth B. Navrate, Fundamentals of Database Systems, Pearson Education, 2008.
3. C.J. Date ,Introduction to Database Systems, Pearson Education

COURSE OUTCOMES:

• Design Entity- Relationship Model for enterprise level databases.
• Develop the database and provide restricted access to different users of database and formulate the Complex SQL queries.
• Analyze various Relational Formal Query Languages and various Normal forms to carry out Schema refinement
• Use of suitable Indices and Hashing mechanisms for real time implementation.
• Ability to analyze various concurrency control protocols and working principles of recovery algorithms.

ANURAG ENGINEERING COLLEGE

(An Autonomous Institution)

II Year B. Tech. CSE - II Semester

L	T / P / D	C
3	0	3

(A54025) SOFTWARE ENGINEERING

PREREQUISITES: Any programming language

COURSE OBJECTIVES

- Understand the framework activities for a given project.
- Choose a process model to apply for given project requirements.
- Design various system models for a given scenario.
- Design and apply various testing techniques.
- Understand metrics for Process and Products.

UNIT- I

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

UNIT- II

Process models: The waterfall model, Incremental process models, Evolutionary process model, Agile process. Software Requirements: Functional and non- functional requirements, 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, Modeling component level design: design class based components, conducting component level design. Performing User interface design: Golden rules.

UNIT- IV

Testing Strategies: A strategic approach to software testing, test strategies for conventional software, Black- Box and White- Box testing, Validation testing, System testing, Product metrics : Software Quality, Metrics for Analysis Model- function based metrics, Metrics for Design Model- object oriented metrics, class oriented metrics, component design metrics, Metrics for source code, Metrics for maintenance.

UNIT- V

Metrics for Process and Products: Metrics for software quality. Risk management: Reactive vs. Proactive Risk strategies, software risks, Risk identification, Risk projection, Risk refinement, RMMM, RMMM Plan. Quality Management: Quality concepts, Software Reviews, Formal technical reviews, Software reliability, The ISO 9000 quality standards.

TEXT BOOKS:

1. Roger S. Pressman, Software Engineering - A practitioner's Approach, 6th edition.

McGraw Hill International Edition, 2005.

2. Sommerville, Software Engineering, 7th edition, Pearson education, 2009.

REFERENCE BOOKS:

1. K.K. Agarwal & Yogesh Singh, Software Engineering, New Age International Pub,3rdedition, 2008

2. James F. Peters, Witold Pedrycz, Software Engineering - an Engineering approach, John Wiely, 2007.

3. Shely Cashman Rosenblatt, Systems Analysis and Design, Thomson Publications.

4. Waman S Jawadekar, Software Engineering Principles and Practice, The McGraw- Hill Companies, 2013.

COURSE OUTCOMES:

- Choose a process model to apply for given project requirements.
- Analyze and apply the framework activities for a given project.
- Design various system models for a given scenario.
- Design and apply various testing techniques.
- Understand metrics for Process and Products.

ANURAG ENGINEERING COLLEGE

(An Autonomous Institution)

II Year B. Tech. CSE - II Semester

L	T / P / D	C
3	0	3

(A54026) JAVA PROGRAMMING

PREREQUISITES: Any programming language

COURSE OBJECTIVES:

- Understand the concept of OOP and learn the basic syntax and semantics of the Java language and programming environment
- Be familiar with the purpose and usage principles of inheritance, polymorphism, encapsulation and method overloading.
- Understand Exceptional handling and multithreading concepts
- Be familiar with GUI applications.

UNIT- I
Fundamentals of Object Oriented Programming: Object- Oriented Paradigm, Basic Concepts of Object Oriented Programming- Objects and Classes, Data abstraction and encapsulation, inheritance ,Polymorphism, Data binding, Message Communication, Benefits of OOP, Applications of OOP.
Java Basics History of Java, Java buzzwords, data types, variables, scope and life time of variables, arrays, operators, expressions, control statements, type conversion and costing, simple java program, concepts of classes, objects, constructors, methods, access control, this keyword, garbage collection, overloading methods and constructors, parameter passing, recursion, nested and inner classes, Strings

UNIT- II
Inheritance - Base class object, subclass, subtype, substitutability, forms of inheritance-specialization, specification, construction, extension, limitation, combination, Member access rules, super uses, using final with inheritance, polymorphism- method overriding, abstract classes, Object class
Packages and Interfaces : Defining, Creating and Accessing a Package, Understanding CLASSPATH, importing packages, differences between classes and interfaces, File, Byte Streams, Character Streams, Stream I/O.

UNIT- III
Exception handling - Concepts of exception handling, exception hierarchy, usage of try, catch, throw, throws and finally, built in exceptions, creating own exception sub classes. Package java.util-The Collection Interface,list interface, Queue interface,The Collection class:LinkedListClass, HashSetClass. TreeSetClass, StringTokenizer, Date, Random, Scanner.
Multi threading: Differences between multi threading and multitasking, thread life cycle, creating threads, thread priorities, synchronizing threads, inter thread communication

UNIT- IV
Event Handling: Events, Event sources, Event classes, Event Listeners, Delegation event model, handling mouse and keyboard events, Adapter classes.

AWT: class hierarchy, component, container, panel, window, frame, canvas, graphics, Layout Manager - layout manager types - boarder, grid, flow, card and grib bag.

UNIT - V
AWT controls: Labels, button, canvas, scrollbars, text components, check box, check box groups, choices, lists panels - scroll pane, dialogs, menu bar.

Applets - Concepts of Applets, differences between applets and applications, life cycle of an applet, create applets, passing parameters to applets.

JDBC Connectivity: JDBC Type 1 to 4 Drivers, connection establishment, QueryExecution.

TEXT BOOKS:

1. Herbert schildt , Java- the complete reference, Seventh edition, Tata McGraw Hill.
2. George Reese, Database Programming with JDBC & JAVA, Second Edition, O'Reilly Media.

REFERENCE BOOKS:

1. Thinking in Java Fourth Edition, Bruce Eickel
2. Introduction to Java programming, Y. Daniel Liang, pearson education.
3. Understanding OOP with Java, updated edition, T. Budd, pearson education.

COURSE OUTCOMES:

- Design, write and test a java program to implement a working understand the fundamental concepts of the object oriented paradigm and their implementation in the Java programming language.
- Write code to define classes and interfaces that uses class libraries such as java.lang, java.util,java.io.
- Use exception handling and multithreading in programs.
- Develop GUI applications.
- Give object oriented solutions for the complex and real world problems.

ANURAG ENGINEERING COLLEGE

(An Autonomous Institution)

II Year B. Tech. CSE - II Semester

L	T / P / D	C
0	3	2

(A54213) JAVA PROGRAMMING LAB

PREREQUISITES:

1 Data structures and a parallel course on java programming

CO-REQUISITE

2 A course on java programming

Week 1: 1. Write a program to find total, average of given two numbers by using function with default arguments, static data members and this keyword?
2. Write a program to illustrate class and objects (Banking operations)

Week 2: 1. Write a program to illustrate constructors?(Inventory of Books).
2. Write a program to create a class complex with necessary operator overloading and type conversion such as integer to complex, complex to double.

Week 3: 1. Write a program that randomly generates complex numbers and write two numbers per line in a file along with an operator(+,- ,P,*,/) .The numbers are written to file in the format (a+ib)
2. Write a program to read online at a time, perform the corresponding operation on two complex numbers read, write the result to another file (one per line)

Week 4: 1. Write a program to illustrate inheritance (Student Evaluation)
2. Write a java program to handle the situation of exception handling.

Week 5: 1. Write a java program to demonstrate the concept of polymorphism.
2. Write a java program to illustrate Method Overriding?

Week 6: 1. Write a java program to illustrate Method overloading of assignment operator?
2. Write a program to illustrate Array Manipulation?

Week 7: 1. Write a program to illustrate Synchronization?
2. Write a program to StringTokenizer?

Week 8: 1. Write a program to implement the concept of User defined Exceptions.
2. Write a program to illustrate the use of creation of packages.

Week 9: 1. Write a program to illustrate Multithreading and Multitasking?
2. Write a program to illustrate thread priorities.

Week10: 1. Write a program to illustrate applet concept.

Week11: 1. Write a program to illustrate Event Handling(keyboard, Mouse events)

Week12: 1. Write a program to develop a calculator application using AWT.

Week13: 1. Write a program to illustrate JDBC

COURSE OUTCOMES:

- Familiarize with Java Environment and use of Java Development Kit for the creation and execution of java programs
- Develop programs on various concepts like data abstraction & dathiding,encapsulation, inheritance, polymorphism.
- Create and use threads, handle exceptions and write applets.
- Develop the programs using interfaces, inner classes, wrapper classes and generics.
- Develop GUI applications.

ANURAG ENGINEERING COLLEGE
(An Autonomous Institution)

II Year B. Tech. CSE - II Semester

L	T / P /	C
0	3	2

(A54214) DATABASE MANAGEMENT SYSTEMS LAB

PREREQUISITES: A parallel course on data base management systems.

1. **Database Schema for a customer- sale scenario** Customer(**Cust id : integer,** cust_name: string) Item(**item_id:integer,**item_name: string, price: integer) Sale(**bill_no: integer,** bill_data: date, **cust_id: integer, item_id: integer**, qty_sold: integer)
   For the above schema, perform the following:
   a) Create the tables with the appropriate integrity constraints
   b) Insert around 10 records in each of the tables
   c) List all the bills for the current date with the customer names And item numbers
   d) List the total Bill details with the quantity sold, price of the item and the final amount
   e) List the details of the customer who have bought a product which has a price>200
   f) Give a count of how many products have been bought by each customer
   g) Give a list of products bought by a customer having cust_id as 5
   h) List the item details which are sold as of today
   i) Create a view which lists out the bill_no, bill_date, cust_id, item_id, price, qty_sold, amount
   j) Create a view which lists the daily sales date wise for the   last one week

2. **Database Schema for a Student Library scenario Student (Stud_no : integer,Stud_name: string) Membership(Mem_no: integer,Stud_no: integer) Book(book_no: integer, book_name:string, author: string) Iss_rec(iss_no:integer, iss_date: date, Mem_no: integer, book_no:integer)**
   For the above schema, perform the following:
   a) Create the tables with the appropriate integrity constraints
   b) Insert around 10 records in each of the tables
   c) List all the student names with their membership numbers
   d) List all the issues for the current date with student and Book names
   e) List the details of students who borrowed book whose author is CJDATE
   f)   Give a count of how many books have been bought by each student
   g) Give a list of books taken by student with stud_no as 5
   h) List the book details which are issued as of today
   i) Create a view which lists out the iss_no, iss _date, stud_name, book name
   j) Create a view which lists the daily issues- date wise for the last one week

3. **Database Schema for a Employee- pay scenario** employee(**emp_id : integer,**emp_name: string) department(**dept_id: integer**,dept_name:string) paydetails(**emp_id : integer**,**dept_id: integer**, basic: integer, deductions: integer, additions: integer, DOJ: date) payroll**(emp_id : integer**, pay_date: date)
   For the above schema, perform the following:
   a) Create the tables with the appropriate integrity constraints
   b) Insert around 10 records in each of the tables
   c) List the employee details department wise

d) List all the employee names who joined after particular date

e) List the details of employees whose basic salary is between 10,000 and 20,000

f) Give a count of how many employees are working in each department

g) Give a names of the employees whose netsalary>10,000

h) List the details for an employee_id=5

i) Create a view which lists out emp_name, department, basic, deductions, net salary

j) Create a view which lists the emp_name and his net salary.

4 **Database Schema for a Video Library scenario Customer(cust_no: integer,cust_name: string) Membership(Mem_no: integer, cust_no: integer) Cassette(cass_no:integer, cass_name:string, Language: String) Iss_rec(iss_no: integer, iss_date: date, mem_no: integer, cass_no: integer)**
For the above schema, perform the following:

a) Create the tables with the appropriate integrity constraints

b) Insert around 10 records in each of the tables

c) List all the customer names with their membership numbers

d) List all the issues for the current date with the customer names and cassette names

e) List the details of the customer who has borrowed the cassette whose title is " The Legend"

f) Give a count of how many cassettes have been borrowed by each customer

g) Give a list of book which has been taken by the student with mem_no as 5

h) List the cassettes issues for today

i) Create a view which lists outs the iss_no, iss_date, cust_name,cass_name

j) Create a view which lists issues- date wise for the last one week

5 **Database Schema for a student- Lab scenario Student(stud_no: integer, stud_name: string, class: string) Class(class: string,descrip: string) Lab(mach_no: integer, Lab_no: integer, description: String) Allotment(Stud_no: Integer, mach_no: integer, dayof week: string)**
For the above schema, perform the following:

a) Create the tables with the appropriate integrity constraints

b) Insert around 10 records in each of the tables

c) List all the machine allotments with the student names, lab and machine numbers

d) List the total number of lab allotments day wise

e) Give a count of how many machines have been allocated to the 'CSIT' class

f) Give a machine allotment etails of the stud_no 5 with his personal and Class details

g) Count for how many machines have been allocated in **Lab_no 1** for   The day of the week as "Monday".

h) How many students class wise have allocated machines in the labs

i) Create a view which lists out the stud_no, stud_name, mach_no, lab_no,dayofweek

j) Create a view which lists the machine allotment details for "Thursday".

6 Write a program to find largest number from the given three numbers.

7 Simple programs using loop, while and for iterative control statement.

8 Write a program to check whether the given number is Armstrong or not

9 Write a program to generate all prime numbers below 100.

10 Write a program to demonstrate the GOTO statement.

11 Write a program to demonstrate %type and %rowtype attributes

12 Write a program to demonstrate predefined exceptions

13 Write a program to demonstrate user defined exceptions

14 Create a cursor, which displays all employee numbers and names from the EMP table.

15 Create a cursor, which update the salaries of all employees as per the given data.

16 Create a cursor, which displays names of employees having salary > 50000.
17 Create a procedure to find reverse of a given number
18 Create a procedure to update the salaries of all employees as per the given data
19 Create a procedure to demonstrate IN, OUT and INOUT parameters
20 Create a function to check whether given string is palindrome or not.
21 Create a function to find sum of salaries of all employees working in depart number 10.
22 Create a trigger before/after update on employee table for each row/statement.
23 Create a trigger before/after delete on employee table for each row/statement.
24 Create a trigger before/after insert on employee table for each row/statement.
25 Create a Form to display employee details using SQL
26 Create a Report to generate all employee annual salaries

COURSE OUTCOMES:

- Use the SQL commands such as DDL, DML, DCL, TCL to create, manipulate, access data from database objects and providing authorization to access database by different users.
- To apply various integrity Constraints on the database tables for preserving the integrity of the database.
- Design and implement Pl/SQL programs which includes procedures, functions, cursor and triggers.

ANURAG ENGINEERING COLLEGE
(An Autonomous Institution)

II Year B. Tech. CSE - II Semester

L	T / P / D	C
0	2	0

(A54215) HUMAN VALUES AND PROFESSIONAL ETHICS

COURSE OBJECTIVES:

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

UNIT- I

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

UNIT- II

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

UNIT- III

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

UNIT- IV

Understanding Harmony in the nature and Existence - Whole existence as Co-existence: Understanding the harmony in the Nature. Interconnectedness and mutual fulfillment among the four orders of nature - recyclability and self-regulation in nature. Understanding Existence as Co-existence (Sah-astiva) of mutually interacting units in all-pervasive space. Holistic perception of harmony at all levels of existence.

UNIT- V

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

a. Ability to utilize the professional competence for augmenting universal human order,

b. Ability to identify the scope and characteristics of people-friendly and eco-friendly production systems.Ability to identify and develop appropriate technologies and management patterns for above production systems.

Case studies of typical holistic technologies, management models and production systems.

Strategy for transition from the present state to Universal Human Order.

  a. At the level of individual: as socially and ecologically responsible engineers, technologists and managers

  b. At the level of society: as mutually enriching institutions and organizations.

TEXT BOOKS:

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

REFERENCE BOOKS:

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

RELEVANT CDS, MOVIES, DOCUMENTARIES & OTHER LITERATURE:

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

ANURAG ENGINEERING COLLEGE

(An Autonomous Institution)

III Year B.Tech. CSE - I Sem

L	T/P/D	C
3	1	3

(A55032) FORMAL LANGUAGES AND AUTOMATA THEORY

COURSE OBJECTIVES:

- The purpose of this course is to acquaint the student with an overview of the theoretical foundations of computer science from the perspective of formal languages.
- Introduces the fundamental concepts of formal languages, grammars and automata theory.
- Topics include finite automata, regular expressions, regular languages and their properties, context-free grammars, context-free languages and their properties, pushdown automata, Turing machines and un decidability.

UNIT- I

Introduction to Finite Automata. Structural Representations. Automata and Complexity. The Central Concepts of Automata Theory Alphabets. Strings. Languages. Problems.
Deterministic Finite Automata. Definition of a Deterministic Finite Automaton. How a DFA Processes Strings. Simpler Notations for DFA's. Extending the Transition Function to Strings. The Language of a DFA .
Nondeterministic Finite Automata .Definition of Nondeterministic Finite Automata. The Extended Transition Function. The Language of an NFA. Equivalence of Deterministic and Nondeterministic Finite Automata. An Application: Text Search. Finding Strings in Text. Nondeterministic Finite Automata for Text Search. A DFA to Recognize a Set of Keywords. Finite Automata with Epsilon-Transitions. Uses of e-Transitions. The Formal Notation for an e-NFA. Epsilon-Closures .Extended Transitions and Languages for e-NFA's. Eliminating e-Transitions

UNIT- II

Regular Expressions: The Operators of Regular Expressions. Building Regular Expressions. Precedence of Regular-Expression Operators. Finite Automata and Regular Expressions. From DFA's to Regular Expressions. Converting DFA's to Regular Expressions by Eliminating States. Converting Regular Expressions to Automata. Applications of Regular Expressions. Regular Expressions in UNIX. Lexical Analysis. Finding Patterns in Text. Algebraic Laws for Regular Expressions. Associativity and Commutativity. Identities and Annihilators. Distributive Laws. The Idempotent Law. Laws Involving Closures. Discovering Laws for Regular Expressions.
The Pumping Lemma for Regular Languages. Pumping Lemma for Regular Languages. Applications of the Pumping Lemma.
Closure Properties of Regular Languages. Closure of Regular Languages Under Boolean Operations. Reversal. Homomorphisms. Inverse Homomorphisms. Decision Properties of Regular Languages. Converting Among Representations. Testing Emptiness of Regular Languages. Testing Membership in a Regular Language.
Equivalence and Minimization of Automata. Testing Equivalence of States. Testing Equivalence of Regular Languages. Minimization of DFA's.

UNIT- III

Context-Free Grammars: Definition of Context-Free Grammars, Derivations Using a Grammar.

Leftmost and Rightmost Derivations. The Language of a Grammar. Sentential Forms. Parse Tress. Constructing Parse Trees. The Yield of a Parse Tree. Inference, Derivatons, and Parse Trees. From Inferences to Trees. From Trees to Derivations. From Derivations to Recursive Inferences. Applications of Context-Free Grammars. Parsers. The YACC Parser-Generator. Mark-up Languages. XML and Document-Type Definitions.

Ambiguity in Grammars and Languages. Ambiguous Grammars. Removing Ambiguity From Grammars. Leftmost Derivations as a Way to Express Ambiguity. Inherent Ambiguity. **Push Down Automata**: Definition of the Pushdown Automaton. The Formal Definition of Pushdown Automata. A Graphical Notation for PDA's. Instantaneous Descriptions of a PDA. The Languages of a PDA. Acceptance by Final State. Acceptance by Empty Stack. From Empty Stack to Final State. From Final State to Empty Stack Equivalence of PDA's and CFG's. From Grammar to Pushdown Automata. From PDA's to Grammars. Deterministic Pushdown Automata. Definition of a Deterministic PDA. Regular Languages and Deterministic PDA's. DPDA's and Context-Free Languages. DPDA's and Ambiguous Grammars.

UNIT- IV
Normal Forms for Context-Free Grammars. Eliminating Useless Symbols. Computing the Generating and Reachable Symbols. Eliminating e-Productions. Eliminating Unit Productions. Chomsky Normal Form.
The Pumping Lemma for Context-Free Languages. The Size of Parse Trees. Statement of the Pumping Lemma. Applications of the Pumping Lemma for CFL's.
Closure Properties of Context-Free Languages. Substitutions. Applications of the Substitution Theorem. Reversal. Intersection with a Regular Language, Inverse Homomorphism, Decision Properties of CFL's. Complexity of Converting among CFG's and PDA's. Running time of conversion to Chomsky Normal Form.

UNIT- V
Introduction to Turing Machines.
Problems That Computers Cannot Solve. Programs, The Turing Machine. Notation for the Turing Machine. Instantaneous Descriptions for the Turing Machines. Transition Diagrams for Turing Machines. The Language of a Turing Machine. Turing Machines and Halting. Programming Techniques for Turing Machines. Storage in the State. Multiple Tracks. Shifting Over. Multiple Turing Machines. Equivalence of One-Tape and Multi-tape TM's Nondeterministic Turing Machines. Restricted Turing Machine Turing Machines With Semi-infinite Tapes. Multi-stack Machines. Counter Machines. The Power of Counter Machines. Turing Machines and Computers. Simulating a Turing Machine by Computer. Simulating a Computer by a Turing Machine.
Undecidability: A Language that is Not Recursively Enumerable. Enumerating the Binary Strings. Codes for Turing Machines .The Diagonalization Language. An Undecidable Problem That is RE. Recursive Languages. Complements of Recursive and RE Languages. The Universal Language. Undecidability of the Universal Language. Undecidable Problems about Turing Machines. Reductions. Turing Machines that Accept the Empty Language. Rice's Theorem and Properties of the RE Languages. Problems about Turing-Machine Specifications. Post's Correspondence Problem. Definition of Post's Correspondence Problem. The "Modified" PCP.Completion of the Proof of PCP Undecidability. Other Undecidable Problems. Problems about Programs.

TEXT BOOKS :
   1.   Introduction to Automata Theory, Languages and Computation, John E.Hopcroft, Rajeev

Motwani , Jeffrey D.Ullman, Pearson, Third Edition.

2. Theory of Computation, VivekKulakarni, Oxford University press 2013, Second impression 2014

REFERENCE BOOKS :

1. Introduction to Computer theory, Daniel I.A.Cohen, John Wiley.
2. Introduction to languages and the theory of Computation,John C Martin,TATA McGraw hill

COURSE OUTCOMES :

- Gain proficiency in classifying machines by their power in recognizing languages.
- Learn to employ finite state machines for modeling and solving computing problems.
  - Comprehend the hierarchy of problems arising in computing.

ANURAG ENGINEERING COLLEGE

(An Autonomous Institution)

III Year B.Tech. CSE - I Sem

L	T/P/D	C
3	1	3

(A55021) MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS

COURSE OBJECTIVES:

- To explain the basic principles of managerial economics, financial accounting and current business environment underlying business decision making.

UNIT - I

Introduction to Managerial Economics: 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, Methods of Demand Forecasting (Survey Methods, Statistical Methods, Expert Opinion Method, Test Marketing, Controlled Experiments, Judgmental Approach to Demand Forecasting)

UNIT – II

Theory of Production and Cost Analysis: Production Function - Isoquants and Isocosts, MRTS, Least Cost Combination of Inputs, Laws of Returns, Internal and External Economics of Scale.

Cost Analysis: Cost concepts, Opportunity Cost, Out of Pocket Costs vs. Imputed Costs. Breakeven Analysis (BEA) - Determination of Breakeven Point (simple problems), Managerial Significance and limitations of BEA.

UNIT – III

Market Structures&Pricing Policies:Market structures: Types of Competition, Features of Perfect Competition, Monopoly and Monopolistic Competition, Pric- Output determination in Perfect Competition and monopoly.

Objectives and Policies of Pricing: Objectives of pricing**,** Methods of Pricing - Cost Plus Pricing, Marginal Cost Pricing, Sealed Bid Pricing, Going Rate Pricing, Limit Pricing, Market Skimming Pricing, Penetration Pricing, Two - Part Pricing, Block Pricing, Peak Load Pricing, Cross Subsidization.

UNIT - IV

Capital and Capital Budgeting: Capital and its significance, Types of Capital, Estimation of Fixed and Working Capital requirements. Nature and scope of Capital Budgeting, features of Capital budgeting proposals, Methods of Capital Budgeting- Payback Method, Accounting Rate of Return (ARR) and Net Present Value Method, Profitability Index, Internal Rate of Return (simple problems).

UNIT - V

Introduction to Financial Accounting: Accounting, Double- Entry Book Keeping, Journal, Ledger, and Trial Balance, Final Accounts (Trading Account, Profit and Loss Account and Balance Sheet with simple adjustments).

Financial Analysis through ratios: Computation, Analysis and Interpretation of Liquidity Ratios

(Current Ratio and Quick Ratio), Activity Ratios (Inventory Turnover Ratio and Debtor Turnover Ratio), Capital Structure Ratios (Debt - Equity, Interest Coverage Ratio), and Profitability Ratios (Gross Profit Ratio, Net Profit Ratio, Operating Profit Ratio, P/E Ratio and EPS).

TEXT BOOKS :

1. Aryasri, Managerial Economics and Financial Analysis, TMH, 2012.
2. Varshney&Maheshwari, Managerial Economics, Sultan Chand& Sons, 2014.
3. S.A. Siddiqui and A.S. Siddiqui, Managerial Economics and Financial Analysis, New Age International Publishers, Hyderabad, 2013

REFERENCE BOOKS :

1. Raghunatha Reddy &Narasimhachary, Managerial Economics & Financial Analysis, Scitech, 2009.
2. V. Rajasekarn& R. Lalitha, Financial Accounting, Pearson Education, New Delhi, 2010.
3. Domnick Salvatore, Managerial Economics in a Global Economy, 4th Edition, Cengage, 2009.
4. Subhash Sharma & M. P. Vittal, Financial Accounting for Management, Text & Cases, Machmillan, 2012.
5. S. N. Maheshwari& S. K. Maheshwari, Financial Accounting, Vikas 2012.
6. Truet and Truet, Managerial Economics; Analysis, Problems and Cases, Wiley, 2012.
7. Dwivedi, Managerial Economics, Vikas 2012.
8. M. Kasi Reddy and S.Saraswathi, Managerial Economics and Financial Accounting, PHI, 2012.
9. Erich A. Helfert, Techniques of Financial Analysis, Jalco, 2007.

Codes / **Tables**: Present Value Tables need to be permitted into the Examination Hall.

COURSE OUTCOMES:

- By the end of this course the students will be able to assess the costs useful for managerial decision making and
- Determine Break Even Point (BEP) of an enterprise, the process & principles of accounting and
- Prepare Journal, Ledger, Trial Balance and
- Analyze, interpret & comment on the financial statements of a business enterprise by using ratios.

ANURAG ENGINEERING COLLEGE

(An Autonomous Institution)

III Year B.Tech. CSE - I Sem

L	T / P / D	C
4	0	4

(A55033) COMPUTER NETWORKS

COURSE OBJECTIVES:

- Compare OSI & TCP/IP models
- Understand error detection, correction codes and farming methods
- Discuss the concepts of noise and noiseless protocols
- Explain MAC and types of Ethernet
- Discuss the concepts of LANs and Virtual Networks
- Discuss different routing protocols
- Outline the concepts of logical addressing
- Outline Application Layer

UNIT- I
Network Models:Layered Tasks, OSI model, Layers in the OSI model, TCP/IP protocol suite , addressing
Physical layer : Guided transmission media, Unguided transmission media

UNIT- II
Data Link Layer: **Error Detection and Correction**- Introduction, Block coding, Cyclic Codes, checksum
Data Link Control -Framing, Flow and Error Control, Protocols, Noiseless Channels, Noisy Channels, HDLC.
Multi Access Protocols - ALOHA, CSMA,

UNIT- III
Wired LANs- IEEE Standards, Standard Ethernet, Changes in standard, Fast Ethernet,Gigabit Ethernet.
Connecting LANs, Backbone Networks and Virtual LANs: Connecting Devices,   Backbone Networks, Virtual LANs.
Wireless LANS: IEEE 802.11 , Bluetooth.

UNIT- IV
Network Layer: **Delivery, Forwarding and Routing**- Delivery, Forwarding, Uni- casting Routing Protocols, Multicast Routing Protocols
Logical Addressing - IPV4 addresses, IPV6 addresses
Transport layer: process to process delivery,UDP,TCP,SCTP

UNIT- V
Application Layer: **Domain Name System**- Domain Name Space,   DNS in Internet, Resolution, Domain Name Space (DNS) Messages, Electronic Mail, File Transfer, WWW,HTTP

TEXT BOOKS :

1. Behrouz A Forouzan, Data Communications and Networking, 4th Edition, McGraw

Hill,2013.

REFERENCE BOOKS :

1. Andrew S. Tanenbaum, Computer Network, 5th Edition, Pearson Education India, 2014.

2. William Stallings, Data Communications, 8th Edition, Pearson Education, 2013.

COURSE OUTCOMES :

- Analyze TCP/IP and OSI models and various protocols.
- Identify suitable multiple access protocol for different networks.
- Analyze various error handling mechanisms.
- Use of various devices in connecting different types of LANs.
- Analyze different routing protocols.
- Compare and contrast IPv4 and IPv6.

ANURAG ENGINEERING COLLEGE

(An Autonomous Institution)

III Year B.Tech. CSE - I Sem

L	T / P / D	C
4	0	4

(A55034) OPERATING SYSTEMS

COURSE OBJECTIVES :

- Understand operating system concepts.
- Analyze process scheduling and synchronization concepts.
- Identify deadlock mechanisms.
- Understand memory management approaches.
- Identify storage management and protection.

UNIT - I

Operating Systems Overview and Process Management: Introduction- What operating system do, Operating system structure (uni- programmed and multi programmed), Operating system operations, Operating system services, System calls, Types of System calls, Operating system structure. Process Management- Process concepts, Process scheduling, Operations on processes, Inter process communication.

UNIT - II

Process Scheduling and Synchronization: Multithread programming: Overview, Multithreading models.
Process Scheduling - Basic concepts, Scheduling criteria, Scheduling algorithms, Thread scheduling.
Process coordination: Synchronization - Background, The critical section problem, Peterson's solution, Synchronization hardware, Semaphore, Classical problems of synchronization, Monitors

UNIT - III

Deadlocks: System model, Deadlock characterization, Methods for handling deadlocks, Deadlock prevention, Detection and avoidance, Recovery from deadlock.
Mass Storage Structure -Overview of Mass Storage Structure, Disk Structure, Disk Attachment, Disk Scheduling, Disk Management, Swap space Management

UNIT - IV

Memory Management: Swapping, Contiguous memory allocation, Paging, Segmentation. Virtual memory management - Demand paging, copy- on- write, page- replacement, Thrashing

UNIT - V

File system, system protection and security: Storage management - File concept, Access methods, Directory and disk structure, File- system mounting. System protection- Goals of protection, principles of protection, Domain of protection, Access matrix. System Security - Security problem, Program threats, System and Network threats

TEXT BOOKS :

1. Abraham Silberchatz, Peter B. Galvin, Greg Gagne, Operating System Concepts, 9thedition ,John Wiley, 2016.

REFERENCE BOOKS :

1. D.M. Dharmdhere, Operating Systems - A Concept based Approach, 2nd Edition. TMH, 2007.
2. Andrew S Tanenbaum, Modern Operating Systems, 3rd Edition, PHI, 2008.
3. Behrouz A. Forouzan, Richard F. Gilberg, UNIX and shell programming, cengage Learning 2009.

COURSE OUTCOMES :

• Summarize operating system and process management concepts

• Apply process scheduling and synchronization related issues.

• Understand Deadlock prevention, avoidance, detection, recovery mechanisms.

• Analyze effectively memory management concepts
  Illustrate various protection and security measures

ANURAG ENGINEERINGCOLLEGE

(An Autonomous Institution)

III Year B.Tech (CSE), I Semester

	L	T/P/D	C
	3	0	3

(A55035) MICROPROCESSORS AND MICROCONTROLLERS

COURSE OBJECTIVES:
- To develop an in-depth understanding of the operation of microprocessors and microcontrollers.
- To develop machine language programming skills & interfacing techniques.

UNIT- I
8086 Architecture:
8086 Architecture-Functional diagram, Register Organization, Memory Segmentation, Programming Model, Memory addresses, Physical Memory Organization, Signal descriptions of 8086- Common Function Signals, Timing diagrams, Interrupts of 8086.

UNIT- II
Instruction Set and Assembly Language Programming of 8086:
Instruction formats, Addressing modes, Instruction Set, Assembler Directives, Simple Programs involving Logical, Branch and Call Instructions, Sorting, String Manipulations.

UNIT - III
I/O Interface:
8255 PPI, Various Modes of Operation of 8255 and Interfacing to 8086, Interfacing Keyboard, Display, D/A and A/D Converter.
Interrupt and Communication Interface:
8259 Priority Interrupt control, 8251 USART Architecture and Interfacing to 8086.

UNIT- IV
Introduction to Microcontrollers:
Overview of 8051 Microcontroller, Architecture, I/O Ports, Memory Organization, Addressing Modes and Instruction set of 8051, Simple Programs.

UNIT - V
8051 Real Time Control:
Programming Timer Interrupts, Programming External Hardware Interrupts, Programming the Serial Communication Interrupts, Programming 8051 Timers and Counters

TEXT BOOKS:

1. D. V. Hall, Microprocessors and Interfacing, TMGH, 2nd Edition 2006.
2. Kenneth. J. Ayala, The 8051 Microcontroller, 3rd Ed., Cengage Learning.

REFERENCE BOOKS:

1. Advanced Microprocessors and Peripherals – A. K. Ray and K.M. Bhurchandani, TMH, 2nd Edition 2006.
2. The 8051Microcontrollers, Architecture and Programming and Applications -K.Uma Rao, Andhe Pallavi, Pearson, 2009.
3. Micro Computer System 8086/8088 Family Architecture, Programming and Design - Liu and GA Gibson, PHI, 2nd Ed.
4. Microcontrollers and Application - Ajay. V. Deshmukh, TMGH, 2005.
   The 8085 Microprocessor: Architecture, programming and Interfacing – K.Uday Kumar, B.S.Umashankar, 2008, Pearson

COURSE OUTCOMES :

- The student will learn the internal organization of popular 8086/805 microprocessors /microcontrollers.
- The student will learn hardware and software interaction and integration.
- The students will learn the design of microprocessors/microcontrollers-based systems.

ANURAG ENGINEERING COLLEGE

(An Autonomous Institution)

III Year B.Tech. CSE - I Sem

L	T / P /D	C
3	0	3

(A55036) HUMAN COMPUTER INTERACTION
(PROFESSIONAL ELECTIVE - I)

COURSE OBJECTIVES:

- Demonstrate an understanding of guidelines, principles, and theories influencing human computer interaction.
- Recognize how a computer system may be modified to include human diversity.
- Select an effective style for a specific application.
- Design mock ups and carry out user and expert evaluation of interfaces

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 - 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

UNIT - III

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 - IV

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 - V

Software tools - Specification methods, interface - BuildingTools.

Interaction Devices - Keyboard and function keys - pointing devices - speech recognition digitization and generation - image and video displays - drivers

TEXT BOOKS :

1. Wilbert O Galitz, The essential guide to user interface design, Wiley DreamaTech, 2007.
2. Ben Shneidermann, Designing the user interface. 3rd Edition, Pearson Education Asia,

2001.

REFERENCE BOOKS :

1. Alan Dix, Janet Fincay, GreGoryd, Abowd, Russell Bealg, Human - Computer Interaction., Pearson.
2. Rogers, Sharps ,Interaction Design Prece,. Wiley DreamTech,

COURSE OUTCOMES:

- Identify and formulate characteristics and components of graphical user interface.
- Analyze various design paradigms for human computer interaction.
- Design & implement human computer interaction using various design techniques.
- Support Design rules to use HCI in the software process.

ANURAG ENGINEERING COLLEGE

(An Autonomous Institution)

III Year B.Tech. CSE - I Sem

L	T / P / D	C
3	0	3

(A55037) ADVANCED DATABASES
(**PROFESSIONAL ELECTIVE - I**)

COURSE OBJECTIVES:

- Understand the concept of distributed database system.
- Understand basic concepts of XML databases.
- Understand the Basic Concepts of NoSQL databases
- Understand the basic concepts of Cassandra and MongoDB.

UNIT - I
Features of Distributed versus Centralized Databases: Principles Of Distributed Databases - Levels of Distribution Transparency, Reference Architecture for Distributed Databases , Types of Data Fragmentation, Integrity Constraints in Distributed Databases, Parallel Database Systems- Parallel Architectures, Parallel DBMS Techniques, Distributed Database Design, A framework for Distributed Database Design, The Design of Database Fragmentation, The Allocation of Fragments.

UNIT - II
XML Databases: Structure of XML Data, XML Document Schema, Querying and Transformation, API to XML, Storage of XML Data, XML Application.

UNIT - III
Why NoSQL – Aggregate Data Models – More Details on Data Models – Distribution Models – Consistency – Version Stamps – Map Reduce

UNIT – IV
Introduction to Cassandra: ACID, CAP, BASE, Terminology – Data Modelling –CQL.

UNIT - V
Introduction – Getting Started – Creating, Updating and Deleting Documents – Querying.

TEXT BOOKS :

1. Stefano Ceri, Giuseppe Pelagatti,Distributed Database Principles &Systems, McGraw- Hill. (Unit-I)
2. Abraham Silberschatz, HneryF.Korth, S.Sudarshan, Database System Concepts – 6th Edition – McGrawHill. (Unit-II)
3. Pramod J. Sadalage, Martin Fowler, NoSQL Distilled – A definitive Guide to Emerging World of Polyglot persistence. (Unit-III)
4. Russell Bradberry, Eric Lubow, Practical Cassandra - A Practical Approach, Addision Wesley, 2014.(Unit-IV)
5. Kristina Chodorow, MongoDB: The Definitive Guide, 2nd Edition, O'REILLY. (Unit-V)

REFERENCE BOOKS :

1. M.TamerOzsu, Distributed Database Systems, 3rd Edition, Pearson Education.
2. RamezElmasri, Shamkant B. Navathe,Fundamentals of Database systems,5thEditions, Pearson educations, 2008.
3. Raghurama Krishnan, Database Management Systems, Johannes Gehrke, TMH,3rd Edition.
4. Kevin Williams, Professional XML Databases, Wrox Press Ltd., 2000
5. Kyle Banker, Peter Bakkum, Shaun Verch, Douglas Garrett, Tim Hawkins, MongoDB in Action, Second Edition, Manning Publications, 2016.
6. Eric Redmond, Jim R. Wilson, Seven Databases in Seven Weeks - A Guide to Modern Databases and the NoSQL Movement, Pragmatic Programmers, 2012.
7. Eben Hewitt, Cassandra: The Definitive Guide, O'Reilly', 2011.

COURSE OUTCOMES :

- Understand the concepts of Distributed databases.
- Design XML databases and querying.
- Understands NoSQL database concepts and their necessity and usage.
- Designing and querying the Cassandra and MongoDB databases.

ANURAG ENGINEERING COLLEGE

(An Autonomous Institution)

III Year B.Tech. CSE - I Sem

L	T / P / D	C
3	0	3

(A55038) MOBILE COMPUTING
(PROFESSIONAL ELECTIVE - I)

COURSE OBJECTIVES:

- Introduction of an advanced element of learning in the field of wireless communication.
- The students to the concepts of wireless devices and mobile computing.
- To introduce wireless communication and networking principles, that support connectivity to cellular networks, wireless internet and sensor devices.
- To understand the use of transaction and e- commerce principles over such devices to support mobile business concepts
- To appreciate the social and ethical issues of mobile computing, including privacy.

UNIT - 1

Introduction to MC, Applications, limitations, and architecture. GSM : Mobile services, System architecture, Radio interface, Protocols, Localization and calling, Handover, Security, and New data services.(Wireless) Medium Access Control : Motivation for a specialized MAC (Hidden and exposed terminals, Near and far terminals), SDMA, FDMA, TDMA, CDMA.

UNIT - II

Mobile Network Layer : Mobile IP (Goals, assumptions, entities and terminology, IP packet delivery, agent advertisement and discovery, registration, tunneling and encapsulation, optimizations), Dynamic Host Configuration Protocol (DHCP).

UNIT - III

Mobile Transport Layer : Traditional TCP, Indirect TCP, Snooping TCP, Mobile TCP, Fast retransmit/fast ecovery, Transmission /time- out freezing, Selective retransmission, Transaction oriented TCP.

UNIT - IV

Mobile Ad hoc Networks (MANETs):RoutingDistination sequence distance vector Dynamic source outingalternative metrics overview Adhoc routing protocols.

UNIT - V

Protocols and Tools : Wireless Application Protocol- WAP. (Introduction, protocol architecture, and reatment of protocols of all layers), Bluetooth User scenarios
,Architecture , security, link management) and J2ME.

TEXT BOOKS :

1. Jochen Schiller, Mobile Communications , ,2nd edition, Addison- Wesley,2004.
2. Asoke K Talukder, Mobile Computing , 2nd Edition, McGraw Education

REFERENCE BOOKS :

1. Reza Behravanfar, Mobile Computing Principles, Designing and Developing Mobile Applications with UML and XM, ISBN: 0521817331, Cambridge University Press, October

2004,

2. Adelstein, Frank, Gupta, Sandeep KS, Richard III, Golden , Schwiebert, Loren, Fundamentals of Mobile and Pervasive Computing, ISBN: 0071412379, McGraw- Hill Professional, 2005.

3. Hansmann, Merk, Nicklous, Stober, Principles of Mobile Computing, Springer, second edition, 2003.

4. MartynMallick, Mobile and Wireless Design Essentials, Wiley DreamTech,2003.

COURSE OUTCOMES :

- Understand the necessary knowledge of cellular Communication, infrastructure- less networks.
- Describe the main characteristics of mobile IP and how it differs from IP
- Analyze TCP, MAC protocols and their technical feasibility.
- Implement the hardware components/architectures/databases/operating system of mobile networks
- Describe current and emerging interests in wireless and mobile computing and current capabilities, limitations and potential of each.

ANURAG ENGINEERING COLLEGE

(An Autonomous Institution)

III Year B.Tech. CSE - I Sem

L	T / P / D	C
0	3	2

(A55209) Advanced English Communication Skills Lab

INTRODUCTION

The introduction of the English Language 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 an integrated theory and lab course to enable students to use good English and perform the following:

- Gather ideas and information, to organize ideas relevantly and coherently.
- Engage in debates.
- Participate in group discussions.
- Face interviews.
- Write project/research reports/technical reports
- Make oral presentations.
- Write formal letters.
- Transfer information from non- verbal to verbal texts and vice versa.
- To take part in social and professional communication.

COURSE OBJECTIVES:

- This Lab focuses on using computer- aided multimedia instruction for language development to meet the following targets:
- To improve the students' fluency in English, through a well- developed vocabulary and enable them to listen to English spoken at normal conversational speed by educated English speakers and respond appropriately in different socio- cultural and professional contexts.
- Further, they would be required to communicate their ideas relevantly and coherently in writing.

SYLLABUS

The following course content is prescribed for the Advanced Communication Skills Lab:

1. **Vocabulary Building** - synonyms and antonyms, Word Roots, One- Word Substitutes, Prefixes and Suffixes, Study of Word Origin, Analogy, Idioms and Phrases.

2. **Reading Comprehension -** Reading for Facts, Guessing meanings from context, Scanning, Skimming, Inferring Meaning, and Critical Reading.

3. **Writing Skills** -Structure and presentation of different types of writing -   Resume Writing /E- Correspondence/Statement of Purpose

   Technical Writing- Technical Report Writing,Researc Abilities/Data Collection/Organizing Data/Tools/Analysis.

4.   **Group Discussion** - Dynamics of Group Discussion, Intervention, Summarizing, Modulation of Voice, Body Language, Relevance, Fluency and Coherence.

5.   **Presentation Skills** -Oral presentations (individual and group) through JAM sessions/Seminars, Written Presentations through Projects/ PPTs/e- mails etc.

6.   **Interview Skills** - Concept and Process, Pre- Interview Planning, Opening Strategies, Answering Strategies, Interview through Telephone and Video- Conferencing.

Minimum Requirement: The English Language Lab shall have two parts:

i)   The Computer aided Language Lab for 60 students with 60 systems, one master console, LAN facility and English language software for self- study by learners.

ii)   The Communication Skills Lab with movable chairs and audio- visual aids with a P.A System, a T. V., a digital stereo -audio & video system and camcorder etc.

System Requirement (Hardware component): Computer network with Lan with minimum 60 multimedia systems with the following specifications:

i) P - IV Processor

   a) Speed - 2.8 GHZ

   b) RAM - 512 MB Minimum

   c) Hard Disk - 80 GB

ii) Headphones of High quality

Suggested Software:

The software consisting of the prescribed topics elaborated above should be procured and used.

Suggested Software:

- Clarity Pronunciation Power - part II □

- editionOxford Advanced Learner's Compass, 7th

- 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

   i.   Preparing for being Interviewed,

   ii.   Positive Thinking,

   iii.   Interviewing Skills,

   iv.   Telephone Skills,

   v.   Time Management

   vi.   Team Building,

   vii.   Decision making

- English in mind , Herbert puchta and Jeff Stranks with Meredith Levy , Cambridge

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. English Language Communication : A Reader cum Lab Manual Dr A Ramakrishna Rao, Dr G Natanam & Prof SA Sankaranarayanan, Anuradha Publications, Chennai 2008.
4. English Vocabulary in Use series, Cambridge University Press 2008.
5. Management Shapers Series by Universities Press (India) Pvt Ltd., Himayatnagar, Hyderabad 2008.
6. Communication Skills by Leena Sen, PHI Learning Pvt Ltd., New Delhi, 2009.
7. Handbook for Technical Writing by David A McMurrey & Joanne Buckely CENGAGE Learning 2008.
8. Job Hunting by Colm Downes, Cambridge University Press 2008.
9. Master Public Speaking by Anne Nicholls, JAICO Publishing House, 2006.
10. English for Technical Communication for Engineering Students, Aysha Vishwa mohan, Tata Mc Graw- Hil 2009.
11. Books on TOEFL/GRE/GMAT/CAT/ IELTS by Barron's/DELTA/Cambridge University Press.
12. International English for Call Centres by Barry Tomalin and Suhashini Thomas, Macmillan Publishers, 2009.

ANURAG ENGINEERING COLLEGE

(An Autonomous Institution)

III Year B.Tech. CSE - I Sem

L	T / P / D	C
0	3	2

(A55210)OPERATING SYSTEM AND COMPUTER NETWORKS LAB

PREREQUISITES :

1. A course n "Computer Programming "

CO-REQUISITE :

1. A course on "operating systems"

COURSE OBJECTIVES:

- Analyze system calls that can offer operating system services
- Demonstrate various operating system concepts
- Understand and apply concepts towards new operating system design
- Understand the concept of Dead lock and its avoidance
- Developing page replacement algorithms

Develop the CPU scheduling applications

.**PREREQUISITES :**

1 A course on "Computer Programming and Data Structures"

CO-REQUISITE :

1 A course on "Computer Networks"

PART A

1. Write a programs using the following system calls of UNIX operating system: fork, exec, getpid, exit, wait, close, stat, opendir, readdir
2. Write a program to implement multithreading?
3. Give the list of processes, their CPU burst times and arrival times, display or print the Gantt chart for FCFS and SJF. For each of the scheduling policy compute and print the average waiting time and average turnaround time
4. Give the list of processes, their CPU burst times and arrival times, display or print the Gantt chart for Priority and Round Rabin. For each of the scheduling policy compute and print the average waiting time and average turnaround time.
5. Implement producer consumer problem using semaphore?
6. Write a program to implement Banker's algorithm for deadlock avoidance?
7. Write a program to implement page replacement algorithms (FCFS, Optimal, LRU)

COURSE OUTCOMES:

- Understand system calls behavior and implement that can offer operating system services
- Implement operating system concepts
- Implement the producer and consumer problem
- Implement the dead lock avoidance using banker's algorithm

COURSE OBJECTIVES:

- Understand datalink layer framing methods
- Explain various error handling methods
- Learn the packet tracer software
- Implement various routing protocols

PART B

1. Implement datalinklayer framing metdods such as
   - bitstuffing
   - character stuffing
2. Implement error detection methos such as 16 bit CRC
3. Implement minimum hamming distance
4. Configure network topology using packet tracer software
5. Configure network topology using distance vector routing protocol
6. Configure network topology using state vector routing protocol

COURSE OUTCOMES:

- Implement different datalink layer framing methods
- Analyze error control metods
- Implement topology using packet tracer software
- Implement different routing prtocols

ANURAG ENGINEERING COLLEGE

(An Autonomous Institution)

III Year B.Tech. CSE - II Sem   **L   T / P / D   C**

3   1   3

(A56028) COMPILER DESIGN

COURSE OBJECTIVES:

- To introduce the concepts of text processing.
- To introduce major parsing methods.
- To introduce the principal ideas in syntax directed definitions and translations and intermediate code generation for typical programming languages.
- To introduce the technology of code optimization
- To introduce different code generation algorithms.

UNIT- I
INTRODUCTION: The Structure of a Compiler, Applications of Compiler Technology Syntax Definition, Syntax- Directed Translation, Parsing, Lexical Analysis, Symbol Tables, Intermediate Code Generation.

UNIT- II
LEXICAL ANALYSIS: The Role of the Lexical Analyzer, Input Buffering, Specification of Tokens, Recognition of Tokens, The Lexical- Analyzer Generator Lex.
SYNTAX ANALYSIS: Introduction, Context- Free Grammars

UNIT- III
PARSING: Top- Down Parsing, Bottom- Up Parsing, Introduction to LR Parsing: Simple LR, More Powerful LR Parsers, Using Ambiguous Grammars.

UNIT- IV
SYNTAX- DIRECTED TRANSLATION: Applications of Syntax- Directed Translation, Syntax- Directed Translation Schemes.
INTERMEDIATE- CODE GENERATION: Three- Address Code, Types and Declaration Translation of Expressions, Type Checking, Control Flow, Switch- Statements, Intermediate Code for Procedures

UNIT- V
CODE GENERATION: Issues in the Design of a Code Generator, Basic Blocks and Flow Graphs, Optimization of Basic Blocks, A Simple Code Generator, Peephole Optimization, Register Allocation and Assignment
MACHINE- INDEPENDENT OPTIMIZATIONS: The Principal Sources of Optimization, Introduction to Data- Flow Analysis, Partial- Redundancy Elimination

TEXT BOOKS:

1. Compilers :Principles, Techniques, & Tools by Alfred V. Aho, Monica S. Lam, Ravi Sethi ,Jeffrey D. Ullman PEARSON Addison- Wesley- Second Edition

REFERENCE BOOKS:

1. J P Trembly and P G Sorenson, The Theory and practice of Compiler Writing

2. Dick Grone, Henri E Bal, Ceriel J H Jacobs , Wiley ,Modern Compiler Design Dreamtech.

COURSE OUTCOMES:

- Analyze different phases of compiler and different translators.
- Design top down parsers and bottom up parsers for the language constructs.
- Understand the role of symbol table and design various data structures for symbol table.
- Apply syntactic analysis and generate intermediate code for different programs.
- Apply different optimization techniques and code generation.

ANURAG ENGINEERING COLLEGE

(An Autonomous Institution)

III Year B.Tech. CSE - II Sem
        L   T / P / D C
        4   0   4

(A56029) DATA WAREHOUSING AND DATA MINING

COURSE OBJECTIVES:

- To familiarize the concepts and architectural types of data Warehouses.
- Provides efficient design and management of data storages using data warehousing and OLAP.
- To understand the fundamental processes concepts and techniques of data mining.
- To consistently apply knowledge concerning current data mining research and how this may contribute to the effective design and implementation of data mining applications.
- To provide advance research skills through the investigation of data- mining Literature

UNIT- I

Data Warehouse and OLAP Technology: what is a Data Warehouse, Multidimensional Data Model, OLAP Operations on Multidimensional Data, Data Warehouse Architecture
Cube computation: Multiway Array Aggregation, BUC

UNIT- II

Introduction to Data Mining: Fundamentals of data mining, Data Mining Functionalities, Data Mining Task Primitives, Major issues in Data Mining.
Data Preprocessing: Needs for Preprocessing the Data, Data Cleaning, Data Integration and Transformation, Data Reduction

UNIT- III

Mining Frequent Pattern: Associations and Correlations:Basic Concepts, Efficient and Scalable Frequent Item set Mining Methods, Mining various kinds of Association Rules,
Classification and Prediction: Issues Regarding Classification and Prediction, Classification by Decision Tree Induction, Bayesian Classification

UNIT- IV

Cluster Analysis: Types of Data in Cluster Analysis, A Categorization of Major Clustering Methods, Partitioning Methods- K- means, PAM, Hierarchical Methods- BIRCH, Density- Based Methods-DBSCAN, Outlier Detection

UNIT- V

Overview Sequential pattern mining: Mining time series data,mining sequence patterns in transactional databases,graph mining,spatial datamining,text mining,mining the world wide web.

TEXT BOOKS:

1. Jiawei Han and MichelineKamber, Data Mining Concepts and Techniques, Second Edition, Elsevier, 2007.

REFERENCE BOOKS:

1. Alex Berson and Stephen J. Smith, Data Warehousing, Data Mining & OLAP, Tata McGraw Hill, Tenth Reprint, 2007.
2. ArunK.Pujari, Data Mining Techniques, 2nd Edition, Universities press. Introduction to Data Mining: Fundamentals of data mining, Data Mining Functionalities, Data Mining Task Primitives, Major issues in Data Mining. Data Preprocessing: Needs for Preprocessing the Data, Data Cleaning, Data Integration and Transformation, Data Reduction.

COURSE OUTCOMES:

- Design a data mart or data warehouse for any organization
- Apply Association and classification knowledge to different data sets
- App the clustering Techniques for different data sets
- Explore recent trends in data mining such as web mining, spatial- temporal mining

ANURAG ENGINEERING COLLEGE

(An Autonomous Institution)

III Year B.Tech. CSE - II Sem

L	T / P / D	C
4	0	4

(A56030) OBJECT ORIENTED ANALYSIS AND DESIGN

COURSE OBJECTIVES:

- Object oriented Analysis and Design using UML present the concepts and techniques necessary to effectively use system requirements to drive the development of a robust design model.
- To acquire UML, a common language for talking about requirements, designs, and component interfaces. Model a real-world application by using a UML class diagram.
- Showing how we apply the process of object oriented analysis and design to software development.
- Pointing out the importance and function of each UML model to the process of object oriented analysis and design, and explaining the notation of various elements in these models.

UNIT-I
Introduction to UML: Importance of modeling, principles of modeling, object oriented Modeling, conceptual model of the UML, Architecture, Software Development Life Cycle.
Basic Structural Modeling: Classes, Relationships, common Mechanisms, and diagrams.

UNIT-II
Advanced Structural Modeling: Advanced classes, advanced relationships, Interfaces, Types and Roles, Packages
Class & Object Diagrams: Terms, concepts, modeling techniques for Class & Object Diagrams. Design class diagram for Library information system.

UNIT-III
Basic Behavioral Modeling-I: Interactions, Interaction diagrams.
Basic Behavioral Modeling-II: Use cases, Use case Diagrams, Activity Diagrams. Design Use cases, Use case diagrams, Interaction diagram and Activity diagram for library system.

UNIT-IV
Advanced Behavioral Modeling: Events and signals, state machines, processes and Threads, time and space, state chart diagrams. Design State machine for different objects in library system.

UNIT-V
Architectural Modeling: Component, Deployment, Component diagram and Deployment diagrams. Design and document of library system

TEXT BOOKS :

1. Grady Booch, James Rumbaugh, Ivar Jacobson, The Unified Modeling Language User Guide, 7th Impression, Pearson Education, 2008.

REFERENCE BOOKS :

1. Hans-Erik Eriksson, Magnus Penker, Brian Lyons, David Fado, UML2 Toolkit, 2nd Edition, WILEY- DreamTech India Pvt. Ltd., 2012.

2. Meilir Page-Jones, Fundamentals of Object Oriented Design in UML, Illustrated Edition, Pearson Education, 2000.

3. Pascal Roques, Modeling Software Systems Using UML2, 1st edition, WILEY-DreamTech India Pvt. Ltd.,2011.

4. Atul Kahate, Object Oriented Analysis & Design, 1st Edition, The McGraw-Hill Companies, 2007.

5. Mark Priestley, Practical Object-Oriented Design with UML, 2nd Edition, TATA McGrawHill, 2005.

COURSE OUTCOMES:

- Recognize the concepts and principles of object oriented programming concepts.
- Understand the purposes, major components and key mechanisms of Class and Object Diagram.
- Describe the basic resource management responsibilities of Interaction Diagram.
- Knowledge on State-chart Diagram.
- Applying the techniques for Component and Deployment Diagrams.

ANURAG ENGINEERING COLLEGE

(An Autonomous Institution)

III Year B.Tech. CSE - II Sem

L	T / P / D	C
3	0	3

(A56031) WEB TECHNOLOGIES

COURSE OBJECTIVES:

- Developing static web pages using HTML and CSS.
- Data Validations using JavaScript.
- To build XML applications with DTD and style sheets that spans multiple domains.
- Developing Dynamic pages.
- Manipulating data in the database using JDBC.

UNIT- I

Fundamental: A Brief introduction to the internet, WWW, Web Browsers and servers, URL, MIME (Multi purpose mail extension), hyper text Transfer protocol

Introduction to XHTML: :Evolution of HTML and XHTML, Basic syntax, XHTML Structure, Basic Text Markup, Images, Hypertext links, Lists, Tables, Forms, Frames, Difference between HTML and XHTML

CSS: Introduction, Levels of style sheets, Style specification formats, Selector Forms, Property value Forms, Font properties, List properties, Color, Alignment of text, Box model, <span> and <div> tags

UNIT- II

Java Script: Overview, Object Orientation and Java Script, Genera syntactic Characteristics, Primitives, Operations, Expressions, Screen Output and Keyboard Input, Control Statements, Object Creation and Modification, Arrays, Functions, An example, Constructors, Pattern Matching using Regular Expressions, Another example Errors in Scripts

Java script and XHTML documents: The Java Script Execution Environment, The Document Object Model, Element Access in Java Script, Events and Event Handling, Handling Events from Body Elements, Handling Events from Button Elements, Handling Events from Textbox and Password Elements, The DOM 2 Event Model ,The Navigator Object, DOM Tree Traversal and Modification

Dynamic Documents with java script: Introduction, Positioning Elements, Moving Elements, Element Visibility, Changing Colors and Fonts, Dynamic Content, Stacking Elements, Locating the Mouse Cursor, Reacting to a Mouse Click, Slow Movement of Elements, Dragging and Dropping Elements

UNIT- III

Introduction to XML: Introduction, The Syntax of XML, XML Document Structure, Document Type Definitions, Namespaces, XML Schemas, Displaying Raw XML Documents, Displaying XML Documents with CSS, XSLT Style Sheets, XML Processors, Web Services

Introduction to AJAX: Overview of AJAX, The Basics of Ajax, Rails with Ajax

UNIT- IV

Servlet Basics: Basic Servlet Structure, A Servlet that Generates Plain Text, A Servlet that Generates HTML, The Servlet Life Cycle.

Handling the client request: form data: The Role of Form Data, Reading Form Data from Servlets, Example: Reading Three Parameters, Example: Reading All Parameters, Redisplaying the Input Form When Parameters Are Missing or Malformed

Handling The Client Request: HTTP Request Headers: Reading Request Headers, Sending Compressed Web Pages, Differentiating Among Different Browser Types, Changing The Page According To How The User Got There.

Accessing Databases with Jdbc: Using Jdbc In General, Basic Jdbc Examples, Simplifying Database, Access with Jdbc Utilities, Using Prepared Statements, Creating Callable Statements, Using Database Transactions.

UNIT- V

Overview of Jsp Technology: The Need for Jsp, Benefits Of Jsp, Advantages of Jsp Over Competing Technologies, Basic Syntax.

Invoking Java Code With Jsp Scripting Elements: Creating Template Text, Invoking Java Code From Jsp, Using Jsp Expressions, Example: Jsp Expressions, Comparing Servlet To Jsp Pages, Writing Scriptlets, Scriptlet Example, Using Scriptlets To Make Parts Of The Jsp Page Conditional, Using Declarations, Declaration Example, Using Predefined Variables, Comparing Jsp Expressions, Scriptlets And Declarations

Including Files and Applets in Jsp Pages: Including Pages At Request Time: The Jsp: Include Action, Including Files at Page Translation Time: The Include Directive, Forwarding Request with Jsp: Forward, Including Applets for the Java Plug-In

Integrating Servlets and Jsp: The Model View Controller Architecture: Understanding the Need for MVC, Implementing the MVC with Request Dispatch, Summarizing MVC Code, Interpreting Relative URL'S In the Destination Page, Applying MVC: Bank Account Balances, Comparing the Three Data Sharing Approaches, Forwarding Request From Jsp Pages, Including Pages. Introduction to hyper nets and struts

TEXT BOOKS:

1. Sebesta, Programming the World Wide Web,4th edition,Pearson,2008.
2. Marty Hall and Larry Brown, Core Servlets and Java Server Pages Volume 1: Core Technologies, 2nd edition, Pearson 2012

REFERENCE BOOKS:

1. Chris Bates, Web Programming, building internet applications, 2nd edition, WILEY Dreamtech, 2012.
2. Dietel and Dietel, Internet and World Wide Web – How to program, 3rd edition, PHI/Pearson Education Asia, 2012.
3. Uttam K Roy,Web Technologies 8th Impression, Oxford Publication,2014.

COURSE OUTCOMES:

- Design static web pages and provide client side authentication.
- Prepare Static Web pages With Validations.
- Develop new tag sets using XML mechanism.
- Design and develop web applications using JSP and MVC architecture.
- Understand database connectivity and retrieving data using client/server database.

ANURAG ENGINEERING COLLEGE

(An Autonomous Institution)

III Year B.Tech. CSE - II Sem

L	T / P / D	C
3	0	3

(A56032) MACHINE LEARNING
(PROFESSIONAL ELECTIVE – II)

COURSE OBJECTIVES:

- To understand the concepts of machine learning
- To understand supervised and unsupervised learning and their applications
- To understand the theoretical and practical aspects of probabilistic graphical models
- To appreciate the concepts and algorithms of reinforcement learning
- To learn aspects of computational learning theory

UNIT- I
INTRODUCTION: Machine Learning - Machine Learning Foundations –Overview – applications - Types of machine learning - basic concepts in machine learning Examples of Machine Learning - Applications - Linear Models for Regression-Linear Basis Function Models - The Bias-Variance Decomposition - Bayesian Linear Regression - Bayesian Model Comparison

UNIT- II
SUPERVISED LEARNING: Linear Models for Classification, Linear Models for Classification - Discriminant Functions -Probabilistic Generative Models - Probabilistic Discriminative Models - Bayesian Logistic Regression.Decision Trees - Classification Trees- Regression Trees - Pruning. Neural Networks -Feed-forward Network Functions - Error Back propagation, Radial Basis Function Networks.

UNIT- III
UNSUPERVISED LEARNING: Clustering- K-means - EM - Mixtures of Gaussians - The EM Algorithm in General -Model selection for latent variable models - high-dimensional spaces -- The Curse of Dimensionality -Dimensionality Reduction - Factor analysis - Principal Component Analysis - Probabilistic PCA- Independent components analysis

UNIT- IV
PROBABILISTIC GRAPHICAL MODELS : Directed Graphical Models - Bayesian Networks - Exploiting Independence Properties - From Distributions to Graphs - Examples -Markov Random Fields - Inference in Graphical Models - Learning –Naive Bayes classifiers-Markov Models – Hidden Markov Models.

UNIT- V
ADVANCED LEARNING: Sampling – Basic sampling methods , Reinforcement Learning- K-Armed Bandit Elements - Model-Based Learning- Value Iteration- Policy Iteration. Temporal Difference Learning Exploration Strategies- Deterministic and Non- deterministic Rewards and Actions. Semi - Supervised Learning. Computational Learning Theory

TEXT BOOKS:

1. Christopher Bishop, Pattern Recognition and Machine Learning, Springer,2006

2. Tom Mitchell, Machine Learning, McGraw-Hill, 1997

REFERENCE BOOKS:

1. Kevin P. Murphy, Machine Learning: A Probabilistic Perspective, MIT Press, 2012
2. Ethem Alpaydin, Introduction to Machine Learning, Prentice Hall of India, 2005
3. Hastie, Tibshirani ,Friedman, The Elements of Statistical Learning,2^{nd}Edition, Springer,2008
4. Stephen Marsland, Machine Learning –An Algorithmic Perspective, CRC Press, 2009

COURSE OUTCOMES:

- To implement a neural network for an application of your choice using an available tool
- To implement probabilistic discriminative and generative algorithms for an application of your choice and analyze the results
- To use a tool to implement typical clustering algorithms for different types of applications
- To design and implement an HMM for a sequence model type of application
- To identify applications suitable for different types of machine learning with suitable Justification

ANURAG ENGINEERING COLLEGE

(An Autonomous Institution)

III Year B.Tech. CSE - II Sem

L	T / P / D	C
3	0	3

(A56033) INTERNET OF THINGS
(PROFESSIONAL ELECTIVE – II)

COURSE OBJECTIVES:

- Vision and Introduction to IoT.
- Understand IoT Market perspective.
- Data and Knowledge Management and use of Devices in IoT Technology.
- Understand State of the Art – IoT Architecture.
- Real World IoT Design Constraints, Industrial Automation and Commercial Building Automation in IoT.

UNIT- I
What is the IoT and why is it important?: Elements of an IoT ecosystem, Technology driver Business drivers, Typical IoT applications, Trends and implications.

UNIT- II
Sensors and sensor nodes: Sensing devices , Sensor modules, nodes and systems.
Connectivity and networks: Wireless technologies for the IoT , Edge connectivity and protocols. Wireless sensor networks.

UNIT- III
Analytics and applications: Signal processing, real-time and local analytics ,Databases, cloud analytics and applications.

UNIT- IV
Industry perspective: Business considerations , Legal challenges.

UNIT- V
IOT lab exercises and mini-project
Local processing on the sensor nodes , Connecting devices at the edge and to the cloud Processing data offline and in the cloud.
 Mini-project: Designing an IoT system (group exercise).

TEXTBOOKS:

1. J. Biron and J. Follett, "Foundational Elements of an IoT Solution", O'Reilly Media, 2016.
2. Keysight Technologies, "The Internet of Things: Enabling Technologies and Solutions for Design and Test", Application Note, 2016.
3. Charles Bell, "Beginning Sensor Networks with Arduino and Raspberry Pi", Apress, 2013.
4. D. Evans, "The Internet of Things: How the Next Evolution of the Internet Is Changing Everything", Cisco Internet Business Solutions Group, 2011
5. McKinsey&Company, "The Internet of Things: Mapping the value beyond the hype", McKinsey Global Institute, 2015
6. European Alliance for Innovation (EAI), "Internet of Things: Exploring the potential", Innovation Academy Magazine, Issue No. 03, 2015

7. Digital Greenwich, "Greenwich Smart City Strategy", 2015
8. ITU and Cisco, "Harnessing the Internet of Things for Global Development", A contribution to the UN broadband commission for sustainable development

REFERNCE BOOKS:

1. Vijay Madisetti and Arshdeep Bahga, **"Internet of Things (A Hands-on-Approach)",** 1st Edition, VPT, 2014.
2. Francis daCosta, **"Rethinking the Internet of Things: A Scalable Approach to Connecting Everything",** 1st Edition, Apress Publications, 2013

COURSE OUTCOMES:

- Explain in a concise manner how the general Internet as well as Internet of Things work.
- Understand constraints and opportunities of wireless and mobile networks for Internet of Things.
- Use basic measurement tools to determine the real-time performance of packet based networks.
- Analyses trade-offs in interconnected wireless embedded sensor networks.

ANURAG ENGINEERING COLLEGE

(An Autonomous Institution)

III Year B.Tech. CSE - II Sem

L	T / P / D	C
3	0	3

(A56034) CYBER FORENSICS
(PROFESSIONAL ELECTIVE – II)

COURSE OBJECTIVES

- To Professionalize and advance the science of cyber security ,digital and computer forensics
- To set high forensics and ethical standers for cyber security.

UNIT- I
Computer Forensics Fundamentals: What is Computer Forensics?, Use of Computer Forensics in Law Enforcement, Computer Forensics Assistance to Human Resources/Employment Proceedings, Computer Forensics Services, Benefits of Professional Forensics Methodology, Steps taken by Computer Forensics Specialists Types of Computer Forensics Technology: Types of Military Computer Forensic Technology, Types of Law Enforcement ,Computer Forensic Technology , Types of Business Computer Forensic Technology Computer Forensics Evidence and Capture: Data Recovery Defined ,Data Back-up and Recovery , The Role of Back-up in Data Recovery , The Data-Recovery Solution.

UNIT- II
Evidence Collection and Data Seizure: Why Collect Evidence? Collection Options, Obstacles ,Types of Evidence , The Rules of Evidence , Volatile Evidence General Procedure , Collection and Archiving , Methods of Collection , Artifacts Collection Steps,

Controlling Contamination: The Chain of Custody Duplication and Preservation of Digital Evidence: Preserving the Digital Crime Scene , Computer Evidence Processing Steps, Legal Aspects of Collecting and Preserving Computer Forensic Evidence Computer Image Verification and Authentication: Special Needs of Evidential Authentication , Practical Consideration ,Practical Implementation.

UNIT- III
Computer Forensics analysis and validation: Determining what data to collect and analyze, validating forensic data, addressing data-hiding techniques, performing remote acquisitions

Network Forensics: Network forensics overview, performing live acquisitions, developing standard procedures for network forensics, using network tools, examining the honeynet project.

Processing Crime and Incident Scenes: Identifying digital evidence, collecting evidence in private-sector incident scenes, processing law enforcement crime scenes, preparing for a search, securing a computer incident or crime scene, seizing digital evidence at the scene, storing digital evidence, obtaining a digital hash, reviewing a case

UNIT-IV
Current Computer Forensic tools: evaluating computer forensic tool needs, computer forensics software tools, computer forensics hardware tools, validating and testing forensics software E-Mail Investigations: Exploring the role of e-mail in investigation, exploring the roles of the client and server in e-mail, investigating e-mail crimes and violations, understanding e-mail servers, using specialized e-mail forensic tools .

Cell phone and mobile device forensics: Understanding mobile device forensics, understanding

acquisition procedures for cell phones and mobile devices.

UNIT-V

Working with Windows and DOS Systems: understanding file systems, exploring Microsoft File Structures, Examining NTFS disks, Understanding whole disk encryption, windows registry, Microsoft startup tasks, MS-DOS startup tasks, virtual machines

TEXT BOOKS

1. Computer Forensics, Computer Crime Investigation by John R. Vacca, Firewall Media, New Delhi.
2. Computer Forensics and Investigations by Nelson, Phillips Enfinger, Steuart, CENGAGE Learning

REFERENCE BOOKS

1. Real Digital Forensics by Keith J. Jones, Richard Bejtiich, Curtis W. Rose, Addison-Wesley Pearson Education
2. Forensic Compiling, A Tractitioneris Guide by Tony Sammes and Brian Jenkinson, Springer International edition.
3. Computer Evidence Collection & Presentation by Christopher L.T. Brown, Firewall Media.
4. Homeland Security, Techniques & Technologies by Jesus Mena, Firewall Media.
5. Software Forensics Collecting Evidence from the Scene of a Digital Crime by Robert M.Slade, TMH 2005
6. Windows Forensics by Chad Steel, Wiley India Edition.

COURSE OUTCOMES:

- Students will understand the usage of computers in forensic, and how to use various forensic tools for a wide variety of investigations.
- It gives an opportunity to students to continue their zeal in research in computer forensics

ANURAG ENGINEERING COLLEGE

(An Autonomous Institution)

III Year B.Tech. CSE - II Sem

L	T / P / D	C
0	3	2

(A56209) DATA WAREHOUSE AND DATA MINING LAB

PREREQUISITES :

  1. A course on "Database Management Systems"

COREQUISITE :

  1. A course on "Dataware housing and Data Mining"

COURSE OBJECTIVES:

- To implement data warehouses for different organizations.
- To analyze the process of preprocessing the data.
- To test the real world data sets using supervised learning and unsupervised learning.
- To determine the performance and accuracy of models.
- To handle small data mining project for a given practical domain.

Week- 1: Design multi- dimensional data models namely star, snowflake and Fact constellation schemas for one enterprise (Like banking).

Week- 2- 3: Apply below preprocessing techniques on given dataset.
Handling Missing Values , Remove records having a NULL value, Replace Numeric attributes by mean value, Remove Nominal attributes having null value, Sampling, Discretization (Binning) , Normalization

Week- 4: Market basket analysis using Association Rule Mining

Week- 5: movie reviews classification using WEKA Tool

Week- 6: weather classification using WEKA Tool

Week- 7: Multiple regression analysis on sales data set

Week- 8: Demonstrate K- means based Clustering in weka

Week- 9: Demonstrate hierarchical based Clustering in weka

Week- 10: apply classification, cluster technique on time series data sets
Week- 11: apply classification, cluster technique on time spatial data sets
Week- 12: Demonstrate Outlier detection technique

Week- 13- 16: Credit Risk Assessment

DESCRIPTION:

   The business of banks is making loans. Assessing the credit worthiness of an applicant is of crucial importance. You have to develop a system to help a loan officer decide whether the credit of a customer is good, or bad. A bank's business rules regarding loans must consider two opposing factors. On the one hand, a bank wants to make as many loans as possible. Interest on these loans is the banks profit source. On the other hand, a bank cannot afford to make too many bad loans. Too many bad loans could lead to the collapse of the bank. The bank's loan policy must involve a compromise: not too strict, and not too lenient

COURSE OUTCOMES:

- The data mining process and important issues around data cleaning, pre- processing and integration**.**

- The principle algorithms and techniques used in data mining, such as clustering, association mining, classification and prediction

ANURAG ENGINEERING COLLEGE

(An Autonomous Institution)

III Year B.Tech. CSE - II Sem

L	T / P / D	C
0	3	2

(A56210) WEB TECHNOLOGIES LAB

PREREQUISITES :

1. A course on "Computer Programming and Data Structures"
2. A course on "Objected-Oriented Programming Through Java"

CO-REQUISITE :

1. A course on "Web Technologies"

COURSE OBJECTIVES :

- Developing static web pages using HTML and CSS.
- Data Validations using JavaScript.
- To build XML applications with DTD and style sheets that span multiple domains.
- Manipulating data in the database using JDBC
- Developing Dynamic pages using servlets, JSP.

Week- 1:
Design the following static web pages required for an online book store web site.
1) HOME PAGE:
2) LOGIN PAGE:

Week - 2:
Design the student REGISTRATION PAGE:

Week- 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 a white space and lines are separated with new line character.

Week - 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).

Week - 5: VALIDATION:
Write JavaScript to validate the following fields of the above registration page.

Week - 6:
Write an XML file which will display the Book information which includes the following: Write a Document Type Definition (DTD) to validate the above XML file.

Week - 7:
Install TOMCAT web server and APACHE. While installation assign port number 4040 to TOMCAT and 8080 to APACHE. Make sure that these ports are available i.e., no other process is using this port. Deploy above all pages in to tomcat web server.

Week - 8:
Write a program to display the HELLO WORLD message using servlet.

Week - 9:
Communicate two servlets using doGET and doPOST methods.

Week - 10:
Write a program to create cookies and retrieval using servlet.

Week - 11:
Write a program to display the HELLO WORLD message using JSP

Week - 12:
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 the site "message, where <name> should be replaced with the entered name. Otherwise it should send "Welcome <name> to this site "message.

Week - 13:
Using registration form Authenticate the user when he submits the login form using the user name and password from the database

Week - 14:

Create tables in the database which contain the details of items (books in our case like Book name, Price, Quantity, Amount)) of each category. Modify your catalogue page (week 4)in such a way that you should connect to the database and extract data from the tables and display them in the catalogue page using JDBC

Week - 15:
Design a web page for bank that provide customer information by authenticating him against database

COURSE OUTCOMES:
- Design static web pages and provide client side authentication.
- Develop new tag sets using XML mechanism.
- Understand database connectivity and retrieving data using client/server database.
- Design dynamic web pages and develop web applications using MVC architecture.

ANURAG ENGINEERING COLLEGE
(An Autonomous Institution)

IV Year B.Tech. CSE - I Sem

L	T / P / D	C
3	1	3

(A57037) INFORMATION SECURITY

COURSE OBJECTIVES:

- Analyze the importance of information Security in real world.
- Compare and analyze different encryption Algorithms.
- Summarize authentication functions using MAC and Hash.
- Analyze security importance of various web applications.
- Categorize various types of intruders and viruses

UNIT - I

Information Security: Introduction, History of Information security, What is Security, CNSS Security Model, Components of Information System, Balancing Information Security and Access, Approaches to Information Security Implementation, The Security Systems Development Life Cycle.

UNIT - II

Cryptography: Concepts and Techniques, symmetric and asymmetric key cryptography, steganography, Symmetric key Ciphers: DES structure, DES Analysis, Security of DES, variants of DES, Block cipher modes of operation , AES structure, Analysis of AES , Key distribution Asymmetric key Ciphers: Principles of public key cryptosystems, RSA algorithm, Analysis of RSA, Diffie-Hellman Key exchange.

UNIT - III

Message Authentication and Hash Functions: Authentication requirements and functions, MAC and Hash Functions, MAC Algorithms: Secure Hash Algorithm, Whirlpool, HMAC, Digital signatures, X.509, Kerberos.

UNIT - IV

Security at layers (Network, Transport, Application): IPSec, Secure Socket Layer(SSL), Transport Layer Security(TLS), Secure Electronic Transaction(SET), Pretty Good Privacy(PGP), S/MIME.

UNIT – V

Intruders, Virus and Firewalls: Intruders, Intrusion detection, password management, Virus and related threats, Countermeasures, Firewall design principles, Types of firewalls.

TEXT BOOKS:
1. Michael E. Whitman, Herbert J. Mattord,Principles of Information Security, CENGAGE Learning, 4th Edition.
2. William Stallings, Cryptography and Network Security, Pearson Education,4th Edition

REFERENCE BOOKS:
1. C K Shyamala, N Harini, Dr T R Padmanabhan, Cryptography and Network Security : Wiley India, 1st Edition.
2. Bernard Menezes, Network Security and Cryptography: CENGAGE Learning

3. AtulKahate, Cryptography and Network Security: McGraw Hill, 2nd Edition

COURSE OUTCOMES:
- Analyze the importance of information Security in real world.
- Designing and analysis of different encryption Algorithms.
- Implementation of MAC and Hash functions, security at different layers of a network.
- Explore different types of intruders and viruses

ANURAG ENGINEERING COLLEGE

(An Autonomous Institution)

IV Year B.Tech. CSE - I Sem

L T / P / D C
4   0   3

(A57038) UNIX PROGRAMMING

COURSE OBJECTIVES:

- To understand the Unix utilities and be able to work with Bourne again shell (bash).
- To understand the file concepts, process, role of kernel in process management, signal generation and handling.
- Introduction to inter process communication, semaphores and multithreading.

UNIT - I

Introduction to Unix:- Architecture of Unix, Features of Unix , Unix 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.

UNIT - II

Unix Utilities:- Introduction to unix file system, vi editor, 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 , detailed commands to be covered are tail, head , sort, nl, uniq, grep, egrep, fgrep, cut, paste, join, tee, pg, comm, cmp, diff, tr, awk, cpio

UNIT - III

Working with the Bourne shell(bash): Introduction, shell responsibilities, pipes and input Redirection, output redirection, here documents, running a shell script, the shell as a programming language, shell meta characters, file name substitution, shell variables, command substitution, test command, control structures, arithmetic in shell, functions.
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 - IV

Inter-process Communications: Introduction to IPC, Pipes, FIFOs, Introduction   to three types of IPC-message queues, semaphores and shared memory.
Message Queues: Kernel support for messages, Unix system V APIs for messages, client/server example.
Semaphores: Kernel support for semaphores, Unix system V APIs for semaphores.
Shared Memory: Kernel support for shared memory, Unix system V APIs for shared memory, semaphore and shared memory example.

UNIT - V

Files: File Concept, Files System Structure, Inodes, File Attributes, File Types, Library functions, the standard I/O and formatted I/O in C, stream errors, kernel support for files, System calls, file descriptors.
Process: Process concept, Kernel support for process, process attributes, process control-process creation, waiting for a process, process termination, zombie process, orphan process, Process

APIs.

Signals: Introduction to signals, Signal generation and handling, Kernel support for signals, Signal function, unreliable signals, reliable signals, kill, pause, abort, sleep functions

TEXT BOOKS:

1. Sumitabha Das, Unix Concepts and Applications, 4th edition, TMH, 2006.
2. T.Chan, Unix System Programming using C++, PHI,2012.

REFERENCE BOOKS:

1. N.Mathew, R.Stones,Wrox, Beginning Linux Programming, 4th edition, Wiley India Edition.
   2.W.R.Stevens, Unix Network Programming, PHI, 2001.
2. Graham Glass, King Ables, Unix for programmers and users, 3rd Edition, Pearson
3. Education, 2003.
4. B.A.Forouzan and R.F.Gilberg, Unix and Shell programming, Cengage Learning, 2009.
5. W.R.Stevens, Advanced Programming in the Unix environment, 2nd Edition, Pearson Education, 2001.

COURSE OUTCOMES :

- Will be able to describe and use the UNIX operating system.
- Will be able to describe and use the fundamental UNIX system tools and utilities.
- We will able to describe and write shell scripts in order to perform basic shell programming.
- Will be able to describe and understand the UNIX file system

ANURAG ENGINEERING COLLEGE

(An Autonomous Institution)

IV Year B.Tech. CSE - I Sem

L	T/P/D	C
3	0	3

(A57039) MANAGEMENT SCIENCE

COURSE OBJECTIVES:

- The aim of this course is to enable the students to see that many managerial decision-making situations can be addressed using standard techniques and methods.
- Provide a comprehensive and concise introduction to the key techniques and methods used within management science that are directly relevant to the managerial context.
- Enable to see both the benefits, and limitations, of the techniques and methods presented.

UNIT - I

Introduction to Management: Nature and importance of management, Functions of Management, Taylor's Scientific Management Theory, Fayol's principles of management, Maslow's theory of Human Needs, Douglas McGregor's Theory X and Theory Y, Herzberg's Two factor Theory of Motivation. Systems Approach to Management, Leadership Styles, Social Responsibilities of Manager, Organization levels and types of organization structures.

UNIT - II

A) Operations 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- Statistical Quality Control - X chart, R chart, C chart, P chart, (simple problems), Acceptance Sampling, Deming's contribution to quality.

B) Materials Management: Objectives, Need for inventory control, EOQ, ABC Analysis, Purchase procedure, Stores management and Stores records, Supply chain management.

UNIT - III

A) Human Resources Management (HRM): Evolution of HRM, Concepts of HRM, 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.

B) Marketing: Functions of Marketing, Marketing Mix, Marketing strategies based on Product Life cycle, Channels of distribution.

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 &Contemporary Management Practices: Mission, Goals, Objectives, Policy, Strategy, Programmes, Elements of corporate planning process, Environmental Scanning, SWOT analysis, Steps in Strategy Formulation and Implementation, Generic Strategy alternatives. Basic concepts of Just-In-Time(JIT) system, Total Quality Management(TQM), Six Sigma and Capability Maturity Model(CMM) levels, Value chain Analysis.

TEXT BOOKS:

1. Aryasri, Management Science, TMH, New Delhi, 2009

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. KanishkaBedi, Production and Operations Management, Oxford University Press, 2012.
5. Samuel C. Certo, Modern Management, 2012.
6. Schermerhorn, Capling, Poole and Wiesner, Management, Wiley, 2012.
7. Parnell, Strategic Management, Cengage, 2012.
8. Lawrence R Jauch, R. Gupta and William F. Glueck: Business Policy and Strategic Management Science, McGraw Hill, 2012.

COURSE OUTCOMES:

- On completion of the course, the student should be able to discuss the main techniques and methods used within management science.
- Critically appraise the strengths and limitations of these techniques and methods.
- Carry out simple exercises using such techniques and methods themselves.

ANURAG ENGINEERING COLLEGE
(An Autonomous Institution)

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

(A57040) SOFTWARE PROJECT MANAGEMENT
(PROFESSIONAL ELECTIVE – III)

COURSE OBJECTIVES:

- A basic knowledge of software project management principles
- The ability to come up with a project schedule and assign resources
- Choose an appropriate project development methodology (e.g. waterfall, spiral …)
- Identify project risks, monitor and track project deadlines

UNIT - I
Introduction to software project management: Introduction, importance of software project management, Categorization of software project, problems, setting of objectives, stakeholders, the business case, management control.

Stepwise: overview of project planning: Introduction, selection of projects, objectives infrastructure, products and activities, activity risks. Analysis of project characteristics, estimation of effort for each activity, allocation of resources, review/publicize plan/execute plan.

UNIT - II
Programme management and project evaluation: programme management, management of allocation of resources within a programme, strategic programme management, creating a programme management, aids to programme management, benefits, evaluation of individual project's, technical assessment, cost benefit analysis, evaluation techniques, cash flow forecasting.

Selection of an appropriate project approach: choosing technologies, technical plan content list, and dynamic system development method

UNIT - III
Software effort estimation: applications and its problems, the basis of software estimation.

Activity Planning: objectives, plan, project schedules, projects and activities(sequencing and scheduling),network planning models, formulating the network models, far ward and backward pass, identifying the critical path, activities.

UNIT - IV
Risk Management: framework (identification, assessment, planning, and management), evaluating risks to the schedule, applying the PERT techniques, monte carol simulation, and critical chain concepts.

Resource Allocation: Nature, identifying requirements, scheduling, creating critical paths, counting costs, publishing, cost schedule, scheduling sequence.

UNIT - V
Monitoring and control: creating framework, collecting data, visualizing progress, cost monitoring, earned value analysis, prioritizing monitoring, change control.

Managing contracts: ISO 12207 approach, supply process, types, stages, typical terms of a

contract, contract management, acceptance.

TEXT BOOKS:

1. Bob Hughes and Mike Cotterell, Software Project Management, Tata McGraw- Hill, 4TH Edition.
2. Newtown Square A Guide To The Project Management Body Of Knowledge (PMBOK Guide)., Pa. : Project Management Institute, Inc., 2004. Print.

REFERENCE BOOKS:

1. Walker Royce, Software Project Management: Pearson Education, 2005.
2. Joel Henry: Software Project Management, Pearson Education.
3. PankajJalote: Software Project Management in practice, Pearson Education.

COURSE OUTCOMES:

- Apply the practice of project management in delivering of projects.
- Evaluate the project against strategic, technical and economiccriteria.
- Identify effort estimation and activity plan of a project.
- Categorize and prioritize actions for risk management.
- Evaluate the characteristics of various team structures

ANURAG ENGINEERING COLLEGE

(An Autonomous Institution)

IV Year B.Tech. CSE- I Sem

L   **T / P / D**   **C**
3   **0**   **3**

(A57041) CLOUD COMPUTING
(PROFESSIONAL ELECTIVE – III)

COURSE OBJECTIVES

- To understand the concepts of virtualization and its benefits
- To impart fundamental concepts in the area of cloud computing.
- To impart knowledge in applications of cloud computing.

UNIT- I

System Modeling, Clustering and Virtualization: Distributed system Models and Enabling Technologies - Scalable Computing over the Internet, Technologies for Network-Based Systems, System Models for Distributed and Cloud Computing, Software Environments for Distributed Systems and Clouds, Performance, Security, and Energy Efficiency,

computer clusters for scalable parallel computing - Clustering for Massive Parallelism, Computer Clusters and MPP Architectures, Design Principles of Computer Clusters, Cluster Job and Resource Management..

UNIT- II

virtual machines and virtualization of clusters and data centers - Implementation Levels of Virtualization. Virtualization Structures/Tools and Mechanisms, Virtualization of CPU, Memory, and I/O Devices, Virtual Clusters and Resource Management, Virtualization for Data-Center Automation.

UNIT- III

Cloud Platform Architecture over Virtualized Data Centers – Cloud Computing and Service Models, Data-Center Design and Interconnection Networks, Architectural Design of Compute and Storage Clouds, Public Cloud Platforms: GAE, AWS, and Azure, Inter-cloud Resource Management, Cloud Security and Trust Management

UNIT- IV

Cloud Programming and Software Environments - Features of Cloud and Grid Platforms, Parallel and Distributed Programming Paradigms, Programming Support of Google App Engine, Programming on Amazon AWS and Microsoft Azure, Emerging Cloud Software Environments.

UNIT- V

Grid Computing Systems and Resource Management - Grid Architecture and Service Modeling, Grid Projects and Grid Systems Built, Grid Resource Management and Brokering, Software and Middleware for Grid Computing, Grid Application Trends and Security Measures.

TEXT BOOKS:

1. Distributed and Cloud Computing , Kai Hwang, Geoffery C.Fox, Jack J.Dongarra, Elsevier, 2012..
2. Cloud Computing: Principles and Paradigms by Rajkumar Buyya, James Broberg and Andrzej M. Goscinski, Wiley, 2011.

REFERENCE BOOKS:

1. Cloud Computing: A Practical Approach,Anthony t.Velte,Toby J.Velte,Robert Elsenpeter,Tata McGraw Hill,rp2011.
2. Enterprise Cloud Computing, Gautam Shroff, Cambridge University Press, 2010.
3. Cloud Computing: Implementation,Management and Security,John W.Rittinghouse,F.Ransome,CRC Presstp2012

COURSE OUTCOMES:

- Compare and contrast different cloud architecture
- Learn & Implement Virtualization
- Analyze and design storage mechanisms
- Apply security mechanism for the Cloud.
- Understand Disaster recovery in Cloud

ANURAG ENGINEERING COLLEGE
(An Autonomous Institution)

IV Year B.Tech. CSE - I Sem

L	T / P / D	C
3	0	3

(A57042) SOFTWARE TESTING
(PROFESSIONAL ELECTIVE – III)

COURSE OBJECTIVES:

- Understand fundamentals of Software testing.
- To understand Path, Transaction, Dataflow & Domain testing Strategies.
- To analyze node reduction algorithm.
- To explore the logic & state testing strategies.
- Acquire knowledge on various automated testing tools

UNIT - I
Software Testing Strategy and Environment: Minimizing Risks, Writing a Policy for Software Testing, Economics of Testing, Testing-an organizational issue, Management Support for Software Testing, Building a Structured Approach to Software Testing, Developing a Test Strategy.
Building Software Testing Process: Software Testing Guidelines, workbench concept, Customizing the Software Testing Process, Process Preparation checklist -

UNIT - II
Software Testing Techniques: Dynamic Testing – Black Box testing techniques, White Box testing techniques, Static testing, Validation Activities, Regression testing.

UNIT - III
Software Testing Tools: Selecting and Installing Software Testing tools ,Automation and Testing Tools,Load Runner, Win runner and Rational Testing Tools, Skill test, Java Testing Tools, JMetra, JUNIT and Cactus.

UNIT - IV
Testing Process Seven Step Testing Process – I: Overview of the Software Testing Process, Organizing of Testing, Developing the Test Plan, Verification Testing, Validation Testing.

UNIT - V
 Seven Step Testing Process – II: Analyzing and Reporting Test results, Acceptance and Operational Testing, Post-Implementation Analysis
 Specialized Testing Responsibilities: Software Development Methodologies, Testing Client/Server Systems

TEXT BOOKS:

1. Effective Methods for Software Testing, Third edition, *William E. Perry*, Wiley India, 2009.
2. Software Testing – Principles and Practices, *Naresh Chauhan,* Oxford University Press, 2010.

REFERENCE BOOKS:

1. GlenfordMyers , The art of Software testing, 2nd edition, 2004.

2. Brain Marrick, The craft of software testing, 1st edition, Pearson Education.
3. N.Chauhan,Software Testing-, 1stedition., Oxford University Press.

COURSE OUTCOMES:

- Prioritize & categorize the bugs and take necessary measures.
- Apply Path, Transaction, and Dataflow& Domain testing Strategies.
- Identify Number of test cases by applying node reduction algorithm.
- Apply logic & state testing strategies. Understand various automated testing tools

ANURAG ENGINEERING COLLEGE

(An Autonomous Institution)

IV Year B.Tech. CSE - I Sem

L	T/P/D	C
3	1	3

(A57043) PREDICTIVE ANALYTICS WITH R PROGRAMMING
(PROFESSIONAL ELECTIVE - IV)

COURSE OBJECTIVES

- Assess Advanced BI concepts and core IT concepts
- Explain predictive analytics fundamentals
- Facilitate advanced problem solving using data mining.
- Critique problems, issues, and trends using predictive analysis
- Perform predictive analytics and data science
- Evaluate advanced data science concepts

UNIT - I
Introduction to Predictive Analytics: What and Why Analytics, Introduction to Tools and Environment, Application of Modeling in Business, Databases & Types of data and variables, Data Modeling Techniques, Missing imputations etc. Need for Business Modeling

UNIT - II
Introduction to R programming: R Programming Language and statistical software applications, Overview of R, R data types and objects, reading and writing data.
Control structures, functions, scoping rules, dates and times, Loop functions, debugging Simulation, code profiling.

UNIT - III
Introduction to business analytics: Uses of statistical data, Business impact of predictive analytics. Trends in business analytics Data quality models for analytics,

UNIT - IV
Trend detection in business analytics: Feasibility of investment in business analytics. Analytics driven solutions, using analytics to understand the customer,
Introduction to business intelligence : KPIs, Dashboards ,score cards, python programming

UNIT - V
Future trends for data mining: Strategic intelligence in corporate planning, Tactical intelligence in marketing, Operational intelligence in manufacturing, financial intelligence in accounting

TEXT BOOKS :

1. Student's Handbook for Associate Analytics-Ill.
2. Software for Data Analysis: Programming with R (Statistics and Computing) by John M. Chambers (Springer)
3. Loshin, D. (2012). Business intelligence. Elsevier. ISBN: 978-0123858894

REFERENCE BOOK

1. Gareth James' Daniela Witten Trevor Hastie Robert Tibshirani:. An Introduction to Statistical

Learning with Applications in R

2. www.clipfolio.com

3. www.nptel.com

COURSE OUTCOMES:

- Understand and describe the R Programming in-detail.
- Being able to utilize and apply the Data Analytics lifecycle to Big Data analytics projects
- Apply appropriate techniques (such as ML) and tools (models) to analyze Big Data problems and recognize insights that lead to actionable work items.

ANURAG ENGINEERING COLLEGE

(An Autonomous Institution)

IV Year B.Tech. CSE - I Sem

L	T/P/D	C
3	1	3

(A57044) SCRIPTING LANGUAGES
(PROFESSIONAL ELECTIVE - IV)

COURSE OBJECTIVES:
- Analyses requirements of software systems for the purpose of determining the suitability of implementing in Perl or Python;
- Analyses and model requirements and constraints for the purpose of designing and implementing software systems in Perl and Python;
- Evaluate and compare designs of such systems on the basis of specific requirements and constraints.

PROBLEM SOLVING: analyze problems and synthesize suitable solutions. Specifically:

- Design and implement Perl and Python software solutions that accommodate specified requirements and constraints, based on analysis or modeling or requirements specification.

UNIT - I
PHP Basics : PHP Basics- Features, Embedding PHP Code in your Web pages, Outputting the data to the browser, Data types, Variables, Constants, expressions, string interpolation, control structures, Function, Creating a Function, Function Libraries, Arrays, strings and Regular Expressions.

UNIT - II
Advanced PHP Programming: PHP and Web Forms, Files, PHP Authentication and Methodologies -Hard Coded, File Based, Database Based, IP Based, Login Administration, Uploading Files with PHP, Sending Email using PHP, PHP Encryption Functions, the Mcrypt package, Building Web sites for the World.

UNIT – III
Introduction to Python: , installing Python; basic syntax, interactive shell, editing, saving, and running a script.
The concept of data types; variables, assignments; immutable variables; numerical types; arithmetic operators and expressions; comments in the program; understanding error messages; Conditions, boolean logic, logical operators; ranges; Control statements: if-else, loops (for, while); short-circuit (lazy) evaluation.

UNIT - IV
Strings and text files; manipulating files and directories, os and sys modules; text files: reading/writing text and numbers from/to a file; creating and reading a formatted file (csv or tab-separated).
Lists, tuples, and dictionaries: basic list operators, replacing, inserting, removing an element; searching and sorting lists; dictionary literals, adding and removing keys, accessing and replacing values; traversing dictionaries.
Design with functions: hiding redundancy, complexity; arguments and return values; formal vs actual arguments, named arguments. Program structure and design. Recursive functions.

UNIT - V

Introduction to PERL and Scripting: Scripts and Programs, Origin of Scripting , Scripting Today, Characteristics of Scripting Languages, Uses for Scripting Languages, Web Scripting, and the universe of Scripting Languages. PERL- Names and Values, Variables, Scalar Expressions, Control Structures, arrays, list, hashes, strings, pattern and regular expressions, subroutines.

TEXT BOOKS:

1. Beginning PHP and MySQL, 3rd Edition, Jason Gilmore, Apress Publications (Dream tech.).
2. Fundamentals of Python: First Programs by Kenneth Lambert, Course Technology Publisher, Cengage Learning, 2012 ISBN-13: 978-1-111-82270-5
3. The World of Scripting Languages, David Barron, Wiley Publications.

REFERENCE BOOKS:

1. Open Source Web Development with LAMP using Linux, Apache, MySQL, Pen and PHP, J.Lee and B.Ware(Addison Wesley) Pearson Education.
2. Programming Python,M.Lutz,SPD.
3. PHP 6 Fast and Easy Web Development, Julie Meloni and Matt Telles, Cengage Learning Publications.
4. PHP 5.1,l.Bayross and S.Shah, The X Team, SPD.
5. Core Python Programming, Chun, Pearson Education.
6. Guide to Programming with Python, M.Dawson, Cengage Learning.
7. Pen by Example, E.Quigley, Pearson Education.
8. Programming Perl,Larry Wall, T.Christiansen and J.Orwant,O'Reilly, SPD.
9. The PHP Complete Reference-Steven Holzner-Tata McGraw-Hill Edition
10. PHP and MySQL by Example, E.Quigley, Prentice Hall(Pearson).
11. Perl Power, J.RFlynt, Cengage Learning.
12. PHP Programming solutions, V.Vaswani, TMH.
13. Python Web Programming, Steve Holden and David Beazley, New Riders Publications.

COURSE OUTCOMES:

- Ability to understand the differences between scripting languages.
- Ability to apply your knowledge of the weaknesses of scripting languages to select implementation..
- Master an understanding of python especially the object oriented concepts.

ANURAG ENGINEERING COLLEGE
(An Autonomous Institution)

IV Year B.Tech. CSE - I Sem

L	T / P / D	C
3	1	3

(A57045) PROGRAMMING WITH PYTHON
(PROFESSIONAL ELECTIVE - IV)

COURSE OBJECTIVES

- This course introduces core programming basics—including data types, control structures, algorithm development, and program design with functions—via the Python programming language.
- The course discusses the fundamental principles of Object-Oriented Programming, as well as in-depth data and information processing techniques.
- Students will solve problems, explore real-world software development challenges, and create practical and contemporary applications.

UNIT - I
Conceptual introduction: topics in computer science, algorithms; modern computer systems: hardware architecture, data representation in computers, software and operating system; installing Python; basic syntax, interactive shell, editing, saving, and running a script.

UNIT - II
The concept of data types; variables, assignments; immutable variables; numerical types; arithmetic operators and expressions; comments in the program; understanding error messages; Conditions, boolean logic, logical operators; ranges; Control statements: if-else, loops (for, while); short-circuit (lazy) evaluation.

UNIT - III
Strings and text files; manipulating files and directories, os and sys modules; text files: reading/writing text and numbers from/to a file; creating and reading a formatted file (csv or tab-separated).
String manipulations: subscript operator, indexing, slicing a string; strings and number system: converting strings to numbers and vice versa. Binary, octal, hexadecimal numbers.

UNIT - IV
Lists, tuples, and dictionaries: basic list operators, replacing, inserting, removing an element; searching and sorting lists; dictionary literals, adding and removing keys, accessing and replacing values; traversing dictionaries.

UNIT - V
Design with functions: hiding redundancy, complexity; arguments and return values; formal vs actual arguments, named arguments. Program structure and design. Recursive functions

TEXTBOOKS:

1. Fundamentals of Python: First Programs by Kenneth Lambert, Course Technology Publisher, Cengage Learning, 2012 ISBN-13: 978-1-111-82270-5
2. Python cook book by David Beazley and Brian K . Jones O'Reilly, 3rd Edition

REFERENCE BOOKS:

1 Undergraduate Topics in Computer Science .Python Programming
2. Fundamentals by Kent D Lee Second Edition, Springer Publications.

COURSE OUTCOMES:

- Master the Basic Concepts of Python
- Understand Python Scripts on UNIX/Windows, Python Editors and IDEs
- Master the Concepts of Sequences and File operations
- Learn how to use and create functions, sorting different elements, Lambda function, error handling techniques and Regular expressions ans using modules in Python

ANURAG ENGINEERING COLLEGE

(An Autonomous Institution)

IV Year B.Tech. CSE - I Sem

L	T / P / D	C
0	3	2

(A57213) INFORMATION SECURITY LAB

PREREQUISITES :

1. A Course on "Computer Networks"

CO-REQUISITE :

1. A course on "Network Security and Cryptography"

COURSE OBJECTIVES:

- Understand the Security Scanner through NMAP
- Explain the packet analyser.
- Understand different encryption algorithms.
- Implement simple encryption algorithms using C
- Understands brute force attack

Software Requirements:NMAP, WIRESHARK,JCRYPT TOOL.

Week 1

1. Installation of NMAP.

Week 2

2. Implement port scanning with NMAP

Week 3

3. Perform the following using NMAP

.Find ports on a system

.Find active machines

.Find the version of remote OS.

Week 4

4. Installation of Wireshark.

Week 5

5. Perform an experiment to sniff for router traffic by using Wireshark.

Week 6,7

6 .Implement Simple Data Encryption Standard (SDES) Algorithm through C program

Week 8,9

7. ImplementDiffie–Hellman key exchange algorithm through C program.

Week 10

8. Installation of Jcrypt tool

Week 11

9. Implement DES algorithm using Jcrypt tool

Week 12

10. Implement RSA algorithm using Jcrypt tool

Week 13

11. Implement HASH algorithm using Jcrypt tool

Week 14

     12. Implement SHA1 algorithm using Jcrpty tool

Week 15

     13. Implement brute force algorithm in C .

COURSE OUTCOMES:

- Implements port scanning.
- Performs security scanning and network exploration
- Analysis of packet protocols,IP spoofing.
- Implements various encryption algorithms.
- Illustrates PGP and digital signature.

ANURAG ENGINEERING COLLEGE

(An Autonomous Institution)

IV Year B.Tech. CSE - I Sem

L	T / P / D	C
0	3	2

(A57214)UNIX PROGRAMMING LAB

PREREQUISITES:

1. Any programming language, operating systems and a parallel course on unix programming.

CO-REQUISITE :

2. A course on "Unix Programming"

COURSE OBJECTIVES:

- To provide the foundation of Unix programming..
- To understand the Unix utilities.
- Be able to work with Bourne again shell (bash).
- To provide exploration of file concepts.
- To understand the process, role of kernel in process management, signal generation and handling.

1. Write a shell script that accepts a file name, starting and ending numbers as arguments and displays all the lines between the given line numbers.

2. Write a shell script that deletes all lines containing the specified word in one or more files supplied as arguments to it.
   a. To delete first character
   b. Deletes last second character in every line.
   c. First word and second word goes to second word and first word in every line.

3. Write a shell script that displays a list of all files in the current directory to which the user has read,   write and execute permissions.

4. Write a shell script that receives any number of file names as arguments checks if every argument supplied is a file as its arguments, counts and reports the occurrence of each word that is present in the first argument file on other argument files.

5. Write a shell script that accepts a list of file names as its arguments, counts and reports the occurrence of each word that is present in the first argument file on other argument files.

6. Write a shell script to list all of the directory files in a directory.

7. Write a shell script to find factorial of a given number.

8. Implement in C the following Unix commands and System calls.
     a. cat b. ls c. mv.
   a. Implement in C the cat Unix command using system calls
   b. Implement in C the following ls Unix command using system calls
   c. Implement in C the Unix command mv using system calls

9. Write a C program to emulate the Unix ls – l command.

10. Write a C program that takes one or more file or directory names as command line input and reports the following information on the file.
   1. file type
   2. number of links
   3. read, write and execute permissions
   4. time of last access

11. Write a C program that redirects a standard output to a file. Ex: ls>f1.
12. Write a C program to create a child process and allow the parent to display "parent" and the child to display "child" on the screen.
13. Write a C program to create a zombie process.
14. Write a C program that illustrates how an orphan is created.
15. Write a C program that illustrates the following.
    a) Creating a message queue.
    b) Writing to a message queue.
    c) Reading from a message queue.
16. Write a C program that illustrates inter process communication using shared memory system calls.
17. Write a C program that implements a producer-consumer system with two processes.(using semaphores)
18. Write a C program that illustrates file locking using semaphores.
19. Write a C program that counts the number of blanks in a text file using standard I/O
20. Write a C program that illustrates communication between two unrelated processes using named pipe.

COURSE OUTCOMES:

- Will be able to describe and use the LINUX operating system.
- Will be able to describe and use the fundamental LINUX system tools and utilities.
- We will able to describe and write shell scripts in order to perform basic shell programming.
- Will be able to describe and understand the LINUX file system.

ANURAG ENGINEERING COLLEGE
(An Autonomous Institution)

IV Year B.Tech. CSE - II Sem

L	T / P / D	C
4	0	4

(A58025) BIG DATA ANALYTICS
(PROFESSIONAL ELECTIVE – V)

COURSE OBJECTIVES:

- To understand the performance management this interprets the meaning of big data in company databases using pre-determined queries and multidimensional analysis.
- To understand the Data exploration i.e. makes heavy use of statistics to experiment and get answers to questions those managers might not have thought of previously.
- To understand the social analytics measure the vast amount of non-transactional data that exists today.
- To understand the decision science which involves experiments and big data analysis

UNIT - I
INTRODUCTION TO BIG DATA
Introduction –distributed file system –Big Data and its importance, Four Vs, Drivers for Big data, Big data analytics, Big data applications. Algorithms using map reduce

UNIT - II
INTRODUCTION TO HADOOP AND HADOOP ARCHITECTURE
Big Data –Apache Hadoop &Hadoop EcoSystem, Moving Data in and out of Hadoop – Understanding inputs and outputs of MapReduce - Data Serialization

UNIT - III
HDFS, HIVE AND HIVEQL, HBASE HDFS
Overview, Installation and Shell, Java API; Hive Architecture and Installation, Comparison with Traditional Database, HiveQL Querying Data, Sorting And Aggregating, Map Reduce Scripts, Joins & Sub queries, HBase concepts, Advanced Usage, Schema Design, Advance Indexing, PIG, Zookeeper , how it helps in monitoring a cluster, HBase uses Zookeeper and how to Build Applications with Zookeeper.

UNIT - IV
SPARK
Introduction to Data Analysis with Spark, Downloading Spark
and Getting Started, Programming with RDDs, Machine Learning with MLlib.
NoSQL
What is it?, Where It is Used Types of NoSQL databases, Why NoSQL?, Advantages of NoSQL, Use of NoSQL in Industry, SQL vs NoSQL, NewSQL

UNIT – V
Data Base for the Modern Web
Introduction to MongoDB key features, Core Server tools, MongoDB through the JavaScript's Shell, Creating and Querying through Indexes, Document-Oriented, principles of schema design, Constructing queries on Databases, collections and Documents , MongoDB Query Language.

TEXT BOOKS:

1. Boris lublinsky, Kevin t. Smith, AlexeyYakubovich, "Professional Hadoop Solutions", Wiley, ISBN: 9788126551071, 2015.
2. Chris Eaton,Dirk derooset al. , "Understanding Big data ", McGraw Hill, 2012.
3. BIG Data and Analytics , Sima Acharya, Subhashini Chhellappan, Willey
4. MongoDB in Action, Kyle Banker,Piter Bakkum , Shaun Verch, Dream tech Press
5. Tom White , "HADOOP: The definitive Guide", O Reilly 2012.
6. VigneshPrajapati, "Big Data Analyticswith R and Haoop", Packet Publishing 2013.
7. http://www.bigdatauniversity.com/
8. Learning Spark: Lightning Fast Big Data Analysis Paperback by Holden Karau.

REFERENCE BOOKS:

1. Michael Minelli, Michele Chambers, AmbigaDhiraj,JimStogdill, "BigDataBigAnalytics : Emerging Business Intelligence and Analytic Trends for Today's Businesses", 1st Edition,Wiley Publications,2013
2. Chris Eaton, Dirk DeRoos, Tom Deutsch, George Lapis, Paul Zikopoulos, "Understanding Big Data: Analytics for Enterprise Class Hadoop and Streaming Data", McGrawHill Publishing, 2012
3. PeteWarden, "Big Data Glossary", O'Reilly, 2011.

COURSE OUTCOMES:

- Know about sources of BigData and Analyzing Tools.
- Map statistical methods to analyze huge data.
- Know the other frameworks in Distributed File Systems.
- Know to create cluster in Hadoop distributed file system.
- Apply Map Reduction in HDFS.

ANURAG ENGINEERING COLLEGE
(An Autonomous Institution)

IV Year B. Tech. CSE - II Sem

	L	T / P /D	C
	4	0	4

(A58026) DISTRIBUTED SYSTEMS
(PROFESSIONAL ELECTIVE – V)

COURSE OBJECTIVES

- Understand the need for distributed systems and their applications.
- Understand the concepts of remote procedure calls, remote file systems, distributed agreement, clock synchronization, and security.

UNIT - I
Characterization of Distributed Systems-Introduction, Examples of Distributed systems, Resource sharing and web, challenges, System models-Introduction, Architectural and Fundamental models, Networking and Internetworking, Interprocess Communication. Distributed objects and Remote Invocation-Introduction, Communication between distributed objects, RPC, Events and notifications, Case study-Java RMI.

UNIT - II
Operating System Support- Introduction, OS layer, Protection, Processes and Threads, Communication and Invocation, Operating system architecture, Distributed File Systems-Introduction, File Service architecture, case study- SUN network file systems. Name Services-Introduction, Name Services and the Domain Name System, Case study of the Global Name Service, Case study of the X.500 Directory Service.

UNIT - III
Peer to Peer Systems–Introduction, Napster and its legacy, Peer to Peer middleware, Routing overlays, Overlay case studies-Pastry, Tapestry, Application case studies-Squirrel, OceanStore, 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 - IV
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. Replication-Introduction, System model and group communication, Fault tolerant services, Transactions with replicated data..

UNIT - V
Security-Introduction, Overview of Security techniques, Cryptographic algorithms, Digital signatures, Case studies-Kerberos, TLS, 802.11 Wi-Fi. Distributed shared memory, Design and Implementation issues, Sequential consistency and Ivy case study, Release consistency and Munin case study, Other consistency models, CORBA case study-Introduction, CORBA RMI, CORBA Services.

TEXT BOOKS:

1. Distributed Systems Concepts and Design, G Coulouris, J Dollimore and T Kindberg, Fourth Edition, Pearson Education.
2. Distributed Systems, S.Ghosh, Chapman and Hall/CRC, Taylor & Francis Group, 2010.

REFERENCE BOOKS:

1. Distributed Computing, S.Mahajan and S.Shah, Oxford University Press.
2. Distributed Operating Systems Concepts and Design, Pradeep K.Sinha, PHI.
3. Advanced Concepts in Operating Systems, M Singhal, N G Shivarathri, Tata McGraw-Hill Edition.
4. Reliable Distributed Systems, K.P.Birman, Springer.
5. Distributed Systems: Principles and Paradigms, A.S. Tanenbaum and M.V. Steen, Pearson Education.
6. Distributed Operating Systems and Algorithm Analysis,R.Chow, T.Johnson,Pearson.
7. Distributed Operating Systems, A.S.Tanenbaum, Pearson Education

COURSE OUTCOMES

- Able to understand the need of distributed systems and their applications.
- Able to understand peer to peer systems
- Able to understand concurrency
- To Understand the concepts of remote procedure calls, remote file systems, distributed agreement, clock synchronization, and security.

ANURAG ENGINEERING COLLEGE

(An Autonomous Institution)

IV Year B. Tech. CSE - II Sem

L	T / P /D	C
4	0	4

(A58027) OPERATIONS RESEARCH
(PROFESSIONAL ELECTIVE – V)

COURSE OBJECTIVES:

- To learn the importance of Operations Research in the design, planning, scheduling, manufacturing and business applications.
- To use the various techniques of Operations Research in solving such problems.

UNIT - I

Development – definition– characteristics and phases – types of operation research models – applications.

ALLOCATION: Linear programming problem formulation – graphical solution – simplex method – artificial variables techniques -two–phase method, big-M method – duality principle.

UNIT - II

TRANSPORTATION PROBLEM: Formulation – optimal solution, unbalanced transportation problem – degeneracy, assignment problem – formulation – optimal solution - variants of assignment problem- traveling salesman problem.

SEQUENCING – Introduction – flow **–**shop sequencing – n jobs through two machines – n jobs through three machines – job shop sequencing – two jobs through 'm' machines.

UNIT - III

REPLACEMENT: Introduction – replacement of items that deteriorate with time – when money value is not counted and counted – replacement of items that fail completely, group replacement.

UNIT - IV

THEORY OF GAMES: Introduction – mini. max (max. mini) – criterion and optimal strategy – solution of games with saddle points – rectangular games without saddle points – 2 x 2 games – dominance principle – m x 2 & 2 x n games -graphical method.

WAITING LINES: Introduction – single channel – poison arrivals – exponential service times – with infinite population and finite population models– multichannel – poison arrivals – exponential service times with infinite population single channel poison arrivals.

UNIT - V

INVENTORY : Introduction – single item – deterministic models – purchase inventory models with one price break and multiple price breaks – shortages are not allowed – stochastic models – demand may be discrete variable or continuous variable – instantaneous production. Instantaneous demand and continuous demand and no set up cost. ABC & VED Analysis

TEXT BOOKS:
   1. Operations Research / S.D.Sharma-Kedarnath

REFERENCES:
   1. Introduction to O.R/Hiller & Libermann (TMH).

2. Operations Research / A.M.Natarajan, P. Balasubramani, A. Tamilarasi / Pearson Education.
3. Operations Research: Methods & Problems / Maurice Saseini, Arhur Yaspan & Lawrence Friedman.
4. Operations Research / R.Pannerselvam,PHI Publications.
5. Operations Research / Wagner/ PHI Publications.
6. Operation Research /J.K.Sharma/MacMilan.
7. Operations Research/ Pai/ Oxford Publications
8. Operations Research/S Kalavathy / Vikas Publishers
9. Operations Research / DS Cheema/University Science Press
10. Operations Research / Ravindran, Philips, Solberg / Wiley publishers.

COURSE OUTCOMES:

After completion of the course, the student will be able to:
- To solve the LP and DP problems.
- To solve the Transportation,
- Assignment, game,
- Inventory, replacement,
- Sequencing, queuing problems.

ANURAG ENGINEERING COLLEGE
(An Autonomous Institution)

IV Year B. Tech. CSE - II Sem

L	T / P /D	C
3	1	3

(A58028) DESIGN PATTERNS
(PROFESSIONAL ELECTIVE – VI)

COURSE OBJECTIVES:

- To understand that design patterns are standard solutions to common software design problems.
- To be able to use systematic approach that focus and describe abstract systems of interaction between classes, objects, and communication flow

UNIT - I

Introduction : What Is a Design Pattern?, Design Patterns in Smalltalk MVC, Describing Design Patterns, The Catalog of Design Patterns, Organizing the Catalog, How Design Patterns Solve Design Problems, How to Select a Design Pattern, How to Use a Design Pattern.

UNIT - II

A Case Study : Designing a Document Editor : Design Problems, Document Structure, Formatting,
Embellishing the User Interface, Supporting Multiple Look-and-Feel Standards, Supporting Multiple Window Systems, User Operations Spelling Checking and Hyphenation, Summary ..

UNIT - III

Structural Pattern Part-I : Adapter, Bridge, Composite
Structural Pattern Part-II : Decorator, facade, Flyweight, Proxy.

UNIT - IV

Behavioral Patterns Part-I : Chain of Responsibility, Command, Interpreter, Iterator
Behavioral Patterns Part-II : Mediator, Memento, Observer , Strategy, Template Method ,Visitor, Discussion of Behavioral Patterns

UNIT - V

What to Expect from Design Patterns: A Brief H story, The Pattern Community An Invitation, A Parting Thought
A Case Study: Rigs of Rods ("RoR") is an open source multi-simulation game which uses soft-body physics to simulate the motion and deformation of vehicles.

TEXT BOOK:

1. Design Patterns By Erich Gamma, Pearson Education

REFERENCE BOOKS:

1. Pattern's in JAVA Vol-I By Mark Gra d ,Wiley DreamTech.
2. Pattern's in JAVA Vol-II By Mark Gra d ,Wiley DreamTech.
3. JAVA Enterprise Design Patter s Vol-III By Mark Grand ,Wiley DreamTech

COURSE OUTCOMES:

- Have a deeper knowledge of the principles of object- oriented design

ANURAG ENGINEERING COLLEGE

(An Autonomous Institution)

IV Year B. Tech. CSE - II Sem

L	T / P /D	C
3	1	3

(A58029) ARTIFICIAL INTELLIGENCE
(PROFESSIONAL ELECTIVE – VI)

COURSE OBJECTIVES

- To learn the distinction between optimal reasoning Vs. human like reasoning
- To understand the concepts of state space representation, exhaustive search, heuristic search together with the time and space complexities.
- To learn different knowledge representation techniques.
- To understand the applications of AI, namely game playing, theorem proving, expert systems, machine learning and natural language processing

UNIT - I
Introduction:
AI problems, The Underlying Assumption, AI Techniques, The Level of the Model, Criteria for Success

Problems, Problem Spaces and Search: Defining the Problem as a State Space Search, Production Systems, Problem Characteristics, Production System Characteristics, Issues in the Design of Search Programs

Heuristic Search Techniques:
Generate – and – Test, Hill Climbing, Best – First Search, Problem Reduction, Constraint Satisfaction, Means-Ends Analysis.

UNIT - II
Knowledge Representation:
Issues in Knowledge Representation, Representing Simple Facts in Predicate Logic, Representing Instance and ISA Relations, Computable Functions and Predicates, Resolution, Natural Deduction

Representing Knowledge Using Rules: Procedural Vs Declarative Knowledge, Logic Programming, Forward Vs Backward Reasoning, Matching, Control Knowledge

Weak Slot – and – Filler Structures: semantic nets, frames

Strong Slot – and – Filler Structures: conceptual dependency, scripts, CYC

UNIT - III
Reasoning Techniques: Introduction to Non-monotonic reasoning, Logics for Non-monotonic Reasoning, Implementation Issues, Augmenting a Problem Solver, Implementation of Depth First Search and Breadth First Search, Probability and Bayes Theorem, Certainty Factors and Rule-based Systems, Bayesian Networks.

UNIT - IV
Game Playing: Overview, Minimax Search, Alpha – Beta Cutoffs

Planning System: Overview, The Blocks World, Components of a Planning System, Goal Stack Planning, Hierarchical Planning

Understanding: Understanding as constraint satisfaction, Waltz Algorithm

Natural Language Processing: Introduction, Syntactic Processing, Augmented Transition Networks, Semantic Analysis

UNIT - V

Learning: What Is Learning? Rote Learning, Learning by Taking Advice, Learning in Problem Solving, Learning from Examples, Winston's Learning Program, Decision Trees

Expert Systems: Representing and Using Domain Knowledge, Shell, Explanation, Knowledge Acquisition.

TEXT BOOKS:

1. Artificial Intelligence" 3rd Edn. , E.Rich and K.Knight (TMH)

REFERENCE BOOKS:

1. Artificial Intelligence A Modern Approach, Second Edition, Stuart Russell, Peter Norvig, PHI/ Pearson Education.
2. Artificial Intelligence and Expert systems – Patterson PHI

COURSE OUTCOMES:

- Ability to formulate an efficient problem space for a problem expressed in natural language.
- Select a search algorithm for a problem and estimaate its time and space complexities.
- Possess the skill for representing knowledge using the appropriate technique for a given problem
- Possess the ability to apply AI techniques to solve problems of game playing, expert systems, machine learning and natural language processing.

ANURAG ENGINEERING COLLEGE
(An Autonomous Institution)

IV Year B. Tech. CSE - II Sem

L	T / P /D	C
3	1	3

(A58030)MULTIMEDIA COMPUTING
(PROFESSIONAL ELECTIVE – VI)

COURSE OBJECTIVES:

- To understand properties of multimedia & characteristics of data streams.
- To understand basic concepts of sound and audio.
- To know representation of digital image and its applications
- To list out various data compression techniques.

UNIT - I
Introduction - Branch-over lapping Aspects of multimedia , Global structure of multimedia, data streams:medium**,** main properties ofmultimedia system, multimedia, traditional data streams characteristics, data streams characteristics for continuous media

UNIT - II
Sounds /**Audio**:   Basic sound concepts: computer representation of sounds, audio Formats, music: MIDI basic concepts, MIDI devices, MIDI messages, MIDI and SMPTE timing standards , MIDI software, speech: speech generation, speech analysis, speech transmission.

UNIT - III
Image and graphics: basic concepts, digital image representation, image format, graphic format, computer image processing, image synthesis, image analysis, image transmission.

UNIT - IV
Video and animation: Video signal representation, computer video format,   television conventional system, enhanced definition system, high –definition system, transmission
Computer –based animation: Basic concepts, animation languages, method of controlling animation, display of animation, transmission of animation .

UNIT - V
Data compression: storage space, coding requirements, source ,entropy and hymode coding, compression techniques: JPEG,H.261(PX64),MPEG,DVI

TEXT BOOK:

   1. Multimedia: computing, communication and Applications, Ralf steinmetz and klaranahrstedt.

REFERENCE BOOKS

   1. Z.N. Li and M.S. Drew, Fundamentals of Multimedia. Prentice Hall, 2003.
   2. K. Jeffay and H. Zhang, Readings in Multimedia Computing and Networking. Morgan Kaufmann, 2002.

COURSE OUTCOMES:

- Analyze various data streams in multimedia.
- Analyze speech recognition in sound/ audio.
- Edit graphic files using graphics software to improve the images and analysis of image.
- Develop visual effects & rendering effects by using animation.
- Apply data compression techniques & tools in real time applications