G.Pullaiah College of Engineering and Technology
(Autonomous)

(Approved by AICTE | NAAC Accreditation with 'A' Grade | Accredited by NBA (CSE, ECE & EEE) | Permanently Affiliated to JNTUA) Nandikotkur Road, Venkayapalli (V), Kurnool - 518452, Andhra Pradesh

BACHELOR OF TECHNOLOGY

ACADEMIC REGULATIONS
GPCET - R18

B.Tech Regular Four Year Degree Programme
(for the batches admitted from the academic year 2018- 2019)
&
B.Tech (Lateral Entry Scheme)
(for the batches admitted from the academic year 2019 - 2020)

Preliminary Definitions and Nomenclature

AICTE: Means All India Council for Technical Education, New Delhi.

Autonomous Institute: Means an institute designated as Autonomous by University Grants Commission (UGC), New Delhi in concurrence with affiliating University (Jawaharlal Nehru Technological University Ananthapur).

Academic Autonomy: Means freedom to an institute in all aspects of conducting its academic programs, granted by UGC for Promoting Excellence.

Academic Council: The Academic Council is the highest academic body of the institute and is responsible for the maintenance of standards of instruction, education and examination within the institute. Academic Council is an authority as per UGC regulations and it has the right to take decisions on all academic matters including academic research.

Academic Year: It is the period necessary to complete an actual course of study within a year. It comprises two main semesters i.e., (one odd and one even).

Branch: Means specialization in a program like B.Tech degree program in Civil Engineering, B.Tech degree program in Computer Science and Engineering etc.

Board of Studies (BOS):BOS is an authority as defined in UGC regulations, constituted by Head of the Organization for each of the departments separately. They are responsible for curriculum design and updation in respect of all the programs offered by a department.

Backlog Course: A course is considered to be a backlog course, if the student has obtained a failure grade in that course.

Basic Sciences: The courses offered in the areas of Mathematics, Physics, Chemistry etc., are considered to be foundational in nature.

Betterment: Betterment is a way that contributes towards improvement of the students' grade in any course(s).
It can be done by either (a) re-appearing or (b) re-registering for the course.

Commission: Means University Grants Commission (UGC), New Delhi.

Choice Based Credit System: The credit-based semester system is one which provides flexibility in designing curriculum and assigning credits based on the course content and hours of teaching along with provision of choice for the student in the course selection.

Certificate Course: It is a course that makes a student to have hands-on expertise and skills required for holistic development in a specific area/field.

Compulsory course: Course required to be undertaken for the award of the degree as per the program.

Internal Examination: It is an examination conducted towards sessional assessment.

Core: The courses that are essential constituents of each engineering discipline are categorized as professional core courses for that discipline.

Course: A course is a subject offered by a department for learning in a particular semester.

Course Outcomes: The essential skills that need to be acquired by every student through a course.

Credit: A credit is a unit that gives weight to the value, level or time requirements of an academic course. The number of 'Contact Hours' in a week of a particular course determines its credit value. One credit is equivalent to one lecture/tutorial hour per week.

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

Cumulative Grade Point Average (CGPA): It is a measure of cumulative performance of a student overall the completed 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.

Curriculum: Curriculum incorporates the planned interaction of students with instructional content, materials, resources, and processes for evaluating the attainment of Program Educational Objectives.

Department: An academic entity that conducts relevant curricular and co-curricular activities, involving both teaching and non-teaching staff, and other resources in the process of study for a degree.

Detention in a Course: Student who does not obtain minimum prescribed attendance in a course shall be detained in that particular course.

Elective Course: A course that can be chosen from a set of courses. An elective can be Professional Elective and/or Open Elective.

Evaluation: Evaluation is the process of judging the academic performance of the student in her/his courses. It is done through a combination of continuous internal examinations and semester end examinations.

Grade: It is an index of the performance of the students in a said course. Grades are indicated by alphabets.

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

Institute: Means G.Pullaiah College of Engineering and Technology, Kurnool unless indicated otherwise by the context.

Massive Open Online Courses (MOOC): MOOC courses inculcate the habit of self-learning. MOOC courses would be additional choices in all the elective group courses.

Minor: Minor are coherent sequences of courses which may be taken in addition to the courses required for the B.Tech degree.

Pre-requisite: A specific course or subject, the knowledge of which is required to complete before student register another course at the next grade level.

Professional Elective: It indicates a course that is discipline centric. An appropriate choice of minimum number of such electives as specified in the program will lead to a degree with specialization.

Program: Means, UG degree program: Bachelor of Technology (B.Tech); PG degree program: Master of Technology (M.Tech) / Master of Business Administration (MBA).

Program Educational Objectives: The broad career, professional and personal goals that every student will achieve through a strategic and sequential action plan.

Project work: It is a design or research-based work to be taken up by a student during his/her final year to achieve a particular aim. It is a credit-based course and is to be planned carefully by the student.

Registration: Process of enrolling into a set of courses in a semester of a program.

Regulations: The regulations, common to all B.Tech programs offered by Institute, are designated as "GPCET Regulations - R18" and are binding on all the stakeholders.

Semester: It is a period of study consisting of 16 to 18 weeks of academic work equivalent to normally90 working days. Odd semester commences usually in July and even semester in December of every year.

Semester End Examinations: It is an examination conducted for all courses offered in a semester at the end of the semester.

Student Outcomes: The essential skill sets that need to be acquired by every student during her/his program of study. These skill sets are in the areas of employability, entrepreneurial, social and behavioural.

University: Means Jawaharlal Nehru Technological University Ananthapur (JNTUA), Ananthapuramu.

G.Pullaiah College of Engineering and Technology
(Autonomous)
Academic Regulations
Regulations for Four Year Bachelor of Technology (B.Tech) Degree programme for the batches admitted from the academic year 2018-19
&
For B.Tech Lateral Entry batches admitted from the academic year 2019 - 2020

1. Award of B.Tech. Degree

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

i. Pursues a course of study for not less than four academic years and in not more than eight academic years. However, for the students availing Gap year facility this period shall be extended by two years at the most and these two years would not be counted in the maximum time permitted for graduation.

ii. Registers for 176 credits and secures all 176 credits.

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

3. Courses of study

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

S.No.	Name of the Branch	Branch Code
1.	Civil Engineering	01
2.	Electrical and Electronics Engineering	02
3.	Mechanical Engineering	03
4.	Electronics and Communication Engineering	04
5.	Computer Science and Engineering	05

4. Credits:

i. *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 two hours of practical work/field work per week.
ii. *Academic Year:* Two consecutive (one odd + one even) semesters constitute one academic year.
iii. *Choice Based Credit System (CBCS):* The CBCS provides choice for students to select from the prescribed courses.
iv. Each course is assigned certain number of credits based on following

	Semester	
	Periods / Week	Credits
Theory	03	03
Practical	04	02
Mini Project/Internship	04	02
Technical Seminar	04	02
Project Work	04/16	02/08

5. Distribution and Weightage of Marks

5.1 The performance of a student in each semester shall be evaluated subject wise with a maximum of 100 marks for theory and 100 marks for practical subject. In addition, Technical Seminar will be evaluated for 100

marks and Project work Phase-I shall be evaluated for a maximum of 100 internal marks and Project work Phase-II shall be evaluated for 200 marks whereas audit courses shall be evaluated for a maximum of 100 internal marks.

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

5.2. Internal Examinations:

i. For theory subjects, during the semester, there shall be two midterm examinations. Each midterm examination consists of subjective paper for 30 marks with duration of 1hour 50 minutes which will be condensed to 20 marks. The remaining 10 marks will be awarded based on the submission of assignments by the students. A student has to submit two assignments in every subject each for 10 marks.

Subjective paper shall contain two parts –Part-A and Part-B. Part-A is compulsory and shall contain 12 questions each for 0.5 marks. Part-B shall contain 5 questions out of which the student needs to answer 3 questions each for 8 marks. The descriptive questions carrying 8 marks may contain either or questions also.

***Note 1: T**he marks obtained in the subjective paper shall be condensed to 20 marks, any fraction (0.5 & above) shall be rounded off to the next higher mark.

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

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

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

5.3. End Examinations:

End examination of theory subjects shall have the following pattern:

There shall be 6 questions and all questions are compulsory. Question I shall contain 10 compulsory short answer questions for a total of 20 marks such that each question carries 2 marks. There shall be 2 short answer questions from each unit. In each of the questions from 2 to 6, there shall be either/or type questions of 10 marks each. Student shall answer any one of them. Each of these questions from 2 to 6 shall cover one unit of the syllabus.

End examination of theory subjects consisting of two parts of different subjects, for eg: Electrical & Mechanical Technology, shall have the following pattern:

Question paper shall be in two parts viz., Part A and Part B with equal Weightage. In each part, there shall be 3 either-or type questions for 12, 12 and 11 marks.

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

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

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

5.5. There shall be an audit pass courses; one is Human Values & Professional Ethics and the other is Advanced English Language Communication skills course with no credits. There shall be no external examination. However, attendance in the audit course shall be considered while calculating aggregate attendance and student shall be declared pass in the audit course only when he/she secures 40% or more in the internal examinations. In case if student fails, re-exam shall be conducted for failed candidates every six months/semester at a convenient date of student satisfying the conditions mentioned in item 1 & 2 of the regulations.

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

Day-to-day work shall be evaluated for 10 marks by the concerned subject teacher based on the reports/submissions prepared in the class. And there shall be two midterm examinations in a semester for duration of 2 hours each for 30 marks with consideration of 80% weightage to the better mid exam and 20% to the other for the finalization of Internal marks. The subjective paper shall contain 5 questions of equal weightage of 10 marks and the marks obtained for 3 questions shall be condensed to 20 marks, any fraction (0.5 & above) shall be rounded off to the next higher mark. There shall be no objective paper in internal examination. The sum of day to day evaluation and the internal test marks will be the final sessional marks for the subject.

In the end examination pattern for Engineering Drawing there shall be 5 questions, either/or type, of 14 marks each. There shall be no objective type questions in the end examination. However, the end examination pattern for other subjects related to design/drawing is mentioned along with the syllabus.

5.7 There shall be two comprehensive online examinations, one at the end of II year and the other at the end of III year, with 100 objective questions for 100 marks on the subjects studied in the respective semesters. For each subject at least eight questions are to be framed. A student shall acquire 1 credit assigned to each of the comprehensive online examination when he/she secures 40% or more marks. In case, if a student fails in comprehensive online examination, he/she shall reappear/re-register by following a similar procedure adopted for the lab examinations.

5.8 There shall be a Discipline Centric Elective Course through **Massive Open Online Course (MOOC)** in VIII semester. The Head of the Department shall appoint one mentor for each of the MOOC subjects offered and the mentor appointed shall conduct the internal examinations following the guidelines. Further, the College shall conduct the external examination for the MOOC subject in line with other regular subjects (5.3) based on the syllabi of the respective subject provided in the curriculum.

5.9 There shall be an Open Elective/**Choice Based Credit Course (CBCC)** in V and VII semester, where in the students have to choose an elective offered by various departments including his/her own department.

5.10 **Minor in a discipline** (Minor degree/programme) concept is introduced in the curriculum for all conventional B. Tech programmes in which it offers a major. The main objective of Minor in a discipline is to provide additional learning opportunities for academically motivated students and it is an optional feature of the B. Tech. programme. In order to earn a Minor in a discipline a student has to earn 20 extra credits by studying four theory subjects and a minor discipline project.

a. Students who have a CGPA 8.5 (for SC/ST students CGPA 8.0) or above (up to II year-I semester) and without any backlog subjects will be permitted to register for Minor discipline programme. An SGPA

and CGPA of 8.0 has to be maintained in the subsequent semesters without any backlog subjects in order to keep the Minor discipline registration active else Minor discipline registration will be cancelled.

b. Students aspiring for a Minor must register from **third** year **first** semester onwards and must opt for a Minor in a discipline other than the discipline he/she is registered in. However, Minor discipline registrations are not allowed in the **Fourth** year.

c. Students are not allowed to register and pursue more than two subjects in any semester. Students may register for minor discipline project from **third** year **first** semester onwards and may complete the same before **fourth** year **second** semester.

d. Each department enlisted a set of subjects from its curriculum which are core for the discipline without any prerequisites. The Evaluation pattern of theory subjects and minor discipline project work will be similar to the regular programme evaluation. The minor discipline project shall be evaluated by the committee consisting of Head of the Department along with the two senior faculty members of the department.

e. Students are not allowed to pursue minor discipline programme subjects under Self-study and/or MOOCs manner.

f. Student may enlist their choices of Minor discipline programmes in order of preference, to which they wish to join. It will not be permissible to alter the choices after the application has been submitted. However, students are allowed to opt for only one Minor discipline programme in the order of preference given by the student.

g. Minimum strength for offering Minor in a discipline is considered as One-Fifth (i.e., 20% of the class) of the class size and Maximum size would be Four-Fifth of Class size (i.e., 80% of the class).

h. Completion of a Minor discipline programme requires no addition of time to the regular Fouryear Bachelors' programme. That is, Minor discipline programme should be completed by the end of final year B. Tech. program along with the major discipline.

i. The Concerned Head of the department will arrange separate course/class work and time table of the various Minor programmes. Attendance regulations for these Minor discipline programmes will be as per regular courses.

j. A Student registered for Minor in a discipline and pass in all subjects that constitute the requirement for the Minor discipline programme. No class/division (i.e., second class, fist class and distinction etc.) shall be awarded for Minor discipline programme.

k. This Minor in a discipline will be mentioned in the degree certificate as Bachelor of Technology in XXX with Minor in YYY. For example, Bachelor of Technology in **Computer Science & Engineering** with Minor in **Electronics & Communication Engineering**. The fact will also be reflected in the transcripts, along with the list of courses and a project taken for Minor programme with CGPA mentioned separately.

5.11 An **Internship/Mini Project** is introduced for 2 credits in the curriculum. The students need to take up the Internship during the break of end of VI Semester for a period of four weeks. The students who have not taken up the Internship may take up the Mini Project during the VII semester. The student who has taken up Internship shall submit a technical report along with internship certificate from the Internship organization in order to obtain the 2 credits. The organization in which the student wishes to carry out Internship need to be approved by Internal Department Committee comprising of Head of Department and 2 senior faculty. The evaluation of Mini Project shall be conducted at the end of the VII semester. The Internal Evaluation shall be made by the departmental committee (Head of the Department, two senior faculty members of the department and Supervisor), on the basis of project submitted by the student.

B. Tech **Civil Engineering** students need to take up the Mini project on Water Resource Engineering during the break of end of VI Semester for a period of four weeks for 2 credits. This shall be evaluated at the end of VII Semester by a committee consisting of Head of Civil Engineering Department along with two senior faculty members of the department.

5.12 There shall be a **Technical Seminar** presentation in IV year II Semester. For the seminar, the student shall collect the information on a specialized topic and prepare a technical report, showing his/her understanding about the topic and submit to the department before presentation. The report and the presentation shall be evaluated by the departmental committee consisting of Head of the Department, seminar supervisor and a senior faculty member. The seminar shall be evaluated for 50 marks. A student shall acquire 2 credits assigned to the seminar when he/she secures 40% or more marks for the total of 50 marks. In case, if a student fails in seminar he/she shall reappear as and when IV/II supplementary examinations are conducted. The seminar shall be conducted

anytime during the semester as per the convenience of the department committee and students. There shall be no external examination for seminar.

5.13 The **Project Work** shall be evaluated in 2 phases. The Phase-1 of the Project Work shall start in IV-I. There shall be a presentation of Abstract of the main project in the VII Semester. After selecting the specific topic, the student shall collect the information and prepare a report, showing his/her understanding of the topic and submit the same to the department before presentation. The report and the presentation shall be evaluated by the departmental committee consisting of Head of the Department, Project supervisor and a senior faculty member. The evaluation of project work phase-I shall be conducted at the end of the VII semester on the internal evaluation basis for 100 marks. A student shall acquire 2 credits assigned, when he/she secures 40% or more marks for the total of 100 marks. There shall be no external evaluation for Project I. In case, if a student fails in Project I, re- examination shall be conducted within a month. In case if he/she fails in the re- examination also, he/she shall not be permitted to register for Project II. Further, such students shall reappear as and when VII semester supplementary examinations are conducted.

Procedure for Conduct and Evaluation of Project II:

Out of a total of 200 marks for the Project stage - II, 60 marks shall be for Internal Evaluation and 140 marks for the End Semester Examination (Viva-voce). The Viva-Voce shall be conducted by a committee consisting of HOD, Project Supervisor and an External Examiner. The evaluation of project work shall be conducted at the end of the VIII semester. The Internal Evaluation shall be made by the departmental committee (Head of the Department, two senior faculty members of the department and Supervisor), on the basis of two seminars given by each student on the topic of his/her project.

Further Civil Engineering Students need to carry out a survey camp during the break after IV Semester for a period of 2 weeks for 2 credits. The evaluation will be carried out in VIII Semester by the Departmental Committee consisting of head of Department and two senior faculty members.

6. Attendance Requirements:

- A student shall be eligible to appear for University examinations if he/she acquires a minimum of 75% of attendance in aggregate of all the subjects in a semester.
- Condonation of shortage of attendance in aggregate up to 10% (65% and above and below 75%) in each semester may be granted by the College Academic Committee.
- Shortage of Attendance below 65% in aggregate shall in NO case be condoned.
- Students whose shortage of attendance is not condoned in any semester are not eligible to take their end examination of that class and their registration shall stand cancelled.
- A student will not be promoted to the next semester unless he satisfies the attendance requirements of the present semester. They may seek readmission for that semester when offered next.

7. Minimum Academic Requirements:

The following academic requirements have to be satisfied in addition to the attendance requirements mentioned in item no.**6**

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

7.2 A student shall be promoted from II to III year only if he/she fulfils the academic requirement of securing 40% of the credits in the subjects that have been studied up to II year I semester from the following examinations, irrespective of whether the candidate takes the end examination or not as per the normal course of study.

One regular and one supplementary examinations of I year (I & II Semesters).

One regular examination of II year I semester

7.3 A student shall be promoted from III year to IV year only if he/she fulfils the academic requirements of securing 40% of the credits in the subjects that have been studied up to III year I semester from the following examinations, irrespective of whether the candidate takes the end examination or not as per the normal course of study.

One regular and four supplementary examinations of I year I Semester.
One regular and three supplementary examinations of I year II Semester.
One regular and two supplementary examinations of II year I Semester.
One regular and one supplementary examinations of II year II Semester.
One regular examination of III year I Semester.

And in case if student is detained for want of credits for particular academic year by sections 7.2 and 7.3 above, the student may make up the credits through supplementary examinations and only after securing the required credits he/she shall be permitted to join in the III Year or IV Year as the case may be.

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

7.5 Students who fail to earn 176 credits as indicated in the course structure within eight academic years from the year of their admission shall forfeit their seat in B.Tech. course and their admission shall stand cancelled.

8. Course Pattern:

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

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

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

8.3 **With–holding of Results**:

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

8.4 Grading

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

Table – Conversion into Grades and Grade Points assigned

Range in which the marks in the subject fall	Grade	Grade points Assigned
≥ 90	S (Superior)	10
80-89	A (Excellent)	9
70-79	B (Very Good)	8
60-69	C (Good)	7
50-59	D (Average)	6
40-49	E (Below Average)	4
< 40	F (Fail)	0
Absent	Ab (Absent)	0

A student obtaining Grade F shall be considered failed and will be required to reappear for that subject when the next supplementary examination offered. Same is the case with a student who obtains 'Ab' in end examination.

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

9. Semester Grade Point Average (SGPA) and Cumulative Grade Point Average (CGPA):

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

$$\text{SGPA} = \frac{\sum_{i=1}^{n} C_i \times GP_i}{\sum_{i=1}^{n} C_i}$$

where, C_i is the number of credits of the i^{th} subject and GP_i is the grade point scored by the student in the i^{th} course.

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

$$\text{CGPA} = \frac{\sum_{j=1}^{m} SGPA_j \times TC_j}{\sum_{j=1}^{m} TC_j}$$

where "$SGPA_j$" is the SGPA of the j^{th} semester and TC_j is the total number of credits in that semester.

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

iv. While computing the SGPA the subjects in which the student is awarded Zero grade points will also be included.

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

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

10. Award of Class:

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

Class Awarded	CGPA Secured
First Class with Distinction	≥ 7.5
First Class	≥ 6.5 < 7.5
Second Class	≥ 5.5 < 6.5
Pass Class	≥ 4.0 < 5.5

11. Gap Year:

Gap year concept of Student Entrepreneur in Residence shall be introduced and outstanding students who wish to pursue entrepreneurship are allowed to take a break of one year at any time after II year to pursue entrepreneurship full time. This period may be extended to two years at the most and these two years would not be counted for the time for the maximum time for graduation. An evaluation committee shall be constituted by the College to evaluate the proposal submitted by the student and the committee shall decide whether or not to permit the student(s) to avail the Gap Year.

12. Transitory Regulations:

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

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

13. Minimum Instruction Days:

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

14. Medium of Instruction

The Medium of Instruction is **English** for all courses, laboratories, internal and external examinations, Comprehensive Viva-Voce, seminar presentations and project reports.

15. Rules of Discipline

(i) Use of mobile phones with camera, in the campus is strictly prohibited.

(ii) Students shall behave and conduct themselves in a dignified and courteous manner in the campus/Hostels.

(iii) Students shall not bring outsiders to the institution or hostels.

(iv) Students shall not steal, deface, damage or cause any loss to the institution property.

(v) Students shall not collect money either by request or coercion from others within the campus or hostels.

(vi) Students shall not resort to plagiarism of any nature/extent. Use of material, ideas, figures, code or data without appropriate acknowledgement or permission of the original source shall be treated as cases of plagiarism. Submission of material, verbatim or paraphrased, that is authored by another person or published earlier by oneself shall also be considered as cases of plagiarism.

(vii) Use of vehicles by the students inside the campus is prohibited.

(viii) Any conduct which leads to lowering of the esteem of the organization is prohibited.

(ix) Any student exhibiting prohibited behaviour shall be suspended from the institute. The period of suspension and punishment shall be clearly communicated to the student. The student shall lose the attendance for the suspended period

(x) Dress Code

Boys: All the boy students should wear formal dresses. Wearing T-shirts and other informal dresses in the campus is strictly prohibited.

Girls: All the girls students shall wear saree/chudidhar with dupatta

16. Punishments for Malpractice cases – Guidelines

The examinations committee may take the following guidelines into consideration while dealing with the suspected cases of malpractice reported by the invigilators/squad members etc; during end examinations. The punishment may be more severe or less severe depending on the merits of the individual cases.

S.No.	**Nature of Malpractice/Improper conduct**	**Punishment**
1	Possesses or keeps accessible in examination hall, any paper, note book, programmable calculators, Cellphones, pager, palm computers or any other form of material concerned with or related to the course 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 student which can be used as an aid in the course of the examination).	Expulsion from the examination hall and cancellation of the performance in that course only.
2	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.
3	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/year examinations.
4	Gives assistance or guidance or receives it from any other student orally or by any other body language methods or communicates through cell phones with any other student 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 students involved. In case of an outsider, he will be handed over to the police and a case shall be registered against him.
5	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 student is appearing.	Expulsion from the examination hall and cancellation of the performance in that course and all other courses including practical examinations and project work of that semester/year.
6	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 including practical examinations and project work of that semester/year.
7	Smuggles in the Answer book or takes out or arranges to send out the question paper during the examination or answer book during or after the examination	Expulsion from the examination hall and cancellation of performance in that course and all the other courses including practical examinations and project work of that semester/year. The student is also debarred for two consecutive semesters from class work and all examinations. The continuation of the course by the student is subject to the academic regulations in connection with forfeit of seat.
8	Refuses to obey the orders of the Chief	In case of students of the college, they

	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.	shall be expelled from examination halls and cancellation of their performance in that course and all other courses of that semester/year. The students also are debarred and forfeit their seats. In case of outsiders, they will be handed over to the police and a police case shall be registered against them.
9	Leaves the exam hall taking away answer script or intentionally tears up the script or any part there of inside or outside the examination hall.	Expulsion from the examination hall and cancellation of performance in that course and all the other courses including practical examinations and project work of that semester/year. The candidate is also debarred for two consecutive semesters from classwork and all end examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.
10	Possesses 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 including practical examinations and project work of that semester/year. The student is also debarred and forfeits the seat.
11	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 S.No7 to S.No 9.	For Student of the college: Expulsion from the examination hall and cancellation of the performance in that course and all other courses including practical examinations and project work of that semester/year. The candidate is also debarred and forfeits the seat. Person(s) who do not belong to the College will be handed over to police and, a police case shall be registered against them.
12	Impersonates any other student in connection with the examination	The student who has impersonated shall be expelled from examination hall. The student is debarred from writing the remaining exams, and rusticated from the college for one academic year during which period the student will not be permitted to write any exam. If the imposter is an outsider, he will be handed over to the police and a case shall be registered against him. The performance of the original student who has been impersonated, shall be cancelled in all the courses of the examination including practicals and project work of that semester/year. The student is rusticated from the college for two consecutive years during which period

		the student will not be permitted to write any exam. The continuation of the course by the student is subject to the academic regulations in connection with forfeiture of seat.
13	If any malpractice is detected which is not covered in the above S.No 1 to S.No 12 items, it shall be reported to the college academic council for further action and award suitable punishment.	
14	Malpractice cases identified during sessional examinations will be reported to the examination committee nominated by Academic council to award suitable punishment.	

ACADEMIC REGULATIONS FOR B. TECH.(R15)
(LATERAL ENTRY SCHEME)

(Effective for the students getting admitted into II year through Lateral Entry Scheme from the Academic Year 2019-2020 and onwards)

1. Award of B.Tech. Degree

A student admitted in Lateral Entry Scheme (LES) will be declared eligible for the award of the B.Tech degree if he fulfills the following academic regulations:

a) Pursues a course of study for not less than three academic years and in not more than six academic years.

b) Registers for *134* credits and secures all *134* credits from II to IV year of Regular B. Tech. program.

(a) Students, who fail to fulfill the requirement for the award of the degree in six consecutive academic years from the year of admission, shall forfeit their seat.

(b) The regulations **3** to **6** are to be adopted as that of B. Tech. (Regular).

2. Minimum Academic Requirements:

The following academic requirements have to be satisfied in addition to the attendance requirements mentioned in item no.**6**

i. A student shall be deemed to have satisfied the minimum academic requirements and earned the credits allotted to each theory, practical, design, drawing subject or project if he secures not less than 35% of marks in the end examination and a minimum of 40% of marks in the sum total of the internal evaluation and end examination taken together. For the Seminar & Comprehensive viva-voce he should secure 40% in the internal evaluation.

ii. A student shall be promoted from third year to fourth year only if he fulfills the academic requirements of *40%* credits obtained till III-I from the following examinations, irrespective of whether the candidate takes the end examination or not as per the normal course of study.

a. One regular and Two supplementary examinations of II year I semester.
b. One regular and one supplementary examinations of II year II semester.
c. One regular examination of III year I semester.

And in case if student is already detained for want of credits for particular academic year , the student may make up the credits through supplementary exams of the above exams before the commencement of IV year I semester class work of next year.

3. Course Pattern

- The entire course of study is three academic years on semester pattern.
- A student eligible to appear for the end examination in a subject, but absent at it or has failed in the end examination may appear for that subject at the next supplementary examination offered.
- When a student is detained due to lack of credits/shortage of attendance he may be re-admitted when the semester is offered after fulfillment of academic regulations, he shall be in the academic regulations into which he is readmitted.

4. The regulations **9** to **10** are to be adopted as that of B. Tech. (Regular).

5. Award of Class:

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

First Class with Distinction	70% and above	From the aggregate marks secured for 134 Credits (i.e. II year to IV year)
First Class	Below 70% but not less than 60%	
Second Class	Below 60% but not less than 50%	
Pass Class	Below 50% but not less than 40%	

6. The regulations **11** to **16** are to be adopted as that of B. Tech. (Regular). All other regulations as applicable for B. Tech. Four-year degree course (Regular) will hold good for B. Tech. (Lateral Entry Scheme).

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G. PULLAIAH COLLEGE OF ENGINEERING AND TECHNOLOGY, KURNOOL

(An Autonomous Institute affiliated to JNTUA, Ananthapuramu)

NAAC Accreditation with 'A' Grade, Permanent Affiliation Status from JNTUA

Pasupula Village, Nandikotkur Road, Kurnool – 518002, Andhra Pradesh, India,

www.gpcet.ac.in

CURRICULUM FRAMEWORK

UG- BACHELOR OF TECHNOLOGY

COMPUTER SCIENCE AND ENGINEERING

Under R18 Regulations

B. Tech. - Regular Four-Year Degree Program

(For batches admitted from the Academic Year 2018 - 2019)

&

B. Tech. - Lateral Entry Scheme

(For batches admitted from the Academic Year 2019 - 2020)

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G.PULLAIAH COLLEGE OF ENGINEERING AND TECHNOLOGY, KURNOOL

(An Autonomous Institute affiliated to JNTUA, Ananthapuramu)

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

PROGRMME CURRICULUM STRUCTURE UNDER R18 REGULATIONS

B. TECH – COMPUTER SCIENCE AND ENGINEERING

I SEMESTER (I YEAR)

Code	Course	Category	Periods per Week			Credits	Scheme of Examination Maximum Marks		
			L	T	P	C	Internal	External	Total
A1001	Functional English	HS	3	0	0	3	30	70	100
A1002	Mathematics – I	BS	3	0	0	3	30	70	100
A1501	Computer Programming	ES	3	0	0	3	30	70	100
A1003	Engineering Physics	BS	3	0	0	3	30	70	100
A1301	Engineering Drawing	ES	0	0	6	3	30	70	100
A1006	English Language Communication Skills Laboratory	HS	0	0	4	2	30	70	100
A1007	Engineering Physics Laboratory	BS	0	0	4	2	30	70	100
A1502	Computer Programming Laboratory	ES	0	0	4	2	30	70	100
	TOTAL		12	00	18	21	240	560	800

II SEMESTER (I YEAR)

Code	Course	Category	Periods per Week			Credits	Scheme of Examination Maximum Marks		
			L	T	P	C	Internal	External	Total
A1008	English for Professional Communication	HS	3	0	0	3	30	70	100
A1009	Mathematics – II	BS	3	0	0	3	30	70	100
A1503	Data Structures	ES	3	0	0	3	30	70	100
A1004	Engineering Chemistry	BS	3	0	0	3	30	70	100
A1005	Environmental Studies	BS	3	0	0	3	30	70	100
A1504	Data Structures Laboratory	ES	0	0	4	2	30	70	100
A1010	Engineering Chemistry Laboratory	BS	0	0	4	2	30	70	100
A1302	Engineering and IT Workshop	ES	0	0	4	2	30	70	100
	TOTAL		15	0	12	21	240	560	800

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PROGRMME CURRICULUM STRUCTURE UNDER R18 REGULATIONS

B. TECH – COMPUTER SCIENCE AND ENGINEERING

III SEMESTER (II YEAR)

Code	Course	Category	Periods per Week			Credits	Scheme of Examination Maximum Marks		
			L	T	P	C	Internal	External	Total
A1505	Object Oriented programming through Java	PC	3	1	0	4	30	70	100
A1506	Database Management System	PC	3	1	0	4	30	70	100
A1507	Discrete Mathematics	PC	4	0	0	4	30	70	100
A1416	Digital Logic and Computer Organization	ES	4	0	0	4	30	70	100
A1701	Managerial Economics and Financial Analysis	HS	3	0	0	3	30	70	100
A1508	Database Management System Laboratory	PC	0	0	3	1.5	30	70	100
A1509	Object Oriented Programming Laboratory using Java	PC	0	0	3	1.5	30	70	100
A1417	Digital Electronics Laboratory	ES	0	0	2	1	30	70	100
A1012	Quantitative Aptitude	BS	1	0	0	1	30	70	100
	TOTAL		18	02	08	24	270	630	900

IV SEMESTER (II YEAR)

Code	Course	Category	Periods per Week			Credits	Scheme of Examination Maximum Marks		
			L	T	P	C	Internal	External	Total
A1017	Probability and Statistics	BS	3	1	0	4	30	70	100
A1510	Software Engineering	PC	3	1	0	4	30	70	100
A1511	Operating Systems	PC	3	0	0	3	30	70	100
A1512	Design and Analysis ofAlgorithms	PC	4	0	0	4	30	70	100
A1513	Formal Languages and Automata Theory	PC	3	0	0	3	30	70	100
A1514	R Programming Laboratory	PC	0	0	3	1.5	30	70	100
A1515	Design and AlgorithmLaboratory	PC	0	0	2	1	30	70	100
A1516	Web Programming Laboratory	PC	0	0	3	1.5	30	70	100
A1013	Verbal Ability and LogicalReasoning	HS	1	0	0	1	30	70	100
A1517	Comprehensive Online Examination-I	PC	0	0	0	1	-	100	100
	TOTAL		17	02	08	24	270	730	1000

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PROGRMME CURRICULUM STRUCTURE UNDER R18 REGULATIONS

B. TECH – COMPUTER SCIENCE AND ENGINEERING

V SEMESTER (III YEAR)

Code	Course	Category	Periods per Week			Credits	Scheme of Examination Maximum Marks		
			L	T	P	C	Internal	External	Total
A1518	Computer Networks	PC	3	1	0	4	30	70	100
A1519	Data Mining	PC	4	0	0	4	30	70	100
A1520	Compiler Design	PC	4	0	0	4	30	70	100
	Professional Elective-1	PE	3	0	0	3	30	70	100
	Open Elective – 1	OE	3	0	0	3	30	70	100
A1521	Computer Networks Laboratory	PC	0	0	3	1.5	30	70	100
A1522	Data Mining Laboratory	PC	0	0	3	1.5	30	70	100
A1523	Python Programming Laboratory	PC	0	0	4	2	30	70	100
A1015	Human Values and Professional Ethics	MC	2	0	0	0	100*	-	100*
	TOTAL		19	01	10	23	240	560	800

VI SEMESTER (III YEAR)

Code	Course	Category	Periods per Week			Credits	Scheme of Examination Maximum Marks		
			L	T	P	C	Internal	External	Total
A1524	Cloud Computing	PC	3	1	0	4	30	70	100
A1525	Software Testing Techniques	PC	3	0	0	3	30	70	100
A1526	Artificial Intelligence	PC	3	1	0	4	30	70	100
	Professional Elective – 2	PE	3	0	0	3	30	70	100
	Professional Elective – 3	PE	3	0	0	3	30	70	100
A1527	Software Testing Laboratory	PC	0	0	3	1.5	30	70	100
A1528	Artificial Intelligence Laboratory	PC	0	0	3	1.5	30	70	100
A1529	Cloud Computing Laboratory	PC	0	0	4	2	30	70	100
A1530	Comprehensive Online Examination-II	PC	0	0	0	1	-	100	100
A1016	Advanced English Language Communication Skills	MC	2	0	0	0	100*	-	100*
	TOTAL		17	02	10	23	240	660	900

* The marks for Audit Courses/Mandatory Courses are not considered for calculating SGPA

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PROGRMME CURRICULUM STRUCTURE UNDER R18 REGULATIONS

B. TECH – COMPUTER SCIENCE AND ENGINEERING

VII SEMESTER (IV YEAR)									
Code	Course	Category	Periods per Week			Credits	Scheme of Examination Maximum Marks		
			L	T	P	C	Internal	External	Total
A1531	Cryptography and Network Security	PC	3	1	0	4	30	70	100
A1532	Mobile Application Development	PC	3	1	0	4	30	70	100
A1533	Machine learning	PC	3	0	0	3	30	70	100
	Professional Elective – 4	PE	3	0	0	3	30	70	100
	Open Elective – 2	OE	3	0	0	3	30	70	100
A1534	Mobile Application Development Laboratory	PC	0	0	3	1.5	30	70	100
A1535	Machine Learning Laboratory	PC	0	0	3	1.5	30	70	100
A1536	Mini-Project/Internship	PW	0	0	4	2	100	-	100
A1537	Project Work Phase-I	PW	0	0	4	2	100		100
		TOTAL	15	02	14	24	410	490	900

VIII SEMESTER (IV YEAR)									
Code	Course	Category	Periods per Week			Credits	Scheme of Examination Maximum Marks		
			L	T	P	C	Internal	External	Total
	MOOCs Course/ Professional Elective-5	PE	3	0	0	3	30	70	100
	Open Elective – 3	OE	3	0	0	3	30	70	100
A1538	Technical Seminar	PW	0	0	4	2	100	-	100
A1539	Project Work Phase-II	PW	0	0	16	8	60	140	200
		TOTAL	06	00	20	16	220	280	500

Professional Electives

Professional Elective – 1	
Course Code	**Title of the Course**
A1551	Distributed Databases
A1552	Enterprise storage Systems
A1553	TCP/IP Protocol
A1554	Angular

Professional Elective – 2	
Course Code	**Title of the Course**
A1555	Big Data
A1556	Parallel Algorithms
A1557	Networking architecture and design
A1558	Design Patterns

Professional Elective – 3	
Course Code	**Title of the Course**
A1559	Data Analytics
A1560	Cloud Cryptography
A1561	Ethical Hacking
A1562	DevOps

Professional Elective – 4	
Course Code	**Title of the Course**
A1563	Data Visualization Networks
A1564	Software Defined Networks
A1565	Natural Language Processing
A1566	Solution Stack

Professional Elective – 5/MOOCs	
Course Code	**Title of the Course**
A1567	Deep Learning
A1568	Block Chain Technology
A1569	Cyber Security
A1570	User Interface Design

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PROGRMME CURRICULUM STRUCTURE UNDER R18 REGULATIONS

B. TECH – COMPUTER SCIENCE AND ENGINEERING

Open Electives

Course Code	Title of the Course	L-T-P	Credits	Offered by
A1181	Basic Civil Engineering	3-0-0	3	CE
A1182	Building Planning and Construction	3-0-0	3	CE
A1183	Disaster Management	3-0-0	3	CE
A1184	Water Resources Conservation	3-0-0	3	CE
A1281	Fundamentals of Electrical Engineering	3-0-0	3	EEE
A1282	Renewable Energy Sources	3-0-0	3	EEE
A1283	Electrical Measuring Instruments	3-0-0	3	EEE
A1381	Optimization Techniques	3-0-0	3	ME
A1382	Mechanical Technology	3-0-0	3	ME
A1383	Introduction to Automobile Systems	3-0-0	3	ME
A1481	Basic Electronics	3-0-0	3	ECE
A1482	Introduction to Communication Systems	3-0-0	3	ECE
A1483	Fundamentals of IoT	3-0-0	3	ECE
A1581	Basic Data Structures	3-0-0	3	CSE
A1582	Fundamentals of DBMS	3-0-0	3	CSE
A1583	Basics of Software Engineering	3-0-0	3	CSE
A1584	Python for Everyone	3-0-0	3	CSE
A1585	Computer Organization and Operating Systems	3-0-0	3	CSE
A1586	Fundamentals of Artificial Intelligence and Machine Learning	3-0-0	3	CSE
A1081	Management Science	3-0-0	3	H&S
A1082	Research Methodology	3-0-0	3	H&S
A1083	Intellectual Property Rights	3-0-0	3	H&S
A1084	National Service Scheme	3-0-0	3	H&S
A1085	Yoga	3-0-0	3	H&S
A1086	Design Thinking	3-0-0	3	H&S
A1087	Entrepreneurship Development	3-0-0	3	H&S

G. PULLAIAH COLLEGE OF ENGINEERING & TECHNOLOGY, KURNOOL
(AUTONOMOUS)

Course Structure for B.Tech. - R18 Regulations
COMPUTER SCIENCE & ENGINEERING

I B.Tech. - I Semester

S.No	Course code	Subject	Theory	Tu / Drg / Lab	Credits
1.	A1001	Functional English	3	1 - -	3
2.	A1002	Mathematics – I	3	1 - -	3
3.	A1501	Computer Programming	3	1 - -	3
4.	A1003	Engineering Physics	3	1 - -	3
5.	A1301	Engineering Drawing	0	- 6 -	3
6.	A1006	English Language Communication Skills Lab	-	- - 4	2
7.	A1007	Engineering Physics Lab	-	- - 4	2
8.	A1502	Computer Programming Lab	-	- - 4	2
					21

I B.Tech. I - Semester | **T** | **Tu** | **C**
3 | **1** | **3**

(A1001) FUNCTIONAL ENGLISH
(Common to All Branches)

Preamble:

English is an international language as well as a living and vibrant one. People have found that knowledge of English is a passport for better career, better pay, and advanced knowledge and for communication with the entire world. As it is a language of opportunities in this global age, English is bound to expand its domain of use everywhere. The syllabus has been designed to enhance communication skills of the students of engineering and pharmacy. The prescribed book serves the purpose of preparing them for everyday communication and to face the global competitions in future.

The text prescribed for detailed study focuses on LSRW skills and vocabulary development. The teachers should encourage the students to use the target language. The classes should be interactive and learner-centered. They should be encouraged to participate in the classroom activities keenly.

In addition to the exercises from the text done in the class, the teacher can bring variety by using authentic materials such as newspaper articles, advertisements, promotional material etc.

Objectives:

- To enable the students to communicate in English for academic and social purpose.
- To enable the students to acquire structure and written expressions required for their profession.
- To develop the listening skills of the students.
- To inculcate the habit of reading and critical thinking skills.
- To enhance the study skills of the students with emphasis on LSRW skills.

UNIT –I

Topics: Paragraph writing, writing letters, role play, reading graphs, prepositions, designing posters, tenses, making recommendations.

Text: ENVIRONMENTAL CONSCIOUSNESS‟ from *MINDSCAPES*
Climate Change - Green Cover – Pollution

UNIT –II

Topics: Compound nouns, imperatives, writing instructions, interpreting charts and pictures, note making, role play, prefixes, subject-verb agreement.

Text: EMERGING TECHNOLOGIES from *MINDSCAPES*
Solar Thermal Power - Cloud Computing - Nanotechnology

UNIT –III

Topics: Making conversations, homonyms and homophones, SMS and use of emotions, past participle for irregular verbs, group discussion, E - mail communication, antonyms, Preparing projects

Text: GLOBAL ISSUES from *MINDSCAPES*
Child Labour - Food Crisis - Genetic Modification - E-Waste - Assistive Technology

UNIT –IV

Topics: Group discussion, affixes, double consonants, debates, writing a book / film review, predicting and problem-solving-future tense, adverbs

Text: SPACE TREK from *MINDSCAPES*

Hubble Telescope - Chandrayan-2 - Anusat - Living Quarters - Space Tourism

UNIT –V

Topics: Compare and contrast, effective writing, group discussion, writing reports, writing advertisements, tweeting and blogging, types of interviews, framing questions.

Text: MEDIA MATTERS from *MINDSCAPES*

History of Media - Language and Media - Milestone in Media - Manipulation by Media - Entertainment Media - Interviews

Text Books:

1. MINDSCAPES: English for Technologists and Engineers, Orient Blackswan, 2014.

References:

1. A Practical Course in Effective English Speaking Skills by J.K.Gangal, PHI Publishers, New Delhi.2012
2. Technical Communication, Meenakshi Raman, Oxford University Press,2011.
3. Spoken English, R.K. Bansal & JB Harrison, Orient Longman,2013, 4Th edition.
4. Murphy‟s English Grammar with CD, Murphy, Cambridge University Press,3 Rd edition.
5. An Interactive Grammar of Modern English, Shivendra K. Verma and Hemlatha Nagarajan , Frank Bros & CO,2008.

Outcomes:

- Have improved communication in listening, speaking, reading and writing skills in general.
- Have developed their oral communication and fluency in group discussions and interviews.
- Have improved awareness of English in science and technology context.
- Have achieved familiarity with a variety of technical reports.

I B.Tech. - I Semester	T	Tu	C
	3	1	3

(A1002) MATHEMATICS – I
(Common to All Branches)

Objectives:

- To train the students thoroughly in Mathematical concepts of ordinary differential equations and their applications.
- To prepare students for lifelong learning and successful careers using mathematical concepts of differential and Integral calculus, ordinary differential equations and vector calculus.
- To develop the skill pertinent to the practice of the mathematical concepts including the students abilities to formulate and modeling the problems, to think creatively and to synthesize information.

UNIT – I

Exact, linear and Bernoulli equations, Applications to first order equations; Orthogonal trajectories, Simple electric circuits.

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

UNIT – II

Method of variation of parameters, linear equations with variable coefficients: Euler-Cauchy

Equations, Legendre‟s linear equation. Applications of linear differential equations-Mechanical and Electrical oscillatory circuits and Deflection of Beams.

UNIT – III

Taylor‟s and Maclaurin‟s Series - Functions of several variables – Jacobian – Maxima and Minima of functions of two variables, Lagrange‟s method of undetermined Multipliers with three variables only.

Radius of curvature.

UNIT – IV

Multiple integral – Double and triple integrals – Change of Variables – Change of order of integration. Applications to areas and volumes in Cartesian and polar coordinates using double and triple integral.

UNIT – V

Vector Calculus: Gradient – Divergence – Curl and their properties; Vector integration – Line integral - Potential function – Area – Surface and volume integrals. Vector integral theorems: Green‟s theorem – Stoke‟s and Gauss‟s Divergence Theorem (Without proof). Application of Green‟s, Stoke‟s and Gauss‟s Theorems.

Text Books:

1. Engineering Mathematics-I, E. Rukmangadachari & E. Keshava Reddy, Pearson Publisher
2. Higher Engineering Mathematics, B.S.Grewal, Khanna publishers.

References:

1. Engineering Mathematics Volume-I, by T.K.V. Iyengar, B.Krishna Gandhi, S.Ranganatham and M.V.S.S.N.Prasad, S.Chand publication.
2. Advanced Engineering Mathematics, by Erwin Kreyszig, Wiley India.
3. Higher Engineering Mathematics, by B.V.Ramana, Mc Graw Hill publishers.
4. Advanced Engineering Mathematics, by Alan Jeffrey, Elsevier.

Outcomes:

- The students become familiar with the application of differential and integral calculus, ordinary differential equations and vector calculus to engineeringproblems.

- The students attain the abilities to use mathematical knowledge to analyze, formulate and solve problems in engineering applications.

I B.Tech. I - Semester

T	Tu	C
3	1	3

(A1501) COMPUTER PROGRAMMING
(Common to All Branches)

Objectives:

- Understand problem solving techniques
- Understand representation of a solution to a problem
- Understand the syntax and semantics of C programming language
- Understand the significance of Control structures
- Learn the features of C language

UNIT - I

Overview of Computers and Programming - Electronic Computers Then and Now - Computer Hardware - Computer Software - Algorithm - Flowcharts - Software Development Method - Applying the Software Development Method.

Types, Operators and Expressions: Variable Names - Data Types and Sizes - Constants - Declarations - Arithmetic Operators - Relational and Logical Operators - Type Conversions - Increment and Decrement Operators - Bitwise Operators - Assignment Operators and Expressions - Conditional Expressions - Precedence and Order of Evaluation.

UNIT - II

Selections Statements – Iteration Statements – Jump Statements- Expression Statements - Block Statements.

Single Dimensional Arrays – Generating a Pointer to an Array – Passing Single Dimension Arrays to Functions – Strings – Two Dimensional Arrays – Indexing Pointers – Array Initialization – Variable Length Arrays

UNIT - III

Pointer Variables – Pointer Operators - Pointer Expressions – Pointers And Arrays – Multiple Indirection – Initializing Pointers – Pointers to Functions – C‟s Dynamic Allocation Functions – Problems with Pointers.

Understanding the scope of Functions – Scope Rules – Type Qualifiers – Storage Class Specifiers-Functions Arguments –The Return Statement.

UNIT - IV

Command line arguments – Recursion – Function Prototypes – Declaring Variable Length Parameter Lists

Structures – Arrays of Structures – Passing Structures to Functions – Structure Pointers – Arrays and Structures within Structures – Unions – Bit Fields – Enumerations – typedef

UNIT - V

Reading and Writing Characters – Reading and Writing Strings – Formatted Console I/O – Printf - Scanf – Standard C Vs Unix File I/O – Streams and Files – File System Basics – Fread and Fwrite – Fseek and Random Access I/O – Fprintf ( ) and Fscanf( ) – The Standard Streams – The Preprocessor Directives #define and #include.

Text Books:

1. “The Complete Reference C”- Fourth Edition- Herbert Schildt- McGrawHill Eduction.
2. “The C Programming Language” Second Edition- Brain W. Kernighan- Dennis M. Ritchie-Prentice Hall-India. (UNIT- I)

References:

1. Programming in C, Second Edition – Pradip Dey, Manas Ghosh, Oxford University Press.
2. “C From Theory to Practice”- George S. Tselikis- Nikolaos D. Tselikas- CRC Press.
3. “Programming with C”- R S Bichkar- University Press.

4. Programming in C and Data Structures, J.R.Hanly, Ashok N. Kamthane and A.Ananda Rao, Pearson Education. (UNIT-I)
5. Computer Fundamentals and C Programming- Second Edition- P.Chenna Reddy- Available at Pothi.com (http://pothi.com/pothi/book/dr-p-chenna-reddy-computer-fundamentals-and-c-programming).

Outcomes:

- Apply problem solving techniques in designing the solutions for a wide-range of problems
- Choose appropriate control structure depending on the problem to be solved
- Modularize the problem and also solution

I B.Tech. I - Semester

T	Tu	C
3	1	3

(A1003) ENGINEERING PHYSICS
(Common to CSE/EEE/CIVIL)

Objectives:

- To evoke interest on applications of superposition effects like interference and diffraction, the mechanisms of emission of light, achieving amplification of electromagnetic radiation through stimulated emission, study of propagation of light through transparent dielectric waveguides along with engineering applications.
- To enlighten the periodic arrangement of atoms in crystals, direction of Bragg planes, crystal structure determination by X-rays and non-destructive evaluation using ultrasonic techniques.
- To get an insight into the microscopic meaning of conductivity , classical and quantum free electron model, the effect of periodic potential on electron motion, evolution of band theory to distinguish materials and to understand electron transport mechanism in solids.
- To open new avenues of knowledge and understanding semiconductor based electronic devices , basic concepts and applications of semiconductors and magnetic materials have been introduced which find potential in the emerging micro device applications.
- To give an impetus on the subtle mechanism of superconductors in terms of conduction of electron pairs using BCS theory, different properties exhibited by them and their fascinating applications. Considering the significance of microminiaturization of electronic devices and significance of low dimensional materials, the basic concepts of nanomaterials, their synthesis, properties and applications in emerging technologies are elicited.

UNIT - I
PHYSICAL OPTICS, LASERS AND FIBRE OPTICS

Physical Optics: Interference (Review) – Interference in thin film by reflection –Newton‟s rings – Diffraction (Review) - Fraunhofer diffraction due to single slit, double slit and diffraction grating. *Lasers:* Characteristics of laser – Spontaneous and stimulated emission of radiation – Einstein‟s coefficients — Population inversion – Excitation mechanism and optical resonator – Nd:YAG laser - He-Ne laser – Semiconductor Diode laser - Applications of lasers

Fiber optics: Introduction - construction and working principle of optical fiber –Numerical aperture and acceptance angle – Types of optical fibers – Attenuation and losses in Optical fibers –Block diagram of Optical fiber communication system – Applications of optical fibers

UNIT – II
CRYSTALLOGRAPHY AND ULTRASONICS

Crystallography: Introduction – Space lattice –Unit cell – Lattice parameters –Bravias lattice – Crystal systems – Packing fractions of SC, BCC and FCC - Directions and planes in crystals – Miller indices – Interplanar spacing in cubic crystals – X-ray diffraction - Bragg‟s law – Powder method.

Ultrasonics: Introduction – Production of ultrasonics by piezoelectric method – Properties and detection – Applications in non-destructive testing.

UNIT – III
QUANTUM MECHANICS AND ELECTRON THEORY

*Quantum Mechanics: M*atter waves – de‟Broglie hypothesis and properties - Schrodinger‟s time dependent and independent wave equations – Physical significance of wave function - Particle in one dimensional infinite potential well.

Electron theory: Classical free electron theory – Equation for electrical conductivity - Quantum free electron theory – Fermi-Dirac distribution – Source of electrical resistance – Kronig-Penny model (qualitative treatment) – Origin of bands in solids – Classification of solids into conductors, semiconductors and insulators.

UNIT – IV

SEMICONDUCTORS AND MAGNETIC MATERIALS

Semiconductors: Intrinsic and extrinsic semiconductors (Qualitative treatment) – Drift & diffusion currents and Einstein‟s equation – Hall effect - Direct and indirect band gap semiconductors – Formation of p-n junction.

Magnetic materials: Introduction and basic definitions – Origin of magnetic moments – Bohr magnetron – Classification of magnetic materials into dia, para, ferro, antiferro and ferri magnetic materials (Qualitative treatment) – Hysteresis - Soft and hard magnetic materials, applications of magnetic materials.

UNIT – V

SUPERCONDUCTIVITY AND PHYSICS OF NANOMATERIALS

Superconductivity: Introduction - Effect of magnetic field - Meissner effect – Type I and Type II superconductors – Flux quantization – Penetration depth - BCS theory (qualitative treatment) — Josephson effects –Applications of superconductors.

Physics of Nanomaterials: Introduction - Significance of nanoscale and types of nanomaterials – Physical properties: optical, thermal, mechanical and magnetic properties – Synthesis of nanomaterials by Top down and bottom up approaches: ball mill, chemical vapour deposition, and sol gel –Applications of nanomaterials.

Text Books:

1. Engineering Physics – K.Thyagarajan, 5th Edition, MacGraw Hill Publishers, NewDelhi, 2014. 2. Physics for Engineers - N.K Verma, 1st Edition, PHI Learning Private Limited, New Delhi,2014.

References:

1. Engineering Physics – Dr. M.N. Avadhanulu & Dr. P.G. Kshirsagar, 10th Edition, S.Chand and Company, New Delhi, 2014.
2. Engineering Physics – D K Pandey, S. Chaturvedi, 2nd Edition, Cengage Learning, New Delhi, 2013.
3. Engineering Physics – D.K Bhattacharya, Poonam Tandon, 1nd Edition, Oxford University Press, New Delhi, 2015.

Outcomes:

- The different realms of physics and their applications in both scientific and technological systems are achieved through the study of physical optics, lasers and fibre optics.
- The important properties of crystals like the presence of long-range order and periodicity, structure determination using X-ray diffraction are focused along with defects in crystals and ultrasonic non-destructive techniques.
- The discrepancies between the classical estimates and laboratory observations of physical properties exhibited by materials would be lifted through the understanding of quantum picture of subatomic world.
- The electronic and magnetic properties of materials were successfully explained by free electron theory and the bases for the band theory are focused.
- The properties and device applications of semiconducting and magnetic materials are illustrated.

- The importance of superconducting materials and nanomaterials along with their engineering applications are well elucidated.

B.Tech. I - I Sem. **Th Drg C**
0 6 3

(A1301) ENGINEERING DRAWING
(Common to CSE/EEE/CIVIL)

Objectives:

- To gain and understanding of the basics of geometrical constructions of various planes and solids, understanding system of graphical representation of various objects and various views to draft and read the products to be designed and eventually for manufacturing applications.
- To learn about various projections, to understand complete dimensions and details of object.
- Ultimately student must get imaginary skill to put an idea of object, circuit, assembly of parts in black & white, to design a product and to understand the composition, which can be understood universally.

UNIT I

Introduction to Engineering Drawing: Principles of Engineering Graphics and their Significance-Conventions in Drawing-Lettering – BIS Conventions. Curves used in Engineering Practice. a) Conic Sections including the Rectangular Hyperbola- General method only, b) Cycloid, Epicycloid and Hypocycloid

UNIT II

Scales: Plain, Diagonal and Vernier;

Projection of Points: Principles of orthographic projection – Convention – First angle projections, projections of points.

UNIT III

Projections of Lines: lines inclined to one or both planes, Problems on projections, Finding True lengths.

Projections of Planes: Projections of regular plane surfaces- plane surfaces inclined to both planes.

UNIT IV

Projections of Solids: Projections of Regular Solids with axis inclined to both planes.

Developments of Solids: Development of Surfaces of Right Regular Solids-Prism, Cylinder, Pyramid, Cone.

UNIT V

Isometric and Orthographic Projections: Principles of isometric projection- Isometric Scale- Isometric Views- Conventions- Isometric Views of lines, Planes, Simple solids (cube, cylinder and cone). Isometric projections of spherical parts. Conversion of isometric Views to Orthographic Views.

***Text Books**:*

1. Engineering Drawing, N.D. Bhatt, Charotar Publishers
2. Engineering Drawing, K.L. Narayana& P. Kannaih, Scitech Publishers, Chennai

***References**:*

1. Engineering Drawing, Johle, Tata McGraw-Hill Publishers
2. Engineering Drawing, Shah and Rana,2/e, Pearson Education
3. Engineering Drawing and Graphics, Venugopal/New age Publishers
4. Engineering Graphics, K.C. John, PHI,2013
5. Engineering Drawing, B.V.R. Guptha, J.K. Publishers

Outcomes:

- Drawing 2D and 3D diagrams of various objects.
- Learning conventions of Drawing, which is an Universal Language of Engineers.

- Drafting projections of points, planes and solids.

I B.Tech. I - Semester **P C**
4 2

(A1006) ENGLISH LANGUAGE COMMUNICATION SKILLS (ELCS) LAB
(Common to All Branches)

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.

Objectives:

- To enable students to learn better pronunciation through stress on word accent, intonation, and rhythm.
- To help the second language learners to acquire fluency in spoken English and neutralize mother tongue influence
- To train students to use language appropriately for interviews, group discussion and public speaking

UNIT - 1

1. Phonetics -importance
2. Introduction to Sounds of Speech
3. Vowels and consonants sounds
4. Phonetic Transcription

UNIT - II

5. Word Stress
6. Syllabification
7. Rules of word stress
8. Intonation

UNIT - III

9. Situational Dialogues
10. Role Plays
11. JAM
12. Describing people/objects/places

UNIT - IV

13. Debates
14. Group Discussions
15. Interview skills

UNIT - V

16. Video speech writing
17. Book reviews -oral and written

Minimum Requirements for ELCS Lab:

The English Language Lab shall have two parts:

1. Computer Assisted Language Learning (CALL) Lab: The Computer aided Language Lab for 60 students with 60 systems, one master console, LAN facility and English language software for self-study by learners.
2. The Communication Skills Lab with movable chairs and audio-visual aids with a P.A. system, Projector, a digital stereo-audio & video system and camcorder etc.
   System Requirement (Hardware component):

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

i) P – IV Processor
   a) Speed – 2.8 GHZ
   b) RAM – 512 MB Minimum
   c) Hard Disk – 80 GB

ii) Headphones of High quality

Suggested Software:

1. Clarity Pronunciation Power – Part I (Sky Pronunciation)
2. Clarity Pronunciation Power – part II
3. K-Van Advanced Communication Skills
4. Walden InfoTech Software.

References:

1. A Textbook of English Phonetics for Indian Students 2nd Ed T. Balasubramanian. (Macmillian),2012.
2. A Course in Phonetics and Spoken English, Dhamija Sethi, Prentice-Hall of India Pvt.Ltd
3. Speaking English Effectively, 2nd Edition Krishna Mohan & NP Singh, 2011. (Mcmillan).
4. A Hand book for English Laboratories, E.Suresh Kumar, P.Sreehari, Foundation Books,2011
5. Spring Board Succes, Sharada Kouhik, Bindu Bajwa, Orient Blackswan, Hyderbad, 2010.

Outcomes:

- Become active participants in the learning process and acquire proficiency in spoken English.
- Speak with clarity and confidence thereby enhance employability skills.

I B.Tech. I - Semester **p C**
4 2

(A1007) ENGINEERING PHYSICS LABORATORY
(Common to CSE/EEE/CIVIL)

Objectives:

- Will recognize the important of optical phenomenon like Interference and diffraction.
- Will understand the role of optical fiber parameters and signal losses in communication.
- Will recognize the importance of energy gap in the study of conductivity and hall effect in a semiconductor
- Will understand the applications of B H curve.
- Will acquire a practical knowledge of studying the crystal structure in terms of lattice constant.
- Will recognize the application of laser in finding the particle size and its role in diffraction studies.
- Will learn to synthesis of the nanomaterials and recognize its importance by knowing its nano particle size and its impact on its properties.

Any 10 of the following experiments has to be performed during the I year I semester

1. Determination of radius of curvature of a Plano-convex lens by forming Newton‟s rings.
2. Determination of wavelength of given source using diffraction grating in normal incidence method.
3. Determination of Numerical aperture, acceptance angle of an optical fiber.
4. Energy gap of a Semiconductor diode.
5. Hall effect – Determination of mobility of charge carriers.
6. B-H curve – Determination of hysteresis loss for a given magnetic material.
7. Determination of Crystallite size using X-ray pattern (powder) using debye-scheerer method.
8. Determination of particle size by using laser source.
9. Determination of dispersive power of a prism.
10. Determination of thickness of the thin wire using wedge Method.
11. Laser : Diffraction due to single slit
12. Laser : Diffraction due to double slit
13. Laser: Determination of wavelength using diffraction grating
14. Magnetic field along the axis of a current carrying coil – Stewart and Gee‟s method.
15. Synthesis of nanomaterial by any suitable method.

References:

1. Engineering Physics Practicals – NU Age Publishing House, Hyderabad.
2. Engineering Practical physics – Cengage Learning, Delhi.

Outcomes:

- Would recognize the important of optical phenomenon like Interference and diffraction.
- Would have acquired the practical application knowledge of optical fiber, semiconductor, dieclectric and magnetic materials, crystal structure and lasers by the study of their relative parameters.
- Would recognize the significant importance of nanomaterials in various engineering fields.

I B.Tech. I - Semester **P C**
4 2

(A1502) COMPUTER PROGRAMMING LAB
(Common to All branches)

Objectives:

- Learn C Programming language
- To make the student solve problems, implement algorithms using C language.

List of Experiments/Tasks

1. Practice DOS and LINUX Commands necessary for design of C Programs.
2. Study of the Editors, Integrated development environments, and Compilers in chosen platform.
3. Write, Edit, Debug, Compile and Execute Sample C programs to understand the programming environment.
4. Practice programs: Finding the sum of three numbers, exchange of two numbers, maximum of two numbers, To read and print variable values of all data types of C language, to find the size of all data types, to understand the priority and associativity of operators using expressions, to use different library functions of C language.
5. Write a program to find the roots of a Quadratic equation.
6. Write a program to compute the factorial of a given number.
7. Write a program to check whether the number is prime or not.
8. Write a program to find the series of prime numbers in the given range.
9. Write a program to generate Fibonacci numbers in the given range.
10. Write a program to find the maximum of a set of numbers.
11. Write a program to reverse the digits of a number.
12. Write a program to find the sum of the digits of a number.
13. Write a program to find the sum of positive and negative numbers in a given set of numbers.
14. Write a program to check for number palindrome.
15. Write a program to evaluate the sum of the following series up to „n" terms e $^{x}=1+x+x^{2}/2!+x^{3}/3!+x^{4}/4!+$--------
16. Write a program to generate Pascal Triangle.
17. Write a program to read two matrices and print their sum and product in the matrix form.
18. Write a program to read matrix and perform the following operations.
    i. Find the sum of Diagonal Elements of a matrix.
    ii. Print Transpose of a matrix.
    iii. Print sum of even and odd numbers in a given matrix.
19. Write a program to accept a line of characters and print the number of Vowels, Consonants, blank spaces, digits and special characters.
20. Write a program to insert a substring in to a given string and delete few characters from the string. Don"t use library functions related to strings.
21. Write a program to perform the operations addition, subtraction, multiplication of complex numbers.
22. Write a program to split a „file" in to two files, say file1 and file2. Read lines into the „file" from standard input. File1 should consist of odd numbered lines and file2 should

consist of even numbered lines.

23. Write a program to merge two files.
24. Write a program to implement numerical methods Lagrange‟s interpolation, Trapezoidal rule.
25. Write a program to read a set of strings and sort them in alphabetical order.

26. Write a program to read two strings and perform the following operations without using built-in string Library functions and by using your own implementations of functions.
    i. String length determination ii .Compare Two Strings
    iii. Concatenate them, if they are not equal iv. String reversing
27. Write programs using recursion for finding Factorial of a number, GCD, LCM, and solving Towers of Hanoi problem.
28. Write a program to exchange two numbers using pointers.
29. Write a program to read student records into a file. Record consists of rollno, name and marks of a student in six subjects and class. Class field is empty initially. Compute the class of a student. The calculation of the class is as per JNTUA rules. Write the first class, second class, third class and failed students lists separately to another file.
30. A file consists of information about employee salary with fields employeeid, name, Basic, HRA, DA, IT, other-deductions, Gross and Net salary. Initially only employeeid, name, and basic have valid values. HRA is taken as 10% of the basic, DA is taken as 80% of basic, IT is 20% of the basic, other deductions is user specified. Compute the Gross and Net salary of the employee and update the file.
31. Write a program to perform Base (decimal, octal, hexadecimal, etc) conversion.
32. Write a program to find the square root of a number without using built-in library function.
33. Write a program to convert from string to number.
34. Write a program to implement pseudo random generator.
35. Write a program to generate multiplication tables from 11 to 20.
36. Write a program to express a four digit number in words. For example 1546 should be written as one thousand five hundred and forty six.
37. Write a program to generate a telephone bill. The contents of it and the rate calculation etc should be as per BSNL rules. Student is expected to gather the required information through the BSNL website.
38. Write a program to find the execution time of a program.
39. Design a file format to store a person's name, address, and other information. Write a program to read this file and produce a set of mailing labels

Note:

1. Instructors are advised to conduct the lab in LINUX/UNIX environment also
2. The above list consists of only sample programs. Instructors may choose other programs to illustrate certain concepts, wherever is necessary. Programs should be there on all the concepts studied in Theory. Instructors are advised to change atleast 25% of the programs every year until the next syllabus revision.

References:

1. “How to Solve it by Computer”, R.G. Dromey, Pearson.
2. “The C Programming Language”, Brian W. Kernighan, Dennis M. Ritchie, Pearson.
3. “Let us C”, Yeswant Kanetkar, BPB publications

4. “Pointers in C”, Yeswant Kanetkar, BPB publications.
5. Programming in C and Data Structures, J.R.Hanly, Ashok N. Kamthane and A.Ananda Rao, Pearson Education.

Outcomes:

- Apply problem solving techniques to find solutions to problems
- Able to use C language features effectively and implement solutions using C language.
- Improve logical skills.

G. PULLAIAH COLLEGE OF ENGINEERING & TECHNOLOGY, KURNOOL
(AUTONOMOUS)

I-II Semester

S.No	Course code	Subject	Th	Tu/Drg/Lab	Credits
1.	A1008	English for Professional Communication	3	1 - -	3
2.	A1009	Mathematics – II	3	1 - -	3
3.	A1503	Data Structures	3	1 - -	3
4.	A1004	Engineering Chemistry	3	1 - -	3
5.	A1005	Environmental Studies	3	1 -	3
6.	A1504	Data Structures Lab	-	- - 4	2
7.	A1010	Engineering Chemistry Lab	-	- - 4	2
8.	A1302	Engineering & IT Workshop	-	- - 4	2
		15 5 12			21

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

(A1008) ENGLISH FOR PROFESSIONAL COMMUNICATION

1. INTRODUCTION:

English is a global language and has international appeal and application. It is widely used in a variety of contexts and for varied purposes. The students would find it useful both for social and professional development. There is every need to help the students acquire skills useful to them in their career as well as workplace. They need to write a variety of documents and letters now extending into professional domain that cuts across business and research also. The syllabus has been designed to enhance communication skills of the students of engineering and pharmacy. The prescribed book serves the purpose of preparing them for everyday communication and to face the global competitions in future.

The text prescribed for detailed study focuses on LSRW skills and vocabulary development. The teachers should encourage the students to use the target language. The classes should be interactive and learner-centered. They should be encouraged to participate in the classroom activities keenly.

In addition to the exercises from the text done in the class, the teacher can bring variety by using authentic materials such as newspaper articles, advertisements, promotional material etc.

2. OBJECTIVES:

1. To develop confidence in the students to use English in everyday situations.
2. To enable the students to read different discourses so that they appreciate English for science and technologies.
3. To improve familiarity with a variety of technical writings.
4. To enable the students to acquire structure and written expressions required for their profession.
5. To develop the listening skills of the students.

3. SYLLABUS:

UNIT –I

Topics: Group discussion, cause and effect, events and perspectives, debate, if conditional, essay writing.

Text: LESSONS FROM THE PAST from ***MINDSCAPES***

Importance of History - Differing Perspectives - Modern Corporatism - Lessons From The Past

UNIT-II

Topics: Idioms, essay writing, power point presentation, modals, listening and rewriting, preparing summary, debate, group discussion, role play, writing a book review, conversation

Text: 'ENERGY' from ***MINDSCAPES***

Renewable and Non-Renewable Sources - Alternative Sources -Conservation -Nuclear Energy

UNIT-III

Topics: Vocabulary, impromptu speech, creative writing, direct and indirect speech, fixed expressions, developing creative writing skills, accents, presentation skills, making posters, report writing

Text: 'ENGINEERING ETHICS' from ***MINDSCAPES***

Challenger Disaster - Biotechnology - Genetic Engineering - Protection From Natural Calamities

UNIT-IV

Topics: Vocabulary, Conversation, Collocation, Group discussion, Note-making, Clauses, Interpreting charts and tables , Report writing.

Text: 'TRAVEL AND TOURISM' from ***MINDSCAPES***

Advantages and Disadvantages of Travel - Tourism - Atithi Devo Bhava - Tourism in India

UNIT-V

Topics: Vocabulary, phrasal verbs, writing a profile, connectives, discourse markers, problem-solving, telephone skills, application letters, curriculum vitae, interviews (telephone and personal)

Text: 'GETTING JOB-READY' from ***MINDSCAPES***

SWOT Analysis - Companies And Ways Of Powering Growth - Preparing For Interviews

Prescribed Text

MINDSCAPES: English for Technologists and Engineers, Orient Blackswan, 2014.

REFERENCES:

1. **Effective Tech Communication,** Rizvi,Tata McGraw-Hill Education, 2007.

2. **Technical Communication,** Meenakshi Raman, Oxford University Press.

3. **English Conversations Prcatice,** Grant Taylor, Tata Mc GrawHill publications,2013**.**

4**.Practical English Grammar.** Thomson and Martinet, OUP, 2010.

Expected Outcomes:

At the end of the course, students would be expected to:

1. Have acquired ability to participate effectively in group discussions.
2. Have developed ability in writing in various contexts.
3. Have acquired a proper level of competence for employability.

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

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(A1009) MATHEMATICS – II
(Common to All Branches)

Objectives: Our emphasis will be more on conceptual understanding and application of Fourier series, Fourier, Z and Laplace transforms and solution of partial differential equations.

UNIT – I

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

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

UNIT – II

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- Parseval's formula- Complex form of Fourier series.

UNIT – III

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

UNIT – IV

Formation of partial differential equations by elimination of arbitrary constants and arbitrary functions – Method of separation of variables – Solutions of one dimensional wave equation, heat equation and two-dimensional Laplace's equation under initial and boundary conditions.

UNIT – V

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

TEXT BOOKS:

1. Higher Engineering Mathematics, B.S.Grewal, Khanna publishers.
2. Engineering Mathematics, Volume - II, E. Rukmangadachari Pearson Publisher.

REFERENCES:

1. Mathematical Methods by T.K.V. Iyengar, B.Krishna Gandhi, S.Ranganatham and M.V.S.S.N.Prasad S. Chand publication.
2. Higher Engineering Mathematics, by B.V.Ramana, Mc Graw Hill publishers.
3. Advanced Engineering Mathematics, by Erwin Kreyszig, Wiley India.

Outcomes: The student gains the knowledge to tackle the engineering problems using the concepts of Fourier series, various transforms and partial differential equations.

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

(A1503) DATA STRUCTURES
(Common to CSE and IT branches of Engineering)

Objectives:

- Understand different Data Structures
- Understand Searching and Sorting techniques

Unit-1

Introduction and overview: Asymptotic Notations, One Dimensional array- Multi Dimensional array- pointer arrays.

Linked lists: Definition- Single linked list- Circular linked list- Double linked list- Circular Double linked list- Application of linked lists.

Unit-2

Stacks: Introduction-Definition-Representation of Stack-Operations on Stacks- Applications of Stacks.

Queues: Introduction, Definition- Representations of Queues- Various Queue Structures- Applications of Queues. **Tables**: Hash tables.

Unit-3

Trees: Basic Terminologies- Definition and Concepts- Representations of Binary Tree- Operation on a Binary Tree- Types of Binary Trees-Binary Search Tree, Heap Trees, Height Balanced Trees, B. Trees, Red Black Trees.

Graphs: Introduction- Graph terminologies- Representation of graphs- Operations on Graphs- Application of Graph Structures: Shortest path problem- topological sorting.

Unit-4

Sorting : Sorting Techniques- Sorting by Insertion: Straight Insertion sort- List insertion sort- Binary insertion sort- Sorting by selection: Straight selection sort- Heap Sort- Sorting by Exchange- Bubble Sort-Shell Sort-Quick Sort-External Sorts: Merging Order Files-Merging Unorder Files- Sorting Process.

Unit-5

Searching: List Searches- Sequential Search- Variations on Sequential Searches- Binary Search-Analyzing Search Algorithm- Hashed List Searches- Basic Concepts- Hashing Methods- Collision Resolutions- Open Addressing- Linked List Collision Resolution- Bucket Hashing.

Text Books:

1. "Classic Data Structures", Second Edition by Debasis Samanta, PHI.
2. "Data Structures A Pseudo code Approach with C", Second Edition by Richard F. Gilberg, Behrouz A. Forouzan, Cengage Learning.

Reference Books:

1. Fundamentals of Data Structures in C – Horowitz, Sahni, Anderson-Freed, Universities Press, Second Edition.
2. Schaum' Outlines – Data Structures – Seymour Lipschutz – McGrawHill-Revised First Edition.
3. Data structures and Algorithms using C++, Ananda Rao Akepogu and Radhika Raju Palagiri, Pearson Education.

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

(A1004) ENGINEERING CHEMISTRY
(Common to All Branches)

Objectives:

- The Engineering Chemistry course for undergraduate students is framed to strengthen the fundamentals of chemistry and then build an interface of theoretical concepts with their industrial/engineering applications.
- The course main aim is to impart in-depth knowledge of the subject and highlight the role of chemistry in the field of engineering.
- The lucid explanation of the topics will help students understand the fundamental concepts and apply them to design engineering materials and solve problems related to them. An attempt has been made to logically correlate the topic with its application.
- The extension of fundamentals of electrochemistry to energy storage devices such as commercial batteries and fuel cells is one such example.
- After the completion of the course, the student would understand the concepts of chemistry and apply to various materials for engineering applications.

UNIT – I WATER QUALITY AND TREATMENT

Impurities in water, Hardness of water and its Units, Disadvantages of hard water, Estimation of hardness by EDTA method, Numerical problems on hardness, Estimation of dissolved oxygen, Alkalinity, acidity and chlorides in water, Water treatment for domestic purpose (Chlorination, Bleaching powder, ozonisation)

Industrial Use of water:

For steam generation, troubles of Boilers: Scale & Sludge, Priming and Foaming, Caustic Embrittlement and Boiler Corrosion.

Treatment of Boiler Feed water:

Internal Treatment: Colloidal, Phosphate, Carbonate, Calgon and sodium aluminate treatment.

External Treatment: Ion-Exchange and Permutit processes.

Demineralisation of brackish water: Reverse Osmosis and Electrodialysis

UNIT – II POLYMERS

i) Introduction: Basic concepts of polymerisation, Types of poloymerisation (Chain Growth (Addition), Step growth (Condensation)), Mechanism: cationic, anionic, free radical and coordination covalent.

Plastomers: Thermosetting and Thermoplatics, Preparation, properties and Engineering applications of PVC, Teflon, Bakelite and nylons.

Elastomers

Natural Rubber; Processsing of natural rubbers, Compounding of Rubber

Synthetic Rubber: Preparation, properties and engineering applications of Buna-S, Buna-N, Polyurethene, Polysulfide (Thiokol) rubbers

ii) Conducting polymers: Mechanism, synthesis and applications of polyacetyline, polyaniline.

iii) Inorganic Polymers: Basic Introduction, Silicones, Polyphospazins (-(R)2-P=N-) applications

UNIT – III ELECTROCHEMISTRY

i) Galvanic cells, Nernest Equation, Numerical calculations, Batteries: Rechargeable batteries (Lead acid, Ni-Cd, Lithium Ion Batteries),Fuels cells: (Hydrogen-Oxygen and Methanol-Oxygen, Solid oxide)

ii) Corrosion: Introduction, type of corrosion (Concentration cell corrosion, Galvanic corrosion), Chemical (Dry) and Electrochemical (Wet) Theory of corrosion. Galvanic series, factors affecting the corrosion (Metal and environment). Prevention: Cathodic protection (Sacrificial anode and impressed current), Inhibitors (Anodic and cathodic), electroplating (Copper, nickel and chromium) and electroless plating (Copper and nickel)

UNIT – IV FUELS AND COMBUSTION

Classifications of Fuels – Characteristics of Fuels- Calorific Value – Units, Numerical Problems.

Solid Fuels: Coal-Classification and Analysis (proximate and ultimate), Coke :Characteristics of metallurgical coke, Manufacture of Metallurgical Coke by Otto Hoffmann's by product oven processes.
Liquid Fuels:
Petroleum: Refining of Petroleum, Gasoline- Octane Number, Diesel -Cetane Number, Synthetic Petrol: Bergius Processes, Fischer Troph's synthesis
Power Alcohol: Manufacture, Advantages and Disadvantages of Power Alcohol
Gaseous Fuels: Natural gas, Producer gas, Water gas, Coal gas and Biogas. Determination calorific value of Gases fuels by Junker's calorimeter.
Combustion: Basic principles and numerical problems, Flue Gas analysis by Orsat's apparatus.

UNIT – V CHEMISTRY OF ENGINEERING MATERIALS

i) Cement: Composition, Classification, preparation (Dry and Wet processes), Setting and Hardening (Hydration and Hydrolysis)
ii) Refractories: Introduction, Classification , properties and applications
iii) Lubricants: Introduction, classification (Solid, liquid, semi solid, emulsion and synthetic),Theory of lubrication (Thin film, Thick film & Extreme pressure) , properties of lubricants and applications.
iv) Carbon clusters: Fullerenes and Carbon Nano Tubes (CNT)

Text Books:

1. Engineering Chemistry, First Edition, Jayaveera KN, Subba Reddy GVand Ramachandraiah C, McGraw Hill Higher Education, New Delhi, 2013.
2. A Text Book of Enigneering Chemistry, 15th Edition, Jain and Jain, Dhanapathi Rai Publications, New Delhi, 2013.

References:

1. A Text book of Engineering Chemistry, 12th Edition, SS Dhara,Uma, S. Chand Publications, New Delhi, 2010.
2. Engineering Chemistry, First edition, K.B. Chandra Sekhar, UN.Das and Sujatha Mishra, SCITECH Publications India Pvt Limited, 2010.
3. Engineering Chemistry, First edition, Seshamaheswaramma K and Mridula Chugh, Pearson Education, 2013.

Outcomes: The student is expected to:

- Differentiate between hard and soft water. Understand the disadvantages of using hard water domestically and industrially. Select and apply suitable treatments domestically andindustrially.
- Understand the electrochemical sources of energy

Understand industrially based polymers, various engineering materials.

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

(A1005) ENVIRONMENTAL STUDIES

OBJECTIVE: *To make the students to get awareness on environment, to understand the importance of protecting natural resources, ecosystems for future generations and pollution causes due to the day to day activities of human life to save earth from the inventions by the engineers.*

UNIT – I

MULTIDISCIPLINARY NATURE OF ENVIRONMENTAL STUDIES: – Definition, Scope and Importance – Need for Public Awareness.

NATURAL RESOURCES : Renewable and non-renewable resources – Natural resources and associated problems – Forest resources – Use and over – exploitation, deforestation, case studies – 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, case studies – Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies. – Energy resources:

UNIT – II

ECOSYSTEMS: Concept of an ecosystem. – Structure and function of an ecosystem – Producers, consumers and decomposers – Energy flow in the ecosystem – Ecological succession – Food chains, food webs and ecological pyramids – Introduction, types, characteristic features, structure and function of the following ecosystem:

a. Forest ecosystem.
b. Grassland ecosystem
c. Desert ecosystem
d. Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

BIODIVERSITY AND ITS CONSERVATION : Introduction 0 Definition: genetic, species and ecosystem diversity – Bio-geographical classification of India – Value of biodiversity: consumptive use, Productive use, social, ethical, aesthetic and option values – Biodiversity at global, National and local levels – India as a mega-diversity nation – Hot-sports of biodiversity – Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts – Endangered and endemic species of India – Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

UNIT – III

ENVIRONMENTAL POLLUTION: Definition, Cause, effects and control measures of :

a. Air Pollution.
b. Water pollution
c. Soil pollution
d. Marine pollution
e. Noise pollution
f. Thermal pollution
g. Nuclear hazards

SOLID WASTE MANAGEMENT : Causes**,** effects and control measures of urban and industrial wastes – Role of an individual in prevention of pollution – Pollution case studies – Disaster management: floods, earthquake, cyclone and landslides.

UNIT – IV

SOCIAL ISSUES AND THE ENVIRONMENT: From Unsustainable to Sustainable development – Urban problems related to energy – Water conservation, rain water harvesting, watershed management – Resettlement and rehabilitation of people; its problems and concerns. Case studies – Environmental ethics: Issues and possible solutions – Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case Studies – Wasteland reclamation. – Consumerism and waste products. – Environment Protection Act. – Air (Prevention and Control of Pollution) Act. – Water (Prevention and control of Pollution) Act – Wildlife Protection Act – Forest Conservation Act – Issues involved in enforcement of environmental legislation – Public awareness.

UNIT – V

HUMAN POPULATION AND THE ENVIRONMENT: Population growth, variation among nations. Population explosion – Family Welfare Programmed. – Environment and human health – Human Rights – Value Education – HIV/AIDS – Women and Child Welfare – Role of information Technology in Environment and human health – Case studies.

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, and birds – river, hill slopes, etc..

TEXT BOOKS :

1. Text book of Environmental Studies for Undergraduate Courses by Erach Bharucha for University Grants Commission, Universities Press.
2. Environmental Studies by Kaushik, New Age Pubilishers.

REFERENCES :

1. Environmental studies by R.Rajagopalan, Oxford University Press.
2. Comprehensive Environmental studies by J.P.Sharma, Laxmi publications.

3. Introduction to Environmental engineering and science by Gilbert M. Masters and Wendell P. Ela - Printice hall of India Private limited.

Outcomes :

(1) Students will get the sufficient information that will clarify modern environmental concepts like equitable use of natural resources, more sustainable life styles etc.

(2) Students will realize the need to change their approach so as to perceive our own environmental issues correctly, using practical approach based on observation and self learning.

(3) Students become conversant with the fact that there is a need to create a concern for our environment that will trigger pro-environmental action; including simple activities we can do in our daily life to protect it.

(4) By studying environmental sciences, students is exposed to the environment that enables one to find out solution of various environmental problems encountered on and often.

At the end of the course, it is expected that students will be able to identify and analyze environmental problems as well as the risks associated with these problems and efforts to be taken to protect the environment from getting polluted. This will enable every human being to live in a more sustainable manner.

B.Tech. I - II Sem. (CSE) **P C**
4 2

(A1504) DATA STRUCTURES LAB
(Common to CSE & IT Branches of Engineering)

Course Objectives:

- To strengthen the ability to identify and apply the suitable data structure for the given real world problem

Course Outcomes:

- Apply problem solving techniques to find solutions to problems
- Able to identify the appropriate data structure for a given problem or application.
- Improve logical skills

List of Experiments/Tasks

1. Write a program to sort the elements of an array using sorting by exchange.
2. Write a program to sort the elements of an array using Selection Sort.
3. Write a program to implement heap sort.
4. Write a program to perform Linear Search on the elements of a given array.
5. Write a program to perform Binary Search on the elements of a given array.
6. Write a program to convert infix expression to postfix expression and evaluate postfix expression.
7. Write a program to implement stack, queue, circular queue using arrays and linked lists.
8. Write a program to perform the operations creation, insertion, deletion, and traversing a singly linked list.
9. Write a program to perform the operations creation, insertion, deletion, and traversing a Doubly linked list.
10. Write a program to remove duplicates from ordered and unordered arrays.
11. Write a program to sort numbers using insertion sort.
12. Write a program to implement quick sort using non-recursive and recursive approaches. Use randomized element as partitioning element.
13. Write a program to search a word in a given file and display all its positions.
14. Write a program for tic-tac-toe game.
15. Write a program to perform operations creation, insertion, deletion and traversing on a binary search tree.
16. Write a program to implement depth first search and breadth first search on graphs.
17. Write a program to perform different operations on Red Black trees.
18. Write a program to implement external sorting.
19. Write a program to perform different operations of B Tree.

Note:

1. Instructors are advised to conduct the lab in LINUX/UNIX environment

2. The above list consists of only sample programs. Instructors may choose other programs to illustrate certain concepts, wherever is necessary. Programs should be there on all the concepts studied in Theory. Instructors are advised to change atleast 25% of the programs every year until the next syllabus revision.

References:

1. Fundamentals of Data Structures in C", Horowitz, Sahni, Anderson-freed, Second Edition, Universities Press.
2. Data structures and Algorithms using C++, Ananda Rao Akepogu and Radhika Raju Palagiri, Pearson Education.

B.Tech. I - II Sem. (CSE) **P** **C**
4 **2**

(A1010) ENGINEERING CHEMISTRY LAB
(Common to All Branches)

Objectives:

- Will learn practical understanding of the redox reaction
- Will learn the preparation and properties of synthetic polymers and other material that would provide sufficient impetus to engineer these to suit diverse applications
- Will also learn the hygiene aspects of water would be in a position to design methods to produce potable water using modern technology.

List of Experiments:

1. Determination of total hardness of water by EDTA method.
2. Determination of Copper by EDTA method.
3. Estimation of Dissolved Oxygen by Winkler's method
4. Estimation of iron (II) using diphenylamine indicator (Dichrometry – Internal indicator method).
5. Determination of Alkalinity of Water
6. Determination of acidity of Water
7. Preparation of Phenol-Formaldehyde (Bakelite)
8. Determination of Viscosity of oils using Redwood Viscometer I
9. Determination of Viscosity of oils using Redwood Viscometer II
10. Determination of calorific value of gaseous fuels by Junker's Calorimeter
11. Conductometric estimation of strong acid using standard sodium hydroxide solution
12. Determination of Corrosion rate and inhibition efficiency of an inhibitor for mild steel in hydrochloric acid medium.
13. Potentio metric determination of iron using standard potassium dichromate
14. Colorometric estimation of manganese.
15. pH meter calibration and measurement of pH of water and various other samples.

(Any 10 experiments from the above list)

References:

1. Vogel's Text book of Quantitative Chemical Analysis, Sixth Edition – Mendham J et al, Pearson Education, 2012.
2. Chemistry Practical– Lab Manual, First edition, Chandra Sekhar KB, Subba Reddy GV and Jayaveera KN, SM Enterprises, Hyderabad, 2014.

Outcomes:

- Would be confident in handling energy storage systems and would be able combat chemical corrosion
- Would have acquired the practical skill to handle the analytical methods with confidence.
- Would feel comfortable to think of design materials with the requisite properties
- Would be in a position to technically address the water related problems.

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

4 **2**

(A1302) ENGINEERING & I.T. WORKSHOP

ENGINEERING WORKSHOP

Course Objective:

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

1. TRADES FOR EXERCISES:

a. Carpentry shop– Two joints (exercises) involving tenon and mortising, groove and tongue: Making middle lap T joint, cross lap joint, mortise and tenon T joint, Bridle T joint from out of 300 x 40 x 25 mm soft wood stock
b. Fitting shop– Two joints (exercises) from: square joint, V joint, half round joint or dove tail joint out of 100 x 50 x 5 mm M.S. stock
c. Sheet metal shop– Two jobs (exercises) from: Tray, cylinder, hopper or funnel from out of 22 or 20 guage G.I. sheet
d. House-wiring– Two jobs (exercises) from: wiring for ceiling rose and two lamps (bulbs) with independent switch controls with or without looping, wiring for stair case lamp, wiring for a water pump with single phase starter.
e. Foundry– Preparation of two moulds (exercises): for a single pattern and a double pattern.
f. Welding – Preparation of two welds (exercises): single V butt joint, lap joint, double V butt joint or T fillet joint.

2. TRADES FOR DEMONSTRATION:

a. Plumbing
b. Machine Shop
c. Metal Cutting

Apart from the above the shop rooms should display charts, layouts, figures, circuits, hand tools, hand machines, models of jobs, materials with names such as different woods, wood faults, Plastics, steels, meters, gauges, equipment, CD or DVD displays, First aid, shop safety etc. (though they may not be used for the exercises but they give valuable information to the student). In the class work or in the examination knowledge of all shop practices may be stressed upon rather than skill acquired in making the job.

References:

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

I.T. WORKSHOP

Course Objective:

- To provide Technical training to the students on Productivity tools like Word processors, Spreadsheets, Presentations
- To make the students know about the internal parts of a computer, assembling a computer from the parts, preparing a computer for use by installing the operating system
- To learn about Networking of computers and use Internet facility for Browsing and Searching.

Learning Outcome:

- Disassemble and Assemble a Personal Computer and prepare the computer ready to use.
- Prepare the Documents using Word processors
- Prepare Slide presentations using the presentation tool
- Interconnect two or more computers for information sharing
- Access the Internet and Browse it to obtain the required information
- Install single or dual operating systems on computer

Preparing your Computer (5 weeks)

Task 1: Learn about Computer: Identify the internal parts of a computer, and its peripherals. Represent the same in the form of diagrams including Block diagram of a computer. Write specifications for each part of a computer including peripherals and specification of Desktop computer. Submit it in the form of a report.

Task 2: Assembling a Computer: Disassemble and assemble the PC back to working condition. Students should be able to trouble shoot the computer and identify working and non-working parts. Student should identify the problem correctly by various methods available (eg: beeps). Students should record the process of assembling and trouble shooting a computer.

Task 3: Install Operating system: Student should install Linux on the computer. Student may install another operating system (including proprietary software) and make the system dual boot or multi boot. Students should record the entire installation process.

Task 4: **Operating system features**: Students should record the various features that are supported by the operating system(s) installed. They have to submit a report on it. Students should be able to access CD/DVD drives, write CD/DVDs, access pen drives, print files, etc. Students should install new application software and record the installation process.

Networking and Internet (4 weeks)

Task 5: Networking: Students should connect two computers directly using a cable or wireless connectivity and share information. Students should connect two or more computers using switch/hub and share information. Crimpling activity, logical configuration etc should be done by the student. The entire process has to be documented.

Task 6: Browsing Internet: Student should access the Internet for Browsing. Students should search the Internet for required information. Students should be able to create e-mail account and send email. They should get acquaintance with applications like Facebook, skype etc.

If Intranet mailing facility is available in the organization, then students should share the information using it. If the operating system supports sending messages to multiple users (LINUX supports it) in the same network, then it should be done by the student. Students are expected to submit the information about different browsers available, their features, and search process using different natural languages, and creating e-mail account.

Task 7: Antivirus: Students should download freely available Antivirus software, install it and use it to check for threats to the computer being used. Students should submit information about the features of the antivirus used, installation process, about virus definitions, virus engine etc.

Productivity tools (6 weeks)

Task 8: Word Processor: Students should be able to create documents using the word processor tool. Some of the tasks that are to be performed are inserting and deleting the characters, words and lines, Alignment of the lines, Inserting header and Footer, changing the font, changing the color, including

images and tables in the word file, making page setup, copy and paste block of text, images, tables, linking the images which are present in other directory, formatting paragraphs, spell checking, etc. Students should be able to prepare project cover pages, content sheet and chapter pages at the end of the task using the features studied. Students should submit a user manual of the word processor considered.

Task 9: Spreadsheet: Students should be able to create, open, save the application documents and format them as per the requirement. Some of the tasks that may be practiced are Managing the worksheet environment, creating cell data, inserting and deleting cell data, format cells, adjust the cell size, applying formulas and functions, preparing charts, sorting cells. Students should submit a user manual of the Spreadsheet application considered.

Task 10: Presentations : creating, opening, saving and running the presentations, Selecting the style for slides, formatting the slides with different fonts, colors, creating charts and tables, inserting and deleting text, graphics and animations, bulleting and numbering, hyperlinking, running the slide show, setting the timing for slide show. Students should submit a user manual of the Presentation tool considered.

Optional Tasks:

Task 11: Laboratory Equipment: Students may submit a report on specifications of various equipment that may be used by them for the laboratories in their curriculum starting from I B.Tech to IV. B.Tech. It can vary from department to department. Students can refer to their syllabus books, consult staff members of the concerned department or refer websites. The following is a sample list. Instructors may make modifications to the list to suit the department concerned.

- Desktop computer
- Server computer
- Switch (computer science related)
- Microprocessor kit
- Micro controller kit
- Lathe machine
- Generators
- Construction material
- Air conditioner
- UPS and Inverter
- RO system
- Electrical Rectifier
- CRO
- Function Generator
- Microwave benches

Task 12: Software: Students may submit a report on specifications of various software that may be used by them for the laboratories in their curriculum starting from I B.Tech to IV. B.Tech. The software may be proprietary software or Free and Open source software. It can vary from department to department. Students can refer to their syllabus books, consult staff members of the concerned department or refer websites. The following is a sample list. Instructors may make modifications to the list to suit the department concerned.

- Desktop operating system
- Server operating system
- Antivirus software
- MATLAB

- CAD/CAM software
- AUTOCAD

References:

1. Introduction to Computers, Peter Norton, Mc Graw Hill
2. MOS study guide for word, Excel, Powerpoint & Outlook Exams", Joan Lambert, Joyce Cox, PHI.
3. Introduction to Information Technology, ITL Education Solutions limited, Pearson Education.
4. Networking your computers and devices, Rusen, PHI
5. Trouble shooting, Maintaining & Repairing PCs", Bigelows, TMH

G.PULLAIAH COLLEGE OF ENGINEERING AND TECHNOLOGY
(AUTONOMOUS)
COURSE STRUCTURE OF III AND IV SEMESTERS - B.TECH (R18)
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

III SEMESTER										
S.No.	**Course Code**	**Course**	**Category**	**Periods per Week**			**Credits**	**Scheme of Examination Maximum Marks**		
				L	**T**	**P**		**Internal**	**External**	**Total**
1	A1505	Object Oriented programming through Java	PC	3	1	0	4	30	70	100
2	A1506	Database Management System	PC	3	1	0	4	30	70	100
3	A1507	Discrete Mathematics	PC	4	0	0	4	30	70	100
4	A1416	Digital Logic & Computer Organization	ES	4	0	0	4	30	70	100
5	A1701	Managerial Economics & Financial Analysis	HS	3	0	0	3	30	70	100
6	A1508	Database Management System Lab	PC	0	0	3	1.5	30	70	100
7	A1509	Object Oriented Programming Lab using Java	PC	0	0	3	1.5	30	70	100
8	A1417	Digital Electronics Lab	ES	0	0	2	1	30	70	100
9	A1012	Quantitative Aptitude-1	BS	1	0	0	1	30	70	100
		TOTAL		**18**	**02**	**08**	**24**	**270**	**630**	**900**

IV SEMESTER										
S.No.	Course Code	Course	Category	Periods per Week			Credits	Scheme of Examination Maximum Marks		
				L	T	P		Internal	External	Total
1	A1014	Probability and Statistics	BS	3	1	0	4	30	70	100
2	A1510	Software Engineering	PC	3	1	0	4	30	70	100
3	A1511	Operating Systems	PC	3	0	0	3	30	70	100
4	A1512	Design And Analysis of Algorithms	PC	4	0	0	4	30	70	100
5	A1513	Formal Languages and Automata Theory	PC	3	0	0	3	30	70	100
6	A1514	R Programming Lab	PC	0	0	3	1.5	30	70	100
7	A1515	Design and Algorithms Lab	PC	0	0	2	1	30	70	100
8	A1516	Web Programming Lab	PC	0	0	3	1.5	30	70	100
9	A1013	Verbal ability and logical reasoning	HS	1	0	0	1	30	70	100
10	A1517	Comprehensive Online Examination	PC	0	0	0	1	-	100	100
		TOTAL		**17**	**02**	**08**	**24**	**270**	**730**	**1000**

Category	Description
PC	Professional course
HS	Humanities course
BS	Basic sciences
OE	Open elective
PE	Professional elective
PW	Project work
ES	Engineering sciences

G.PULLAIAH COLLEGE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)
OBJECT ORIENTED PROGRAMMING USING JAVA - R18 Regulations
DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

Title of the course:	**OBJECT ORIENTED PROGRAMMING USING JAVA**			
Branches for which this course is offered:	**B.TECH III SEMESTER (CSE)**	**L**	**T**	**P**
		3	**1**	**0**

COURSE OVERVIEW:
• Study the syntax, semantics and features of Java Programming Language • Learn the method of creating Multi-threaded programs and handle exceptions • Learn Java features to create GUI applications & perform event handling

COURSE OUTCOMES:	
After successful completion of the course, the student will be able to	
CO1	Analyze the necessity for Object Oriented Programming paradigm over structured programming and become familiar with the fundamental concepts in OOP like encapsulation, Inheritance and Polymorphism.
CO2	Demonstrate an ability to design and develop java programs, analyze, and interpret object oriented data and report results.
CO3	Demonstrate an ability to design an object oriented system, swing components and multithreaded processes as per needs and specifications.
CO4	Demonstrate an ability to visualize and work on laboratory and multidisciplinary tasks like console and windows applications both for standalone and Applets programs.
CO5	Demonstrate skills to use latest object oriented programming language and software to analyze OOP problems.
CO6	Develop confidence for self education and ability for life-long learning needed for advanced java technologies.

Course Content:		
UNIT-I	**The History and Evolution of Java:**	**LECTURE HOURS: 12**

Java‟s Lineage, The Creation of java, how java changed the internet, **Java's magic:** The byte code, **Servlets:** java on the server side, java Buzzwords, Evolution of java.

An Overview of Java:

Object Oriented Programming, Two control statements, Using blocks of codes, Lexical issues, The java class Libraries.

Data Types, Arrays and Variables:

Primitive Types, Integers, Floating-point Types, Characters, Booleans, literals, variables, Type conversion and casting, Automatic Type Promotion in Expressions, Arrays, strings, Pointers.

UNIT-II	Operators:	LECTURE HOURS: 14

Arithmetic Operators, The Bitwise Operators, Relational Operators, Boolean Logic operators, The assignment operator, The ? Operator, Operator Precedence, Using Parentheses.

Control Statements:

Java‟s selection Statements, Iteration statements, Jump Statements.

Introducing Classes:

Class Fundamentals, Declaring Objects, Assuming Object reference Variables, Introducing Methods, Constructors, The this Keyword, Garbage Collection, The Finalize() method, A Stack class. Overloading Methods, Using Object as Parameter, Argument Passing, Returning Objects, Recursion, Introducing Access control, Understanding static, Introducing Nested and Inner classes, Exploring the String class, Using Command line Arguments, Varargs: variable-Length Arguments.

UNIT-III	Inheritance:	LECTURE HOURS: 14

Basics, Using super, creating a multi level hierarchy, when constructors are executed, method overriding, dynamic method dispatch, using abstract class, using final with inheritance, the object class.

Packages and Interfaces:

Packages, Access protection, Importing Packages, Interfaces, Default Interfaces, Default interface methods, Use static methods in an Interface, Final thoughts on Packages and interface**s.**

Exception Handling:

Exception handling Fundamentals, Exception Types, Uncaught Exceptions, Using try and catch, Multiple catch clauses, Nested try statements, throw, throws, finally, Java Built-in Exceptions, Creating your own exception subclasses, Chained Exceptions, Three Recently added Exceptions features, Using Exceptions.

UNIT-IV	Multithreaded Programming:	LECTURE HOURS: 12

The java Thread Model, The main thread , Creating Thread, Creating Multiple Threads, Using isAlive() and join(), Thread Priorities, Synchronization, Interthread Communication, Suspending, resuming and stopping threads, Obtaining a thread state, Using Multithreading.

Input and Output operations:

I/O basics, Reading Console input, Writing console Output, The PrintWriter class, Reading and writing files, Automatically closing a file.

UNIT-V	Swing	LECTURE HOURS: 12

Introducing Swing: The Origins of Swing, Two Key Swing Features, Components and Containers, The Swing Packages, A Simple Swing Application, Event Handling, Create a Swing Applet.

Exploring Swing: JLabel and ImageIcon, JTextField, The Swing Buttons, JScrollPane, JList, JComboBox, JTree, JTable.

Text Books:	
1	”Java The Complete Reference”, Herbert Schildt, MC GRAW HILL Education, 9th Edition,2016.

Reference Books:	
1	“Programming with Java” T.V.Suresh Kumar, B.Eswara Reddy, P.Raghavan Pearson Edition.
2	“Java Fundamentals - A Comprehensive Introduction”, Herbert Schildt and Dale Skrien, Special Indian Edition, McGrawHill, 2013.
3	“Java – How to Program”, Paul Deitel, Harvey Deitel, PHI.
4	“Core Java”, NageswarRao, Wiley Publishers.
5	“Thinking in Java”, Bruce Eckel, Pearson Education.
6	“A Programmers Guide to Java SCJP”, Third Edition, Mughal, Rasmussen, Pearson.
7	“Head First Java”, Kathy Sierra, Bert Bates, O‟Reilly “SCJP – Sun Certified Programmer for Java Study guide” – Kathy Sierra, Bert Bates, McGrawHill

G.PULLAIAH COLLEGE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)
DATABASE MANAGEMENT SYSTEMS - R18 Regulations
DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

Title of the course:	**DATABASE MANAGEMENT SYSTEMS**			
Branches for which this course is offered:	**B.TECH III SEMESTER (CSE)**	**L**	**T**	**P**
		3	**1**	**0**

COURSE OVERVIEW:
• To understand the basic concepts and the applications of database systems. • To master the basics of SQL and construct queries using SQL. • To understand the relational database design principles. • To become familiar with the basic issues of transaction processing and concurrency control. • To become familiar with database storage structures and access techniques.

COURSE OUTCOMES:	
After successful completion of the course, the student will be able to	
CO1	Understand the basic concepts of database, data models and to apply the same to get the solution for database related problems using Entity Relationship model.
CO2	Understand the relational database and be able to write relational algebra and calculus expressions. Ability to design database by applying appropriate normalization techniques.
CO3	Apply optimized SQL queries to solve real time problems.
CO4	Create data elements and index structures.
CO5	Analyze the system failures and concurrency control.
CO6	Apply the concepts for the latest technologies and techniques.

Course Content:		
UNIT-I	**Introduction**	**LECTURE HOURS: 12**
Introduction-Basics of Database System and its Applications, Database System Principles **Data View** - Data Abstraction, Instances and Schemas, Data Models, Database Languages, Database Architecture, Database Users and Administrators, Introduction to Database design **ER diagrams**- Entities, Attributes and Entity sets, Relationship sets, Additional features of ER Model, Conceptual Design with ER Model **Relational Model:** Fundamentals of Relational Model - Integrity Constraints over Relations, Enforcing Integrity constraints, Querying relational data, Logical data base Design, Introduction to Views Destroying/ altering Tables and Views.		

UNIT-II	Relational Algebra and SQL	LECTURE HOURS: 12
Relational Algebra - Selection and Projection, Set operations, Renaming, Joins, Division, Examples of Algebra Queries **Basic SQL Queries** - Examples of Basic SQL Queries, Introduction to Sub queries, Correlated Sub queries, Set - Comparison Operators, Aggregate Operators, NULL values - Comparison using Null values, AND, OR and NOT - Impact on SQL Constructs, Outer Joins, Disallowing NULL values, Complex Integrity Constraints in SQL Triggers and Active Data bases.		
UNIT-III	**Fundamentals of Schema Refinement**	**LECTURE HOURS: 14**
Schema Refinement - Redundancy Issues, Decompositions - Examples related to decompositions, Functional Dependencies **Normal Forms -** FIRST, SECOND, THIRD Normal forms – BCNF, Properties of Decompositions - Loss less join Decomposition, Dependency preserving Decomposition, Schema Refinement in Data base Design, Multi valued Dependencies - FOURTH Normal Form, FIFTH Normal form.		
UNIT-IV	**Transaction Management**	**LECTURE HOURS: 12**
Transaction Concept - Transaction State, ACID Properties, Concurrency control, Serializability and Recoverability, Implementation of Isolation , Testing for serializability **Concurrency Control** - Lock Based Protocols, Timestamp Based Protocols, Validation Based Protocols. **Recovery System** - Failure Classification, Storage Structure Recovery and Atomicity, Log Based Recovery, Advance Recovery systems, Remote Backup systems.		
UNIT-V	**Storage and Indexing**	**LECTURE HOURS: 14**
Data on External Storage - File Organization and Indexing - Clustered Indexes, Primary and Secondary Indexes, Index data Structures - Hash Based Indexing, Tree based Indexing Comparison of File Organizations. **Tree Structured Indexing**- Intuitions for tree indexes, Indexed Sequential Access Methods(ISAM) , B+ Trees: A Dynamic Index Structure and its operations. **Hash Based Indexing** - Static Hashing, Extendable hashing, Linear Hashing.		

Text Books:	
1	Data base Management Systems, Raghurama Krishnan, Johannes Gehrke, McGrawHill Education, 3rd Edition, 2003.
2	Data base System Concepts, A.Silberschatz, H.F. Korth, S.Sudarshan, McGraw Hill, VI edition, 2006.

Reference Books:	
1	Database Systems, 6th edition, Ramez Elmasri, Shamkat B. Navathe, Pearson Education, 2013.
2	Database Systems Concepts, Peter Rob & Carlos Coronel, Cengage Learning, 2008.
3	Introduction to Database Systems, C.J. Date, Pearson Education.
4	Database Management Systems, G.K. Gupta, McGrawHill Education.

G.PULLAIAH COLLEGE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)
DISCRETE MATHEMATICS - R18 Regulations
DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

Title of the course:	**DISCRETE MATHEMATICS**			
Branches for which this course is offered:	**B.TECH III SEMESTER (CSE)**	**L**	**T**	**P**
		4	**0**	**0**

COURSE OVERVIEW:
• Understand the methods of discrete mathematics such as proofs, counting principles, number theory, logic and set theory. • Understand the concepts of graph theory, binomial theorem, and generating function in analysis of various computer science applications.

COURSE OUTCOMES:	
After successful completion of the course, the student will be able to	
CO1	Understand definitions and proofs using basic discrete mathematics.
CO2	Create and interpret statements presented in Boolean logic.
CO3	Create short proofs using direct proof, indirect proof, proof by contradiction, and case analysis.
CO4	Demonstrate a working knowledge of set notation and elementary set theory, recognize the connection between set operations and logic, prove elementary results involving sets.
CO5	Apply the different properties of injections, surjection, bisections, compositions, and inverse functions.
CO6	Solve the mathematical problems that involve computing permutations and combinations of a set, fundamental enumeration principles and graph theory

Course Content:		
UNIT-I	**Mathematical Logic**	**LECTURE HOURS: 12**
Introduction, Connectives, Normal Forms, The theory of Inference for the Statement Calculus, The Predicate Calculus, Inference Theory of Predicate Calculus.		
UNIT-II	**SET Theory**	**LECTURE HOURS: 12**
Basic concepts of Set Theory, Representation of Discrete structures, Relations and Ordering, Functions, Recursion.		
UNIT-III	**Algebraic Structures**	**LECTURE HOURS: 14**

Algebraic Systems: Examples and General Properties, Semi groups and Monoids, Polish expressions and their compilation, **Groups:** Definitions and Examples, Subgroups and Homomorphism‟s, Group Codes.

Lattices and Boolean algebra:

Lattices and Partially Ordered sets, Boolean algebra.

UNIT-IV	**An Introduction to Graph Theory**	**LECTURE HOURS: 14**

Definitions and Examples, Sub graphs, complements, Graph Isomorphism, **Vertex Degree:** Euler Trails and Circuits, Planar Graphs, Hamilton Paths and Cycles, Graph Coloring and Chromatic Polynomials

Trees:

Definitions, Properties, Examples, Rooted Trees, Trees and Sorting, Weighted trees and Prefix Codes, Biconnected Components and Articulation Points

UNIT-V	**Fundamental Principles of Counting**	**LECTURE HOURS: 12**

The rules of Sum and Product, Permutations, **Combinations:** The Binomial Theorem, Combinations with Repetition

The Principle of Inclusion and Exclusion:

The Principle of Inclusion and Exclusion, Generalizations of Principle, **Derangements:** Nothing is in Its Right Place, Rook Polynomials, Arrangements with Forbidden Positions

Generating Functions:

Introductory Examples, **Definitions and Examples**: Calculation Techniques, Partitions of Integers, The Exponential Generating Functions, The Summation Operator.

Text Books:

1	“Discrete Mathematical Structures with Applications to Computer Science”, J.P. Tremblay and R. Manohar, Mc Graw Hill Education,2015.
2	“Discrete and Combinatorial Mathematics, an Applied Introduction”, Ralph P. Grimaldi and B.V.Ramana, Pearson, 5th Edition, 2016.

Reference Books:

1	Graph Theory with Applications to Engineering by NARSINGH DEO, PHI.
2	Discrete Mathematics by R.K.Bishtand H.S. Dhami, Oxford Higher Education.
3	Discrete Mathematics theory and Applications by D.S.Malik and M.K.Sen, Cenegage Learning.
4	Elements of Discrete Mathematics, A computer Oriented approach by C L Liu and D P Mohapatra, MC GRAW HILL Education.
5	Discrete Mathematics for Computer scientists and Mathematicians by JOE L.Mott, Abraham Kandel and Theodore P.Baker, Pearson ,2nd Edition

G PULLAIAH COLLEGE OF ENGINEERING AND TECHNOLOGY
(AUTONOMOUS)
Digital logic and Computer Organization - R18 Regulation
DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

Title of the Course:	**Digital logic and Computer organization**			
Branch for which this course is offered:	**III Semester (CSE)**	**L**	**T**	**P**
		4	**0**	**0**

Course Overview:
The course addresses the concepts, principles and techniques of designing digital systems. The course teaches the fundamentals of digital systems applying the logic design and development techniques. Students will learn principles of digital systems logic design and distinguish between analog and digital representations. They will be able to analyze a given combinational or sequential circuit using k-map and Boolean algebra as a tool to simplify and design logic circuits. Construct and analyze the operation of a latch, flip-flop and its application in synchronization circuits provide a thorough discussion of the fundamentals of computer organization and to relate these to contemporary design issues. A computer system is like any other system, consists of an inter-related set of components

Course Outcomes:	
After successful completion of the course, the student will be able to	
CO1	Understand the fundamental concepts of digital circuits.
CO2	Apply the knowledge of digital circuits concepts to minimize a digital circuit for the given parameters using mapping techniques.
CO3	Construct and analyze various combinational circuits used in digital systems such as adders, subtractors, code-convertors, decoders, encoders, and multiplexers,
CO4	Construct and analyze various sequential circuits used in digital systems such as flip-flops, registers and counters.
CO5	Understand the basic concepts of computer and computer arithmetic.
CO6	Analyze the basic processing unit and pipelining .

Course Content:		
Unit-I	**BINARY SYSTEMS ,BOOLEAN ALGEBRA AND LOGIC GATES**	Lecture Hours: 12
BINARY SYSTEMS**:** Digital Systems, Binary Numbers, Number Base Conversions, Octal and Hexadecimal Numbers, Compliments, Signed Binary Numbers, Binary Codes, BOOLEAN ALGEBRA AND LOGIC GATES**:** Basic Definitions, Axiomatic Definition of Boolean Algebra, Basic Theorems and properties of Boolean Algebra, Boolean Functions, Canonical and Standard Forms, Digital Logic Gates		

Unit-II	**GATE LEVEL MINIMIZATION AND COMBINATIONAL LOGIC**	Lecture Hours: 12
GATE LEVEL MINIMIZATION**:** The Map Method, Four Variable Map, Don‟t-Care Conditions, NAND and NOR Implementation COMBINATIONAL LOGIC**:** Combinational Circuits, Design Procedure, Binary Adder-Subtractor, Decimal Adder, Magnitude Comparator, Decoders, Encoders, Multiplexers		
Unit-III	**SYNCHRONOUS SEQUENTIAL LOGIC**	Lecture Hours: 12
SYNCHRONOUS SEQUENTIAL LOGIC: Sequential Circuits, Latches, Flip-Flops, Analysis of Clocked Sequential Circuits, Design Procedure, Registers, Shift Registers, Ripple Counters, Synchronous Counters, Other counters.		
Unit-IV	**BASIC STRCTURE OF COMPUTER ARTHMETIC**	Lecture Hours: 12
BASIC STRCTURE OF COMPUTER: Computer Types, Functional Units, Basic operational Concepts, Bus Structure, Software, Performance, Multiprocessors and Multicomputer. ARTHMETIC: Design and Fast Adders, Multiplication of Positive Numbers, Signed-operand Multiplication, Fast Multiplication, Integer Division		
Unit-V	**BASIC PROCESSING UNIT& PIPELINING**	Lecture Hours: 12
BASIC PROCESSING UNIT**:** Fundamental Concepts, Execution of a Complete Instruction, Multiple- Bus Organization, Hardwired Control, Multi programmed Control. IPELINING**:** Basic Concepts, Data Hazards, Instruction Hazards, The Structure of General-Purpose Multiprocessors, Interconnection Networks.		

Text Books:	
1	Digital Design, M.Morris Mano &Micheal D. Ciletti, Pearson, 5th Edition, 2013.
2	Digital Logic & State Machine Design, David J. Comer, Oxford University Press, 3rd Reprinted Indian Edition, 2012.
3.	“Computer Organization”, Carl Hamacher, ZvonkoVranesic, SafwatZaky, McGraw Hill Education, 5th Edition, 2013**.**
Reference Books:	
1	Digital Logic Design, R.D. Sudhakar Samuel, Elsevier
2	Fundamentals of Logic Design, 5/e, Roth, Cengage
3	Switching and Finite Automata Theory,3/e,Kohavi, Jha, Cambridge.
4	Computer System Architecture, M.Morris Mano, Pearson Education, 3rd Edition.
5	Computer Organization and Architecture, SmrutiRanjanSarangi, McGraw Hill Education.

G.PULLAIAH COLLEGE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)
MANAGERIAL ECONOMICS & FINANCIAL ANALYSIS - R18 Regulations
DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

Title of the course:	**MANAGERIAL ECONOMICS & FINANCIAL ANALYSIS**			
Branches for which this course is offered:	**B.TECH III SEMESTER (CSE)**	**L**	**T**	**P**
		3	**0**	**0**

COURSE OVERVIEW:
The objective of this course is to equip the student with the basic inputs of Managerial Economics and Economic Environment of business and to impart analytical skills in helping them take sound financial decisions for achieving higher organizational productivity.

COURSE OUTCOMES:	
After successful completion of the course, the student will be able to	
CO1	Understand, Concepts of economics, managerial economics, scope, nature and importance of managerial economics, demand determinants, law of demand and its exceptions.
CO2	Understand elasticity of demand, types and measurement of elasticity of demand, demand forecasting, methods of demand forecasting.
CO3	Understand production function, isoquants and isocosts, MRTS, least cost combination of inputs, Cobb-Douglas production function and law of return to scale. Types of cost, BEA, BEP.
CO4	Understand market structure, types of markets, price-output determination under perfect competition, monopoly, monopolistic competition and pricing methods.
CO5	Understand types of business organizations and LPG.
CO6	Understand capital, types, sources, estimation of capital requirements, capital budgeting and techniques of capital budgeting.

Course Content:		
UNIT-I	**INTRODUCTION TO MANAGERIAL ECONOMICS**	**LECTURE HOURS: 9**
Managerial Economics – Definition- Nature- Scope - Contemporary importance of Managerial Economics - Relationship of Managerial Economics with Financial Accounting and Management. –Inflation-**Demand Analysis**: Concept of Demand-Demand Function - Law of Demand - Elasticity of Demand- Significance - Types of Elasticity - Measurement of elasticity of demand - Demand Forecasting- factors governing demand forecasting- methods of demand forecasting.		

UNIT-II	THEORY OF PRODUCTION AND COST ANALYSIS	LECTURE HOURS: 9
Production Function- Least cost combination- Short-run and Long- run production function- Isoquants and ISO -costs, MRTS - Cobb-Douglas production function - Laws of returns - Internal and External economies of scale - **Cost Analysis**: Cost concepts and cost behavior- Break-Even Analysis (BEA) -Determination of Break Even Point (Simple Problems)-Managerial significance and limitations of Break- Even Point.GST-Impact.		
UNIT-III	**INTRODUCTION TO MARKETS AND NEW ECONOMIC ENVIRONMENT**	**LECTURE HOURS: 10**
Market structures: Types of Markets - Perfect and Imperfect Competition - Features of Perfect Competition- Monopoly-Monopolistic Competition-Oligopoly-Price-Output Determination - Pricing Methods and Strategies-Forms of Business Organizations- Sole Proprietorship- Partnership – Joint Stock Companies - Public Sector Enterprises – New Economic Environment- Economic Liberalization – Privatization – Globalization-National Income- GDP-monetary policy-Fiscal Policy		
UNIT-IV	**INTRODUCTION TO FINANCIAL ACCOUNTING AND ANALYSIS**	**LECTURE HOURS: 10**
Financial Accounting – Concept - Emerging need and Importance - Double-Entry Book Keeping- Journal - Ledger – Trial Balance - Financial Statements - Trading Account – Profit & Loss Account – Balance Sheet (with simple adjustments). Financial Analysis – Ratios – Liquidity, Leverage, Profitability, and Activity Ratios (simple problems).		
UNIT-V	**CAPITAL AND CAPITAL BUDGETING**	**LECTURE HOURS: 10**
Concept of Capital - Over and Undercapitalization – Remedial Measures - Sources of Shot term and Long term Capital - Estimating Working Capital Requirements – Capital Budgeting – Features of Capital Budgeting Proposals – Methods and Evaluation of Capital Budgeting Projects – Pay Back Method – Accounting Rate of Return (ARR) – Net Present Value (NPV) – Internal Rate Return (IRR) Method (simple problems)		

Text Books:	
1	Managerial Economics 3/e, Ahuja H.L, S.Chand, 2013.
2	Financial Management, I.M.Pandey, Vikas Publications, 2013.

Reference Books:	
1	Managerial Economics and Financial Analysis, 1/e, Aryasri, TMH, 2013.
2	Managerial Economics and Financial Analysis, S.A. Siddiqui and A.S. Siddiqui, New Age International, 2013.
3	Accounting and Financial Mangement, T.S.Reddy & Y. Hariprasad Reddy, Margham Publishers.

G.PULLAIAH COLLEGE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)
DATABASE MANAGEMENT SYSTEMS LABORATORY-R18 Regulations
DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

Title of the course:	**DATABASE MANAGEMENT SYSTEMS LABORATORY**			
Branches for which this course is offered:	**B.TECH III SEMESTER (CSE)**	**L**	**T**	**P**
		0	**0**	**3**

COURSE OVERVIEW:
• To create a database and query it using SQL, design forms and generate reports. • Understand the significance of integrity constraints, referential integrity constraints, triggers, assertions.

COURSE OUTCOMES:	
After successful completion of the course, the student will be able to	
CO1	Gain knowledge and understand the data models used for structuring data in database systems.
CO2	Understand the general principles of Retrieving information from databases
CO3	Analyze the best possible ways of solving a given query.
CO4	Evaluate the complex nested queries on multiple relations.
CO5	Implement various integrity constraints, triggers and views in database design.
CO6	Analyze the latest technologies and techniques.

Course Content:

TASK-1	**CREATION OF TABLES:**	**PRACTICAL HOURS: 4**

Create a table called **Employee** with the following structure.

Name	**Type**
Empno	Number
Ename	Varchar2(20)
Job	Varchar2(20)
Doj	Number
Sal	Number

a. Add a column commission with domain to the Employeetable.
b. Insert any five records into thetable.
c. Update the column details ofjob
d. Rename the column of Employ table using altercommand.
e. Delete the employee whose empno is19.

TASK-2		PRACTICAL HOURS: 3

Create **department** table with the followingstructure.

Name	Type
Deptno	Number
Deptname	Varchar2(20)
location	Varchar2(20)

a. Add column designation to the departmenttable.
b. Insert values into thetable.
c. List the records of emp table grouped bydeptno.
d. Update the record where deptno is9.
e. Delete any column data from thetable.

TASK-3		PRACTICAL HOURS: 4

Create a table called **Customer**table

Name	Type
Cust name	Varchar2(20)
Cust street	Varchar2(20)
Cust city	Varchar2(20)

a. Insert records into thetable.
b. Add salary column to thetable.
c. Alter the table columndomain.
d. Drop salary column of the customertable.
e. Delete the rows of customer table whose cust_city is,,kurnool".

TASK-4		PRACTICAL HOURS: 4

Create a table called **branch**table.

Name	Type
Branchname	Varchar2(20)
Branchcity	Varchar2(20) asserts
Branchname	Varchar2(20)

a. Increase the size of data type for asserts to the branch.
b. Add and drop a column to the branch table.
c. Insert values to the table.
d. Update the branch name column
e. Delete any two columns from the table

TASK-5		PRACTICAL HOURS: 4

Create a table called **sailor** table

Name	Type
Sid Number	Sname Varchar2(20)
Rating Varchar2(20)	Varchar2(20)
Sid Number	Sname Varchar2(20)

a. Add column age to the sailor table.
b. Insert values into the sailor table.
c. Delete the row with rating >8.
d. Update the column details of sailor.
e. Insert null values into the table.

TASK-6		PRACTICAL HOURS: 4

Create a table called **reserves**table

Name	Type
Boat id	Integer
sid	Integer
day	Integer

a. Insert values into the reservestable.
b. Add column time to the reservestable.
c. Alter the column day data type todate.
d. Drop the column time in thetable.
e. Delete the row of the table with somecondition.

TASK-7	QUERIES USING DDL AND DML	PRACTICAL HOURS: 6

A college consists of number of employees working in different departments. In this context, create two tables**employee** and **department**. Employee consists of columns empno, empname, basic, hra, da, deductions, gross, net, date-of-birth. The calculation of hra,da are as per the rules of the college. Initially only empno, empname, basic have valid values. Other values are to be computed and updated later. Department contains deptno, deptname, and description columns. Deptno is the primary key in department table and referential integrity constraint exists between employee and department tables. Perform the following operations on the the database:

- Create tables department and employee with required constraints.
- Initially only the few columns (essential) are to be added. Add the remaining columns separately by using appropriate SQL command
- Basic column should not be null
- Add constraint that basic should not be less than 5000.
- Calculate hra,da,gross and net by using PL/SQL program.
- Whenever salary is updated and its value becomes less than 5000 a trigger has to be raised preventing the operation.
- The assertions are: hra should not be less than 10% of basic and da should not be less than 50% of basic.

- The percentage of hra and da are to be stored separately.
- When the da becomes more than 100%, a message has to be generated and with user permission da has to be merged with basic.
- Empno should be unique and has to be generated automatically.
- If the employee is going to retire in a particular month, automatically a message has to be generated.
- The default value for date-of-birth is 1 jan, 1970.
- When the employees called daily-wagers are to be added the constraint that salary should be greater than or equal to 5000 should be dropped.
- Display the information of the employees and departments with description of the fields.
- Display the average salary of all the departments.
- Display the average salary department wise.
- Display the maximum salary of each department and also all departments put together.
- Commit the changes whenever required and rollback if necessary.
- Use substitution variables to insert values repeatedly.
- Assume some of the employees have given wrong information about date-of-birth. Update the corresponding tables to change the value.
- Find the employees whose salary is between 5000 and 10000 but not exactly 7500.
- Find the employees whose name contains „en".
- Try to delete a particular deptno. What happens if there are employees in it and if there are no employees.
- Create alias for columns and use them in queries.
- List the employees according to ascending order of salary.
- List the employees according to ascending order of salary in each department.
- Use „&&" wherever necessary
- Amount 6000 has to be deducted as CM relief fund in a particular month which has to be accepted as input from the user. Whenever the salary becomes negative it has to be maintained as 1000 and the deduction amount for those employees is reduced appropriately.
- The retirement age is 60 years. Display the retirement day of all the employees.
- If salary of all the employees is increased by 10% every year, what is the salary of all the employees at retirement time.
- Find the employees who are born in leap year.
- Find the employees who are born on feb 29.
- Find the departments where the salary of atleast one employee is more than 20000.
- Find the departments where the salary of all the employees is less than 20000.
- On first January of every year a bonus of 10% has to be given to all the employees. The amount has to be deducted equally in the next 5 months. Write procedures for it.

TASK-8	**CURSORS**	**PRACTICAL HOURS: 3**

1. Write a PL/SQL block that will display the name, dept no, salary of fist highest paid employees**.**
2. Update the balance stock in the item master table each time a transaction takes place in the item transaction table. The change in item master table depends on the item id is

already present in the item master then update operation is performed to decrease the balance stock by the quantity specified in the item transaction, in case the item id is not presentintheitemmastertablethen therecord isinsertedintheitemmastertable.

3. Write a PL/SQL block that will display the employee details along with salary using cursors.
4. To write a Cursor to display the list of employees who are working as a Managers or Analyst.
5. To write a Cursor to find employee with given job anddeptno.
6. Write a PL/SQL block using implicit cursor that will display message, the salaries of all the employees in the „employee‟ table are updated. If none of the employee‟s salaryare updated we get a message 'None of the salaries were updated'. Else we get a message

TASK-9	PROCEDURES AND FUNCTIONS	**PRACTICAL HOURS: 3**

1. Write a function to accept employee number as parameter and return Basic +HRA together as singlecolumn.
2. Accept year as parameter and write a Function to return the total net salary spent for a givenyear.
3. Create a function to find the factorial of a given number
4. Create function to the reverse of givennumber.

TASK-10	TRIGGERS	**PRACTICAL HOURS: 3**

1. Create a row level trigger for the customers table that would fire for INSERT or UPDATE or DELETE operations performed on the CUSTOMERS table. This trigger will display the salary difference between the old values and new values: CUSTOMERStable:

Id	**Name**	**Age**	**Address**	**Salary**
1	Sri Lakshmi	34	Kurnool	50000
2	Sreedhar	36	Hyderabad	80000
3	Neetu	30	Chennai	30000
4	Nymisha	29	Delhi	20000
5	Nishitha	25	Bombay	40000
6	Jyothsna	29	kurnool	60000

Creation of insert trigger, delete trigger, update trigger practice triggers using the passengerdatabase.

Passenger(Passport_ id INTEGER PRIMARY KEY, Name VARCHAR (50) Not NULL, Age); Integer Not NULL, Sex Char, Address VARCHAR (50) Not NULL

a. Write a Insert Trigger to check the Passport_id is exactly six digits ornot.
b. Write a trigger on passenger to display messages „1 Record is inserted‟, „1 record is deleted‟, „1 record is updated‟ when insertion, deletion and updation are done on passengerrespectively.

3. Insert row in employee table using Triggers. If any employee has same name it must be replaced by new name. These triggers can be raised before insert, update or delete rows on

data base.

4. Convert employee name into uppercase whenever an employee record is inserted or updated. Trigger to fire before the insert orupdate.

A Trigger before deleting a record from emp table. Trigger will insert the row to be deleted into table called delete _emp and also record user who has deleted the record and date and time of delete.

TASK-11	CASE STUDY GENERAL HOSPITAL	**PRACTICAL HOURS: 3**

A General Hospital consists of a number of specialized wards (such as Maternity, Pediatric, Oncology, etc). Each ward hosts a number of patients, who were admitted on the recommendation of their own GP and confirmed by a consultant employed by the Hospital. On admission, the personal details of every patient are recorded. A separate register is to be held to store the information of the tests undertaken and the results of a prescribed treatment. A number of tests may be conducted for each patient. Each patient is assigned to one leading consultant but may be examined by another doctor, if required. Doctors are specialists in some branch of medicine and may be leading consultants for a number of patients, not necessarily from the same ward. For the above case study, do thefollowing.

1. Analyze the datarequired.
2. Normalize theattributes.

Create the logical data model using E-R diagrams.
Create tables and generate Queries

TASK-12	CASE STUDY: CAR RENTAL COMPANY	**PRACTICAL HOURS: 3**

A database is to be designed for a car rental company. The information required includes a description of cars, subcontractors (i.e. garages), company expenditures, company revenues and customers. Cars are to be described by such data as: make, model, year of production, engine size, fuel type, number of passengers, registration number, purchase price, purchase date, rent price and insurance details. It is the company policy not to keep any car for a period exceeding one year. All major repairs and maintenance are done by subcontractors (i.e. franchised garages), with whom CRC has long-term agreements. Therefore the data about garages to be kept in the database includes garage names, addresses, range of services and the like. Some garages require payments immediately after a repair has been made; with others CRC has made arrangements for credit facilities. Company expenditures are to be registered for all outgoings connected with purchases, repairs, maintenance, insurance etc. Similarly the cash inflow coming from all sources: Car hire, car sales, insurance claims must be kept of file. CRC maintains a reasonably stable client base. For this privileged category of customers special credit card facilities are provided. These customers may also book in advance a particular car. These reservations can be made for any period of time up to one month. Casual customers must pay a deposit for an estimated time of rental, unless they wish to pay by credit card. All major credit cards are accepted. Personal details such as name, address, telephonenumber, Drivinglicense,numberabouteachcustomerarekeptinthedatabase.Fortheabovecase.

study, do the following:

1. Analyze the datarequired.
2. Normalize theattributes.

Create the logical data model using E-R diagrams.
Create tables and generate Queries

TASK-13	CASE STUDY: STUDENT PROGRESS MONITORING SYSTEM	PRACTICAL HOURS: 4

A database is to be designed for a college to monitor students' progress throughout their course of study. The students are reading for a degree (such as BA, BA (Hons) M.Sc., etc) within the framework of the modular system. The college provides a number of modules, each being characterized by its code, title, credit value, module leader, teaching staff and the department they come from. A module is coordinated by a module leader who shares teaching duties with one or more lecturers. A lecturer may teach (and be a module leader for) more than one module. Students are free to choose any module they wish but the following rules must be observed: Some modules require pre- requisites modules and some degree programmes have compulsory modules. The database is also to contain some information about students including their numbers, names, addresses, degrees they read for, and their past performance
i.e. modules taken and examination results. For the above case study, do the following:

1. Analyze the datarequired.
2. Normalize theattributes.
3. Create the logical data model i.e., ERdiagrams.
4. Create tables and generate Queries

Text Books:	
1	Data base Management Systems, Raghurama Krishnan, Johannes Gehrke, McGrawHill Education, 3rd Edition, 2003.
2	Data base System Concepts, A.Silberschatz, H.F. Korth, S.Sudarshan, McGraw Hill, VI edition, 2006.

Reference Books:	
1	“Oracle Database 11g PL/SQL Programming”, M.McLaughlin,TMH.
2	“Learning Oracle SQL and PL/SQL”, Rajeeb C. Chatterjee, PHI.
3	“Introduction to SQL”, Rick F.VanderLans, Pearson education.
4	“Oracle PL/SQL”, B.Rosenzweig and E.Silvestrova, Pearson education.

G.PULLAIAH COLLEGE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)
JAVA PROGRAMMING LABORATORY- R18 Regulations
DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

Title of the course:	**JAVA PROGRAMMING LABORATORY**			
Branches for which this course is offered:	**B.TECH III SEMESTER (CSE)**	**L**	**T**	**P**
		0	**0**	**3**

COURSE OVERVIEW:
• Learn to use object orientation to solve problems and use java language to implement them. • To experiment with the syntax and semantics of java language and gain experience with java programming

COURSE OUTCOMES:	
After successful completion of the course, the student will be able to	
CO1	Apply of data types , variables and control structures to solve problems
CO2	Apply object-oriented concepts to solve problems including generating series primes, searching a pattern in a file.
CO3	Design, write, debug and execute applet programs using Integrated Development Environment
CO4	Develop programs using threads and swing concepts
CO5	Apply I/O stream and networking classes to develop client and server interaction
CO6	Apply the concepts and create solution effectively as a member or leader in a team during the development of a software project.

Course Content:		
TASK-1		**LECTURE HOURS: 2**
Preparing and practice – Installation of Java software, study of any Integrated development environment, sample programs on operator precedence and associativity, class and package concept, scope concept, control structures, constructors and destructors. Learn to compile, debug and execute java programs.		
TASK-2		**LECTURE HOURS: 1**
Develop a java application for Banking transactions by using inheritance concept.		
TASK-3		**LECTURE HOURS: 1**
Develop a java application for Ticket Reservation by using the concept of Polymorphism.		
TASK-4		**LECTURE HOURS: 2**
Develop a java application for Daily Attendance by using the concept Dynamic Binding.		
TASK-5		**LECTURE HOURS: 2**
Write a program for the following • Develop a swing program that displays a simple message.		

• Develop a swing program for waving a Flag using Applets and Threads.		
TASK-6		**LECTURE HOURS: 2**
Write Java program(s) which uses the exception handling features of the language, creates exceptions and handles them properly, uses the predefined exceptions, and create own exceptions.		
TASK-7		**LECTURE HOURS: 2**
Write java program that inputs 5 numbers, each between 10 and 100 inclusive. As each number is read display it only if it‟s not a duplicate of any number already read. Display the complete set of unique values input after the user enters each new value.		
TASK-8		**LECTURE HOURS: 2**
Write Java program(s) on creating multiple threads, assigning priority to threads, synchronizing threads, suspend and resume threads		
TASK-9		**LECTURE HOURS: 2**
Write a java program to split a given text file into n parts. Name each part as the name of the original file followed by .part<n> where n is the sequence number of the part file.		
TASK-10		**LECTURE HOURS: 2**
Write a java program to create a super class called Figure that receives the dimensions of two dimensional objects. It also defines a method called area that computes the area of an object. The program derives two subclasses from Figure. The first is Rectangle and second is Triangle. Each of the sub classes override area() so that it returns the area of a rectangle and triangle respectively.		
TASK-11		**LECTURE HOURS: 2**
Write a Java program that creates three threads. First thread displays “Good Morning” every one second, the second thread displays “Hello” every two seconds and the third thread displays “Welcome” every three seconds		
TASK-12		**LECTURE HOURS: 2**
Using swings design a simple calculator which performs all arithmetic operations. The interface should look like the calculator application of the operating system. Handle the exceptions if any.		
TASK-13		**LECTURE HOURS: 2**
Write a java program to handle mouse events		
TASK-14		**LECTURE HOURS: 2**
Write a java program to handle keyboard events		
TASK-15		**LECTURE HOURS: 2**
Write a java program that allows conduction of object type examination containing multiple choice questions, and true/false questions. At the end of the examination when the user clicks a button the total marks have to be displayed in the form of the message.		
TASK-16		**LECTURE HOURS: 2**
Write a java program that creates menu which appears similar to the menu of notepad application of the Microsoft windows or any editor of your choice.		
TASK-17		**LECTURE HOURS: 2**
Write a java program that creates dialog box which is similar to the save dialog box of the Microsoft windows or any word processor of your choice		
TASK-18		**LECTURE HOURS: 2**
Write a Java program that correctly implements producer consumer problem using the concept of		

inter thread communication		
TASK-19		**LECTURE HOURS: 2**
Write a java program to find and replace pattern in a given file.		
TASK-20		**LECTURE HOURS: 2**
Use inheritance to create an exception super class called ExceptionA and exception sub classes ExceptionB and ExceptionC, where ExceptionB inherits from ExceptionA and ExceptionC inherits from ExceptionB. Write a java program to demonstrate that the catch block for type ExceptionA catches exception of type ExceptionB and ExceptionC.		
TASK-21		**LECTURE HOURS: 2**
Write a Java program which opens a connection to standard port on well known server, sends the data using socket and prints the returned data.		
TASK-22		**LECTURE HOURS: 2**
Write a Java program which uses TCP/IP and Datagrams to communicate client and server.		
TASK-23		**LECTURE HOURS: 2**
Create an interface for stack with push and pop operations. Implement the stack in two ways: fixed size stack and Dynamic stack (stack size is increased when stack is full).		
TASK-24		**LECTURE HOURS: 2**
Design a swings program for Hospital management system to maintain doctors and patients data and generate reports by using JDBC connectivity.		
TASK-25		**LECTURE HOURS: 2**
Develop a swing program with menu bar for college management system. The program should establish connectivity with back end for data transactions, it should generate necessary reports as per requirements.		

Text Books:	
1	”Java The Complete Reference”, Herbert Schildt, MC GRAW HILL Education, 9th Edition,2016.

Reference Books:	
1	“Java: How to Program”, P.J.Deitel and H.M.Deitel, PHI.
2	“Object Oriented Programming through Java”, P.Radha Krishna, Universities Press.
3	“Thinking in Java”, Bruce Eckel, Pearson Education
4	“Programming in Java”, S.Malhotra and S.Choudhary, Oxford Univ. Press.

G PULLAIAH COLLEGE OF ENGINEERING AND TECHNOLOGY
(AUTONOMOUS)
Digital Electronics Laboratory - R18 Regulation
DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

Title of the Course	**Digital Electronics Laboratory**			
Branch for which this course is offered	**III Semester (CSE)**	**L**	**P**	**C**
		-	**3**	**1.5**

Course Overview:
This Lab provides the students to study representation of switching functions using Boolean expressions and their minimization techniques, the combinational logic design of various logic and switching devices and their realization, the sequential logic circuits design both in synchronous and Asynchronous modes for various complex logic and switching devices.

Course Outcomes:	
After successful completion of the course, the student will be able to	
CO1	Design digital logic circuits using software.
CO2	Verify the logical operations of the digital logic gates in the laboratory.
CO3	Analyze the functionality of Combinational circuits using LogiSIM.
CO4	Analyze the functionality of Sequential Circuits using LogiSIM.
CO5	Design and analyze the code converters using LogiSIM.
CO6	Design and analyze the counters using LogiSIM.

Course Content:		
PART – A: List of Experiments using LogiSIM.		
Exp – 1	Realization of logic gates	**No. of Hours: 3**
Exp – 2	Realization of Boolean function using basic gates	**No. of Hours: 3**
Exp – 3	Realization of Boolean function usingUniversal gates	**No. of Hours: 3**
Exp – 4	Implementation and verification of Code Converters	**No. of Hours: 3**
Exp – 5	Implementation and verification of Half adder and Full adder	**No. of Hours: 3**
Exp – 6	Implementation and verification of Half subtractor and Full subtractor	**No. of Hours: 3**
Exp – 7	Implementation and verification of multiplexers	**No. of Hours: 3**
Exp – 8	Implementation and verification of magnitude comparators	**No. of Hours: 3**
Exp – 9	Design and verification of Flip-flops	**No. of Hours: 3**
Exp – 10	Design and implementation of synchronous and ripple counters	**No. of Hours: 3**
Exp – 11	Program to blink on board green LED using Arduino	**No. of Hours: 3**
Exp – 12	Program to control on board green LED by taking input fromSwitch	**No. of Hours: 3**

Text Books:	
1	Text Book1 (T1): M. Morris Mano, Michael D. Ciletti (2008), Digital Design, 4th edition, Pearson Education/ PHI, India.
2	Thomas L. Floyd (2006), *Digital fundamentals*, 9th edition, Pearson Education International.
Reference Books:	
1	Zvi. Kohavi (2004), *Switching and Finite Automata Theory*, Tata McGraw Hill, India.
2	C.V.S. Rao (2009), *Switching and Logic Design*, 3rd edition, Pearson Education, India.
3	Donald D.Givone (2002), *Digital Principles and Design*, Tata McGraw Hill, India.

G.PULLAIAH COLLEGE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)
Qualitative Aptitude - 1-R18 Regulations
DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

Title of the course:	**Qualitative Aptitude - 1**			
Branches for which this course is offered:	**B.TECH III SEMESTER (CSE)**	**L**	**T**	**P**
		1	**0**	**0**

Course Content:		
UNIT-I	**Ratio and Proportion& Average, Mixtures and Alligation**	**LECTURE HOURS: 3**
Ratio and Proportion: Ratio, Proportion, Variations, Problems on Ages **Average**, **Mixtures and Alligation**: Averages, Weighted average, Difference between mixture and alligation, Problems on Mixtures and alligation		
UNIT-II	**Percentages, SI & CI & Data Interpretation**	**LECTURE HOURS: 3**
Percentages, SI & CI: Fundamentals of Percentage, Percentage change, SI and CI, Relation between SI, CI **Data Interpretation**: Introduction, Tabulation, Bar Graph, Pie Charts, Line Graphs, Combined Graphs		
UNIT-III	**Profit and loss, Partnerships**	**LECTURE HOURS:3**
Profit and loss, **Partnerships:** Basic terminology in profit and loss, Types of partnership, Problems related to partnership **Logarithms:** Fundamental formulae of logarithms and problems, finding no of terms on expanding a given number.		
UNIT-IV	**Permutation and combination**	**LECTURE HOURS: 3**
Fundamentals counting principle, Definition of Permutation, Seating arrangement, Problems related to alphabets, Rank of the word, Problems related to numbers, Circular permutation, Combination		
UNIT-V	**Clocks & Calendar**	**LECTURE HOURS: 4**
Clocks: Introduction, Finding angle between hands of clock, Gain/Loss of Time, Finding time, Gain or loss of time **Calendar:** Calendars method- 1, Calendars method -2		

Text Books:	
1	Quantitative Aptitude for Competitive Examinations by R S Agrawal
2	Quantitative Aptitude for competitive examinations by Abhijit Guha
3	The Pearson guide to Quantitative Aptitude by Dinesh Khattar

G.PULLAIAH COLLEGE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)
PROBABILITY AND STATISTICS-R18 Regulations
DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

Title of the course:	**PROBABILITY AND STATISTICS**			
Branches for which this course is offered:	**B.TECH IV SEMESTER (CSE)**	**L**	**T**	**P**
		3	**1**	**0**

Course Overview:
The course matter is divided into five chapters covering duly-recognized areas of theory and study. This course develops abstract and critical reasoning by studying logical proofs and the axiomatic method as applied to basic probability and to make connections between probability and other branches of mathematics. The topics covered include probability, random variables and distributions, correlation and regression, sampling distribution, testing of hypothesis for large samples and small samples, queuing theory and stochastic process. The course helps students gain an appreciation for the diverse applications of statistics and its relevance to their lives and fields of study.

Course Outcomes :	
After successful completion of the course , the student will be able to	
CO1	Understand basic concepts of probability and statistics and apply them in solving practical engineering problems
CO2	Apply discrete and continuous probability distributions to evaluate the probability of real world problems
CO3	Conduct hypotheses tests concerning population parameters for single and multiple populations based on sample data.
CO4	Understand concepts of t-test f-test and chi-square test for small samples
CO5	Demonstrate the ability to design, use, and interpret control charts for variables.
CO6	Demonstrate the knowledge and understand various queuing models

Course Content:		
Unit-I		**Lecture Hours:12**
Basic concepts of probability- Random variables – – Expectation-Discrete and continuous Distributions – Distribution functions. Binomial and poison distributions Normal distribution – Related properties.		
Unit-II	**Test of Hypothesis:**	**Lecture Hours:12**
Population and Sample - Confidence interval of mean from Normal distribution - Statistical hypothesis - Null and Alternative hypothesis - Level of significance - Test of significance - Test based on normal distribution - Z test for means and proportions		

Unit-III		Lecture Hours:14
Small samples - t- test for one sample and two sample problem and paired t-test, F-test and Chi-square test (testing of goodness of fit and independence)		
Unit-IV	**Statistical Quality Control**	**Lecture Hours:12**
Concept of quality of a manufactured product -Defects and Defectives - Causes of variations - Random and assignable - The principle of Shewhart Control Chart-Charts for attribute and variable quality characteristics- Constructions and operation of X- bar Chart, R-Chart, P-Chart and C-Chart.		
UNIT-V	**Queuing Theory**	**Lecture Hours:14**
Pure Birth and Death process, M/M/1 & M/M/S & their related simple problems.		

Text Books:	
1	Probability & Statistics for engineers by Dr. J. Ravichandran WILEY-INDIA publishers
2	Probability & Statistics by T.K.V. Iyengar, S.Chand publications.

Reference Books:	
1	Probability & Statistics by E. Rukmangadachari & E. Keshava Reddy, Pearson Publisher.
2	Statistical methods by S.P. Gupta, S.Chand publications.
3	Probability & Statistics for Science and Engineering by G.Shanker Rao, Universities Press.
4	Probability and Statistics for Engineering and Sciences by Jay L.Devore, CENGAGE.
5	Probability and Statistics by R.A. Johnson and Gupta C.B.Jay I Devore, “Probability and Statistics for Engineers and Scientists”, California, 2004.

G.PULLAIAH COLLEGE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)
SOFTWARE ENGINEERING -R18 Regulations
DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

Title of the course:	**SOFTWARE ENGINEERING**			
Branches for which this course is offered:	**B.TECH IV SEMESTER (CSE)**	**L**	**T**	**P**
		3	**1**	**0**

COURSE OVERVIEW:
• To learn the software life cycle models. • To know about software requirements and SRS document. • To understand the importance of modeling and modeling languages. • To design and develop correct and robust software products. • To understand the planning and estimation of software projects. • To understand the implementation issues, validation and verification procedures. • To understand the maintenance of software

COURSE OUTCOMES:	
After successful completion of the course, the student will be able to	
CO1	Possess knowledge on evolving role of software, process and maturity models.
CO2	Understand the various phases of software development life cycles and software requirements.
CO3	Possess necessary skills to elicit the requirements of a software system and to create well written software documentation involving appropriate system models.
CO4	Design, implement and evaluate a computer based system, process, component or program to meet desired needs within realistic constraints specific to the field
CO5	Construct software projects by integrating components with appropriate user interface
CO6	Apply various testing strategies to verify, validate and to release error free software

Course Content:		
UNIT-I	**Software and Software Engineering:**	**LECTURE HOURS: 12**

The Characteristics of Software, The Distinctive Nature of WebApps, Software Engineering, The Software Process, Software Engineering Practice, Software Myths

Process Models: A General Process Model, Process Assessment and Improvement, Prescriptive Process Models, Specialized Process Models, The Unified Process, Personal and Team Process Models, Process Technology, Product and Process.

Agile Development: Agility, Agility and the Cost of Change, Agile Process, Extreme Programming, Other Agile Process Models.

UNIT-II	Requirements Engineering	LECTURE HOURS: 12
Requirements Engineering, Establishing the groundwork, Eliciting Requirements, Developing Use Cases, Building the requirements model, Negotiating Requirements, Validating Requirements. **Requirements Modeling (Scenarios, Information and Analysis Classes):** Requirements Analysis, Scenario-Based Modeling, UML Models that Supplement the Use Case, Data Modeling Concepts, Class-Based Modeling. **Requirements Modeling (Flow, Behavior, Patterns and WEBAPPS):** Requirements Modeling Strategies, Flow-Oriented Modeling, Creating a Behavioral Model, Requirements Patterns Modeling, Requirements Modeling for WebApps.		
UNIT-III	**Design Concepts**	**LECTURE HOURS: 14**
Design with Context of Software Engineering, The Design Process, Design Concepts, The Design Model. **Architectural Design:** Software Architecture, Architecture Genres, Architecture Styles, Architectural Design, Assessing Alternative Architectural Designs, Architectural Mapping Using Data Flow. **Component-Level Design:** Component, Designing Class-Based Components, Conducting Component-level Design, Component Level Design for WebApps, Designing Traditional Components, Component-Based Development.		
UNIT-IV	**User Interface Design**	**LECTURE HOURS: 14**
The Golden Rules, UI Analysis and Design, Interface Analysis, Interface Design Steps, WebApp Interface Design, Design Evaluation. **WebApp Design:** WebApp Design Quality, Design Goal, A Design Pyramid for WebApps, WebApp Interface Design, Aesthetic Design, Content Design, Architecture Design, Navigation Design, Component-Level Design, Object-Oriented Hypermedia Design Method.		
UNIT-V	**Software Testing Strategies:**	**LECTURE HOURS: 12**
A Planned Approach to Software Testing, Strategic Issues, Test Strategies for Conventional Software, Test Strategies for Object-Oriented Software, Test Strategies for WebApps, Validation Testing, System Testing, The Art of Debugging. **Testing Conventional Applications:** Software Testing Fundamentals, Internal and External Views of Testing, White-Box Testing, basic Path testing, Control Structure Testing, Black-Box Testing, Model-based Testing, Testing for Specialized Environments, Architectures and Applications, Patterns for Software Testing. Testing Object-Oriented Applications: Broadening the View of Testing, Testing with OOA and OOD Models, Object-Oriented Testing Strategies, Object-Oriented Testing Methods, Testing Methods Applicable at the Class level, Interclass Test- Case Design.		

Text Books:	
1	"Software engineering A practitioner‟s Approach", Roger S. Pressman, McGraw Hill International Education, Seventh Edition, 2016.

Reference Books:	
1	Fundamentals of Software Engineering, Fourth Edition, Rajib Mall, PHI.
2	Software Engineering, Ninth Edition, IAN Sommerville, Pearson, Ninth edition.
3	Software Engineering, A Precise Approach, Pankaj Jalote, Wiley India,2010.
4	Software Engineering, Principles and Practices, Deepak Jain, Oxford University Press.
5	Software Engineering1: Abstraction and modeling, Diner Bjorner, Springer International edition, 2006.
6	Software Engineering2: Specification of systems and languages, Diner Bjorner, Springer International edition, 2006.
7	Software Engineering Foundations, Yingxu Wang, Auerbach Publications,2008.
8	Software Engineering Principles and Practice, Hans Van Vliet,3rd edition, John Wiley &Sons Ltd.
9	Software Engineering 3: Domains, Requirements, and Software Design, D.Bjorner, Springer International Edition.
10	Introduction to Software Engineering R.J.Leach, CRC Press

G.PULLAIAH COLLEGE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)
OPERATING SYSTEMS -R18 Regulations
DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

Title of the course:	**OPERATING SYSTEMS**			
Branches for which this course is offered:	**B.TECH IV SEMESTER (CSE)**	**L**	**T**	**P**
		3	**0**	**0**

COURSE OVERVIEW:
• To make the students understand the basic operating system concepts such as processes, threads, scheduling, synchronization, deadlocks, memory management, file and I/O subsystems and protection. • To get acquaintance with the class of abstractions afford by general purpose operating systems that aid the development of user applications.

COURSE OUTCOMES:	
After successful completion of the course, the student will be able to	
CO1	Identify and understand the history of operating systems, functions, structures and design issues associated with operating systems.
CO2	Understand the process management concepts including scheduling-criteria, algorithms, their evaluation and Thread scheduling.
CO3	Apply the solutions to process synchronization problems and implementation methods.
CO4	Solve the memory management problems with techniques like paging and segmentation and also use page replacement algorithms
CO5	Understand the principles of dead lock.
CO6	Understand the issues related to file system interface and implementation.

Course Content:		
UNIT-I	**Operating Systems Overview**	**LECTURE HOURS: 9**
Operating system functions, structure, Operations, protection and security, Computing Environments, Open- Source OS **System Structures:** Operating System Services, User and Operating-System Interface, systems calls, Types of System Calls, system programs, operating system structure, operating system debugging, System Boot. **Processes:** Process concept, Scheduling, Operations, Inter process Communication, Examples of IPC systems.		

UNIT-II	Threads	LECTURE HOURS: 9
Overview, Multicore Programming, Multithreading Models, Thread Libraries, Implicit Threading, Threading Issues. **Process Synchronization:** The critical-section problem, Peterson„s Solution, Synchronization Hardware, Mutex Locks, Semaphores, Classic problems of synchronization, Monitors, Synchronization examples, Alternative approaches. **CPU Scheduling:** Scheduling-Criteria, Scheduling Algorithms, Thread Scheduling, Multiple-Processor Scheduling, Real-Time CPU Scheduling, Algorithm Evaluation.		
UNIT-III	**Memory Management**	**LECTURE HOURS: 10**
Swapping, contiguous memory allocation, segmentation, paging, structure of the page table. **Virtual memory:** demand paging, page-replacement, Allocation of frames, Thrashing, Memory-Mapped Files, Allocating Kernel Memory **Deadlocks:** System Model, deadlock characterization, Methods of handling Deadlocks, Deadlock prevention, Detection and Avoidance, Recovery from deadlock.		
UNIT-IV	**Mass-storage structure**	**LECTURE HOURS: 10**
Overview of Mass-storage structure, Disk structure, Disk attachment, Disk scheduling, Swap-space management, RAID structure, Stable-storage implementation. **File system Interface:** The concept of a file, Access Methods, Directory and Disk structure, File system mounting, File sharing, Protection. **File system Implementation:** File-system structure, File-system Implementation, Directory Implementation, Allocation Methods, Free-Space management.		
UNIT-V	**I/O systems**	**LECTURE HOURS: 10**
I/O Hardware, Application I/O interface, Kernel I/O subsystem, Transforming I/O requests to Hardware operations. **Protection:** Goals of Protection, Principles of Protection, Domain of protection, Access Matrix, Implementation of Access Matrix, Access control, Revocation of Access Rights, Capability-Based systems, Language – Based Protection **Security:** The Security problem, Program threats, System and Network threats, Cryptography as a security tool, User authentication, Implementing security defenses, Firewalling to protect systems and networks, Computer–security classifications.		

Text Books:	
1	Operating System Concepts, Abraham Silberchatz, Peter B. Galvin, Greg Gagne, Wiley , Eight Edition, 2014.

Reference Books:	
1	Operating systems by A K Sharma, Universities Press
2	Operating Systems, S.Haldar, A.A.Aravind, Pearson Education.
3	Modern Operating Systems, Andrew S Tanenbaum, Second Edition, PHI.
4	Operating Systems, A.S.Godbole, Second Edition, TMH.
5	An Introduction to Operating Systems, P.C.P. Bhatt, PHI.
6	Operating Systems, G.Nutt, N.Chaki and S.Neogy, Third Edition, Pearson Education
7	Operating Systems, R.Elmasri, A,G.Carrick and D.Levine, Mc Graw Hill.
8	Principles of Operating Systems, B.L.Stuart, Cengage learning, India Edition.
9	Operating System Desgin, Douglas Comer, CRC Press, 2nd Edition.

G.PULLAIAH COLLEGE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)
DESIGN &ANALYSIS OF ALGORITHMS-R18 Regulations
DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

Title of the course:	**DESIGN &ANALYSIS OF ALGORITHMS**			
Branches for which this course is offered:	**B.TECH IV SEMESTER (CSE)**	**L**	**T**	**P**
		4	**0**	**0**

COURSE OVERVIEW:
• To know the importance of the complexity of a given algorithm. • To study various algorithm design techniques. • To utilize data structures and/or algorithmic design techniques in solving new problems. • To know and understand basic computability concepts and the complexity classes P, NP, and NP-Complete. • To study some techniques for solving hard problems.

COURSE OUTCOMES:	
After successful completion of the course, the student will be able to	
CO1	Analyze the efficiency of algorithm
CO2	Understand the running time and space complexity of algorithms by using the concepts of big Oh, Omega and Theta notations.
CO3	Formulate the time order analysis for an algorithm.
CO4	Use the mathematical techniques required to prove the time complexity of a program/algorithm.
CO5	Apply algorithmic methods (such as divide and conquer, greedy method, dynamic programming, local search, branch & bound, and randomized algorithms) to the real-world problems to design an algorithm.
CO6	Analyze the latest technologies and techniques.

Course Content:		
UNIT-I	**Introduction**	**LECTURE HOURS: 12**
Algorithm, specifications of Algorithm, Algorithm Measurement **Divide and Conquer:** General method, Binary Search, Finding the maximum and minimum, Merge sort, Quick Sort, Selection sort, Stressen,,s matrix multiplication.		

UNIT-II	Greedy Method & Dynamic programming	LECTURE HOURS: 12
General method, Knapsack problem, Job Scheduling with Deadlines, Minimum cost Spanning Trees, Optimal storage on tapes, Single-source shortest paths. **Dynamic programming:** General Method, Multistage graphs, All-pairs shortest paths, Optimal binary search trees, 0/1 knapsack, The traveling sales person problem.		
UNIT-III	**Basic Traversal and Search Techniques & Back tracking**	**LECTURE HOURS: 14**
Basic Traversal and Search Techniques: Traversal techniques for binary trees, Traversal techniques for Graphs, Connected components and Spanning trees, Bi-connected components **Back tracking:** Common Method, 8 – queens problem, Sum of subsets problem, Graph coloring and Hamiltonian cycles.		
UNIT-IV	**Branch and Bound & Lower Bound Theory**	**LECTURE HOURS: 14**
Branch and Bound : The method, Travelling salesperson, 0/1 Knapsack problem **Lower Bound Theory**: Comparison trees, Lower bounds through reductions – Multiplying triangular matrices, inverting a lower triangular matrix, computing the transitive closure.		
UNIT-V	**NP – Hard and NP – Complete Problems:**	**LECTURE HOURS: 12**
NP Hardness, NP Completeness, Consequences of being in P, Cook„s Theorem, Halting Problem, Non-Deterministic Problem,Clique‟s, SAT Problem.		

Text Books:	
1	"Fundamentals of Computer Algorithms", Ellis Horowitz, S. Satraj Sahani and Rajasekhran, 2nd edition, University Press.2014.
2	"Design and Analysis of Algorithms", Parag Himanshu Dave, Himanshu Bhalchandra Dave, Pearson Education, Second Edition, 2009.

Reference Books:	
1	"Introduction to Algorithms", second edition, T.H.Cormen, C.E.Leiserson, R.L.Rivest and C.Stein, PHI Pvt. Ltd./ Pearson Education.
2	"Introduction to Design and Analysis of Algorithms A strategic approach", R.C.T.Lee, S.S.Tseng, R.C.Chang and T.Tsai, Mc Graw Hill.
3	"Data structures and Algorithm Analysis in C++", Allen Weiss, Second edition, Pearson education.
4	"Design and Analysis of algorithms", Aho, Ullman and Hopcroft,Pearson education.
5	"Algorithms" – Richard Johnson baugh and Marcus Schaefer, Pearson Education

G.PULLAIAH COLLEGE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)
FORMAL LANGUAGES AND AUTOMATA THEORY-R18 Regulations
DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

Title of the course:	**FORMAL LANGUAGES AND AUTOMATA THEORY**			
Branches for which this course is offered:	**B.TECH IV SEMESTER (CSE)**	**L**	**T**	**P**
		3	**0**	**0**

COURSE OVERVIEW:

- Understand formal definitions of machine models.
- Classify machines by their power to recognize languages.
- To understanding of formal grammars, analysis
- Understanding of hierarchical organization of problems depending on their complexity
- Understanding of the logical limits to computational capacity
- Understanding of un decidable problems

COURSE OUTCOMES:	
After successful completion of the course, the student will be able to	
CO1	Design an Automata to accept strings from various simple languages
CO2	Understand the functioning of Finite-State Machines, Deterministic Finite-State Automata, Nondeterministic Finite-State Automata and Pushdown Automata
CO3	Design grammars and recognizers for different formal languages
CO4	Design automata, regular expressions and context-free grammars accepting or generating a certain language
CO5	Understand the relation between types of languages and types of finite automata
CO6	Describe the language accepted by an automata or generated by a regular expression or a context-free grammar

Course Content:

UNIT-I	**Introduction:**	**LECTURE HOURS: 9**

fundamentals of set theory, Reduction to definitions, Other theorem forms, Proving equivalences about sets, The Contrapositive, Proof by contradiction, Counter examples, Inductive proofs, Alphabets, Strings, Languages, Problems, Formalization of Grammar, Hierarchy of Chomsky

Finite Automata: Familiar picture of Finite Automata, Non Deterministic Finite Automata (NFA), Applying FA for Text search, Finite Automata with Epsilon transitions (ϵ-NFA or NFA- ϵ), Deterministic Finite Automata (DFA) , Mealy Machine and Moor Machine, Conversion of Mealy Machine and Moor Machine, Minimization of Finite Automata, Myhill-Nerode Theorem.

UNIT-II	Fundamentals of Regular Languages	LECTURE HOURS: 9
Introduction to Regular Expressions (RE), Finite Automata and Regular Expressions, Regular Expressions Applications, Laws of Algebraic for Regular Expressions, The Arden„s Theorem, Using Arden„s theorem to construct RE from FA, Pumping Lemma for RLs, Pumping Lemma Applications, Uniformity of Two FAs, Uniformity of Two REs, Construction of Regular Grammar from RE, Constructing FA from Regular Grammar, Closure properties of RLs, Applications of REs and FAs		
UNIT-III	**Context Free Grammars and Languages**	**LECTURE HOURS: 10**
Introduction of Context Free Grammars (CFG), Derivations and Parse trees, Ambiguity in CFGs, Removing ambiguity, Left recursion and Left factoring-Examples, Generalization of CFGs, Normal Forms, Linear grammars, Closure properties for CFLs, Pumping Lemma for CFLs, CFG and Regular Language.		
UNIT-IV	**Push Down Automata (PDA)**	**LECTURE HOURS: 10**
Introduction, The Formal Definition, Graphical notation, Instantaneous description of PDA, The Languages of a PDA, Similarity of PDAs and CFGs, Deterministic Push Down Automata, Non-Deterministic Push Down Automata, Two Stack PDA.		
UNIT-V	**Turing Machines and Undecidability:**	**LECTURE HOURS: 10**
Introduction to Turing Machine (TM), Instantaneous description of TMs, Non Deterministic TM, Conversion of Regular Expression to TM, Comparison of PDA ,FA and TM, Types of TM, TM as an integer function, Universal TM, LBA, TM Languages, Type 0 grammar , Properties of Recursive and Recursively enumerable languages, Undecidability, Undeciadable problems about TMs, PCP, Modified PCP.		

Text Books:	
1	Introduction to Automata Theory, Formal Languages and Computation, Shyamalendu kandar, Pearson.
2	Introduction to Automata Theory, Languages, and Computation, Third Edition, John E.Hopcroft, Rajeev Motwani, Jeffery D. Ullman, Pearson.

Reference Books:	
1	Introduction to Languages and the Theory of Computation, John C Martin, TMH, Third Edition.
2	Theory of Computation, Vivek Kulkarni, OXFORD.
3	Introduction to the Theory of Computation, Michel Sipser, 2nd Edition, Cengage Learning .
4	Theory of computer Science Automata, Languages and Computation, K.L.P. Mishra, N.Chandrasekaran, PHI, Third Edition.
5	Fundamentals of the Theory of Computation, Principles and Practice, Raymond Greenlaw, H. James Hoover, Elsevier, Morgan Kaufmann.
6	Finite Automata and Formal Language A Simple Approach, A.M. Padma Reddy, Pearson

G.PULLAIAH COLLEGE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)
R PROGRAMMING LABORATORY R18 Regulations
DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

Title of the course:	**R PROGRAMMING LABORATORY**			
Branches for which this course is offered:	**B.TECH IV SEMESTER (CSE)**	**L**	**T**	**P**
		0	**0**	**3**

COURSE OVERVIEW:
• Understand the fundamentals of 'R' programming • Learn how to carry out a range of commonly used statistical methods including analysis of variance and linear regression. • Explore data-sets to create testable hypotheses and identify appropriate statistical tests.

COURSE OUTCOMES:	
After successful completion of the course, the student will be able to	
CO1	Implement R Analytics to create Business Insights.
CO2	Analyze the data and results using R.
CO3	Apply analytical methods and produce presentation quality graphics.
CO4	Explore data-sets to create testable hypotheses.
CO5	Perform appropriate statistical tests using R.
CO6	Create and edit visualizations with R.

Course Content:		
TASK-1	**R Basic programs**	**PRACTICAL HOURS: 10**

1. R Multiplication Table
2. R Program to Check Prime Number
3. R Program to check Armstrong Number
4. R Program to Print the Fibonacci Sequence
5. R Program to Check for Leap Year
6. Check if a Number is Odd or Even in R Programming
7. R Program to Check if a Number is Positive, Negative or Zero
8. R Program to Find the Sum of Natural Numbers
9. Convert Decimal into Binary using Recursion in R
10. R program to Find the Factorial of a Number Using Recursion
11. R Program to Find the Factors of a Number
12. Fibonacci Sequence Using Recursion in R
13. R Program to Find H.C.F. or G.C.D.
14. R Program to Find L.C.M.
15. R Program to Make a Simple Calculator

16. Sum of Natural Numbers Using Recursion		
TASK-2		**PRACTICAL HOURS: 7**
1. Creating Vectors and sequences numbers 2. Importing Tabular data, 3. Simple summaries of categorical and continuous data. 4. Manipulating data frames and lists. 5. Writing functions in R.using If/else statements.		
TASK-3	**A common data cleaning task**	**PRACTICAL HOURS: 7**
1. Write a Program on For/while loops. 2. Write a Program on Using apply() to iterate over data. 3. Write a Program on Using with() to specify environment. 4. Multivariate statistical summaries using plyr 5. Program using ggplot2 graphics		
TASK-4	**Statistical tests and models**	**PRACTICAL HOURS: 10**
1. Write a Program on Testing for differences in means between two groups 2. Write a Program on QQ plots 3. Write a Program on Tests for 2x2 tables 4. Write a Program on Plotting confidence intervals 5. Write a Program and calculate ANOVA 6. Write a Program on Linear regression 7. Write a Program on Assessing multicollinearity 8. Write a Program on Diagnosing and interpreting regression		
TASK-5	**Linear regression**	**PRACTICAL HOURS: 4**
1. Write a Program on Interpreting categorical variables in regression 2. Write a Program on Interaction terms in regression		
TASK-6	**Logistic regression**	**PRACTICAL HOURS: 4**
1. Program on Logstic regression		

Text Books:	
1	"Beginning R the statistical programming language" Dr. Mark Gardener, Wiley Publications, 2015.

Reference Books:	
1	Hands-On Programming with R Paperback by Grolemund (Author), Garrett (Author), SPD,2014.
2	The R Book, Michael J. Crawley, WILEY, 2012.

G.PULLAIAH COLLEGE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)
DESIGN AND ANALYSIS OF ALGORITHMS LABORATORY - R18 Regulations
DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

Title of the course:	**DESIGN AND ANALYSIS OF ALGORITHMS LABORATORY**			
Branches for which this course is offered:	**B.TECH IV SEMESTER (CSE)**	**L**	**T**	**P**
		0	**0**	**2**

COURSE OVERVIEW:
• To know the importance of the complexity of a given algorithm. • To study various algorithm design techniques. • To utilize data structures and/or algorithmic design techniques in solving new problems. • To know and understand basic computability concepts and the complexity classes P, NP, and NP-Complete. • To study some techniques for solving hard problems.

COURSE OUTCOMES:	
After successful completion of the course, the student will be able to	
CO1	Demonstrate the complexity of the algorithms
CO2	Analyze various algorithms and design techniques
CO3	Demonstrate the techniques of divide and conquer, greedy, dynamic programming, backtracking, branch and bound to solve the problems.
CO4	Identify and analyze criteria and specifications appropriate to new problems
CO5	Understand the appropriate algorithmic design technique for the solution.
CO6	Demonstrate with proof that a certain problem is NP-Complete.

Course Content:		
TASK-1		**PRACTICAL HOURS:2**
A. Create a Java class called ***Student*** with the following details as variables within it. (i) USN (ii) Name (iii) Branch (iv) Phone Write a Java program to create *nStudent*objects and print the USN, Name, Branch, and *Phoneof*theseobjects with suitable headings. **B**. Write a Java program to implement the Stack using arrays. Write Push(), Pop(), and Display()		

methods to demonstrate its working.

TASK-2		PRACTICAL HOURS:2

a) Implement **next permutation**, which rearranges numbers into the lexicographically next greater permutation of numbers.
If such arrangement is not possible, it must rearrange it as the lowest possible order (ie, sorted in ascending order).
The replacement must be in-place and use only constant extra memory.
Here are some examples. Inputs are in the left-hand column and its corresponding outputs are in the right-hand column.
1,2,3 → 1,3,2
3,2,1 → 1,2,3
1,1,5 → 1,5,1

b) Write a Java class called ***Customer*** to store their name and date_of_birth. The date_of_birth format should be dd/mm/yyyy. Write methods to read customer data as <name, dd/mm/yyyy> and display as <name, dd, mm, yyyy> using StringTokenizer class considering the delimiter character as"/".

TASK-3		PRACTICAL HOURS:4

Sort a given set of elements using the best sorting method and determine the time required to sort the elements. Repeat the experiment for different values of n, the number of elements in the list to be sorted and plot a graph of the time taken versus n. The elements can be read from a file or can be generated using the random number generator. Demonstrate using Java which technique is good to calculate time complexity analysis: worst case, average case and best case.

TASK-4		PRACTICAL HOURS:2

A) Given an array nums, we call (i, j) an important reverse pair if i < j and nums[i] > 2*nums[j].
You need to return the number of important reverse pairs in the given array.
Example1:
Input: [1,3,2,3,1]
Output: 2
Example2:
Input: [2,4,3,5,1]
Output: 3

B) Write a java program to implement the following sorting techniques by using Divide and Conquer Method:
   a) Insertion Sort
   b) Selection sort

TASK-5		PRACTICAL HOURS:4

Write a java program for an array of jobs where every job has a deadline and associated profit if the job is finished before the deadline. It is also given that every job takes single unit of time, so the minimum possible deadline for any job is 1. How to maximize total profit if only one job can be

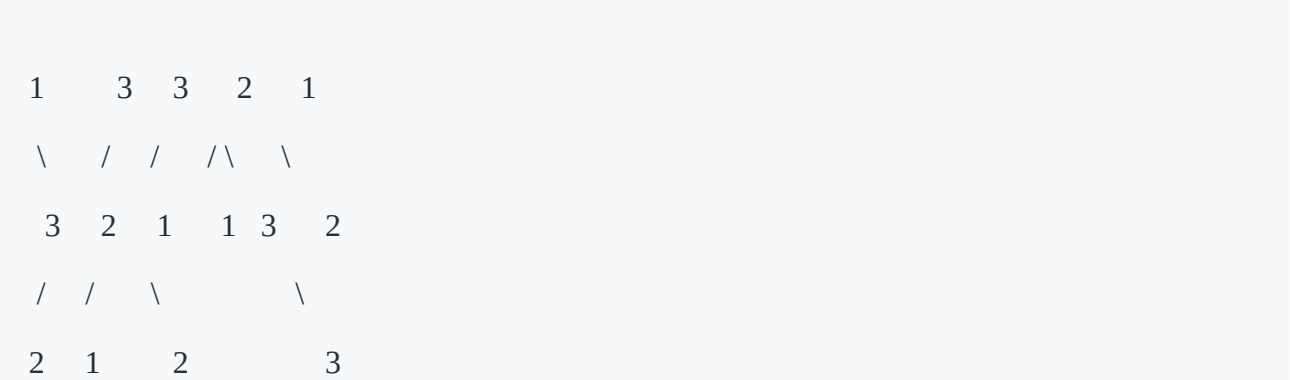
scheduled at a time.

TASK-6		PRACTICAL HOURS:4

A) Given *n*, how many structurally unique **BST's** (binary search trees) that store values 1 ... *n*?

Example:

Input: 3
Output: 5
Explanation:
Given n = 3, there are a total of 5 unique BST's:



B) Write java code to check whether a given graph is strongly connected or not.

TASK-7		PRACTICAL HOURS:4

a) Given an integer array nums, find the contiguous subarray (containing at least one number) which has the largest sum and return its sum.(Using Dynamic Programming)

Example:
Input: [-2,1,-3,4,-1,2,1,-5,4],
Output: 6
Explanation: [4,-1,2,1] has the largest sum = 6.

b) You are a professional robber planning to rob houses along a street. Each house has a certain amount of money stashed, the only constraint stopping you from robbing each of them is that adjacent houses have security system connected and it will automatically contact the police if two adjacent houses were broken into on the same night.

Given a list of non-negative integers representing the amount of money of each house, determine the maximum amount of money you can rob tonight without alerting the police.
Input: [1,2,3,1]
Output: 4

Explanation: Rob house 1 (money = 1) and then rob house 3 (money = 3).
Total amount you can rob = 1 + 3 = 4.

C) Total number of odd length palindrome sub-sequence around each centreby using Dynamic Programming		
TASK-8		**PRACTICAL HOURS:4**
Write a java for the given an undirected weighted connected graph consisting of n vertices and m edges. The task is to find any spanning tree of this graph such that the maximum degree over all vertices is maximum possible. The order in which you print the output edges does not matter and an edge can be printed in reverse also i.e. (u, v) can also be printed as (v, u).		
TASK-9		**PRACTICAL HOURS: 2**
. Java Program is to Implement Knight‟s Tour Problem.A knight‟s tour is a sequence of moves of a knight on a chessboard such that the knight visits every square exactly once. If the knight ends on a square that is one knight‟s move from the beginning square (so that it could tour the board again immediately, following the same path), the tour is closed, and otherwise it is open. The exact number of open tours on an 8×8 chessboard is still unknown		
TASK-10		PRACTICAL HOURS: 2
a) Design and implement in Java to find a subset of a given set S = {Sl, S2,. ...,Sn} of n positive integers whose SUM is equal to a given positive integer d. b) Write a program to print all permutations of a given string using BackTracking.		

Text Books:	
1	“Fundamentals of Computer Algorithms”, Ellis Horowitz, S. SatrajSahani and Rajasekhran, 2nd edition, University Press.2014
2	“Design and Analysis of Algorithms”, ParagHimanshu Dave, HimanshuBhalchandra Dave, Pearson Education, Second Edition, 2009.

Reference Books:	
1	“Introduction to Algorithms”, second edition, T.H.Cormen, C.E.Leiserson, R.L.Rivest and C.Stein, PHI Pvt. Ltd./ Pearson Education.
2	“Introduction to Design and Analysis of Algorithms A strategic approach”, R.C.T.Lee, S.S.Tseng, R.C.Chang and T.Tsai, McGraw Hill.
3	“Data structures and Algorithm Analysis in C++”, Allen Weiss, Second edition, Pearson education.
4	“Design and Analysis of algorithms”, Aho, Ullman and Hopcroft,Pearson education.
5	“Algorithms” – Richard Johnson baugh and Marcus Schaefer, Pearson Education

G.PULLAIAH COLLEGE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)
WEB PROGRAMMING LABORATORY-R18 Regulations
DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

Title of the course:	**WEB PROGRAMMING LABORATORY**			
Branches for which this course is offered:	**B.TECH IV SEMESTER (CSE)**	**L**	**T**	**P**
		0	**0**	**3**

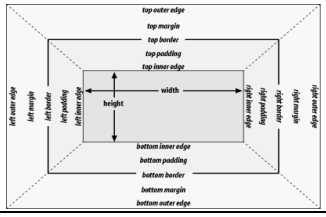
COURSE OVERVIEW:
• To learn the basic web concepts and Internet protocols. • To design web page with visual effects using HTML,DHTML, CSS and Angular JS. • To introduce client side scripting with Javascript . • To introduce server side programming with Java servlets.

COURSE OUTCOMES:	
After successful completion of the course, the student will be able to	
CO1	Apply the design principles of HTML and Java Script for creating static and dynamic web pages.
CO2	Analyze the differences between various scripting languages.
CO3	Demonstrate a structural framework for dynamic web apps using AngularJS
CO4	Analyze the client side validation procedure in web applications.
CO5	Design solutions using web servers and database servers.
CO6	Identify the user requirements and design appropriate business solutions.

Course Content:		
TASK-1		**PRACTICAL HOURS: 6**

Web Site Creation - HTML
a. Open the index.html by clicking on it. The default browser should start and show the content.
b. Find the IP address of your own computer
c. Open the index.html file using IP address
d. Create a small web pages(linking each other) with the following elements
i. Headings
ii. Paragraphs
iii. Tables
iv. Lists
v. Internal or external hyper links
vi. Embed images or videos
vii. Menus

f. Create a Form for a college application using form input & output elements.

TASK-2		**PRACTICAL HOURS: 6**
Cascading Style Sheets – CSS a. Take one of your pages (with bold-face text) and add an inline CSS style sheet (in the section) that make bold-face text use a larger font size. The style sheet can look like this b. Change the style sheet to make the bold-face text red on a blue background. c. Add another piece of text in bold-face, but make it belong to a different class than your previous bold text. (Example more text to view) Make text like that (but not your other bold-face text) use a smaller font than normal and be blue on a red background. d. External CSS files e. CSS for placement of text  		
TASK-3		**PRACTICAL HOURS: 6**
Write a JavaScript that calculates the squares and cubes of the numbers from 0 to 10 and outputs HTML text that displays the resulting values in an HTML table format.		
TASK-4		**PRACTICAL HOURS: 3**
Write a JavaScript code that displays text “TEXT-GROWING” with increasing font size in the interval of 100ms in RED COLOR, when the font size reaches 50pt it displays “TEXT-SHRINKING” in BLUE color. Then the font size decreases to 5pt.		
TASK-5		**PRACTICAL HOURS: 3**
Write a Hello World program to demonstrate Controller, View and Map using Angular JS.		
TASK-6		**PRACTICAL HOURS: 6**
Design a webform in Angular JS using the following elements a. Input elements b. Select elements c. Button elements		
TASK-7		**PRACTICAL HOURS: 3**
Design a web form with sessions to identify each browser and its associated session		
TASK-8		**PRACTICAL HOURS: 3**
Write a java program to implement Email Program with Internet Services (Sending Email, reading Email)		
TASK-9		**PRACTICAL HOURS: 3**
Write a java program to perform CRUD (Create, Read, Update, and Delete) operations on any Database.		
TASK-10		**PRACTICAL HOURS: 3**
Design a web application using servlets demonstrating sessions, cookies and appended URLs.		

Text Books:	
1	Herbert Schildt, “Java-The Complete Reference”, Eighth Edition, Mc Graw Hill Professional, 2011.
2	Angular JS: Up and Running: Enhanced Productivity with structured Web Apps.,Orelly
3	Web Technologies: HTML, JAVASCRIPT, PHP, JAVA, JSP, ASP.NET, XML and Ajax,

Reference Books:	
1	Deitel and Deitel and Nieto, “Internet and World Wide Web - How to Program”, Prentice Hall, 5 th Edition, 2011.
2	Black Book: HTML, Javascript, PHP, Java, Jsp, XML and Ajax, Black Book by Kogent Learning Solutions Inc.

G.PULLAIAH COLLEGE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)
VERBAL ABILITY AND LOGICAL REASONING-R18 Regulations
DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

Title of the course:	**VERBAL ABILITY AND LOGICAL REASONING**			
Branches for which this course is offered:	**B.TECH IV SEMESTER (CSE)**	**L**	**T**	**P**
		1	**0**	**0**

COURSE OVERVIEW:
This course builds to improve the vocabulary, verbal reasoning, abstract and spatial reasoning.

Course Content:		
UNIT-I	**Coding and Decoding**	**LECTURE HOURS:3**
Coding and Decoding: Coding and Decoding, Arrow Method, Chinese coding, Series, Analogy, Odd man out.		
UNIT-II	**Articles and Tenses, Direction Sense**	**LECTURE HOURS: 3**
a) Articles and Tenses: Introduction, usage of articles, Omission of Articles, Types of tenses, Forms and Usage of tenses **b) Direction Sense:** Introduction, Distance method, Facing Method and Shadow Method		
UNIT-III	**Blood Relations, Voices and Forms of Speech**	**LECTURE HOURS: 3**
a) Blood Relations: Introduction, Direct, Puzzle and Coded models **b) Voices and Forms of Speech:** Introduction, conversion of active and passive voice, conversions of direct and indirect speech.		
UNIT-IV	**Data Arrangements, Syllogisms**	**LECTURE HOURS: 3**
a) Data Arrangements: Linear Arrangement, Circular Arrangement, Multiple Arrangements **b) Syllogisms:** Introduction, Tick-Cross method, Inferential Technique, Venn-Diagram method		
UNIT-V	**Visual Reasoning, Sentence Correction**	**LECTURE HOURS: 4**
a) Visual Reasoning: Patterns, Folded Images, Cubes and Analytical Reasoning **b) Sentence Correction:** Subject-Verb Agreement, Pronoun Antecedent, Parallelism, Verb-Time Sequence Error, Determiners and Modifiers		

Text Books:	
1	A Modern Approach to Logical Reasoning Book by R.S. Aggarwal and Vikas Aggarwal

Reference Books:	
1	Test of Reasoning Paperback by Edgar Thorpe and Logical Reasoning by Arun Sharma

G.PULLAIAH COLLEGE OF ENGINEERING AND TECHNOLOGY
(AUTONOMOUS)
COURSE STRUCTURE OF III AND IV SEMESTERS - B.TECH (R18)
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

III SEMESTER										
S.No.	**Course Code**	**Course**	**Category**	**Periods per Week**			**Credits**	**Scheme of Examination Maximum Marks**		
				L	**T**	**P**		**Internal**	**External**	**Total**
1	A1505	Object Oriented programming through Java	PC	3	1	0	4	30	70	100
2	A1506	Database Management System	PC	3	1	0	4	30	70	100
3	A1507	Discrete Mathematics	PC	4	0	0	4	30	70	100
4	A1416	Digital Logic & Computer Organization	ES	4	0	0	4	30	70	100
5	A1701	Managerial Economics & Financial Analysis	HS	3	0	0	3	30	70	100
6	A1508	Database Management System Lab	PC	0	0	3	1.5	30	70	100
7	A1509	Object Oriented Programming Lab using Java	PC	0	0	3	1.5	30	70	100
8	A1417	Digital Electronics Lab	ES	0	0	2	1	30	70	100
9	A1012	Quantitative Aptitude-1	BS	1	0	0	1	30	70	100
		TOTAL		**18**	**02**	**08**	**24**	**270**	**630**	**900**

IV SEMESTER										
S.No.	Course Code	Course	Category	Periods per Week			Credits	Scheme of Examination Maximum Marks		
				L	T	P		Internal	External	Total
1	A1014	Probability and Statistics	BS	3	1	0	4	30	70	100
2	A1510	Software Engineering	PC	3	1	0	4	30	70	100
3	A1511	Operating Systems	PC	3	0	0	3	30	70	100
4	A1512	Design And Analysis of Algorithms	PC	4	0	0	4	30	70	100
5	A1513	Formal Languages and Automata Theory	PC	3	0	0	3	30	70	100
6	A1514	R Programming Lab	PC	0	0	3	1.5	30	70	100
7	A1515	Design and Algorithms Lab	PC	0	0	2	1	30	70	100
8	A1516	Web Programming Lab	PC	0	0	3	1.5	30	70	100
9	A1013	Verbal ability and logical reasoning	HS	1	0	0	1	30	70	100
10	A1517	Comprehensive Online Examination	PC	0	0	0	1	-	100	100
		TOTAL		**17**	**02**	**08**	**24**	**270**	**730**	**1000**

Category	Description
PC	Professional course
HS	Humanities course
BS	Basic sciences
OE	Open elective
PE	Professional elective
PW	Project work
ES	Engineering sciences

G.PULLAIAH COLLEGE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)
OBJECT ORIENTED PROGRAMMING USING JAVA - R18 Regulations
DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

Title of the course:	**OBJECT ORIENTED PROGRAMMING USING JAVA**			
Branches for which this course is offered:	**B.TECH III SEMESTER (CSE)**	**L**	**T**	**P**
		3	**1**	**0**

COURSE OVERVIEW:
• Study the syntax, semantics and features of Java Programming Language • Learn the method of creating Multi-threaded programs and handle exceptions • Learn Java features to create GUI applications & perform event handling

COURSE OUTCOMES:	
After successful completion of the course, the student will be able to	
CO1	Analyze the necessity for Object Oriented Programming paradigm over structured programming and become familiar with the fundamental concepts in OOP like encapsulation, Inheritance and Polymorphism.
CO2	Demonstrate an ability to design and develop java programs, analyze, and interpret object oriented data and report results.
CO3	Demonstrate an ability to design an object oriented system, swing components and multithreaded processes as per needs and specifications.
CO4	Demonstrate an ability to visualize and work on laboratory and multidisciplinary tasks like console and windows applications both for standalone and Applets programs.
CO5	Demonstrate skills to use latest object oriented programming language and software to analyze OOP problems.
CO6	Develop confidence for self education and ability for life-long learning needed for advanced java technologies.

Course Content:		
UNIT-I	**The History and Evolution of Java:**	**LECTURE HOURS: 12**

Java's Lineage, The Creation of java, how java changed the internet, **Java's magic:** The byte code, **Servlets:** java on the server side, java Buzzwords, Evolution of java.

An Overview of Java:

Object Oriented Programming, Two control statements, Using blocks of codes, Lexical issues, The java class Libraries.

Data Types, Arrays and Variables:

Primitive Types, Integers, Floating-point Types, Characters, Booleans, literals, variables, Type conversion and casting, Automatic Type Promotion in Expressions, Arrays, strings, Pointers.

UNIT-II	Operators:	LECTURE HOURS: 14

Arithmetic Operators, The Bitwise Operators, Relational Operators, Boolean Logic operators, The assignment operator, The ? Operator, Operator Precedence, Using Parentheses.

Control Statements:

Java's selection Statements, Iteration statements, Jump Statements.

Introducing Classes:

Class Fundamentals, Declaring Objects, Assuming Object reference Variables, Introducing Methods, Constructors, The this Keyword, Garbage Collection, The Finalize() method, A Stack class. Overloading Methods, Using Object as Parameter, Argument Passing, Returning Objects, Recursion, Introducing Access control, Understanding static, Introducing Nested and Inner classes, Exploring the String class, Using Command line Arguments, Varargs: variable-Length Arguments.

UNIT-III	Inheritance:	LECTURE HOURS: 14

Basics, Using super, creating a multi level hierarchy, when constructors are executed, method overriding, dynamic method dispatch, using abstract class, using final with inheritance, the object class.

Packages and Interfaces:

Packages, Access protection, Importing Packages, Interfaces, Default Interfaces, Default interface methods, Use static methods in an Interface, Final thoughts on Packages and interface**s.**

Exception Handling:

Exception handling Fundamentals, Exception Types, Uncaught Exceptions, Using try and catch, Multiple catch clauses, Nested try statements, throw, throws, finally, Java Built-in Exceptions, Creating your own exception subclasses, Chained Exceptions, Three Recently added Exceptions features, Using Exceptions.

UNIT-IV	Multithreaded Programming:	LECTURE HOURS: 12

The java Thread Model, The main thread , Creating Thread, Creating Multiple Threads, Using isAlive() and join(), Thread Priorities, Synchronization, Interthread Communication, Suspending, resuming and stopping threads, Obtaining a thread state, Using Multithreading.

Input and Output operations:

I/O basics, Reading Console input, Writing console Output, The PrintWriter class, Reading and writing files, Automatically closing a file.

UNIT-V	Swing	LECTURE HOURS: 12

Introducing Swing: The Origins of Swing, Two Key Swing Features, Components and Containers, The Swing Packages, A Simple Swing Application, Event Handling, Create a Swing Applet.

Exploring Swing: JLabel and ImageIcon, JTextField, The Swing Buttons, JScrollPane, JList, JComboBox, JTree, JTable.

Text Books:	
1	”Java The Complete Reference”, Herbert Schildt, MC GRAW HILL Education, 9th Edition,2016.

Reference Books:	
1	“Programming with Java” T.V.Suresh Kumar, B.Eswara Reddy, P.Raghavan Pearson Edition.
2	“Java Fundamentals - A Comprehensive Introduction”, Herbert Schildt and Dale Skrien, Special Indian Edition, McGrawHill, 2013.
3	“Java – How to Program”, Paul Deitel, Harvey Deitel, PHI.
4	“Core Java”, NageswarRao, Wiley Publishers.
5	“Thinking in Java”, Bruce Eckel, Pearson Education.
6	“A Programmers Guide to Java SCJP”, Third Edition, Mughal, Rasmussen, Pearson.
7	“Head First Java”, Kathy Sierra, Bert Bates, O’Reilly “SCJP – Sun Certified Programmer for Java Study guide” – Kathy Sierra, Bert Bates, McGrawHill

G.PULLAIAH COLLEGE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)
DATABASE MANAGEMENT SYSTEMS - R18 Regulations
DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

Title of the course:	**DATABASE MANAGEMENT SYSTEMS**			
Branches for which this course is offered:	**B.TECH III SEMESTER (CSE)**	**L**	**T**	**P**
		3	**1**	**0**

COURSE OVERVIEW:
• To understand the basic concepts and the applications of database systems. • To master the basics of SQL and construct queries using SQL. • To understand the relational database design principles. • To become familiar with the basic issues of transaction processing and concurrency control. • To become familiar with database storage structures and access techniques.

COURSE OUTCOMES:	
After successful completion of the course, the student will be able to	
CO1	Understand the basic concepts of database, data models and to apply the same to get the solution for database related problems using Entity Relationship model.
CO2	Understand the relational database and be able to write relational algebra and calculus expressions. Ability to design database by applying appropriate normalization techniques.
CO3	Apply optimized SQL queries to solve real time problems.
CO4	Create data elements and index structures.
CO5	Analyze the system failures and concurrency control.
CO6	Apply the concepts for the latest technologies and techniques.

Course Content:		
UNIT-I	**Introduction**	**LECTURE HOURS: 12**
Introduction-Basics of Database System and its Applications, Database System Principles **Data View** - Data Abstraction, Instances and Schemas, Data Models, Database Languages, Database Architecture, Database Users and Administrators, Introduction to Database design **ER diagrams**- Entities, Attributes and Entity sets, Relationship sets, Additional features of ER Model, Conceptual Design with ER Model **Relational Model:** Fundamentals of Relational Model - Integrity Constraints over Relations, Enforcing Integrity constraints, Querying relational data, Logical data base Design, Introduction to Views Destroying/ altering Tables and Views.		

UNIT-II	Relational Algebra and SQL	LECTURE HOURS: 12
Relational Algebra - Selection and Projection, Set operations, Renaming, Joins, Division, Examples of Algebra Queries **Basic SQL Queries** - Examples of Basic SQL Queries, Introduction to Sub queries, Correlated Sub queries, Set - Comparison Operators, Aggregate Operators, NULL values - Comparison using Null values, AND, OR and NOT - Impact on SQL Constructs, Outer Joins, Disallowing NULL values, Complex Integrity Constraints in SQL Triggers and Active Data bases.		
UNIT-III	**Fundamentals of Schema Refinement**	**LECTURE HOURS: 14**
Schema Refinement - Redundancy Issues, Decompositions - Examples related to decompositions, Functional Dependencies **Normal Forms -** FIRST, SECOND, THIRD Normal forms – BCNF, Properties of Decompositions - Loss less join Decomposition, Dependency preserving Decomposition, Schema Refinement in Data base Design, Multi valued Dependencies - FOURTH Normal Form, FIFTH Normal form.		
UNIT-IV	**Transaction Management**	**LECTURE HOURS: 12**
Transaction Concept - Transaction State, ACID Properties, Concurrency control, Serializability and Recoverability, Implementation of Isolation , Testing for serializability **Concurrency Control** - Lock Based Protocols, Timestamp Based Protocols, Validation Based Protocols. **Recovery System** - Failure Classification, Storage Structure Recovery and Atomicity, Log Based Recovery, Advance Recovery systems, Remote Backup systems.		
UNIT-V	**Storage and Indexing**	**LECTURE HOURS: 14**
Data on External Storage - File Organization and Indexing - Clustered Indexes, Primary and Secondary Indexes, Index data Structures - Hash Based Indexing, Tree based Indexing Comparison of File Organizations. **Tree Structured Indexing**- Intuitions for tree indexes, Indexed Sequential Access Methods(ISAM) , B+ Trees: A Dynamic Index Structure and its operations. **Hash Based Indexing** - Static Hashing, Extendable hashing, Linear Hashing.		

Text Books:	
1	Data base Management Systems, Raghurama Krishnan, Johannes Gehrke, McGrawHill Education, 3rd Edition, 2003.
2	Data base System Concepts, A.Silberschatz, H.F. Korth, S.Sudarshan, McGraw Hill, VI edition, 2006.

Reference Books:	
1	Database Systems, 6th edition, Ramez Elmasri, Shamkat B. Navathe, Pearson Education, 2013.
2	Database Systems Concepts, Peter Rob & Carlos Coronel, Cengage Learning, 2008.
3	Introduction to Database Systems, C.J. Date, Pearson Education.
4	Database Management Systems, G.K. Gupta, McGrawHill Education.

G.PULLAIAH COLLEGE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)
DISCRETE MATHEMATICS - R18 Regulations
DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

Title of the course:	**DISCRETE MATHEMATICS**			
Branches for which this course is offered:	**B.TECH III SEMESTER (CSE)**	**L**	**T**	**P**
		4	**0**	**0**

COURSE OVERVIEW:
• Understand the methods of discrete mathematics such as proofs, counting principles, number theory, logic and set theory. • Understand the concepts of graph theory, binomial theorem, and generating function in analysis of various computer science applications.

COURSE OUTCOMES:	
After successful completion of the course, the student will be able to	
CO1	Understand definitions and proofs using basic discrete mathematics.
CO2	Create and interpret statements presented in Boolean logic.
CO3	Create short proofs using direct proof, indirect proof, proof by contradiction, and case analysis.
CO4	Demonstrate a working knowledge of set notation and elementary set theory, recognize the connection between set operations and logic, prove elementary results involving sets.
CO5	Apply the different properties of injections, surjection, bisections, compositions, and inverse functions.
CO6	Solve the mathematical problems that involve computing permutations and combinations of a set, fundamental enumeration principles and graph theory

Course Content:		
UNIT-I	**Mathematical Logic**	**LECTURE HOURS: 12**
Introduction, Connectives, Normal Forms, The theory of Inference for the Statement Calculus, The Predicate Calculus, Inference Theory of Predicate Calculus.		
UNIT-II	**SET Theory**	**LECTURE HOURS: 12**
Basic concepts of Set Theory, Representation of Discrete structures, Relations and Ordering, Functions, Recursion.		
UNIT-III	**Algebraic Structures**	**LECTURE HOURS: 14**

Algebraic Systems: Examples and General Properties, Semi groups and Monoids, Polish expressions and their compilation, **Groups:** Definitions and Examples, Subgroups and Homomorphism's, Group Codes.

Lattices and Boolean algebra:

Lattices and Partially Ordered sets, Boolean algebra.

UNIT-IV	**An Introduction to Graph Theory**	**LECTURE HOURS: 14**

Definitions and Examples, Sub graphs, complements, Graph Isomorphism, **Vertex Degree:** Euler Trails and Circuits, Planar Graphs, Hamilton Paths and Cycles, Graph Coloring and Chromatic Polynomials

Trees:

Definitions, Properties, Examples, Rooted Trees, Trees and Sorting, Weighted trees and Prefix Codes, Biconnected Components and Articulation Points

UNIT-V	**Fundamental Principles of Counting**	**LECTURE HOURS: 12**

The rules of Sum and Product, Permutations, **Combinations:** The Binomial Theorem, Combinations with Repetition

The Principle of Inclusion and Exclusion:

The Principle of Inclusion and Exclusion, Generalizations of Principle, **Derangements:** Nothing is in Its Right Place, Rook Polynomials, Arrangements with Forbidden Positions

Generating Functions:

Introductory Examples, **Definitions and Examples**: Calculation Techniques, Partitions of Integers, The Exponential Generating Functions, The Summation Operator.

Text Books:

1	"Discrete Mathematical Structures with Applications to Computer Science", J.P. Tremblay and R. Manohar, Mc Graw Hill Education,2015.
2	"Discrete and Combinatorial Mathematics, an Applied Introduction", Ralph P. Grimaldi and B.V.Ramana, Pearson, 5th Edition, 2016.

Reference Books:

1	Graph Theory with Applications to Engineering by NARSINGH DEO, PHI.
2	Discrete Mathematics by R.K.Bishtand H.S. Dhami, Oxford Higher Education.
3	Discrete Mathematics theory and Applications by D.S.Malik and M.K.Sen, Cenegage Learning.
4	Elements of Discrete Mathematics, A computer Oriented approach by C L Liu and D P Mohapatra, MC GRAW HILL Education.
5	Discrete Mathematics for Computer scientists and Mathematicians by JOE L.Mott, Abraham Kandel and Theodore P.Baker, Pearson ,2nd Edition

G PULLAIAH COLLEGE OF ENGINEERING AND TECHNOLOGY
(AUTONOMOUS)
Digital logic and Computer Organization - R18 Regulation
DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

Title of the Course:	**Digital logic and Computer organization**			
Branch for which this course is offered:	**III Semester (CSE)**	**L**	**T**	**P**
		4	**0**	**0**

Course Overview:
The course addresses the concepts, principles and techniques of designing digital systems. The course teaches the fundamentals of digital systems applying the logic design and development techniques. Students will learn principles of digital systems logic design and distinguish between analog and digital representations. They will be able to analyze a given combinational or sequential circuit using k-map and Boolean algebra as a tool to simplify and design logic circuits. Construct and analyze the operation of a latch, flip-flop and its application in synchronization circuits provide a thorough discussion of the fundamentals of computer organization and to relate these to contemporary design issues. A computer system is like any other system, consists of an inter-related set of components

Course Outcomes:	
After successful completion of the course, the student will be able to	
CO1	Understand the fundamental concepts of digital circuits.
CO2	Apply the knowledge of digital circuits concepts to minimize a digital circuit for the given parameters using mapping techniques.
CO3	Construct and analyze various combinational circuits used in digital systems such as adders, subtractors, code-convertors, decoders, encoders, and multiplexers,
CO4	Construct and analyze various sequential circuits used in digital systems such as flip-flops, registers and counters.
CO5	Understand the basic concepts of computer and computer arithmetic.
CO6	Analyze the basic processing unit and pipelining .

Course Content:		
Unit-I	**BINARY SYSTEMS ,BOOLEAN ALGEBRA AND LOGIC GATES**	Lecture Hours: 12
BINARY SYSTEMS**:** Digital Systems, Binary Numbers, Number Base Conversions, Octal and Hexadecimal Numbers, Compliments, Signed Binary Numbers, Binary Codes, BOOLEAN ALGEBRA AND LOGIC GATES**:** Basic Definitions, Axiomatic Definition of Boolean Algebra, Basic Theorems and properties of Boolean Algebra, Boolean Functions, Canonical and Standard Forms, Digital Logic Gates		

Unit-II	**GATE LEVEL MINIMIZATION AND COMBINATIONAL LOGIC**	Lecture Hours: 12
GATE LEVEL MINIMIZATION**:** The Map Method, Four Variable Map, Don't-Care Conditions, NAND and NOR Implementation COMBINATIONAL LOGIC**:** Combinational Circuits, Design Procedure, Binary Adder-Subtractor, Decimal Adder, Magnitude Comparator, Decoders, Encoders, Multiplexers		
Unit-III	**SYNCHRONOUS SEQUENTIAL LOGIC**	Lecture Hours: 12
SYNCHRONOUS SEQUENTIAL LOGIC: Sequential Circuits, Latches, Flip-Flops, Analysis of Clocked Sequential Circuits, Design Procedure, Registers, Shift Registers, Ripple Counters, Synchronous Counters, Other counters.		
Unit-IV	**BASIC STRCTURE OF COMPUTER ARTHMETIC**	Lecture Hours: 12
BASIC STRCTURE OF COMPUTER: Computer Types, Functional Units, Basic operational Concepts, Bus Structure, Software, Performance, Multiprocessors and Multicomputer. ARTHMETIC: Design and Fast Adders, Multiplication of Positive Numbers, Signed-operand Multiplication, Fast Multiplication, Integer Division		
Unit-V	**BASIC PROCESSING UNIT& PIPELINING**	Lecture Hours: 12
BASIC PROCESSING UNIT**:** Fundamental Concepts, Execution of a Complete Instruction, Multiple- Bus Organization, Hardwired Control, Multi programmed Control. IPELINING**:** Basic Concepts, Data Hazards, Instruction Hazards, The Structure of General-Purpose Multiprocessors, Interconnection Networks.		

Text Books:	
1	Digital Design, M.Morris Mano &Micheal D. Ciletti, Pearson, 5th Edition, 2013.
2	Digital Logic & State Machine Design, David J. Comer, Oxford University Press, 3rd Reprinted Indian Edition, 2012.
3.	"Computer Organization", Carl Hamacher, ZvonkoVranesic, SafwatZaky, McGraw Hill Education, 5th Edition, 2013**.**
Reference Books:	
1	Digital Logic Design, R.D. Sudhakar Samuel, Elsevier
2	Fundamentals of Logic Design, 5/e, Roth, Cengage
3	Switching and Finite Automata Theory,3/e,Kohavi, Jha, Cambridge.
4	Computer System Architecture, M.Morris Mano, Pearson Education, 3rd Edition.
5	Computer Organization and Architecture, SmrutiRanjanSarangi, McGraw Hill Education.

G.PULLAIAH COLLEGE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)
MANAGERIAL ECONOMICS & FINANCIAL ANALYSIS - R18 Regulations
DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

Title of the course:	**MANAGERIAL ECONOMICS & FINANCIAL ANALYSIS**			
Branches for which this course is offered:	**B.TECH III SEMESTER (CSE)**	**L**	**T**	**P**
		3	**0**	**0**

COURSE OVERVIEW:
The objective of this course is to equip the student with the basic inputs of Managerial Economics and Economic Environment of business and to impart analytical skills in helping them take sound financial decisions for achieving higher organizational productivity.

COURSE OUTCOMES:	
After successful completion of the course, the student will be able to	
CO1	Understand, Concepts of economics, managerial economics, scope, nature and importance of managerial economics, demand determinants, law of demand and its exceptions.
CO2	Understand elasticity of demand, types and measurement of elasticity of demand, demand forecasting, methods of demand forecasting.
CO3	Understand production function, isoquants and isocosts, MRTS, least cost combination of inputs, Cobb-Douglas production function and law of return to scale. Types of cost, BEA, BEP.
CO4	Understand market structure, types of markets, price-output determination under perfect competition, monopoly, monopolistic competition and pricing methods.
CO5	Understand types of business organizations and LPG.
CO6	Understand capital, types, sources, estimation of capital requirements, capital budgeting and techniques of capital budgeting.

Course Content:		
UNIT-I	**INTRODUCTION TO MANAGERIAL ECONOMICS**	**LECTURE HOURS: 9**
Managerial Economics – Definition- Nature- Scope - Contemporary importance of Managerial Economics - Relationship of Managerial Economics with Financial Accounting and Management. –Inflation-**Demand Analysis**: Concept of Demand-Demand Function - Law of Demand - Elasticity of Demand- Significance - Types of Elasticity - Measurement of elasticity of demand - Demand Forecasting- factors governing demand forecasting- methods of demand forecasting.		

UNIT-II	THEORY OF PRODUCTION AND COST ANALYSIS	LECTURE HOURS: 9
Production Function- Least cost combination- Short-run and Long- run production function- Isoquants and ISO -costs, MRTS - Cobb-Douglas production function - Laws of returns - Internal and External economies of scale - **Cost Analysis**: Cost concepts and cost behavior- Break-Even Analysis (BEA) -Determination of Break Even Point (Simple Problems)-Managerial significance and limitations of Break- Even Point.GST-Impact.		
UNIT-III	**INTRODUCTION TO MARKETS AND NEW ECONOMIC ENVIRONMENT**	**LECTURE HOURS: 10**
Market structures: Types of Markets - Perfect and Imperfect Competition - Features of Perfect Competition- Monopoly-Monopolistic Competition-Oligopoly-Price-Output Determination - Pricing Methods and Strategies-Forms of Business Organizations- Sole Proprietorship- Partnership – Joint Stock Companies - Public Sector Enterprises – New Economic Environment- Economic Liberalization – Privatization – Globalization-National Income- GDP-monetary policy-Fiscal Policy		
UNIT-IV	**INTRODUCTION TO FINANCIAL ACCOUNTING AND ANALYSIS**	**LECTURE HOURS: 10**
Financial Accounting – Concept - Emerging need and Importance - Double-Entry Book Keeping- Journal - Ledger – Trial Balance - Financial Statements - Trading Account – Profit & Loss Account – Balance Sheet (with simple adjustments). Financial Analysis – Ratios – Liquidity, Leverage, Profitability, and Activity Ratios (simple problems).		
UNIT-V	**CAPITAL AND CAPITAL BUDGETING**	**LECTURE HOURS: 10**
Concept of Capital - Over and Undercapitalization – Remedial Measures - Sources of Shot term and Long term Capital - Estimating Working Capital Requirements – Capital Budgeting – Features of Capital Budgeting Proposals – Methods and Evaluation of Capital Budgeting Projects – Pay Back Method – Accounting Rate of Return (ARR) – Net Present Value (NPV) – Internal Rate Return (IRR) Method (simple problems)		

Text Books:	
1	Managerial Economics 3/e, Ahuja H.L, S.Chand, 2013.
2	Financial Management, I.M.Pandey, Vikas Publications, 2013.

Reference Books:	
1	Managerial Economics and Financial Analysis, 1/e, Aryasri, TMH, 2013.
2	Managerial Economics and Financial Analysis, S.A. Siddiqui and A.S. Siddiqui, New Age International, 2013.
3	Accounting and Financial Mangement, T.S.Reddy & Y. Hariprasad Reddy, Margham Publishers.

G.PULLAIAH COLLEGE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)
DATABASE MANAGEMENT SYSTEMS LABORATORY-R18 Regulations
DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

Title of the course:	**DATABASE MANAGEMENT SYSTEMS LABORATORY**			
Branches for which this course is offered:	**B.TECH III SEMESTER (CSE)**	**L**	**T**	**P**
		0	**0**	**3**

COURSE OVERVIEW:
• To create a database and query it using SQL, design forms and generate reports. • Understand the significance of integrity constraints, referential integrity constraints, triggers, assertions.

COURSE OUTCOMES:	
After successful completion of the course, the student will be able to	
CO1	Gain knowledge and understand the data models used for structuring data in database systems.
CO2	Understand the general principles of Retrieving information from databases
CO3	Analyze the best possible ways of solving a given query.
CO4	Evaluate the complex nested queries on multiple relations.
CO5	Implement various integrity constraints, triggers and views in database design.
CO6	Analyze the latest technologies and techniques.

Course Content:

TASK-1	**CREATION OF TABLES:**	**PRACTICAL HOURS: 4**

Create a table called **Employee** with the following structure.

Name	**Type**
Empno	Number
Ename	Varchar2(20)
Job	Varchar2(20)
Doj	Number
Sal	Number

a. Add a column commission with domain to the Employeetable.
b. Insert any five records into thetable.
c. Update the column details ofjob
d. Rename the column of Employ table using altercommand.
e. Delete the employee whose empno is19.

TASK-2		PRACTICAL HOURS: 3

Create **department** table with the followingstructure.

Name	Type
Deptno	Number
Deptname	Varchar2(20)
location	Varchar2(20)

a. Add column designation to the departmenttable.
b. Insert values into thetable.
c. List the records of emp table grouped bydeptno.
d. Update the record where deptno is9.
e. Delete any column data from thetable.

TASK-3		PRACTICAL HOURS: 4

Create a table called **Customer**table

Name	Type
Cust name	Varchar2(20)
Cust street	Varchar2(20)
Cust city	Varchar2(20)

a. Insert records into thetable.
b. Add salary column to thetable.
c. Alter the table columndomain.
d. Drop salary column of the customertable.
e. Delete the rows of customer table whose cust_city is‘kurnool’.

TASK-4		PRACTICAL HOURS: 4

Create a table called **branch**table.

Name	Type
Branchname	Varchar2(20)
Branchcity	Varchar2(20) asserts
Branchname	Varchar2(20)

a. Increase the size of data type for asserts to the branch.
b. Add and drop a column to the branch table.
c. Insert values to the table.
d. Update the branch name column
e. Delete any two columns from the table

TASK-5		PRACTICAL HOURS: 4

Create a table called **sailor** table

Name	Type
Sid Number	Sname Varchar2(20)
Rating Varchar2(20)	Varchar2(20)
Sid Number	Sname Varchar2(20)

a. Add column age to the sailor table.
b. Insert values into the sailor table.
c. Delete the row with rating >8.
d. Update the column details of sailor.
e. Insert null values into the table.

TASK-6		PRACTICAL HOURS: 4

Create a table called **reserves**table

Name	Type
Boat id	Integer
sid	Integer
day	Integer

a. Insert values into the reservestable.
b. Add column time to the reservestable.
c. Alter the column day data type todate.
d. Drop the column time in thetable.
e. Delete the row of the table with somecondition.

TASK-7	QUERIES USING DDL AND DML	PRACTICAL HOURS: 6

A college consists of number of employees working in different departments. In this context, create two tables**employee** and **department**. Employee consists of columns empno, empname, basic, hra, da, deductions, gross, net, date-of-birth. The calculation of hra,da are as per the rules of the college. Initially only empno, empname, basic have valid values. Other values are to be computed and updated later. Department contains deptno, deptname, and description columns. Deptno is the primary key in department table and referential integrity constraint exists between employee and department tables. Perform the following operations on the the database:

- Create tables department and employee with required constraints.
- Initially only the few columns (essential) are to be added. Add the remaining columns separately by using appropriate SQL command
- Basic column should not be null
- Add constraint that basic should not be less than 5000.
- Calculate hra,da,gross and net by using PL/SQL program.
- Whenever salary is updated and its value becomes less than 5000 a trigger has to be raised preventing the operation.
- The assertions are: hra should not be less than 10% of basic and da should not be less than 50% of basic.

- The percentage of hra and da are to be stored separately.
- When the da becomes more than 100%, a message has to be generated and with user permission da has to be merged with basic.
- Empno should be unique and has to be generated automatically.
- If the employee is going to retire in a particular month, automatically a message has to be generated.
- The default value for date-of-birth is 1 jan, 1970.
- When the employees called daily-wagers are to be added the constraint that salary should be greater than or equal to 5000 should be dropped.
- Display the information of the employees and departments with description of the fields.
- Display the average salary of all the departments.
- Display the average salary department wise.
- Display the maximum salary of each department and also all departments put together.
- Commit the changes whenever required and rollback if necessary.
- Use substitution variables to insert values repeatedly.
- Assume some of the employees have given wrong information about date-of-birth. Update the corresponding tables to change the value.
- Find the employees whose salary is between 5000 and 10000 but not exactly 7500.
- Find the employees whose name contains 'en'.
- Try to delete a particular deptno. What happens if there are employees in it and if there are no employees.
- Create alias for columns and use them in queries.
- List the employees according to ascending order of salary.
- List the employees according to ascending order of salary in each department.
- Use '&&' wherever necessary
- Amount 6000 has to be deducted as CM relief fund in a particular month which has to be accepted as input from the user. Whenever the salary becomes negative it has to be maintained as 1000 and the deduction amount for those employees is reduced appropriately.
- The retirement age is 60 years. Display the retirement day of all the employees.
- If salary of all the employees is increased by 10% every year, what is the salary of all the employees at retirement time.
- Find the employees who are born in leap year.
- Find the employees who are born on feb 29.
- Find the departments where the salary of atleast one employee is more than 20000.
- Find the departments where the salary of all the employees is less than 20000.
- On first January of every year a bonus of 10% has to be given to all the employees. The amount has to be deducted equally in the next 5 months. Write procedures for it.

TASK-8	**CURSORS**	**PRACTICAL HOURS: 3**

1. Write a PL/SQL block that will display the name, dept no, salary of fist highest paid employees**.**
2. Update the balance stock in the item master table each time a transaction takes place in the item transaction table. The change in item master table depends on the item id is

already present in the item master then update operation is performed to decrease the balance stock by the quantity specified in the item transaction, in case the item id is not presentintheitemmastertablethen therecord isinsertedintheitemmastertable.

3. Write a PL/SQL block that will display the employee details along with salary using cursors.
4. To write a Cursor to display the list of employees who are working as a Managers or Analyst.
5. To write a Cursor to find employee with given job anddeptno.
6. Write a PL/SQL block using implicit cursor that will display message, the salaries of all the employees in the 'employee' table are updated. If none of the employee's salaryare updated we get a message 'None of the salaries were updated'. Else we get a message

TASK-9	PROCEDURES AND FUNCTIONS	**PRACTICAL HOURS: 3**

1. Write a function to accept employee number as parameter and return Basic +HRA together as singlecolumn.
2. Accept year as parameter and write a Function to return the total net salary spent for a givenyear.
3. Create a function to find the factorial of a given number
4. Create function to the reverse of givennumber.

TASK-10	TRIGGERS	**PRACTICAL HOURS: 3**

1. Create a row level trigger for the customers table that would fire for INSERT or UPDATE or DELETE operations performed on the CUSTOMERS table. This trigger will display the salary difference between the old values and new values: CUSTOMERStable:

Id	**Name**	**Age**	**Address**	**Salary**
1	Sri Lakshmi	34	Kurnool	50000
2	Sreedhar	36	Hyderabad	80000
3	Neetu	30	Chennai	30000
4	Nymisha	29	Delhi	20000
5	Nishitha	25	Bombay	40000
6	Jyothsna	29	kurnool	60000

Creation of insert trigger, delete trigger, update trigger practice triggers using the passengerdatabase.

Passenger(Passport_ id INTEGER PRIMARY KEY, Name VARCHAR (50) Not NULL, Age); Integer Not NULL, Sex Char, Address VARCHAR (50) Not NULL

a. Write a Insert Trigger to check the Passport_id is exactly six digits ornot.
b. Write a trigger on passenger to display messages '1 Record is inserted', '1 record is deleted', '1 record is updated' when insertion, deletion and updation are done on passengerrespectively.

3. Insert row in employee table using Triggers. If any employee has same name it must be replaced by new name. These triggers can be raised before insert, update or delete rows on

data base.

4. Convert employee name into uppercase whenever an employee record is inserted or updated. Trigger to fire before the insert orupdate.

A Trigger before deleting a record from emp table. Trigger will insert the row to be deleted into table called delete _emp and also record user who has deleted the record and date and time of delete.

TASK-11	CASE STUDY GENERAL HOSPITAL	**PRACTICAL HOURS: 3**

A General Hospital consists of a number of specialized wards (such as Maternity, Pediatric, Oncology, etc). Each ward hosts a number of patients, who were admitted on the recommendation of their own GP and confirmed by a consultant employed by the Hospital. On admission, the personal details of every patient are recorded. A separate register is to be held to store the information of the tests undertaken and the results of a prescribed treatment. A number of tests may be conducted for each patient. Each patient is assigned to one leading consultant but may be examined by another doctor, if required. Doctors are specialists in some branch of medicine and may be leading consultants for a number of patients, not necessarily from the same ward. For the above case study, do thefollowing.

1. Analyze the datarequired.
2. Normalize theattributes.

Create the logical data model using E-R diagrams.
Create tables and generate Queries

TASK-12	CASE STUDY: CAR RENTAL COMPANY	**PRACTICAL HOURS: 3**

A database is to be designed for a car rental company. The information required includes a description of cars, subcontractors (i.e. garages), company expenditures, company revenues and customers. Cars are to be described by such data as: make, model, year of production, engine size, fuel type, number of passengers, registration number, purchase price, purchase date, rent price and insurance details. It is the company policy not to keep any car for a period exceeding one year. All major repairs and maintenance are done by subcontractors (i.e. franchised garages), with whom CRC has long-term agreements. Therefore the data about garages to be kept in the database includes garage names, addresses, range of services and the like. Some garages require payments immediately after a repair has been made; with others CRC has made arrangements for credit facilities. Company expenditures are to be registered for all outgoings connected with purchases, repairs, maintenance, insurance etc. Similarly the cash inflow coming from all sources: Car hire, car sales, insurance claims must be kept of file. CRC maintains a reasonably stable client base. For this privileged category of customers special credit card facilities are provided. These customers may also book in advance a particular car. These reservations can be made for any period of time up to one month. Casual customers must pay a deposit for an estimated time of rental, unless they wish to pay by credit card. All major credit cards are accepted. Personal details such as name, address, telephonenumber, Drivinglicense,numberabouteachcustomerarekeptinthedatabase.Fortheabovecase.

study, do the following:

1. Analyze the datarequired.
2. Normalize theattributes.

Create the logical data model using E-R diagrams.
Create tables and generate Queries

TASK-13	CASE STUDY: STUDENT PROGRESS MONITORING SYSTEM	PRACTICAL HOURS: 4

A database is to be designed for a college to monitor students' progress throughout their course of study. The students are reading for a degree (such as BA, BA (Hons) M.Sc., etc) within the framework of the modular system. The college provides a number of modules, each being characterized by its code, title, credit value, module leader, teaching staff and the department they come from. A module is coordinated by a module leader who shares teaching duties with one or more lecturers. A lecturer may teach (and be a module leader for) more than one module. Students are free to choose any module they wish but the following rules must be observed: Some modules require pre- requisites modules and some degree programmes have compulsory modules. The database is also to contain some information about students including their numbers, names, addresses, degrees they read for, and their past performance
i.e. modules taken and examination results. For the above case study, do the following:

1. Analyze the datarequired.
2. Normalize theattributes.
3. Create the logical data model i.e., ERdiagrams.
4. Create tables and generate Queries

Text Books:	
1	Data base Management Systems, Raghurama Krishnan, Johannes Gehrke, McGrawHill Education, 3rd Edition, 2003.
2	Data base System Concepts, A.Silberschatz, H.F. Korth, S.Sudarshan, McGraw Hill, VI edition, 2006.

Reference Books:	
1	“Oracle Database 11g PL/SQL Programming”, M.McLaughlin,TMH.
2	“Learning Oracle SQL and PL/SQL”, Rajeeb C. Chatterjee, PHI.
3	“Introduction to SQL”, Rick F.VanderLans, Pearson education.
4	“Oracle PL/SQL”, B.Rosenzweig and E.Silvestrova, Pearson education.

G.PULLAIAH COLLEGE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)
JAVA PROGRAMMING LABORATORY- R18 Regulations
DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

Title of the course:	**JAVA PROGRAMMING LABORATORY**			
Branches for which this course is offered:	**B.TECH III SEMESTER (CSE)**	**L**	**T**	**P**
		0	**0**	**3**

COURSE OVERVIEW:
• Learn to use object orientation to solve problems and use java language to implement them. • To experiment with the syntax and semantics of java language and gain experience with java programming

COURSE OUTCOMES:	
After successful completion of the course, the student will be able to	
CO1	Apply of data types , variables and control structures to solve problems
CO2	Apply object-oriented concepts to solve problems including generating series primes, searching a pattern in a file.
CO3	Design, write, debug and execute applet programs using Integrated Development Environment
CO4	Develop programs using threads and swing concepts
CO5	Apply I/O stream and networking classes to develop client and server interaction
CO6	Apply the concepts and create solution effectively as a member or leader in a team during the development of a software project.

Course Content:		
TASK-1		**LECTURE HOURS: 2**
Preparing and practice – Installation of Java software, study of any Integrated development environment, sample programs on operator precedence and associativity, class and package concept, scope concept, control structures, constructors and destructors. Learn to compile, debug and execute java programs.		
TASK-2		**LECTURE HOURS: 1**
Develop a java application for Banking transactions by using inheritance concept.		
TASK-3		**LECTURE HOURS: 1**
Develop a java application for Ticket Reservation by using the concept of Polymorphism.		
TASK-4		**LECTURE HOURS: 2**
Develop a java application for Daily Attendance by using the concept Dynamic Binding.		
TASK-5		**LECTURE HOURS: 2**
Write a program for the following • Develop a swing program that displays a simple message.		

• Develop a swing program for waving a Flag using Applets and Threads.		
TASK-6		**LECTURE HOURS: 2**
Write Java program(s) which uses the exception handling features of the language, creates exceptions and handles them properly, uses the predefined exceptions, and create own exceptions.		
TASK-7		**LECTURE HOURS: 2**
Write java program that inputs 5 numbers, each between 10 and 100 inclusive. As each number is read display it only if it's not a duplicate of any number already read. Display the complete set of unique values input after the user enters each new value.		
TASK-8		**LECTURE HOURS: 2**
Write Java program(s) on creating multiple threads, assigning priority to threads, synchronizing threads, suspend and resume threads		
TASK-9		**LECTURE HOURS: 2**
Write a java program to split a given text file into n parts. Name each part as the name of the original file followed by .part<n> where n is the sequence number of the part file.		
TASK-10		**LECTURE HOURS: 2**
Write a java program to create a super class called Figure that receives the dimensions of two dimensional objects. It also defines a method called area that computes the area of an object. The program derives two subclasses from Figure. The first is Rectangle and second is Triangle. Each of the sub classes override area() so that it returns the area of a rectangle and triangle respectively.		
TASK-11		**LECTURE HOURS: 2**
Write a Java program that creates three threads. First thread displays "Good Morning" every one second, the second thread displays "Hello" every two seconds and the third thread displays "Welcome" every three seconds		
TASK-12		**LECTURE HOURS: 2**
Using swings design a simple calculator which performs all arithmetic operations. The interface should look like the calculator application of the operating system. Handle the exceptions if any.		
TASK-13		**LECTURE HOURS: 2**
Write a java program to handle mouse events		
TASK-14		**LECTURE HOURS: 2**
Write a java program to handle keyboard events		
TASK-15		**LECTURE HOURS: 2**
Write a java program that allows conduction of object type examination containing multiple choice questions, and true/false questions. At the end of the examination when the user clicks a button the total marks have to be displayed in the form of the message.		
TASK-16		**LECTURE HOURS: 2**
Write a java program that creates menu which appears similar to the menu of notepad application of the Microsoft windows or any editor of your choice.		
TASK-17		**LECTURE HOURS: 2**
Write a java program that creates dialog box which is similar to the save dialog box of the Microsoft windows or any word processor of your choice		
TASK-18		**LECTURE HOURS: 2**
Write a Java program that correctly implements producer consumer problem using the concept of		

inter thread communication		
TASK-19		**LECTURE HOURS: 2**
Write a java program to find and replace pattern in a given file.		
TASK-20		**LECTURE HOURS: 2**
Use inheritance to create an exception super class called ExceptionA and exception sub classes ExceptionB and ExceptionC, where ExceptionB inherits from ExceptionA and ExceptionC inherits from ExceptionB. Write a java program to demonstrate that the catch block for type ExceptionA catches exception of type ExceptionB and ExceptionC.		
TASK-21		**LECTURE HOURS: 2**
Write a Java program which opens a connection to standard port on well known server, sends the data using socket and prints the returned data.		
TASK-22		**LECTURE HOURS: 2**
Write a Java program which uses TCP/IP and Datagrams to communicate client and server.		
TASK-23		**LECTURE HOURS: 2**
Create an interface for stack with push and pop operations. Implement the stack in two ways: fixed size stack and Dynamic stack (stack size is increased when stack is full).		
TASK-24		**LECTURE HOURS: 2**
Design a swings program for Hospital management system to maintain doctors and patients data and generate reports by using JDBC connectivity.		
TASK-25		**LECTURE HOURS: 2**
Develop a swing program with menu bar for college management system. The program should establish connectivity with back end for data transactions, it should generate necessary reports as per requirements.		

Text Books:	
1	”Java The Complete Reference”, Herbert Schildt, MC GRAW HILL Education, 9th Edition,2016.

Reference Books:	
1	“Java: How to Program”, P.J.Deitel and H.M.Deitel, PHI.
2	“Object Oriented Programming through Java”, P.Radha Krishna, Universities Press.
3	“Thinking in Java”, Bruce Eckel, Pearson Education
4	“Programming in Java”, S.Malhotra and S.Choudhary, Oxford Univ. Press.

G PULLAIAH COLLEGE OF ENGINEERING AND TECHNOLOGY
(AUTONOMOUS)
Digital Electronics Laboratory - R18 Regulation
DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

Title of the Course	**Digital Electronics Laboratory**			
Branch for which this course is offered	**III Semester (CSE)**	**L**	**P**	**C**
		-	**3**	**1.5**

Course Overview:
This Lab provides the students to study representation of switching functions using Boolean expressions and their minimization techniques, the combinational logic design of various logic and switching devices and their realization, the sequential logic circuits design both in synchronous and Asynchronous modes for various complex logic and switching devices.

Course Outcomes:	
After successful completion of the course, the student will be able to	
CO1	Design digital logic circuits using software.
CO2	Verify the logical operations of the digital logic gates in the laboratory.
CO3	Analyze the functionality of Combinational circuits using LogiSIM.
CO4	Analyze the functionality of Sequential Circuits using LogiSIM.
CO5	Design and analyze the code converters using LogiSIM.
CO6	Design and analyze the counters using LogiSIM.

Course Content:		
PART – A: List of Experiments using LogiSIM.		
Exp – 1	Realization of logic gates	**No. of Hours: 3**
Exp – 2	Realization of Boolean function using basic gates	**No. of Hours: 3**
Exp – 3	Realization of Boolean function usingUniversal gates	**No. of Hours: 3**
Exp – 4	Implementation and verification of Code Converters	**No. of Hours: 3**
Exp – 5	Implementation and verification of Half adder and Full adder	**No. of Hours: 3**
Exp – 6	Implementation and verification of Half subtractor and Full subtractor	**No. of Hours: 3**
Exp – 7	Implementation and verification of multiplexers	**No. of Hours: 3**
Exp – 8	Implementation and verification of magnitude comparators	**No. of Hours: 3**
Exp – 9	Design and verification of Flip-flops	**No. of Hours: 3**
Exp – 10	Design and implementation of synchronous and ripple counters	**No. of Hours: 3**
Exp – 11	Program to blink on board green LED using Arduino	**No. of Hours: 3**
Exp – 12	Program to control on board green LED by taking input fromSwitch	**No. of Hours: 3**

Text Books:	
1	Text Book1 (T1): M. Morris Mano, Michael D. Ciletti (2008), Digital Design, 4th edition, Pearson Education/ PHI, India.
2	Thomas L. Floyd (2006), *Digital fundamentals*, 9th edition, Pearson Education International.
Reference Books:	
1	Zvi. Kohavi (2004), *Switching and Finite Automata Theory*, Tata McGraw Hill, India.
2	C.V.S. Rao (2009), *Switching and Logic Design*, 3rd edition, Pearson Education, India.
3	Donald D.Givone (2002), *Digital Principles and Design*, Tata McGraw Hill, India.

G.PULLAIAH COLLEGE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)
Qualitative Aptitude - 1-R18 Regulations
DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

Title of the course:	**Qualitative Aptitude - 1**			
Branches for which this course is offered:	**B.TECH III SEMESTER (CSE)**	**L**	**T**	**P**
		1	**0**	**0**

Course Content:		
UNIT-I	**Ratio and Proportion& Average, Mixtures and Alligation**	**LECTURE HOURS: 3**
Ratio and Proportion: Ratio, Proportion, Variations, Problems on Ages **Average**, **Mixtures and Alligation**: Averages, Weighted average, Difference between mixture and alligation, Problems on Mixtures and alligation		
UNIT-II	**Percentages, SI & CI & Data Interpretation**	**LECTURE HOURS: 3**
Percentages, SI & CI: Fundamentals of Percentage, Percentage change, SI and CI, Relation between SI, CI **Data Interpretation**: Introduction, Tabulation, Bar Graph, Pie Charts, Line Graphs, Combined Graphs		
UNIT-III	**Profit and loss, Partnerships**	**LECTURE HOURS:3**
Profit and loss, **Partnerships:** Basic terminology in profit and loss, Types of partnership, Problems related to partnership **Logarithms:** Fundamental formulae of logarithms and problems, finding no of terms on expanding a given number.		
UNIT-IV	**Permutation and combination**	**LECTURE HOURS: 3**
Fundamentals counting principle, Definition of Permutation, Seating arrangement, Problems related to alphabets, Rank of the word, Problems related to numbers, Circular permutation, Combination		
UNIT-V	**Clocks & Calendar**	**LECTURE HOURS: 4**
Clocks: Introduction, Finding angle between hands of clock, Gain/Loss of Time, Finding time, Gain or loss of time **Calendar:** Calendars method- 1, Calendars method -2		

Text Books:	
1	Quantitative Aptitude for Competitive Examinations by R S Agrawal
2	Quantitative Aptitude for competitive examinations by Abhijit Guha
3	The Pearson guide to Quantitative Aptitude by Dinesh Khattar

G.PULLAIAH COLLEGE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)
PROBABILITY AND STATISTICS-R18 Regulations
DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

Title of the course:	**PROBABILITY AND STATISTICS**			
Branches for which this course is offered:	**B.TECH IV SEMESTER (CSE)**	**L**	**T**	**P**
		3	**1**	**0**

Course Overview:
The course matter is divided into five chapters covering duly-recognized areas of theory and study. This course develops abstract and critical reasoning by studying logical proofs and the axiomatic method as applied to basic probability and to make connections between probability and other branches of mathematics. The topics covered include probability, random variables and distributions, correlation and regression, sampling distribution, testing of hypothesis for large samples and small samples, queuing theory and stochastic process. The course helps students gain an appreciation for the diverse applications of statistics and its relevance to their lives and fields of study.

Course Outcomes :	
After successful completion of the course , the student will be able to	
CO1	Understand basic concepts of probability and statistics and apply them in solving practical engineering problems
CO2	Apply discrete and continuous probability distributions to evaluate the probability of real world problems
CO3	Conduct hypotheses tests concerning population parameters for single and multiple populations based on sample data.
CO4	Understand concepts of t-test f-test and chi-square test for small samples
CO5	Demonstrate the ability to design, use, and interpret control charts for variables.
CO6	Demonstrate the knowledge and understand various queuing models

Course Content:		
Unit-I		**Lecture Hours:12**
Basic concepts of probability- Random variables – – Expectation-Discrete and continuous Distributions – Distribution functions. Binomial and poison distributions Normal distribution – Related properties.		
Unit-II	**Test of Hypothesis:**	**Lecture Hours:12**
Population and Sample - Confidence interval of mean from Normal distribution - Statistical hypothesis - Null and Alternative hypothesis - Level of significance - Test of significance - Test based on normal distribution - Z test for means and proportions		

Unit-III		**Lecture Hours:14**
Small samples - t- test for one sample and two sample problem and paired t-test, F-test and Chi-square test (testing of goodness of fit and independence)		
Unit-IV	**Statistical Quality Control**	**Lecture Hours:12**
Concept of quality of a manufactured product -Defects and Defectives - Causes of variations - Random and assignable - The principle of Shewhart Control Chart-Charts for attribute and variable quality characteristics- Constructions and operation of X- bar Chart, R-Chart, P-Chart and C-Chart.		
UNIT-V	**Queuing Theory**	**Lecture Hours:14**
Pure Birth and Death process, M/M/1 & M/M/S & their related simple problems.		

Text Books:	
1	Probability & Statistics for engineers by Dr. J. Ravichandran WILEY-INDIA publishers
2	Probability & Statistics by T.K.V. Iyengar, S.Chand publications.

Reference Books:	
1	Probability & Statistics by E. Rukmangadachari & E. Keshava Reddy, Pearson Publisher.
2	Statistical methods by S.P. Gupta, S.Chand publications.
3	Probability & Statistics for Science and Engineering by G.Shanker Rao, Universities Press.
4	Probability and Statistics for Engineering and Sciences by Jay L.Devore, CENGAGE.
5	Probability and Statistics by R.A. Johnson and Gupta C.B.Jay I Devore, “Probability and Statistics for Engineers and Scientists”, California, 2004.

G.PULLAIAH COLLEGE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)
SOFTWARE ENGINEERING -R18 Regulations
DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

Title of the course:	**SOFTWARE ENGINEERING**			
Branches for which this course is offered:	**B.TECH IV SEMESTER (CSE)**	**L**	**T**	**P**
		3	**1**	**0**

COURSE OVERVIEW:
• To learn the software life cycle models. • To know about software requirements and SRS document. • To understand the importance of modeling and modeling languages. • To design and develop correct and robust software products. • To understand the planning and estimation of software projects. • To understand the implementation issues, validation and verification procedures. • To understand the maintenance of software

COURSE OUTCOMES:	
After successful completion of the course, the student will be able to	
CO1	Possess knowledge on evolving role of software, process and maturity models.
CO2	Understand the various phases of software development life cycles and software requirements.
CO3	Possess necessary skills to elicit the requirements of a software system and to create well written software documentation involving appropriate system models.
CO4	Design, implement and evaluate a computer based system, process, component or program to meet desired needs within realistic constraints specific to the field
CO5	Construct software projects by integrating components with appropriate user interface
CO6	Apply various testing strategies to verify, validate and to release error free software

Course Content:		
UNIT-I	**Software and Software Engineering:**	**LECTURE HOURS: 12**
The Characteristics of Software, The Distinctive Nature of WebApps, Software Engineering, The Software Process, Software Engineering Practice, Software Myths **Process Models:** A General Process Model, Process Assessment and Improvement, Prescriptive Process Models, Specialized Process Models, The Unified Process, Personal and Team Process Models, Process Technology, Product and Process. **Agile Development:** Agility, Agility and the Cost of Change, Agile Process, Extreme Programming, Other Agile Process Models.		

UNIT-II	Requirements Engineering	LECTURE HOURS: 12
Requirements Engineering, Establishing the groundwork, Eliciting Requirements, Developing Use Cases, Building the requirements model, Negotiating Requirements, Validating Requirements. **Requirements Modeling (Scenarios, Information and Analysis Classes):** Requirements Analysis, Scenario-Based Modeling, UML Models that Supplement the Use Case, Data Modeling Concepts, Class-Based Modeling. **Requirements Modeling (Flow, Behavior, Patterns and WEBAPPS):** Requirements Modeling Strategies, Flow-Oriented Modeling, Creating a Behavioral Model, Requirements Patterns Modeling, Requirements Modeling for WebApps.		
UNIT-III	**Design Concepts**	**LECTURE HOURS: 14**
Design with Context of Software Engineering, The Design Process, Design Concepts, The Design Model. **Architectural Design:** Software Architecture, Architecture Genres, Architecture Styles, Architectural Design, Assessing Alternative Architectural Designs, Architectural Mapping Using Data Flow. **Component-Level Design:** Component, Designing Class-Based Components, Conducting Component-level Design, Component Level Design for WebApps, Designing Traditional Components, Component-Based Development.		
UNIT-IV	**User Interface Design**	**LECTURE HOURS: 14**
The Golden Rules, UI Analysis and Design, Interface Analysis, Interface Design Steps, WebApp Interface Design, Design Evaluation. **WebApp Design:** WebApp Design Quality, Design Goal, A Design Pyramid for WebApps, WebApp Interface Design, Aesthetic Design, Content Design, Architecture Design, Navigation Design, Component-Level Design, Object-Oriented Hypermedia Design Method.		
UNIT-V	**Software Testing Strategies:**	**LECTURE HOURS: 12**
A Planned Approach to Software Testing, Strategic Issues, Test Strategies for Conventional Software, Test Strategies for Object-Oriented Software, Test Strategies for WebApps, Validation Testing, System Testing, The Art of Debugging. **Testing Conventional Applications:** Software Testing Fundamentals, Internal and External Views of Testing, White-Box Testing, basic Path testing, Control Structure Testing, Black-Box Testing, Model-based Testing, Testing for Specialized Environments, Architectures and Applications, Patterns for Software Testing. Testing Object-Oriented Applications: Broadening the View of Testing, Testing with OOA and OOD Models, Object-Oriented Testing Strategies, Object-Oriented Testing Methods, Testing Methods Applicable at the Class level, Interclass Test-Case Design.		

Text Books:	
1	"Software engineering A practitioner's Approach", Roger S. Pressman, McGraw Hill International Education, Seventh Edition, 2016.

Reference Books:	
1	Fundamentals of Software Engineering, Fourth Edition, Rajib Mall, PHI.
2	Software Engineering, Ninth Edition, IAN Sommerville, Pearson, Ninth edition.
3	Software Engineering, A Precise Approach, Pankaj Jalote, Wiley India,2010.
4	Software Engineering, Principles and Practices, Deepak Jain, Oxford University Press.
5	Software Engineering1: Abstraction and modeling, Diner Bjorner, Springer International edition, 2006.
6	Software Engineering2: Specification of systems and languages, Diner Bjorner, Springer International edition, 2006.
7	Software Engineering Foundations, Yingxu Wang, Auerbach Publications,2008.
8	Software Engineering Principles and Practice, Hans Van Vliet,3rd edition, John Wiley &Sons Ltd.
9	Software Engineering 3: Domains, Requirements, and Software Design, D.Bjorner, Springer International Edition.
10	Introduction to Software Engineering R.J.Leach, CRC Press

G.PULLAIAH COLLEGE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)
OPERATING SYSTEMS -R18 Regulations
DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

Title of the course:	**OPERATING SYSTEMS**			
Branches for which this course is offered:	**B.TECH IV SEMESTER (CSE)**	**L**	**T**	**P**
		3	**0**	**0**

COURSE OVERVIEW:
• To make the students understand the basic operating system concepts such as processes, threads, scheduling, synchronization, deadlocks, memory management, file and I/O subsystems and protection. • To get acquaintance with the class of abstractions afford by general purpose operating systems that aid the development of user applications.

COURSE OUTCOMES:	
After successful completion of the course, the student will be able to	
CO1	Identify and understand the history of operating systems, functions, structures and design issues associated with operating systems.
CO2	Understand the process management concepts including scheduling-criteria, algorithms, their evaluation and Thread scheduling.
CO3	Apply the solutions to process synchronization problems and implementation methods.
CO4	Solve the memory management problems with techniques like paging and segmentation and also use page replacement algorithms
CO5	Understand the principles of dead lock.
CO6	Understand the issues related to file system interface and implementation.

Course Content:		
UNIT-I	**Operating Systems Overview**	**LECTURE HOURS: 9**
Operating system functions, structure, Operations, protection and security, Computing Environments, Open- Source OS **System Structures:** Operating System Services, User and Operating-System Interface, systems calls, Types of System Calls, system programs, operating system structure, operating system debugging, System Boot. **Processes:** Process concept, Scheduling, Operations, Inter process Communication, Examples of IPC systems.		

UNIT-II	Threads	LECTURE HOURS: 9
Overview, Multicore Programming, Multithreading Models, Thread Libraries, Implicit Threading, Threading Issues. **Process Synchronization:** The critical-section problem, Peterson's Solution, Synchronization Hardware, Mutex Locks, Semaphores, Classic problems of synchronization, Monitors, Synchronization examples, Alternative approaches. **CPU Scheduling:** Scheduling-Criteria, Scheduling Algorithms, Thread Scheduling, Multiple-Processor Scheduling, Real-Time CPU Scheduling, Algorithm Evaluation.		
UNIT-III	**Memory Management**	**LECTURE HOURS: 10**
Swapping, contiguous memory allocation, segmentation, paging, structure of the page table. **Virtual memory:** demand paging, page-replacement, Allocation of frames, Thrashing, Memory-Mapped Files, Allocating Kernel Memory **Deadlocks:** System Model, deadlock characterization, Methods of handling Deadlocks, Deadlock prevention, Detection and Avoidance, Recovery from deadlock.		
UNIT-IV	**Mass-storage structure**	**LECTURE HOURS: 10**
Overview of Mass-storage structure, Disk structure, Disk attachment, Disk scheduling, Swap-space management, RAID structure, Stable-storage implementation. **File system Interface:** The concept of a file, Access Methods, Directory and Disk structure, File system mounting, File sharing, Protection. **File system Implementation:** File-system structure, File-system Implementation, Directory Implementation, Allocation Methods, Free-Space management.		
UNIT-V	**I/O systems**	**LECTURE HOURS: 10**
I/O Hardware, Application I/O interface, Kernel I/O subsystem, Transforming I/O requests to Hardware operations. **Protection:** Goals of Protection, Principles of Protection, Domain of protection, Access Matrix, Implementation of Access Matrix, Access control, Revocation of Access Rights, Capability-Based systems, Language – Based Protection **Security:** The Security problem, Program threats, System and Network threats, Cryptography as a security tool, User authentication, Implementing security defenses, Firewalling to protect systems and networks, Computer–security classifications.		

Text Books:	
1	Operating System Concepts, Abraham Silberchatz, Peter B. Galvin, Greg Gagne, Wiley , Eight Edition, 2014.

Reference Books:	
1	Operating systems by A K Sharma, Universities Press
2	Operating Systems, S.Haldar, A.A.Aravind, Pearson Education.
3	Modern Operating Systems, Andrew S Tanenbaum, Second Edition, PHI.
4	Operating Systems, A.S.Godbole, Second Edition, TMH.
5	An Introduction to Operating Systems, P.C.P. Bhatt, PHI.
6	Operating Systems, G.Nutt, N.Chaki and S.Neogy, Third Edition, Pearson Education
7	Operating Systems, R.Elmasri, A,G.Carrick and D.Levine, Mc Graw Hill.
8	Principles of Operating Systems, B.L.Stuart, Cengage learning, India Edition.
9	Operating System Desgin, Douglas Comer, CRC Press, 2nd Edition.

G.PULLAIAH COLLEGE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)
DESIGN &ANALYSIS OF ALGORITHMS-R18 Regulations
DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

Title of the course:	**DESIGN &ANALYSIS OF ALGORITHMS**			
Branches for which this course is offered:	**B.TECH IV SEMESTER (CSE)**	**L**	**T**	**P**
		4	**0**	**0**

COURSE OVERVIEW:
• To know the importance of the complexity of a given algorithm. • To study various algorithm design techniques. • To utilize data structures and/or algorithmic design techniques in solving new problems. • To know and understand basic computability concepts and the complexity classes P, NP, and NP-Complete. • To study some techniques for solving hard problems.

COURSE OUTCOMES:	
After successful completion of the course, the student will be able to	
CO1	Analyze the efficiency of algorithm
CO2	Understand the running time and space complexity of algorithms by using the concepts of big Oh, Omega and Theta notations.
CO3	Formulate the time order analysis for an algorithm.
CO4	Use the mathematical techniques required to prove the time complexity of a program/algorithm.
CO5	Apply algorithmic methods (such as divide and conquer, greedy method, dynamic programming, local search, branch & bound, and randomized algorithms) to the real-world problems to design an algorithm.
CO6	Analyze the latest technologies and techniques.

Course Content:		
UNIT-I	**Introduction**	**LECTURE HOURS: 12**
Algorithm, specifications of Algorithm, Algorithm Measurement **Divide and Conquer:** General method, Binary Search, Finding the maximum and minimum, Merge sort, Quick Sort, Selection sort, Stressen‘s matrix multiplication.		

UNIT-II	Greedy Method & Dynamic programming	LECTURE HOURS: 12
General method, Knapsack problem, Job Scheduling with Deadlines, Minimum cost Spanning Trees, Optimal storage on tapes, Single-source shortest paths. **Dynamic programming:** General Method, Multistage graphs, All-pairs shortest paths, Optimal binary search trees, 0/1 knapsack, The traveling sales person problem.		
UNIT-III	**Basic Traversal and Search Techniques & Back tracking**	**LECTURE HOURS: 14**
Basic Traversal and Search Techniques: Traversal techniques for binary trees, Traversal techniques for Graphs, Connected components and Spanning trees, Bi-connected components **Back tracking:** Common Method, 8 – queens problem, Sum of subsets problem, Graph coloring and Hamiltonian cycles.		
UNIT-IV	**Branch and Bound & Lower Bound Theory**	**LECTURE HOURS: 14**
Branch and Bound : The method, Travelling salesperson, 0/1 Knapsack problem **Lower Bound Theory**: Comparison trees, Lower bounds through reductions – Multiplying triangular matrices, inverting a lower triangular matrix, computing the transitive closure.		
UNIT-V	**NP – Hard and NP – Complete Problems:**	**LECTURE HOURS: 12**
NP Hardness, NP Completeness, Consequences of being in P, Cook's Theorem, Halting Problem, Non-Deterministic Problem,Clique's, SAT Problem.		

Text Books:	
1	"Fundamentals of Computer Algorithms", Ellis Horowitz, S. Satraj Sahani and Rajasekhran, 2nd edition, University Press.2014.
2	"Design and Analysis of Algorithms", Parag Himanshu Dave, Himanshu Bhalchandra Dave, Pearson Education, Second Edition, 2009.

Reference Books:	
1	"Introduction to Algorithms", second edition, T.H.Cormen, C.E.Leiserson, R.L.Rivest and C.Stein, PHI Pvt. Ltd./ Pearson Education.
2	"Introduction to Design and Analysis of Algorithms A strategic approach", R.C.T.Lee, S.S.Tseng, R.C.Chang and T.Tsai, Mc Graw Hill.
3	"Data structures and Algorithm Analysis in C++", Allen Weiss, Second edition, Pearson education.
4	"Design and Analysis of algorithms", Aho, Ullman and Hopcroft,Pearson education.
5	"Algorithms" – Richard Johnson baugh and Marcus Schaefer, Pearson Education

G.PULLAIAH COLLEGE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)
FORMAL LANGUAGES AND AUTOMATA THEORY-R18 Regulations
DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

Title of the course:	**FORMAL LANGUAGES AND AUTOMATA THEORY**			
Branches for which this course is offered:	**B.TECH IV SEMESTER (CSE)**	**L**	**T**	**P**
		3	**0**	**0**

COURSE OVERVIEW:

- Understand formal definitions of machine models.
- Classify machines by their power to recognize languages.
- To understanding of formal grammars, analysis
- Understanding of hierarchical organization of problems depending on their complexity
- Understanding of the logical limits to computational capacity
- Understanding of un decidable problems

COURSE OUTCOMES:

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

CO1	Design an Automata to accept strings from various simple languages
CO2	Understand the functioning of Finite-State Machines, Deterministic Finite-State Automata, Nondeterministic Finite-State Automata and Pushdown Automata
CO3	Design grammars and recognizers for different formal languages
CO4	Design automata, regular expressions and context-free grammars accepting or generating a certain language
CO5	Understand the relation between types of languages and types of finite automata
CO6	Describe the language accepted by an automata or generated by a regular expression or a context-free grammar

Course Content:

UNIT-I	**Introduction:**	**LECTURE HOURS: 9**

fundamentals of set theory, Reduction to definitions, Other theorem forms, Proving equivalences about sets, The Contrapositive, Proof by contradiction, Counter examples, Inductive proofs, Alphabets, Strings, Languages, Problems, Formalization of Grammar, Hierarchy of Chomsky

Finite Automata: Familiar picture of Finite Automata, Non Deterministic Finite Automata (NFA), Applying FA for Text search, Finite Automata with Epsilon transitions (ϵ-NFA or NFA- ϵ), Deterministic Finite Automata (DFA) , Mealy Machine and Moor Machine, Conversion of Mealy Machine and Moor Machine, Minimization of Finite Automata, Myhill-Nerode Theorem.

UNIT-II	Fundamentals of Regular Languages	LECTURE HOURS: 9
Introduction to Regular Expressions (RE), Finite Automata and Regular Expressions, Regular Expressions Applications, Laws of Algebraic for Regular Expressions, The Arden‘s Theorem, Using Arden‘s theorem to construct RE from FA, Pumping Lemma for RLs, Pumping Lemma Applications, Uniformity of Two FAs, Uniformity of Two REs, Construction of Regular Grammar from RE, Constructing FA from Regular Grammar, Closure properties of RLs, Applications of REs and FAs		
UNIT-III	**Context Free Grammars and Languages**	**LECTURE HOURS: 10**
Introduction of Context Free Grammars (CFG), Derivations and Parse trees, Ambiguity in CFGs, Removing ambiguity, Left recursion and Left factoring-Examples, Generalization of CFGs, Normal Forms, Linear grammars, Closure properties for CFLs, Pumping Lemma for CFLs, CFG and Regular Language.		
UNIT-IV	**Push Down Automata (PDA)**	**LECTURE HOURS: 10**
Introduction, The Formal Definition, Graphical notation, Instantaneous description of PDA, The Languages of a PDA, Similarity of PDAs and CFGs, Deterministic Push Down Automata, Non-Deterministic Push Down Automata, Two Stack PDA.		
UNIT-V	**Turing Machines and Undecidability:**	**LECTURE HOURS: 10**
Introduction to Turing Machine (TM), Instantaneous description of TMs, Non Deterministic TM, Conversion of Regular Expression to TM, Comparison of PDA ,FA and TM, Types of TM, TM as an integer function, Universal TM, LBA, TM Languages, Type 0 grammar , Properties of Recursive and Recursively enumerable languages, Undecidability, Undeciadable problems about TMs, PCP, Modified PCP.		

Text Books:	
1	Introduction to Automata Theory, Formal Languages and Computation, Shyamalendu kandar, Pearson.
2	Introduction to Automata Theory, Languages, and Computation, Third Edition, John E.Hopcroft, Rajeev Motwani, Jeffery D. Ullman, Pearson.

Reference Books:	
1	Introduction to Languages and the Theory of Computation, John C Martin, TMH, Third Edition.
2	Theory of Computation, Vivek Kulkarni, OXFORD.
3	Introduction to the Theory of Computation, Michel Sipser, 2nd Edition, Cengage Learning .
4	Theory of computer Science Automata, Languages and Computation, K.L.P. Mishra, N.Chandrasekaran, PHI, Third Edition.
5	Fundamentals of the Theory of Computation, Principles and Practice, Raymond Greenlaw, H. James Hoover, Elsevier, Morgan Kaufmann.
6	Finite Automata and Formal Language A Simple Approach, A.M. Padma Reddy, Pearson

G.PULLAIAH COLLEGE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)
R PROGRAMMING LABORATORY R18 Regulations
DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

Title of the course:	R PROGRAMMING LABORATORY			
Branches for which this course is offered:	B.TECH IV SEMESTER (CSE)	L	T	P
		0	0	3

COURSE OVERVIEW:
• Understand the fundamentals of 'R' programming • Learn how to carry out a range of commonly used statistical methods including analysis of variance and linear regression. • Explore data-sets to create testable hypotheses and identify appropriate statistical tests.

COURSE OUTCOMES:	
After successful completion of the course, the student will be able to	
CO1	List motivation for learning a programming language
CO2	Access online resources for R and import new function packages into the R workspace
CO3	Import, review, manipulate and summarize data-sets in R
CO4	Explore data-sets to create testable hypotheses and identify appropriate statistical tests
CO5	Perform appropriate statistical tests using R
CO6	Create and edit visualizations with R

Course Content:

TASK-1	R Basic programs	PRACTICAL HOURS: 10

1. R Multiplication Table
2. R Program to Check Prime Number
3. R Program to check Armstrong Number
4. R Program to Print the Fibonacci Sequence
5. R Program to Check for Leap Year
6. Check if a Number is Odd or Even in R Programming
7. R Program to Check if a Number is Positive, Negative or Zero
8. R Program to Find the Sum of Natural Numbers
9. Convert Decimal into Binary using Recursion in R
10. R program to Find the Factorial of a Number Using Recursion
11. R Program to Find the Factors of a Number
12. Fibonacci Sequence Using Recursion in R
13. R Program to Find H.C.F. or G.C.D.
14. R Program to Find L.C.M.
15. R Program to Make a Simple Calculator

16. Sum of Natural Numbers Using Recursion		
TASK-2		**PRACTICAL HOURS: 7**
1.Creating Vectors and sequences numbers 2. Importing Tabular data, 3. Simple summaries of categorical and continuous data. 4. Manipulating data frames and lists. 5. Writing functions in R.using If/else statements.		
TASK-3	**A common data cleaning task**	**PRACTICAL HOURS: 7**
1. Write a Program on For/while loops. 2. Write a Program on Using apply() to iterate over data. 3. Write a Program on Using with() to specify environment. 4. Multivariate statistical summaries using plyr 5. Program using ggplot2 graphics		
TASK-4	**Statistical tests and models**	**PRACTICAL HOURS: 10**
1. Write a Program on Testing for differences in means between two groups 2. Write a Program on QQ plots 3. Write a Program on Tests for 2x2 tables 4. Write a Program on Plotting confidence intervals 5. Write a Program and calculate ANOVA 6. Write a Program on Linear regression 7. Write a Program on Assessing multicollinearity 8. Write a Program on Diagnosing and interpreting regression		
TASK-5	**Linear regression**	**PRACTICAL HOURS: 4**
1. Write a Program on Interpreting categorical variables in regression 2. Write a Program on Interaction terms in regression		
TASK-6	**Logistic regression**	**PRACTICAL HOURS: 4**
1. Program on Logstic regression		

Text Books:	
1	"Beginning R the statistical programming language" Dr. Mark Gardener, Wiley Publications, 2015.

Reference Books:	
1	Hands-On Programming with R Paperback by Grolemund (Author), Garrett (Author), SPD,2014.
2	The R Book, Michael J. Crawley, WILEY, 2012.

G.PULLAIAH COLLEGE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)
DESIGN AND ANALYSIS OF ALGORITHMS LABORATORY - R18 Regulations
DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

Title of the course:	**DESIGN AND ANALYSIS OF ALGORITHMS LABORATORY**			
Branches for which this course is offered:	**B.TECH IV SEMESTER (CSE)**	**L**	**T**	**P**
		0	**0**	**2**

COURSE OVERVIEW:
• To know the importance of the complexity of a given algorithm. • To study various algorithm design techniques. • To utilize data structures and/or algorithmic design techniques in solving new problems. • To know and understand basic computability concepts and the complexity classes P, NP, and NP-Complete. • To study some techniques for solving hard problems.

COURSE OUTCOMES:	
After successful completion of the course, the student will be able to	
CO1	Demonstrate the complexity of the algorithms
CO2	Analyze various algorithms and design techniques
CO3	Demonstrate the techniques of divide and conquer, greedy, dynamic programming, backtracking, branch and bound to solve the problems.
CO4	Identify and analyze criteria and specifications appropriate to new problems
CO5	Understand the appropriate algorithmic design technique for the solution.
CO6	Demonstrate with proof that a certain problem is NP-Complete.

Course Content:		
TASK-1		**PRACTICAL HOURS:2**
A. Create a Java class called ***Student*** with the following details as variables within it. (i) USN (ii) Name (iii) Branch (iv) Phone Write a Java program to create *nStudent*objects and print the USN, Name, Branch, and *Phoneof*theseobjects with suitable headings. **B**. Write a Java program to implement the Stack using arrays. Write Push(), Pop(), and Display()		

methods to demonstrate its working.

TASK-2		PRACTICAL HOURS:2

a) Implement **next permutation**, which rearranges numbers into the lexicographically next greater permutation of numbers.
If such arrangement is not possible, it must rearrange it as the lowest possible order (ie, sorted in ascending order).
The replacement must be in-place and use only constant extra memory.
Here are some examples. Inputs are in the left-hand column and its corresponding outputs are in the right-hand column.
1,2,3 → 1,3,2
3,2,1 → 1,2,3
1,1,5 → 1,5,1

b) Write a Java class called ***Customer*** to store their name and date_of_birth. The date_of_birth format should be dd/mm/yyyy. Write methods to read customer data as <name, dd/mm/yyyy> and display as <name, dd, mm, yyyy> using StringTokenizer class considering the delimiter character as"/".

TASK-3		PRACTICAL HOURS:4

Sort a given set of elements using the best sorting method and determine the time required to sort the elements. Repeat the experiment for different values of n, the number of elements in the list to be sorted and plot a graph of the time taken versus n. The elements can be read from a file or can be generated using the random number generator. Demonstrate using Java which technique is good to calculate time complexity analysis: worst case, average case and best case.

TASK-4		PRACTICAL HOURS:2

A) Given an array nums, we call (i, j) an important reverse pair if i < j and nums[i] > 2*nums[j].
You need to return the number of important reverse pairs in the given array.
Example1:
Input: [1,3,2,3,1]
Output: 2
Example2:
Input: [2,4,3,5,1]
Output: 3

B) Write a java program to implement the following sorting techniques by using Divide and Conquer Method:
   a) Insertion Sort
   b) Selection sort

TASK-5		PRACTICAL HOURS:4

Write a java program for an array of jobs where every job has a deadline and associated profit if the job is finished before the deadline. It is also given that every job takes single unit of time, so the minimum possible deadline for any job is 1. How to maximize total profit if only one job can be

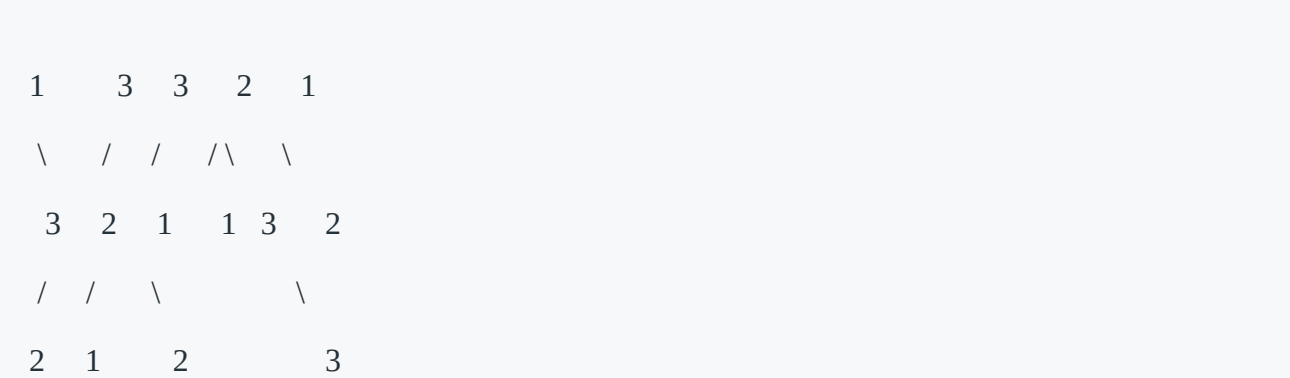
scheduled at a time.

TASK-6		PRACTICAL HOURS:4

A) Given *n*, how many structurally unique **BST's** (binary search trees) that store values 1 ... *n*?

Example:

Input: 3
Output: 5
Explanation:
Given n = 3, there are a total of 5 unique BST's:



B) Write java code to check whether a given graph is strongly connected or not.

TASK-7		PRACTICAL HOURS:4

a) Given an integer array nums, find the contiguous subarray (containing at least one number) which has the largest sum and return its sum.(Using Dynamic Programming)

Example:
Input: [-2,1,-3,4,-1,2,1,-5,4],
Output: 6
Explanation: [4,-1,2,1] has the largest sum = 6.

b) You are a professional robber planning to rob houses along a street. Each house has a certain amount of money stashed, the only constraint stopping you from robbing each of them is that adjacent houses have security system connected and it will automatically contact the police if two adjacent houses were broken into on the same night.

Given a list of non-negative integers representing the amount of money of each house, determine the maximum amount of money you can rob tonight without alerting the police.
Input: [1,2,3,1]
Output: 4

Explanation: Rob house 1 (money = 1) and then rob house 3 (money = 3).
Total amount you can rob = 1 + 3 = 4.

C) Total number of odd length palindrome sub-sequence around each centreby using Dynamic Programming		
TASK-8		**PRACTICAL HOURS:4**
Write a java for the given an undirected weighted connected graph consisting of n vertices and m edges. The task is to find any spanning tree of this graph such that the maximum degree over all vertices is maximum possible. The order in which you print the output edges does not matter and an edge can be printed in reverse also i.e. (u, v) can also be printed as (v, u).		
TASK-9		**PRACTICAL HOURS: 2**
. Java Program is to Implement Knight's Tour Problem.A knight's tour is a sequence of moves of a knight on a chessboard such that the knight visits every square exactly once. If the knight ends on a square that is one knight's move from the beginning square (so that it could tour the board again immediately, following the same path), the tour is closed, and otherwise it is open. The exact number of open tours on an 8×8 chessboard is still unknown		
TASK-10		PRACTICAL HOURS: 2
a) Design and implement in Java to find a subset of a given set S = {Sl, S2, ...,Sn} of n positive integers whose SUM is equal to a given positive integer d. b) Write a program to print all permutations of a given string using BackTracking.		

Text Books:	
1	"Fundamentals of Computer Algorithms", Ellis Horowitz, S. SatrajSahani and Rajasekhran, 2nd edition, University Press.2014
2	"Design and Analysis of Algorithms", ParagHimanshu Dave, HimanshuBhalchandra Dave, Pearson Education, Second Edition, 2009.

Reference Books:	
1	"Introduction to Algorithms", second edition, T.H.Cormen, C.E.Leiserson, R.L.Rivest and C.Stein, PHI Pvt. Ltd./ Pearson Education.
2	"Introduction to Design and Analysis of Algorithms A strategic approach", R.C.T.Lee, S.S.Tseng, R.C.Chang and T.Tsai, McGraw Hill.
3	"Data structures and Algorithm Analysis in C++", Allen Weiss, Second edition, Pearson education.
4	"Design and Analysis of algorithms", Aho, Ullman and Hopcroft,Pearson education.
5	"Algorithms" – Richard Johnson baugh and Marcus Schaefer, Pearson Education

G.PULLAIAH COLLEGE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)
WEB PROGRAMMING LABORATORY-R18 Regulations
DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

Title of the course:	**WEB PROGRAMMING LABORATORY**			
Branches for which this course is offered:	**B.TECH IV SEMESTER (CSE)**	**L**	**T**	**P**
		0	**0**	**3**

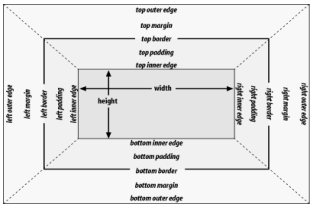
COURSE OVERVIEW:
• To learn the basic web concepts and Internet protocols. • To design web page with visual effects using HTML,DHTML, CSS and Angular JS. • To introduce client side scripting with Javascript . • To introduce server side programming with Java servlets.

COURSE OUTCOMES:	
After successful completion of the course, the student will be able to	
CO1	Apply the design principles of HTML and Java Script for creating static and dynamic web pages.
CO2	Analyze the differences between various scripting languages.
CO3	Demonstrate a structural framework for dynamic web apps using AngularJS
CO4	Analyze the client side validation procedure in web applications.
CO5	Design solutions using web servers and database servers.
CO6	Identify the user requirements and design appropriate business solutions.

Course Content:		
TASK-1		**PRACTICAL HOURS: 6**

Web Site Creation - HTML
a. Open the index.html by clicking on it. The default browser should start and show the content.
b. Find the IP address of your own computer
c. Open the index.html file using IP address
d. Create a small web pages(linking each other) with the following elements
i. Headings
ii. Paragraphs
iii. Tables
iv. Lists
v. Internal or external hyper links
vi. Embed images or videos
vii. Menus

f. Create a Form for a college application using form input & output elements.

TASK-2		PRACTICAL HOURS: 6
Cascading Style Sheets – CSS a. Take one of your pages (with bold-face text) and add an inline CSS style sheet (in the section) that make bold-face text use a larger font size. The style sheet can look like this b. Change the style sheet to make the bold-face text red on a blue background. c. Add another piece of text in bold-face, but make it belong to a different class than your previous bold text. (Example more text to view) Make text like that (but not your other bold-face text) use a smaller font than normal and be blue on a red background. d. External CSS files e. CSS for placement of text  		
TASK-3		**PRACTICAL HOURS: 6**
Write a JavaScript that calculates the squares and cubes of the numbers from 0 to 10 and outputs HTML text that displays the resulting values in an HTML table format.		
TASK-4		**PRACTICAL HOURS: 3**
Write a JavaScript code that displays text “TEXT-GROWING” with increasing font size in the interval of 100ms in RED COLOR, when the font size reaches 50pt it displays “TEXT-SHRINKING” in BLUE color. Then the font size decreases to 5pt.		
TASK-5		**PRACTICAL HOURS: 3**
Write a Hello World program to demonstrate Controller, View and Map using Angular JS.		
TASK-6		**PRACTICAL HOURS: 6**
Design a webform in Angular JS using the following elements a. Input elements b. Select elements c. Button elements		
TASK-7		**PRACTICAL HOURS: 3**
Design a web form with sessions to identify each browser and its associated session		
TASK-8		**PRACTICAL HOURS: 3**
Write a java program to implement Email Program with Internet Services (Sending Email, reading Email)		
TASK-9		**PRACTICAL HOURS: 3**
Write a java program to perform CRUD (Create, Read, Update, and Delete) operations on any Database.		
TASK-10		**PRACTICAL HOURS: 3**
Design a web application using servlets demonstrating sessions, cookies and appended URLs.		

Text Books:	
1	Herbert Schildt, “Java-The Complete Reference”, Eighth Edition, Mc Graw Hill Professional, 2011.
2	Angular JS: Up and Running: Enhanced Productivity with structured Web Apps.,Orelly
3	Web Technologies: HTML, JAVASCRIPT, PHP, JAVA, JSP, ASP.NET, XML and Ajax,

Reference Books:	
1	Deitel and Deitel and Nieto, “Internet and World Wide Web - How to Program”, Prentice Hall, 5 th Edition, 2011.
2	Black Book: HTML, Javascript, PHP, Java, Jsp, XML and Ajax, Black Book by Kogent Learning Solutions Inc.

G.PULLAIAH COLLEGE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)
VERBAL ABILITY AND LOGICAL REASONING-R18 Regulations
DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

Title of the course:	**VERBAL ABILITY AND LOGICAL REASONING**			
Branches for which this course is offered:	**B.TECH IV SEMESTER (CSE)**	**L**	**T**	**P**
		1	**0**	**0**

COURSE OVERVIEW:
This course builds to improve the vocabulary, verbal reasoning, abstract and spatial reasoning.

Course Content:		
UNIT-I	**Coding and Decoding**	**LECTURE HOURS:3**
Coding and Decoding: Coding and Decoding, Arrow Method, Chinese coding, Series, Analogy, Odd man out.		
UNIT-II	**Articles and Tenses, Direction Sense**	**LECTURE HOURS: 3**
a) Articles and Tenses: Introduction, usage of articles, Omission of Articles, Types of tenses, Forms and Usage of tenses **b) Direction Sense:** Introduction, Distance method, Facing Method and Shadow Method		
UNIT-III	**Blood Relations, Voices and Forms of Speech**	**LECTURE HOURS: 3**
a) Blood Relations: Introduction, Direct, Puzzle and Coded models **b) Voices and Forms of Speech:** Introduction, conversion of active and passive voice, conversions of direct and indirect speech.		
UNIT-IV	**Data Arrangements, Syllogisms**	**LECTURE HOURS: 3**
a) Data Arrangements: Linear Arrangement, Circular Arrangement, Multiple Arrangements **b) Syllogisms:** Introduction, Tick-Cross method, Inferential Technique, Venn-Diagram method		
UNIT-V	**Visual Reasoning, Sentence Correction**	**LECTURE HOURS: 4**
a) Visual Reasoning: Patterns, Folded Images, Cubes and Analytical Reasoning **b) Sentence Correction:** Subject-Verb Agreement, Pronoun Antecedent, Parallelism, Verb-Time Sequence Error, Determiners and Modifiers		

Text Books:	
1	A Modern Approach to Logical Reasoning Book by R.S. Aggarwal and Vikas Aggarwal

Reference Books:	
1	Test of Reasoning Paperback by Edgar Thorpe and Logical Reasoning by Arun Sharma

G.PULLAIAH COLLEGE OF ENGINEERING AND TECHNOLOGY, KURNOOL

COURSE STRUCTURE

V SEMESTER

G.PULLAIAH COLLEGE OF ENGINEERING AND TECHNOLOGY, KURNOOL

V SEMESTER (III YEAR)									
Code	Course	Category	Periods per Week			Credits	Scheme of Examination Maximum Marks		
			L	T	P	C	Internal	External	Total
A1518	Computer Networks	PC	3	1	0	4	30	70	100
A1519	Data Mining	PC	4	0	0	4	30	70	100
A1520	Compiler Design	PC	4	0	0	4	30	70	100
	Professional Elective-1	PE	3	0	0	3	30	70	100
	Open Elective – 1	OE	3	0	0	3	30	70	100
A1521	Computer Networks Laboratory	PC	0	0	3	1.5	30	70	100
A1522	Data Mining Laboratory	PC	0	0	3	1.5	30	70	100
A1523	Python Programming Laboratory	PC	0	0	4	2	30	70	100
A1015	Human Values and Professional Ethics	MC	2	0	0	0	100*	-	100*
		TOTAL	19	01	10	23	240	560	800

G.PULLAIAH COLLEGE OF ENGINEERING AND TECHNOLOGY, KURNOOL

COURSE STRUCTURE
A1518 – COMPUTER NETWORKS

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
3	1	0	42	14	0	4	30	70	100

1. Course Description

Course Overview

This course is introduced as a professional core offering insight into important aspects of computer networks. It covers the functionality of each layer in computer networks, besides highlighting the flow of control and congestion control algorithms. This course helps the learner in selecting a domain path leading to cyber security specialization.

Course Pre/corequisites

A1503- Data Structures
A1507- Discrete Mathematics

2. Course Outcomes (COs)

After completion of the course, the learner will be able to:

A1518.1 Apply the networking concepts in configuring the systems.

A1518.2 Illustrates error handling mechanism in data link layer.

A1518.3 Analyze the routing algorithms in finding the shortest path.

A1518.4 Apply transport protocols in network communications.

A1518.5 Implements domain name service and network security in the communication segment.

3. Course Syllabus

UNIT-I

Introduction: network hardware, network software, reference models-OSI,TCP/IP, examples of networks-the internet, 4G mobile phone networks, RFID and sensor networks.

Physical Layer: Guided Transmission, Wireless Transmission, Public switched telephone networks-Structure of the telephone system, FDM, TDM, Switching.

UNIT-II

Data Link Layer: design issues, error detection and correction, elementary data link protocol, sliding window protocols. Medium access sub layer: the channel allocation problem, multiple access protocols, Ethernet, wireless LANS.

UNIT-III

Network Layer: Network layer design issues, routing algorithms-shortest path routing, flooding, hierarchical routing, broadcast, multicast, distance vector routing, link state routing.

Congestion Control: Congestion control algorithms. Quality of service application requirements, Traffic Shaping, the network layer in the internet-the IPV4 protocol, IP- addresses, internet control protocols, IPV6.

UNIT-IV

Transport Layer: Transport services, elements of transport protocols, the internet transport protocols-TCP and UDP protocols.

UNIT-V

Domain Name System: The DNS name space, domain resource records, name servers. Network security: introduction to cryptography, DES—the Data Encryption Standard, RSA.

4. Books and Materials

Text Book(s)

1. Andrew S. Tanenbaum, David J, *Computer Networks*, Pearson Education /PHI, 5th edition 2016.

Reference Book(s)

1. Behrouz A. Forouzan, *Data Communications and Networking,* TMH, 4th edition 2017.
2. S.Keshav*, An Engineering Approach to Computer Networks,* Pearson Education, 2nd edition 2014.

G.PULLAIAH COLLEGE OF ENGINEERING AND TECHNOLOGY, KURNOOL

COURSE STRUCTURE
A1519 – DATA MINING

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
4	0	0	56	0	0	4	30	70	100

1. Course Description

Course Overview

This course is introduced to drive the students to reach the depth of data science with warehous- ing and mining concepts. It covers data pre processing, mining frequent patterns, associations and correlations, classification and prediction, and cluster analysis**.** In addition to this it paves way for machine learning algorithms. This helps the student to choose the career path in data science and architect the data for better decision making.

Course Pre/corequisites

A1503 – Data Structures
A1506 – Database Management Systems

2. Course Outcomes (COs)

After completion of the course, the learner will be able to:

A1519.1 Apply the principles of business intelligence in the commercial segment

A1519.2 Make use of pre-processing techniques for data organization

A1519.3 Implement association, clustering and rule based mining for Market based analysis

A1519.4 Analyze the data mining classification technique for data differentiation

A1519.5 Design the unsupervised clustering algorithms for data analysis

3. Course Syllabus

UNIT-I

Data Mining: Fundamentals of data mining, data mining functionalities, classification of data min- ing systems, data mining task primitives.

UNIT-II

Data Pre Processing: Descriptive data summarization, data cleaning, data integration and trans- formation, data reduction, data discretization and concept hierarchy generation.

UNIT-III

Mining Frequent Patterns, Associations and Correlations: Efficient and scalable frequent item set mining methods, association rules, and correlation analysis

UNIT-IV

Classification and Prediction: Decision tree induction, various classification methods, accuracy and error measures, ensemble methods.

UNIT-V

Cluster Analysis: Types of data in cluster analysis, categorization and partitioning, hierarchical, density-based, grid-based, model-based clustering methods, outlier analysis.

4. Books and Materials

Text Book(s)

1. Jiawei Han, Michel Kamber, *Data Mining Concepts and Techniques*, 3/e, Elsevier, 2019.

Reference Book(s)

1. Alex Berson, Stephen Smith, *Data Warehousing Data Mining & OLAP*, TMH.
2. K.P.Soman, S.Diwakar, V.Ajay, *Insight into Data Mining*, PHI, 2008.

G.PULLAIAH COLLEGE OF ENGINEERING AND TECHNOLOGY, KURNOOL

COURSE STRUCTURE
A1524 – COMPILER DESIGN

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
3	1	0	42	14	0	4	30	70	100

1. Course Description

Course Overview

The main objective of this course is to make students understand the working principles of a compiler. It covers bottom-up parsing, syntax-directed translation, intermediate code generation, type checking, code optimization and code generation. This course enables students to design their own compilers for specific needs.

Course Pre/corequisites

A1513-Formal Languages and Automata Theory

2. Course Outcomes (COs)

After completion of the course, the learner will be able to:

A1524.1 Identify tokens in the source program using lexical analyzer technique

A1524.2 Develop top-down and bottom-up parsers for the given grammar

A1524.3 Construct type checking semantic rules using synthesized and inherited attributes

A1524.4 Develop optimized intermediate code using code optimization techniques

A1524.5 Generate target code using flow graph and DAG

3. Course Syllabus

UNIT-I

Introduction to Compilers: Definition of compiler, interpreter and its differences, the phases of a compiler, role of lexical analyzer, design of simple lexical analyzer LEX-lexical analyzer generator.

UNIT-II

Parsing: Elimination of left recursion, left factoring, top-down parsing-backtracking, recursive-descent parsing, predictive parsers, LL(1)grammars.

Bottom-up Parsing: Stack implementation of shift-reduce parsing, conflicts during shift-reduce parsing, LR grammars, LR parsers-simple LR, canonical LR and look ahead LR parsers, handling of ambiguous grammar, YACC automatic parser generator.

UNIT-III

Syntax-directed Translation: Syntax directed definition, construction of syntax trees, S-attributed and L-attributed definitions, and translation schemes.

UNIT-IV

Intermediate Code Generation: Intermediate forms of source programs– abstract syntax tree, polish notation and three address code, types of three address statements and its implementation.

Type Checking: Static and dynamic checking of types, specification of a simple type checker, equivalence of type expressions.

UNIT-V

Code Optimization: Organization of code optimizer, basic blocks and flow graphs, the principal sources of optimization, the dag representation of basic blocks. **Code Generator:** Design issues, object code forms, the target machine, a simple code Generator, peephole optimization.

4. Books and Materials

Text Book(s)

1. Alfred V. Aho, Ravi Sethi, Jeffrey D. Ullman, *Compilers–Principles, Techniques and Tools*, 2nd edition Low price edition, Pearson Education, 2011.

Reference Book(s)

1. Kenneth C. Louden, Thomson, *Compiler Construction-Principles and Practice*, 1st edition, PWS Publishing.
2. Andrew W. Appel, *Modern Compiler Implementation C*, Cambridge University Press, 2004.

G.PULLAIAH COLLEGE OF ENGINEERING AND TECHNOLOGY, KURNOOL

COURSE STRUCTURE

A1521 – COMPUTER NETWORKS LABORATORY

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
0	0	3	0	0	42	1.5	30	70	100

1. Course Description

Course Overview

This laboratory course provides students with hands on training regarding the design, trouble-shooting, modeling and evaluation of computer networks such as network addressing, address resolution protocol, basic troubleshooting tools, IP routing ,route discovery ,TCP and UDP, IP frag-mentation and many others. Students will also be introduced to the network modeling and simula-tion, and they will have the opportunity to build some simple networking models using the tool and perform simulations that will help them evaluate their design approaches and expected network performance.

Course Pre/corequisites

A1503- Data Structures
A1507-Discrete Mathematics
A1518- Computer Networks

2. Course Outcomes (COs)

After completion of the course, the learner will be able to:

A1521.1 Apply the network principles in establishing network communications

A1521.2 Make use of layered network architecture functionalities in connecting systems

A1521.3 Apply mathematical concepts in solving the computational problems

A1521.4 Analyze performance of protocols in information exchange

A1521.5 Compare routing algorithms for dynamic routing

3. Course Syllabus

Lab Experiments:

1 Study of different types of network cables and practically implement the cross-wired cable and straight through cable using crimping tool.
2 Study of network devices in detail.
3 Study of network IP.
4 Connect the computers in local area network.
5 Study of basic network command and network configuration commands.
6 Configure a network topology using packet tracer software.
7 Configure a network topology using packet tracer software.
8 Configure a network using distance vector routing protocol.
9 Configure network using link state vector routing protocol.

4. Laboratory Equipment/Software/Tools Required

1. A diagramming tool: A diagramming tool lets you draw pictures of your network. Visio (from Microsoft).
2. A network discovery program: For larger networks, you may want to invest in a network discovery program such as Spice works.
3. A protocol analyzer: A *protocol analyzer* monitors and logs the individual packets that travel along your network. (Protocol analyzers are also called *packet sniffers.*) , Network Monitor tool.

5. Books and Materials

Text Book(s)

1. Andrew Tanenbaum, *Computer Networks*, 6th edition, Pearson Education, PHI, 2016.

Reference Book(s)

1. S.Keshav, *An Engineering Approach to Computer Networks*, 2nd edition, Pearson Education, 2001.
2. William, A. Shay, *Understanding communications and Networks*, 3rd edition, Thomson Publication, 2006.

G.PULLAIAH COLLEGE OF ENGINEERING AND TECHNOLOGY, KURNOOL

COURSE STRUCTURE
A1522 – DATA MINING LABORATORY

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
0	0	3	0	0	42	1.5	30	70	100

1. Course Description

Course Overview

This laboratory drives the learners to reach the depth of data warehousing and mining concepts. It gives hands-on practice in implementing data pre-processing, mining frequent patterns, associations and correlations, classification and prediction, and cluster analysis**.** This helps the learner to choose the career path in data science and architect the data for better decision making.

Course Pre/corequisites

A1508- Database Management Systems Laboratory

A1518- Data Mining

2. Course Outcomes (COs)

After completion of the course, the learner will be able to:

A1522.1 Execute data mining algorithms for extraction of appropriate datasets

A1522.2 Apply data preprocessing techniques on raw input data for data cleansing

A1522.3 Appraise the classification techniques on large datasets for differentiation

A1522.4 Apply the data mining algorithms to perform association rule mining and clustering tasks

A1522.5 Differentiate the outlier data from cluster data for statistical analysis

3. Course Syllabus

List of Experiments

1. Introduction to WEKA and create .arff dataset.
2. Explore the available datasets in WEKA.
3. Load a dataset (ex. Iris dataset)
4. Create a weather table with the help of data mining tool WEKA.
5. Demonstration of pre-processing techniques to the training data set of weather table.
6. Write a procedure to normalize weather table data using knowledge flow.
7. Demonstrate construction of decision tree for weather data and classify it.
8. Write a procedure for visualization of weather Table.
9. Write a procedure in finding association Rules for buying data.
10. Demonstration of association rule process on dataset test .arff using apriori algorithm.
11. Write a procedure for clustering customer data using simple K-Means algorithm.

12. Write a procedure for employee data using make density based cluster algorithm

4. Laboratory Equipment/Software/Tools Required

WEKA TOOL

5. Books and Materials

Text Book(s)

1. Pang-Ning Tan, Michael Steinbach, Vipin Kumar, *Introduction to Data Mining*, Pearson Education (Addison Wesley), 2017.

Reference Link

1. http://www.cs.waikato.ac.nz/ml/weka/

G.PULLAIAH COLLEGE OF ENGINEERING AND TECHNOLOGY, KURNOOL

COURSE STRUCTURE

A1529 – PYTHON PROGRAMMING LABORATORY

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
0	0	4	0	0	56	2	30	70	100

1. Course Description

Course Overview

This course is introduced as a professional core offering practical experience in using python language. This course covers python fundamentals, data structures, functions, modules, file handling. In addition the experiments of object oriented programming along with web technology using the Django framework are covered. It helps the student in selecting a domain path leading to Artificial intelligence, Data Science or IoT.

Course Pre/corequisites

The course has no specific prerequisite and co-requisite.

2. Course Outcomes (COs)

After completion of the course, the learner will be able to:

A1529.1 Apply fundamental programming concepts of python for solving general purpose problems

A1529.2 Implement sequences to solve complex problems

A1529.3 Build functions to increase code reusability

A1529.4 Design web applications using Django framework

3. Course Syllabus

1. Basics and Operations

a) Running instructions in Interactive interpreter and a Python Script

b) Write a program to purposefully raise Indentation Error and correct it.

c) Write a program to compute distance between two points taking input from the user

2. Control Flow

a) Write a Program for checking whether the given number is a even number or not.

b) Using a for loop, write a program that prints out the decimal equivalents of 1/2, 1/3, 1/4, . . ,1/10

c) Write a program using a while loop that asks the user for a number, and prints a countdown from that number to zero.

d) By considering the terms in the Fibonacci sequence whose values do not exceed four million, find the sum of the even-valued terms.

3. Data Structures

a) Write a program to count the numbers of characters in the string and store them in a dictionary data structure.

b) Write a program to use split and join methods in the string and trace a birthday with a dictionary data structure.

c) Write a program combine lists that combines these lists into a dictionary.

d) Write a program to count frequency of characters in a given file.

4. Files

a) Write a program to print each line of a file in reverse order.

b) Write a program to compute the number of characters, words and lines in a file.

5. Functions

a) Write a function nearly equal to test whether two strings are nearly equal. Two strings a and b are nearly equal when a can be generated by a single mutation on b.

c) Write a function dups to find all duplicates in the list.

6. Functions - Problem Solving

a) Write a function cumulative product to compute cumulative product of a list of numbers.

b) Write a function reverse to reverse a list. Without using the reverse function.

c) Write function to compute gcd, lcm of two numbers. Each function shouldn't exceed one line.

7. Multi-Dimensional Lists

a) Write a program to perform addition of two square matrices

b) Write a program to perform multiplication of two square matrices.

8. Modules

a) Install packages requests, flask and explore them. using (pip)

b) Write a script that imports requests and fetch content from the page. Eg. (Wiki)

c) Write a simple script that serves a simple HTTP Response and a simple HTML Page.

9. Object Oriented Programming

a) Class variables and instance variable

i) Robot

ii) ATM Machine

10. Configure the Django environment and write a hello world program.
11. Develop a Django project similar to chatting applications.
12. Develop a Django project for sending emails.
13. Develop a login system using Django Framework.

4. Laboratory Equipment/Software/Tools Required

1. Python
2. Django

5. Books and Materials

Text Book(s)

1. Ashok Namdev Kamthane, Amit Ashok Kamthane, *Programming and problem solving with python,* McGraw-Hill Education, 2018.

Reference Book(s)

1. Martin C. Brown, *The Complete Reference: Python*, McGraw-Hill, 2018.
2. Adrian Holovaty, Jacob Kaplan-Moss, *The Definitive Guide to Django: Web Development Done Right.* Apress, 2008.
3. Kenneth A. Lambert, B.L. Juneja, *Fundamentals of Python.* CENGAGE, 2015.

G.PULLAIAH COLLEGE OF ENGINEERING AND TECHNOLOGY, KURNOOL

COURSE STRUCTURE

A1015 – HUMAN VALUES & PROFESSIONAL ETHICS

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
2	0	0	28	0	0	0	100	0	100

1. Course Description

Course Overview

This course has a significant role to play in the betterment of our society through ethics and values. It enables the student to understand the professional values and their role in personal life and professional life to transform individuals with laws and conventions, and then aspiration to live an ethical life for benefit of the society and organization.

Course Pre/corequisites:

The course has no specific prerequisite and corequisite.

2. Course Outcomes (COs)

After completion of the course, the learner will be able to:

A1015.1 Apply human values and ethics in professional life

A1015.2 Develop the moral ideals to maintain good relationships with people

A1015.3 Solve environmental related problems by keeping health of human being into consideration

A1015.4 Make use of the fundamental rights and human rights in life for individual dignity

A1015.5 Build the sound health system both physically and mentally by practicing yoga, karate, sports etc

3. Course Syllabus

UNIT-I

Introduction and basic concepts of society, family, community, and other community-based organizations, dynamics and impact, human values, gender justice.

Channels of youth moments for national building - NSS & NCC, philosophy, aims & objectives; emblems, flags, mottos, songs, badge etc. roles and responsibilities of various NSS functionaries.

UNIT-II

Nehru Yuva Kendra (NYK), activities – socio cultural and sports.

Fundamental rights and fundamental duties, human rights, consumer awareness and the legal rights of the consumer, RTI.

Youth and crime, sociological and psychological factors influencing youth crime, peer mentoring in preventing crimes, awareness about anti-ragging, cybercrime and its prevention, role of youth in peace-building and conflict resolution, role of youth in nation building.

UNIT-III

Environment issues, conservation, enrichment and sustainability, climate change, waste management, natural resource management (rain water harvesting, energy conservation, waste land development, soil conservations and afforestation). **Health, hygiene & sanitation**, health education, food and nutrition, safe drinking water, sanitation, swachh bharat abhiyan.

Disaster management, role of youth in disaster management. Home nursing, first aid. cvil/ self defense, civil defense services, taekwondo, Judo, karate etc.

UNIT-IV

Gender sensitization, understanding gender – gender inequality –challenges – domestic violence, initiatives of government – schemes, law; initiates of NGOs – awareness, movement.

UNIT-V

Physical education, games and sports, biological basis of physical activity, benefits of exercise, physical, psychological, social, respiration, blood circulation. Yoga, protocol, postures, asanas, pranayama, kriyas, bandhas and mudras.

4. Books and Materials

Text Book(s)

1. Mike Martin and Roland Scherzinger, *Ethics in Engineering,* New York, McGraw Hill, 1996.
2. A.S. Chauhan, *Society and Environment,* Jain Brothers Publications, 6th edition, 2006.

Reference Book(s)

1. Govindarajan. M, Natarajan. S, Senthil Kumar. V.S, *Engineering Ethics*, Prentice Hall of India, 2004.
2. Charles D Fleddermann, *Engineering Ethics*, New Jersey Prentice Hall, 2004 (Indian Reprint).
3. John R Boatright, *Ethics and the Conduct of Business*, New Delhi, Pearson Education, 2003.

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COURSE STRUCTURE

VI SEMESTER

G.PULLAIAH COLLEGE OF ENGINEERING AND TECHNOLOGY, KURNOOL

VI SEMESTER (III YEAR)									
Code	Course	Category	Periods per Week			Credits	Scheme of Examination Maximum Marks		
			L	T	P	C	Internal	External	Total
A1524	Cloud Computing	PC	3	1	0	4	30	70	100
A1525	Software Testing Techniques	PC	3	0	0	3	30	70	100
A1526	Artificial Intelligence	PC	3	1	0	4	30	70	100
	Professional Elective – 2	PE	3	0	0	3	30	70	100
	Professional Elective – 3	PE	3	0	0	3	30	70	100
A1527	Software Testing Laboratory	PC	0	0	3	1.5	30	70	100
A1528	Artificial Intelligence Laboratory	PC	0	0	3	1.5	30	70	100
A1529	Cloud Computing Laboratory	PC	0	0	4	2	30	70	100
A1530	Comprehensive Online Examination-II	PW	0	0	0	1	-	100	100
A1016	Advanced English Language Communication Skills	MC	2	0	0	0	100*	-	100*
	TOTAL		17	02	10	23	240	660	900

G.PULLAIAH COLLEGE OF ENGINEERING AND TECHNOLOGY, KURNOOL

COURSE STRUCTURE

A1520 - CLOUD COMPUTING

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
3	1	0	42	14	0	4	30	70	100

1. Course Description

Course Overview

The aim of the course is to provide insight of cloud computing architecture and its services. It includes various cloud service models including Infrastructure as a Service (IaaS), Platform as a Service (PaaS), and Software as a Service (SaaS). This course helps the learner to best utilize the cloud services in their domain and helps in choosing cloud computing as their profession.

Course Pre/corequisites

A1511- Operating systems
A1518-Computer Networks

2. Course Outcomes (COs)

After completion of the course, the learner will be able to:

A1520.1 Analyze cloud delivery models for better architecture.

A1520.2 Implement infrastructure as a service model for industrial applications.

A1520.3 Organize the cloud platform model for optimization services.

A1520.4 Develop various application software with software as service.

A1520.5 Design cloud computing reference architecture for delivery models.

3. Course Syllabus

UNIT-I

Introduction Of Delivery Models In Cloud Computing: introduction to cloud delivery models, list various cloud delivery models, advantages of delivery models in cloud, trade-off in cost to install versus flexibility, cloud service model architecture.

UNIT-II

Infrastructure as a Service (IaaS): Introduction to Infrastructure as a Service delivery model, characteristics of IaaS, architecture, examples of IaaS, applicability of IaaS in the industry.

UNIT-III

Platform as a Service (PaaS): Introduction to Platform as a Service delivery model, characteristics of PaaS, patterns, architecture and examples of PaaS, applicability of PaaS in the industry.

UNIT-IV

Software as a Service (SaaS): Introduction to Software as a Service delivery model, characteristics of SaaS, architecture, examples of SaaS, applicability of SaaS in the industry.

UNIT-V

Cloud Computing Reference Architecture (CCRA): Introduction to cloud computing reference architecture (CCRA), benefits of CCRA, architecture overview, versions and application of CCRA for developing clouds.

4. Books and Materials

Text Book(s):

1. Rajkumar Buyya, James Broberg, and Andrzej Goscinski, *Cloud Computing: Principles and Paradigms* by Wiley Press, New York, USA, 2017.

Reference Book(s):

1. Judith Hurwitz, Robin Bloor, Marcia Kaufman, Fern Halper, *Cloud computing for Dummies* (November 2016).
2. Michael J. Kavis, *Architecting the Cloud: Design Decisions for Cloud Computing Service Models* by, Wiley Press, 2016.
3. Michael J. Kavis, Gautam Shroff, *Enterprise Cloud Computing Technology Architecture Applications*, Cambridge University Press, 2013.

G.PULLAIAH COLLEGE OF ENGINEERING AND TECHNOLOGY, KURNOOL

COURSE STRUCTURE

A1524 – SOFTWARE TESTING TECHNIQUES

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
3	0	0	42	0	0	3	30	70	100

1. Course Description

Course Overview

This course presents a comprehensive study of software testing and quality control concepts. It covers the testing principles, methodologies, management strategies and techniques. In addition it emphasizes on understanding the software testing process. This course is helpful in producing quality software and enables the student to choose the career path as software testing engineer.

Course Pre/corequisites

1. A1501- A Computer Programming
2. A1510- Software Engineering

2. Course Outcomes (COs)

After completion of the course, the learner will be able to:

A1524.1 Derive test cases for any given problem

A1524.2 Compare the different testing techniques to produce quality software

A1524.3 Identify the problem to its suitable testing model for error detection

A1524.4 Apply the appropriate technique for the design of data flow and integration of software

A1524.5 Create appropriate document for the software artifact

3. Course Syllabus

UNIT-I

A Perspective on Testing: Test cases, identifying test cases, levels of testing.

Boundary Value Testing: Normal boundary value testing, robust boundary value testing, random testing.

UNIT-II

Equivalence Class Testing: Traditional equivalence class testing, Improved equivalence class test- ing, equivalence class test cases for the triangle problem, equivalence class test cases for the next date function, equivalence class test cases for the commission problem, edge testing.

UNIT-III

Decision Table–based Testing: Decision table techniques, test cases for the triangle problem, next date function, commission problem

Path Testing: DD-paths, test coverage metrics, basis path testing.

UNIT-IV

Data Flow Testing: Define/Use testing, slice-based testing.

Integration Testing: Decomposition-based integration,call graph–based integration, path-based in- tegration, example: integration Next Date.

UNIT-V

Object-oriented Testing: Issues in testing object-oriented software, example: NextDate, object-oriented unit testing, object-oriented integration testing.

Software Complexity: Unit-level complexity, integration-level complexity, software complexity example, object-oriented complexity.

4. Books and Materials

Text Book(s)

1. Paul C. Jorgensen, *Software Testing*, A Craftsman's Approach, 4th edition, Auerbach Publications, 2013.

Reference Book(s)

1. Gopalaswamy Ramesh, Srinivasan Desikan, *Software Testing Principles and Practices*, 2nd edition, Pearson, 2007.
2. Mauro Pezze, Michal Young, *Software Testing and Analysis- Process, Principles and Techniques,* Wiley India, 2009.
3. Aditya P Mathur: *Foundations of Software Testing*, Pearson Education, 2008.

G.PULLAIAH COLLEGE OF ENGINEERING AND TECHNOLOGY, KURNOOL

COURSE STRUCTURE
A1526 – ARTIFICIAL INTELLIGENCE

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
3	1	0	42	14	0	4	30	70	100

1. Course Description

Course Overview

The aim of this course is to create computer programs that can solve problems and achieve goals like humans would. This course covers problem solving, logical reasoning, planning, knowledge re-presentation and machine learning concepts. In this course, the students are acquainted with the fundamental knowledge for understanding AI and also the basics of designing intelligent agents that can solve general purpose problems. This course helps the students to choose their career path in trending Artificial Intelligence related technologies.

Course Pre/corequisites

1. A1017: Probability and Statistics
2. A1513: Formal Languages and Automata Theory

2. Course Outcomes (COs)

After completion of the course, the learner will be able to:

A1526.1 Apply suitable search strategies in finding better solutions for a given problem

A1526.2 Analyze performance of an algorithm as per given parameters

A1526.3 Analyze the efficient problem state space search for a problem

A1526.4 Implement the appropriate AI techniques to solve uncertainty problems

A1526.5 Apply AI techniques to solve real time problems

3. Course Syllabus

UNIT-I

Problem Solving: Introduction, agents, problem formulation, uninformed search strategies, heuris-tics, informed search strategies, constraint satisfaction.

UNIT-II

Logical Reasoning: Logical agents, propositional logic, inferences, first-order logic, inferences in first order logic, forward chaining, backward chaining, unification, resolution.

UNIT-III

Planning: Planning with state-space search, partial-order planning, planning graphs, planning and acting in the real world.

UNIT-IV

Uncertain Knowledge and Reasoning: Uncertainty, review of probability, probabilistic reasoning, Bayesian networks, and inferences in Bayesian networks, temporal models, Hidden Markov mod- els.

UNIT-V

Learning: Learning from observation, inductive learning, decision trees, and explanation based learning, statistical learning methods, reinforcement learning.

4. Books and Materials

Text Book(s)

1. S. Russel and P. Norvig, *Artificial Intelligence – A Modern Approach*, Fourth Edition, Pearson Education, 2020.

Reference Book(s)

1. David Poole, Alan Mackworth, Randy Goebel, *Computational Intelligence: a logical approach*, Oxford University Press, 2012.
2. G. Luger, *Artificial Intelligence: Structures and Strategies for Complex Problem Solving*, Sixth Edition, Pearson Education, 2008.
3. J. Nilsson, *Artificial Intelligence: A New Synthesis*, First Edition, Elsevier Publishers, 2003.

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COURSE STRUCTURE

A1527– SOFTWARE TESTING LABORATORY

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
0	0	3	0	0	42	1.5	30	70	100

1. Course Description

Course Overview

This Laboratory presents a practical knowledge on software testing and quality control concepts. It covers the testing like decision table-based testing, data flow testing, class value testing. In addi- tion, it is used to implement different searching and sorting algorithms. This course is helpful in producing quality software and chooses the career path as software testing engineer.

Course Pre/corequisites:

A1501-Computer Programming
A1505-Object Oriented Programming
A1524- Software Testing Techniques

2. Course Outcomes (COs)

After completion of the course, the learner will be able to:

A1527.1 Identify the customer requirements for the given problem

A1527.2 Apply decision table testing for select problems

A1527.3 Derive different test cases for any given problem

A1527.4 Apply the appropriate testing technique for the design of flow graphs

A1527.5 Create software testing document for the software artifact

3. Course Syllabus

List of Experiments

1. Design and develop a program in a language of your choice to solve the triangle problem defined as follows: Accept three integers which are supposed to be the three sides of a triangle and determine if the three values represent an equilateral triangle, isosceles triangle, scalene triangle, or they do not form a triangle at all. Assume that the upper limit for the size of any side is 10. Derive test cases for your program based on boundary-value analysis, execute the test cases and discuss the results.
2. Design, develop, code and run the program in any suitable language to solve the com- mission problem. Analyze it from the perspective of boundary value testing, derive different test cases, execute these test cases and discuss the test results.
3. Design, develop, code and run the program in any suitable language to implement the Next- Date function. Analyze it from the perspective of deriving different test cases, executing these test cases and discussing the test results.
4. Design and develop a program in a language of your choice to solve the triangle problem defined as follows: Accept three integers which are supposed to be the three sides of a triangle

and determine if the three values represent an equilateral triangle, isosceles triangle, scalene triangle, or they do not form a triangle at all. Assume that the upper limit for the size of any side is 10. Derive test cases for your program based on equivalence class partitioning, execute the test cases and discuss the results.

5. Design, develop, code and run the program in any suitable language to solve the com- mission problem. Analyze it from the perspective of equivalence class testing, derive different test cases, execute these test cases and discuss the test results.
6. Design, develop, code and run the program in any suitable language to implement the Next Date function. Analyze it from the perspective of equivalence class value testing, derive differ- ent test cases, execute these test cases and discuss the test results.
7. Design and develop a program in a language of your choice to solve the triangle problem defined as follows: Accept three integers which are supposed to be the three sides of a triangle and determine if the three values represent an equilateral triangle, isosceles triangle, scalene triangle, or they do not form a triangle at all. Derive test cases for your program based on a de- cision-table approach, execute the test cases and discuss the results.
8. Design, develop, code and run the program in any suitable language to solve the com- mission problem. Analyze it from the perspective of decision table-based testing, derive differ- ent test cases, execute these test cases and discuss the test results.
9. Design, develop, code and run the program in any suitable language to solve the com- mission problem. Analyze it from the perspective of data flow testing, derive different test cases, execute these test cases and discuss the test results.
10. Design, develop, code and run the program in any suitable language to implement the binary search algorithm. Determine the basis paths and use them to derive different test cases, ex- ecute these test cases and discuss the test results.
11. Design, develop, code and run the program in any suitable language to implement the quick sort algorithm. Determine the basis paths and use them to derive different test cases, execute these test cases and discuss the test results.
12. Design, develop, code and run the program in any suitable language to implement an absolute letter grading procedure, making suitable assumptions. Determine the basis paths and use them to derive different test cases, execute these test cases and discuss the test results.

4. Laboratory Equipment/Software/Tools Required

Ubuntu OS/ Windows OS, C Compiler/JAVA Compiler

5. Books and Materials

Text Book(s)

1. Paul C. Jorgensen, *Software Testing*, A Craftsman's Approach, 4th edition, Auerbach Publications, 2013.

Reference Book(s)

1. Gopala swamy Ramesh, Srinivasan Desikan, *Software testing Principles and Practices*, 2nd edition, Pearson, 2007.
2. Software Testing – Ron Patton, 2nd edition, Pearson Education, 2004.

G.PULLAIAH COLLEGE OF ENGINEERING AND TECHNOLOGY, KURNOOL

COURSE STRUCTURE
A1528 – ARTIFICIAL INTELLIGENCE LABORATORY

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
0	0	3	0	0	42	1.5	30	70	100

1. Course Description

Course Overview

The aim of this Laboratory is to create computer programs that can solve problems by learning experiences. This course covers binarization, normalization data preprocessing technique to apply on sample data. From this course, the student acquires fundamental knowledge on AI techniques to solve general purpose problems. This course helps the students to choose their career path in trending Artificial Intelligence related technologies.

Course Pre/corequisites

1. A1017-Probability and statistics
2. A1513- Formal Languages and Automata Theory
3. A1526 - Artificial Intelligence

2. Course Outcomes (COs)

After completion of the course, the learner will be able to:

A1528.1 Execute statistical problems to produce appropriate solutions

A1528.2 Categorize the problem for selection of an appropriate algorithm

A1528.3 Compare computational complexity of AI problems for better efficiency

A1528.4 Demonstrate various AI algorithms based on empirical and theoretical proofs for performance statistics

3. Course Syllabus

1. Apply Binarization data preprocessing technique on sample data.
2. Apply Mean Removal data preprocessing technique on sample data.
3. Apply Min and Max scaling on sample data.
4. Apply normalization data preprocessing technique on real estate data.
5. How to encode the labels and show the performance of encoded labels.
6. Using Pandas perform the following
    a. Handling.
    b. Slicing.
    c. Extracting statistics from Time Series Data.
7. Use the sklearn.svm package and implement classification.
8. Using python program build a Linear Regressor.

4. Laboratory Equipment/Software/Tools Required

1. Open source scripting language- Python

5. Books and Materials

Text Book(s)

1. S. Russel and P. Norvig, *Artificial Intelligence – A Modern Approach*, 4th edition, Pearson Education, 2020.

Reference Book(s)

1. Elain Rich and Kevin Knight, *Intelligence*, 3rd edition, TMH, 2017.
2. David Poole, Alan Mackworth, Randy Goebel, *Computational Intelligence: a logical approach*, Oxford University Press, 2012.

G.PULLAIAH COLLEGE OF ENGINEERING AND TECHNOLOGY, KURNOOL

COURSE STRUCTURE

A1523 – CLOUD COMPUTING LABORATORY

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
0	0	3	0	0	42	1.5	30	70	100

1. Course Description

Course Overview

The aim of the laboratory is to provide insight of cloud computing architecture and its services. Students gain hands-on practice on various cloud service models including Infrastructure as a Service (IaaS), Platform as a Service (PaaS), and Software as a Service (SaaS) using Amazon Web Services (AWS), Microsoft azure and Google cloud platform. This course helps the learner to best utilize the cloud services in their domain and even helps in choosing cloud computing as their profession.

Course Pre/corequisites

A1511- Operating systems
A1518- Computer Networks
A1520- Cloud Computing

2. Course Outcomes (COs)

After completion of the course, the learner will be able to:

A1523.1 Develop and deploy applications for better cloud utility

A1523.2 Design web services for modern commercial applications

A1523.3 Analyze the performance, scalability, and availability of the underlying cloud technologies for business requirements

A1523.4 Implement software installation for utility of its applications

A1523.5 Compare various cloud computing platforms for better cloud services

3. Course Syllabus

List of cloud computing programs

1: Creating a Warehouse Application in SalesForce.com.
2: Creating an Application in SalesForce.com using Apex Programming Language.
3: Implementation of SOAP Web services in C#/JAVA Applications.
4: Para-Virtualization using VM Ware‘s Workstation/Oracle‘s Virtual Box and Guest O.S.
5: Installation and Configuration of Hadoop
6: Create an application (Ex: Word Count) using Hadoop Map/Reduce.
7: Case Study: PAAS (Facebook, Google App Engine).
8: Case Study: Amazon Web Services

4. Laboratory Equipment/Software/Tools Required

1. Amazon Web Services (AWS)
2. Microsoft Azure
3. Google Cloud Platform

5. Books and Materials

Text Book(s)

1. Rajkumar Buyya, James Broberg, and Andrzej Goscinski, *Cloud Computing: Principles and Paradigms* by Wiley Press, New York, USA, 2017.

Reference Book(s):

1. Judith Hurwitz, Robin Bloor, Marcia Kaufman, Fern Halper, *Cloud computing for Dummies* (November 2016).
2. Michael J. Kavis, *Architecting the Cloud: Design Decisions for Cloud Computing Service Models* by, Wiley Press, 2016.

G.PULLAIAH COLLEGE OF ENGINEERING AND TECHNOLOGY, KURNOOL

COURSE STRUCTURE

A1016-ADVANCED ENGLISH LANGUAGE COMMUNICATION SKILLS

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
2	0	0	28	0	0	0	100*	0	100*

Course Description

Course Overview

With increased globalization and rapidly changing industry expectations, employers are looking for the wide cluster of skills to cater to the changing demand. The introduction of the Advanced Communication Skills 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 communi- cation in the globalised context

Course Pre/co requisites

1. A1001- Functional English
2. A1006- English Language Communication Skills Lab
3. A1008- English for Professional Communication

Course Outcomes (COs)

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

A1016.1 Recall vocabulary and enhance accuracy in grammar.

A1016.2 Understand and communicate effectively in speaking and in writing.

A1016.3 Apply language structures to construct good relations.

A1016.4 Identify and develop effective technical writing skills.

A1016.5 Determine and develop personal presentation techniques.

A1016.6 Design necessary skills to deliver presentation confidently for improving in respective domains.

Course Syllabus

UNIT I: COMMUNICATION SKILLS:

1. Reading Comprehension –General and Technical 2. Listening Comprehension 3. Vocabulary Development 4. Common Errors.

UNIT II: WRITING SKILLS:

1. Technical Report writing 2. Resume Preparation 3. E-mail Writing

UNIT III: PRESENTATION SKILLS:

1. Oral presentation 2. Power Point Presentation 3. Poster presentation

UNIT IV: GETTING READY FOR JOB:

1 Debates 2 Group discussions 3 Job Interviews

UNIT V: INTERPERSONAL SKILLS:

1. Time Management 2. Problem Solving & Decision Making 3. Etiquettes-Telephone and email etiquette.

Books and Materials

Text Books:

2. Rizvi, M. Ashraf. Effective Technical Communication. Noida: McGraw-Hill Education. 2009.

Reference Books:

1. Dhanavel, S P. English for Communication Skills for Students of Science and Engineers. New Delhi: Mittal Books India. 2009.
2. Lewis, Norman. Word Power made Easy. Haryana: Penguin Random House India. 2009.
3. Mohan, Krishna and N P Krishna. *Speaking English Effectively.* India: MacMillan.2009.

Software

Indigenous and orell software.

COURSE STRUCTURE

VII & VIII SEMESTER

PROGRAMME CURRICULUM STRUCTURE UNDER R18 REGULATIONS

VII SEMESTER (IV YEAR)									
Code	Course	Category	Periods per Week			Credits	Scheme of Examination Maximum Marks		
			L	T	P	C	Internal	External	Total
A1531	Cryptography and Network Security	PC	3	1	0	4	30	70	100
A1532	Mobile Application Development	PC	3	1	0	4	30	70	100
A1533	Machine learning	PC	3	0	0	3	30	70	100
	Professional Elective –4	PE	3	0	0	3	30	70	100
	Open Elective –2	OE	3	0	0	3	30	70	100
A1534	Mobile Application Development Laboratory	PC	0	0	3	1.5	30	70	100
A1535	Machine Learning Laboratory	PC	0	0	3	1.5	30	70	100
A1536	Mini-Project/Internship	PW	0	0	4	2	100	-	100
A1537	Project Work Phase-I	PW	0	0	4	2	100		100
		TOTAL	15	02	14	24	410	490	900

VIII SEMESTER (IV YEAR)									
Code	Cour se	Category	Periods per Week			Credits	Scheme of Examina-tion Maximum Marks		
			L	T	P	C	Internal	External	Total
	MOOCs Course/ Professional Elective-5	PE	3	0	0	3	30	70	100
	Open Elective – 3	OE	3	0	0	3	30	70	100
A1538	Technical Seminar	PW	0	0	4	2	100	-	100
A1539	Project Work Phase-II	PW	0	0	16	8	60	140	200
		TOTAL	06	00	20	16	220	280	500

COURSE STRUCTURE
A1531 – CRYPTOGRAPHY AND NETWORK SECURITY

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
3	0	0	42	0	0	3	30	70	100

1. Course Description

This Course focuses towards the introduction of network security using various cryptographic algorithms. Underlying network security applications. It also focuses on the practical applications that have been implemented and are in use to provide email and web security

Course Pre/corequisites

Computer Networks

2. Course Outcomes (COs)

After completion of the course, the learner will be able to:

A1531.1. Understand cryptography and network security concepts and application

A1531.2. Apply security principles to system design

A1531.3. Identify and investigate network security threat

A1531.4. Analyze and design network security protocols

A1531.5. Conduct research in network security

3. Course Syllabus

UNIT– I

Introduction: Security Trends, Security attacks, Security services, Security Mechanisms, A Model for Network Security Model, Classical Encryption Techniques, Symmetric Cipher Model, Substitution Techniques, Transposition Techniques, Steganography.

UNIT– II

Symmetric Encryption Principles -symmetric encryption algorithms-cipher block modes of operation. Approaches of Message Authentication-Secure Hash Functions and MAC. Public key cryptography principles-public key cryptography algorithms-digital signatures.

UNIT–III

Kerberos - version4, Key distribution using asymmetric encryption, X.509 -certificates, Authentication procedure. E-mail Security-Pretty Good Privacy -Notation, operational description, keys and key rings. S/MIME- MIME, S/MIME functionality and messages.

UNIT–IV

IP Security Overview-IP Security Policy-Encapsulating Security Payload-Key Management- Oakley Key Determination Protocol. Web Security considerations- Secure Socket Layer (SSL) and Transport Layer Security (TLS)-Secure Electronic Transaction –SET overview, key features of SET,SET participants, Dual Signature.

UNIT–V

System Security: Secure Socket Layer and Transport Layer Security, Secure Electronic Transaction, Intruders, Intrusion Detection, Password Management, Malicious Software, Firewalls, Trusted Systems.

1. Books and Materials

Text Book(s)

1. Network Security Essentials (Applications and Standards) by William Stallings, Pearson, Fourth Edition.
2. Hack Proofing your network, Russell, Dreamtech, Second edition.

References(s):

1. C K Shyamala, N Harini and Dr. T R Padmanabhan: Cryptography and Network Security, WileyIndiaPvt.Ltd
2. BehrouzA.Foruzan, Cryptography and Network Security, Tata McGraw Hill 2007.
3. Charlie Kaufman, Radia Perlman, and Mike Speciner, Network Security: PRIVATE Communication in a PUBLIC World, Prentice Hall, ISBN 0-13-046019-2.

COURSE STRUCTURE
A1532-MOBILE APPLICATION DEVELOPMENT

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
3	0	0	42	0	0	3	30	70	100

1. Course Description

This course provides fundamentals of smart phone programming and android software development, construct and apply knowledge on how to develop User Interface for a mobile application Design, develop and substitute basic things on data persistence, content provider, messaging, and location based services for a mobile application.

Course Pre/corequisites

Computer Networks

2. Course Outcomes (COs)

After completion of the course, the learner will be able to:

A1532.1 Able to recognize the importance of knowledge on Android programming basics

A1532.2 Able to construct the various aspects of user interfaces.

A1532.3 Able to apply knowledge on displaying pictures, menus and data services.

A1532.3 Able to develop application on content provider and messaging services.

A1532.5 Able to substitute on the fundamentals of location based services, and creating your own services.

3. Course Syllabus

UNIT–I

Getting started with android programming: What is android, obtaining the required tools, creating first android application, Using Android Studio for Android Development. Activities, fragments & Intents: Understanding activities, linking activities using intents, fragments, displaying notifications.

UNIT–II

Getting to know the android user interface: Understanding the components of a screen, adapting to display orientation, managing changes to screen orientation, utilizing the action bar, creating the user interface programmatically, and listening for UI notifications. Designing User Interface with Views: Using basic views, using picker views, using list views to display long lists.

UNIT–III

Displaying pictures and Menus with Views : Using image views to display pictures-Gallery and Image View views, using menus with views, analog and digital clock views. Data Persistence: Saving and loading user preferences, persisting data to files, creating and using databases.

UNIT–IV

Content Providers Sharing data in android, using a content provider, creating own content providers. Messaging: SMS messaging, sending E-mail.

UNIT–V

Location based services Displaying maps, getting a location data, monitoring a location, building a

location tracker. Developing android services: Creating your own services.

4. Books and Materials

Text Book(s)

1. Beginning Android programming with android studio 4th edition, J. F. DiMarzio, Published by John Wiley & Sons, Inc.

References(s):

1. Professional Android 4 Application Development, Reto Meier, Wiley India, (Wrox), 2012.
2. Android Application Development for Java Programmers, James C Sheusi, Cengage Learning, 2013

COURSE STRUCTURE
A1533–MACHINE LEARNING

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
3	0	0	42	0	0	3	30	70	100

1. Course Description

Course Overview

The goal of this course is to give foundation in machine learning and basic concepts used in the design of classification, prediction models. It includes different machine learning algorithms and methods. In addition, it helps to apply the appropriate machine learning technique for classification, pattern recognition and optimization and decision problems.

Course Pre/corequisites

Algebra and Calculus
Probability and Statistics

2. Course Outcomes (COs)

After completion of the course, the learner will be able to:

A1533.1 Distinguish between, supervised, unsupervised and semi-supervised learning

A1533.2 Apply the opt machine learning strategy for any given problem

A1533.3 Suggest supervised, unsupervised or semi-supervised learning algorithms for any given problem

A1533.4 Design a system that uses the appropriate graph models of machine learning

A1533.5 Modify existing machine learning algorithms to improve classification efficiency

3. Course Syllabus

UNIT-I

INTRODUCTION: Learning – Types of Machine Learning – Supervised Learning – The Brain and the Neuron – Design a Learning System – Perspectives and Issues in Machine Learning – Concept Learning Task – Concept Learning as Search – Finding a Maximally Specific Hypothesis – Version Spaces and the Candidate Elimination Algorithm – Linear Discriminants – Perceptron – Linear Separability – Linear Regression.

UNIT-II

LINEAR MODELS: Multi-layer Perceptron – Going Forwards – Going Backwards: Back Propagation Error – Multi-layer Perceptron in Practice – Examples of using the MLP – Overview – Deriving Back-Propagation – Radial Basis Functions and Splines – Concepts – RBF Network – Curse of Dimensionality – Interpolations and Basis Functions – Support Vector Machines

UNIT-III

TREE AND PROBABILISTIC MODELS: Learning with Trees – Decision Trees – Constructing Decision Trees – Classification and Regression Trees – Ensemble Learning – Boosting – Bagging – Different ways to Combine Classifiers – Probability and Learning – Data into Probabilities – Basic Statistics – Gaussian Mixture Models – Nearest Neighbor Methods – Unsupervised Learning – K means Algorithms – Vector Quantization – Self Organizing Feature Map

UNIT-IV

DIMENSIONALITY REDUCTION AND EVOLUTIONARY MODELS : Dimensionality Reduction – Linear Discriminant Analysis – Principal Component Analysis – Factor Analysis – Independent Component Analysis – Locally Linear Embedding – Isomap – Least Squares Optimization – Evolutionary Learning – Genetic algorithms – Genetic Offspring: - Genetic Operators – Using Genetic Algorithms – Reinforcement Learning – Overview – Getting Lost Example – Markov Decision Process

UNIT-V

GRAPHICAL MODELS: Markov Chain Monte Carlo Methods – Sampling – Proposal Distribution – Markov Chain Monte Carlo – Graphical Models – Bayesian Networks – Markov Random Fields – Hidden Markov Models – Tracking Methods

4. Books and Materials

Text Book(s)

1. Stephen Marsland, —Machine Learning – An Algorithmic Perspective‖, Second Edition, Chapman and Hall/CRC Machine Learning and Pattern Recognition Series, 2014.
2. Tom M Mitchell, —Machine Learning‖, First Edition, McGraw Hill Education, 2013

Reference Book(s)

1. Peter Flach, —Machine Learning: The Art and Science of Algorithms that Make Sense of Data‖, First Edition, Cambridge University Press, 2012.
2. Jason Bell, —Machine learning – Hands on for Developers and Technical Professionals‖, First Edition, Wiley, 2014
3. Ethem Alpaydin, —Introduction to Machine Learning 3e (Adaptive Computation and Machine Learning Series)‖, Third Edition, MIT Press, 2014

COURSESTRUCTURE

A1534 - MOBILE APPLICATION DEVELOPMENT LAB

HoursPerWeek			HoursPerSemester			Credits	AssessmentMarks		
L	T	P	L	T	P	C	CIE	SEE	Total
0	0	3	0	0	42	1.5	30	70	100

1. Course Description

Course Overview

This Laboratory presents to learn how to develop Applications in android environment to develop user interface applications, data persistence, messaging and location based services.

Course Pre/corequisites:

Computer Network

2. Course Outcomes(COs)

After completion of the course, the learner will be able to:

A1534 .1 Able to acquire practical knowledge on Android programming.
A1534 .2 Able to understand the implementation aspects of user interfaces.
A1534 .3 Able to understand the implementation of image view and persistent data services.
A1534 .4 Able to acquire practical knowledge on messaging services.
A1534 .5 Able to understand the practical exposure on implementation of location based services.

3. Syllabus

The student is expected to be able to do the following problems, though not limited.

1. a) Create an Android application that shows Hello + name of the user and run it on an emulator.
   b) Create an application that takes the name from a text box and shows hello Message along with the name entered in text box, when the user clicks the OK button.
2. Create an application that has as button, when the user clicks the button it should display second activity which has edit text and an OK button. When user writes something on the edit text and clicks the OK button it should go back to first activity and display content of edit text in the form of toast.
3. Create a screen that has input boxes for User Name, Password, and Address, Gender (radio buttons for male and female), Age (numeric), Date of Birth (Date Picket), State (Spinner) and a submit button. On clicking the submit button, print all the data below the Submit Button. Use (a) Linear Layout (b) Relative Layout and (c) Grid Layout or Table Layout.
4. Develop an application that shows names as a list and on selecting a name it should show the details of the candidate on the next screen with a “Back” button. If the screen is rotated to landscape mode (width greater than height), then the screen should show list on left fragment and details on right fragment instead of second screen with back button. Use Fragment transactions and Rotation event listener.
5. Develop an application that uses a menu with 3 options for dialing a number, opening a website and to send an SMS. On selecting an option, the appropriate action should be invoked using intents.
6. Develop an application that inserts some notifications into Notification area and whenever a notification is inserted, it should show a toast with details of the notification.

7. a) Create an application to display images in gallery and Image Views.
   b) Create an application to display analog and digital clock.
8. a) Create a user registration application that stores the user details in a database table.
   b) Create a database and a user table where the details of login names and passwords are stored. Insert some names and passwords initially. Now the login details entered by the user should be verified with the database and an appropriate dialog should be shown to the user.
9. a) Create an admin application for the user table, which shows all records as a list and the admin can select any record for edit or modify. The results should be reflected in the table.
   b) Create an application that shows all contacts of the phone along with details like name, mobile number etc.
10. Create an application that saves user information like name, age, gender etc. in shared preference and retrieves them when the program restarts.
11. Create an alarm that rings every Sunday at 8:00 AM. Modify it to use a time picker to set alarm time.
12. Develop an application that shows the current location's latitude and longitude continuously as the device is moving (tracking).
13. Create an application that shows the current location on Google maps. 14.Create an application that illustrates sending E-mail.
14. Create an application that illustrates SMS messaging.

4. Laboratory Equipment/Software/Tools Required

1. Amazon Web Services(AWS)
2. Microsoft Azure
3. Google Cloud Platform

5. Books and Materials

1. Beginning Android programming with android studio 4th edition, J. F. DiMarzio, Published by John Wiley & Sons, Inc.

COURSE STRUCTURE
A1535–MACHINE LEARNING LAB

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
3	0	0	42	0	0	3	30	70	100

1. Course Description

Course Overview

The goal of this course is to give foundation in machine learning and basic concepts used in the design of classification, prediction models. It includes different machine learning algorithms and methods. In addition it helps to apply the appropriate machine learning technique for classification, pattern recognition and optimization and decision problems.

Course Pre/Co requisites

A1017-Probability and Statistics

2. Course Outcomes (COs)

After completion of the course, the learner will be able to:

A1535.1 Distinguish between, supervised, unsupervised and semi-supervised learning

A1535.2 Apply the opt machine learning strategy for any given problem

A1535.3 Suggest supervised, unsupervised or semi-supervised learning algorithms for any given problem

A1535.4 Design a system that uses the appropriate graph models of machine learning

A1535.5 Modify existing machine learning algorithms to improve classification efficiency

3. Lab Programs

1. Implement and demonstrate the FIND-S algorithm for finding the most specific hypothesis based on a given set of training data samples. Read the training data from a .CSV file.
2. For a given set of training data examples stored in a .CSV file, implement and demonstrate the Candidate-Elimination algorithm to output a description of the set of all hypotheses consistent with the training examples.
3. Write a program to demonstrate the working of the decision tree based ID3 algorithm. Use an appropriate data set for building the decision tree and apply this knowledge to classify a new sample.
4. Build an Artificial Neural Network by implementing the Back propagation algorithm and test the same using appropriate data sets.
5. Write a program to implement the naïve Bayesian classifier for a sample training data set stored as a .CSV file. Compute the accuracy of the classifier, considering few test data sets.
6. Assuming a set of documents that need to be classified, use the naïve Bayesian Classifier model to perform this task. Built-in Java classes/API can be used to write the pro-

gram. Calculate the accuracy, precision, and recall for your data set.

7. Write a program to construct a Bayesian network considering medical data. Use this model to demonstrate the diagnosis of heart patients using standard Heart Disease Data Set. You can use Java/Python ML library classes/API.
8. Apply EM algorithm to cluster a set of data stored in a .CSV file. Use the same data set for clustering using k-Means algorithm. Compare the results of these two algorithms and comment on the quality of clustering. You can add Java/Python ML library classes/API in the program.
9. Write a program to implement k-Nearest Neighbour algorithm to classify the iris data set. Print both correct and wrong predictions. Java/Python ML library classes can be used for this problem.
10. Implement the non-parametric Locally Weighted Regression algorithm in order to fit data points. Select appropriate data set for your experiment and draw graphs.

4. Books and Materials

Text Book(s)

1. Stephen Marsland, —Machine Learning – An Algorithmic Perspective‖, Second Edition, Chapman and Hall/CRC Machine Learning and Pattern Recognition Series, 2014.
2. Tom M Mitchell, —Machine Learning‖, First Edition, McGraw Hill Education, 2013

Reference Book(s)

1. Peter Flach, —Machine Learning: The Art and Science of Algorithms that Make Sense of Data‖, First Edition, Cambridge University Press, 2012.
2. Jason Bell, —Machine learning – Hands on for Developers and Technical Professionals‖, First Edition, Wiley, 2014
3. Ethem Alpaydin, —Introduction to Machine Learning 3e (Adaptive Computation and Machine Learning Series)‖, Third Edition, MIT Press, 2014

PROFESSIONAL ELECTIVE-1

COURSE STRUCTURE
A1551 – DISTRIBUTED DATABASES

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
3	0	0	42	0	0	3	30	70	100

1. Course Description

Course Overview

The aim of the course is to organize and access the data in a distributed database secured environment with enhanced performance. This course covers distributed database architectures, distributed database design, distributed and parallel query processing with optimization. In addition, it focuses on concurrency control in distributed parallel database systems. It paves way to choose a career path in administering and architecting databases.

Course Pre/corequisites

1. A1506- Database Management Systems

2. Course Outcomes (COs)

After completion of the course, the learner will be able to:

A1551.1 Analyze distributed database design to address architectural issues

A1551.2 Apply partitioning techniques to enhance data storage and security

A1551.3 Design various query processing strategies for query optimization

A1551.4 Develop a concurrent system for transaction management

A1551.5 Design parallel architecture to counter the failures of parallel databases

3. Course Syllabus

UNIT-I

Introduction: What is a DDBS, history of distributed DBMS, data delivery dlternatives, promises of distributed DBMSs, design issues, and distributed DBMS architectures.

UNIT-II

Distributed and Parallel Database Design: Data fragmentation, data allocation, distributed data control, distributed query processing: overview, data localization.

UNIT-III

Distributed Query Optimization: Distributed query optimization algorithms, adaptive query processing, distributed transaction processing.

UNIT-IV

Data Replication: Consistency of replicated databases, update management strategies, replication protocols, replication and failures.

UNIT-V

Parallel Database Systems: Parallel architectures, parallel query processing, load balancing, database clusters, and database integration-multi database systems.

4. Books and Materials

Text Book(s)

1. M. Tamer Ozsu, Patrick Valduriez, *Principles of Distributed Database Systems*, 4th edition :(c) Springer Nature Switzerland AG 2020, Springer, Cham.

Reference Book(s)

1. Silberschatz, orth and Sudershan*, Database System Concept*, McGraw Hill, 6th edition, 2016.
2. Tannenbaum, *Distributed Systems: Principles and Paradigms,* 2nd edition, pearson, 2017.

COURSE STRUCTURE

A1552 – ENTERPRISE STORAGE SYSTEM

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
3	0	0	42	0	0	3	30	70	100

1. Course Description

Course Overview

This course provides a comprehensive overview of storage technologies for complex information technology environments. It covers the storage networking technologies, backup, recovery and infrastructure virtualization. In addition, it includes policy based information management functionality**.** The learners of this course are benefited to choose their career in data centers or cloud infra with strong knowledge in data maintenance.

Course Pre/corequisites

1. A1506- Database Management System
2. A1511- Operating Systems

2. Course Outcomes (COs)

After completion of the course, the learner will be able to:

A1552.1 Analyze the architecture of an intelligent storage system for rapid data accessing

A1552.2 Justify the implementation of storage solutions to enable business continuity

A1552.3 Apply Storage Area Network for virtualization

A1552.4 Design a storage solution based on organizations requirements

A1552.5 Provide Storage Infrastructure Virtualization for better storage management

3. Course Syllabus

UNIT-I

Storage Systems: Data classification, storage evolution and data centre infrastructure. RAID level performance and availability considerations.

UNIT-II

Storage Networking Technologies: Direct-Attached Storage (DAS) architecture, Storage Area Network (SAN) attributes. Networked Attached Storage (NAS) components IP Storage Area Network (IP SAN) ISCSI, FCIP and FCoE architecture.

UNIT-III

Storage Backup & Recovery: architecture, topologies, and technologies in SAN and NAS environments. Data archival.

UNIT-IV

Storage Security and Management: security and regulations. Designing secure solutions security implementation in SAN, NAS, and IP-SAN networking. Monitoring and storage management activities and challenges.

UNIT-V

Storage Infrastructure Virtualization: Storage network virtualization VLAN, VSAN. Cloud optimized storage: global storage management locations, scalability, and operational efficiency. Policy based information management; metadata attitudes.

4. Books and Materials

Text Book(s)

1. John Wiley & Sons, *Information Storage and Management*, Wiley publisher, 2nd ed., 2014.

Reference Book(s)

1. Richard Barker, Paul Massiglia, *Storage Area Network Essentials: A Complete Guide to Understanding and Implementing Sans*, Wiley, 2014.
2. W. Curtis Preston, *Using SANs and NAS*, O'Reilly & Associates Sebastopol, Calif., 2013.

COURSE STRUCTURE

A1553 – TCP/IP Protocol

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
3	0	0	42	0	0	3	30	70	100

1. Course Description

Course Overview

The intention of this course is to provide fundamentals of data communication and computer networks. It covers network models, congestion and quality of service, queue management, stream control transmission protocol. In addition to this it deals with random drop, passive buffer and queue management schemes. The course benefits the students to choose their professional career as network engineers with deep roots in designing communication protocols.

Course Pre/corequisites

A1518- Computer Networks

2. Course Outcomes (COs)

After completion of the course, the learner will be able to:

A1553.1 Analyze the layers of the OSI and TCP/IP for efficient data transmission.

A1553.2 Distinguish between reliable and unreliable protocols for interconnections in application level and network level

A1553.3 Design routing mechanisms for congestion avoidance

A1553.4 Apply buffer management techniques to enhance performance

A1553.5 Apply flow, error and congestion control mechanisms for efficient data transmission

3. Course Syllabus

UNIT-I

Network Models: TCP/IP Protocol suite, addressing. Routers, gateway.

UNIT-II

Internetworking Concepts: Principles of internetworking interconnection through IP Routers TCP, UDP & IP: TCP Services, IP Addressing.

UNIT-III

Congestion and Quality of Service: Data Traffic, congestion, congestion control, congestion control in TCP, quality of service, techniques to improve QOS: scheduling, admission control, resource reservation.

UNIT-IV

Queue Management: Concepts of buffer management, drop tail, drop front, random drop, passive buffer management schemes, active queue management

UNIT-V

Stream Control Transmission Protocol: SCTP services, SCTP features, packet format, flow control, error control, congestion control.

4. Books and Materials

Text Book(s)

1. Behrouz A Forouzan, *TCP/IP Protocol Suite*, McGraw-Hill Publishing Company, 2014.

Reference Book(s)

1. Douglas. E.Comer, *Internetworking with TCP/IP*, Volume I, PHI-2011.

COURSE STRUCTURE
A1554 – ANGULAR JS

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
3	0	0	42	0	0	3	30	70	100

1. Course Description

Course Overview

This course deals with generating dynamic web frameworks. It includes data architecture with support of typescript, directives, forms and routing. It also includes chat threads, components to develop chatting applications. The learners of this course can choose web development as their career.

Course Pre/corequisites

1. A1505- Object Oriented Programming through Java
2. A1516- Web Programming Laboratory

2. Course Outcomes (COs)

After completion of the course, the learner will be able to:

A1554.1: Apply single-page application designs in developing web applications

A1554.2: Implement the type scripts layers for web applications

A1554.3: Build Angular forms for client interaction

A1554.4: Implement efficient Angular routings to protect components from unauthorized access

A1554.5: Design view components for chatting applications

3. Course Syllabus

UNIT-I

Overview: Introduction, adding data to the component. Working with arrays, using the user item component, bootstrapping crash course, expanding our application, dering multiple rows, finishing touches, deployment.

UNIT-II

Typescript: Angular is built in typescript, built-in types, the price-display-component component.

UNIT-III

Directives and Forms: Built-in directives, forms in angular, form controls and form groups, reactive forms with form builder, dependency injection.

UNIT-IV

HTTP: Introduction, a basic request, writing a YouTubeSearchComponent

Routing: Components of angular routing, components of angular routing, application component, configuring the routestesting strategies, route parameters, router hooks.

UNIT-V

Data Architecture in Angular: Data architecture, chat app overview, implementing the models, data architecture with observable, building our views using threads.

4. Books and Materials

Text Book(s)

1. Nate. Murray, Felipe Coury, Ari Lerner, Carlos Taborda Ng-book: *The Complete Guide to Angular*, Create Space Independent Publishing Platform, 2018.

Reference Book(s)

1. Dhananjay Kumar, *Angular Essentials*, BPB Publications, 2019.
2. SohailSalehi, *Angular Services,* Packet Publishing, 2017.

PROFESSIONAL ELECTIVE-2

COURSE STRUCTURE
A1555 – BIG DATA

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
3	0	0	42	0	0	3	30	70	100

1. Course Description

Course Overview

This course enlightens the core concepts of big data, its applications and systems. It covers distributed programming, distributed file systems leading to Hadoop file systems and map-reduce programming concepts**.** In addition, it provides an introduction to Hadoop-Map reduce frameworks. The learners of this course can choose their domain in Data Engineering and can opt their career in Data Science and intern to increase the potential for data utility to transform the world.

Course Pre/corequisites

A1519- Data Mining

2. Course Outcomes (COs)

After completion of the course, the learner will be able to:

A1555.1 Analyze distributed programs for formation of large scale clusters

A1555.2 Apply enabling techniques of Hadoop and Map Reduce for distributed processing

A1555.3 Assemble the components of Hadoop and its Eco-System for efficient data storage and processing

A1555.4 Develop Map-Reduce programs in Java for performing large scale data analysis

A1555.5 Apply K-means clustering and Mahout Techniques for efficient data analysis

3. Course Syllabus

UNIT-I

Distributed Programming Using Java: Quick recap and advanced java programming-generics, threads, sockets, simple client server programming using JAVA, difficulties in developing distributed programs for large scale clusters and introduction to cloud computing.

UNIT-II

Distributed File Systems leading to Hadoop File System: Introduction, using HDFS, Hadoop architecture, internals of Hadoop file systems.

UNIT-III

Map-reduce Programming: Developing distributed programs and issues, why Map- reduce and conceptual understanding of Map-reduce programming, developing Map-reduce programs in java, setting up the cluster with HDFS and understanding how Map- reduce works on HDFS, Running simple word count Map-reduce program on the cluster, additional examples of M-R programming.

UNIT-IV

Anatomy of Map-reduce Jobs: Understanding how Map- Reduce program works, tuning Map-Reduce jobs, understanding different logs produced by Map-Reduce jobs and debugging the Map-Reduce jobs.

UNIT-V

Case studies of Big Data analytics: Case studies of Big Data analytics using Map-Reduce programming, K-Means clustering, using Big Data analytics libraries using Mahout.

4. Books and Materials

Text Book(s)

1. Tom White, *Hadoop: The Definitive Guide*, 4th edition, O'reilly, 2015.

Reference Book(s)

1. Chuck Lam, *Hadoop in Action*, 2nd edition, Manning Publications, 2014.
2. David Flanagan, *Java in a Nutshell*, 6th edition, O'Reilly & Associates, 2014.

COURSE STRUCTURE
A1556 – PARALLEL ALGORITHMS

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
3	0	0	42	0	0	3	30	70	100

1. Course Description

Course Overview

The aim of this course is to enrich the concepts on design, analysis and implementation of sequential as well as parallel algorithms. In particular, it focuses on pram algorithms, SIMD algorithms being supported by MIMD algorithms. The hardware industry requires students with the knowledge to develop algorithms with micro instructions while designing multiprocessors and controllers.

Course Pre/corequisites

A1512- Design and Analysis of Algorithms

2. Course Outcomes (COs)

After completion of the course, the learner will be able to:

A1556.1 Design parallel random access machines algorithms for standard problems and applications

A1556.2 Analyze efficiency of different parallel algorithms

A1556.3 Choose the mapping on multi computers for efficient data processing. (Assess multiprocessors and multi computers for efficient data processing).

A1556.4 Design the matrix algorithms to reduce complexity.

A1556.5 Apply the graph algorithms to solve complex numeric problems

3. Course Syllabus

UNIT-I

Introduction: Parallel processing terminology, the sieve of Eratosthenes. PRAM algorithms - PRAM model of parallel computation, PRAM algorithms, reducing the number of processors.
Processor arrays, multiprocessors, and multicomputer: processor organizations, processor arrays, multiprocessor, Flynn's taxonomy.

UNIT-II

Mapping and Scheduling: Mapping data to processors on processor and multi computers, dynamic load balancing on multi computers, static scheduling on UMA (Uniform Memory Access) multi computers, deadlock.

UNIT-III

Elementary Parallel Algorithms: Classifying MIMD algorithms, reduction, prefix sums.

UNIT-IV

Matrix Multiplication: Sequential matrix multiplication, algorithms for processor arrays, algorithms for multiprocessor, algorithms for multi computers.

UNIT-V

Graph Algorithms: Searching a graph, connected components, all-pairs shortest path, single source shortest path, minimum-cost spanning tree.

4. Books and Materials

Text Book(s)

1. Michael J. Quinn, *Parallel Computing: Theory & Practice*, Tata McGraw Hill Edition, 2nd edition, 2017.

Reference Book(s)

1. Ellis Horowitz, Sartaj Sahni and Sanguthevar Rajasekaran, *Fundamentals of Computer Algorithms*, University press, Second edition, 2011.
2. V Rajaraman, C Siva Ram Murthy, *Parallel computers- Architecture and Programming*, PHI learning, 2016.

COURSE STRUCTURE

A1557 – NETWORKING ARCHITECTURE AND DESIGN

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
3	0	0	42	0	0	3	30	70	100

1. Course Description

Course Overview

The goal of this course is to give foundation in computer networks mechanisms and advanced concepts used in the design of protocols and network architectures. It includes the basic principles of transmission and switching, wireless communications, shared medium transmission, mechanisms and algorithms for routing, network architecture and networking, resource management and network services. The learners of the course can choose their career as network engineers.

Course Pre/corequisites

A1510- Computer Networks
A1511- Computer Networks Laboratory

2. Course Outcomes (COs)

After completion of the course, the learner will be able to:

A1557.1 Apply computer design and instruction set principles as per system requirements

A1557.2 Analyze system requirements to remove redundancy

A1557.3 Propose sub-netting and routing strategies in addressing architectural issues

A1557.4 Apply network management mechanisms for data security and privacy

A1557.5 Develop hybrid mechanisms for effective interconnection

3. Course Syllabus

UNIT-I

Introduction: Architecture and design processes requirements analysis. The requirements specification and map.

UNIT-II

Requirements Analysis: Gathering and listing requirements. Requirements mapping developing the requirements specification – flow analysis. Example application of flow analysis.

UNIT-III

Network Architecture: Component architecture- systems and network architectures. Addressing and routing architecture. Routing strategies – architectural considerations.

UNIT-IV

Network Management Architecture: Network management mechanisms – architectural considerations performance mechanisms – architectural considerations. Security and privacy architecture: developing a security and privacy plan.

UNIT-V

Network Design: Selecting technologies for network design. Guidelines and constraints on technology evaluations. Routing applying interconnection mechanisms to the design.

4. Books and Materials

Text Book(s)

1. James D. McCabe, *Network Analysis, Architecture and Design*, 3rd edition, Elsevier, 2014.

Reference Book(s)

1. Andrew S. Tanenbaum, *Computer Networks*, Fifth Edition, Prentice Hall, Upper Saddle River, New Jersey, 2013.

COURSE STRUCTURE
A1558-DESIGN PATTERNS

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
3	0	0	42	0	0	3	30	70	100

1. Course Description

Course Overview

This course extends object-oriented programming by incorporating design patterns to create interactive applications. It includes patterns like creational, structural and behavioral. In addition it helps to recognize a design and enables to minimize the amount of refactoring by using primitive techniques such as objects, inheritance, and polymorphism. The learners will have a foundation to build more complex software applications.

Course Pre/corequisites

A1505- Object-oriented programming through JAVA

2. Course Outcomes (COs)

After completion of the course, the learner will be able to:

A1558.1 Apply the model-view-controller architecture for a given application

A1558.2 Propose the most suitable design pattern to solve a design problem

A1558.3 Inspect existing code to perform software refactoring

A1558.4 Apply the basic design principles for quality software

3. Course Syllabus

UNIT-I

Introduction to Design Patterns: Design pattern definition, design patterns in SmallTalk MVC, describing design patterns, catalog of design patterns, organizing the catalog, solving of design problems using design patterns, selection of a design pattern, use of design patterns.

UNIT-II

Creational Patterns: Abstract factory, builder, factory method, prototype, singleton, discussion of creational patterns.

UNIT-III

Structural Patterns: Adapter, bridge, composite**. Structural Patterns-2**: Decorator, façade, flyweight, proxy, discuss of structural patterns.

UNIT-IV

Behavioral Patterns Part-1: Chain of responsibility, command, interpreter, iterator, mediator, memento, observer.

UNIT-V

Behavioral Patterns Part -2: State, strategy, template method, visitor, and discussion of behavioral patterns. What to expect from design patterns, a brief history, the pattern community aninvitation, a parting thought.

4. Books and Materials

Text Book(s):

1. Erich Gamma, Rechard helm, Ralp johnson, John vlissides, *Design Patterns Elements of reusable object-oriented software*, Pearson Education, 2015.

Reference Book(s):

1. Mark Grand, *Patterns in JAVA* Vol-I, II & III, Wiley DreamTech, 2016.
2. Eric Freeman, Head *First Design Patterns*, second edition, O'reilly-spd 2014.

PROFESSIONAL ELECTIVE-3

COURSE STRUCTURE
A1559 – DATA ANALYTICS

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
3	0	0	42	0	0	3	30	70	100

1. Course Description

Course Overview

This course deals with descriptive and inferential statistics. It covers Introduction to analytics and R programming, NoSQL using R, correlation and regression analysis. The learners of this course expertise in data visualization and choose their career as data analyst.

Course Pre/corequisites

A1506- Database Management System
A1519- Data Mining

2. Course Outcomes (COs)

After completion of the course, the learner will be able to:

A1559.1 Analyze different datasets, file types for effective data visualization

A1559.2 Apply central limit theorem for summarizing data

A1559.3 create connection between R and NoSQL Database for processing multidimensional data

A1559.4 Implement correlation and regression models for better analysis

A1559.5 Analyze various business problems for effective decision making

3. Course Syllabus

UNIT-I

Introduction to Analytics and R programming: Introduction to R, RStudio (GUI) - R Windows environment, introduction to various data types, numeric, character, date, data frame, array, matrix etc., reading datasets, working with different file types .txt, .csv etc. outliers, combining datasets, R functions and loops.

UNIT-II

Summary Statistics: Summarizing data with R, probability, expected, random, bivariate random variables, probability distribution. Central limit theorem etc.

UNIT-III

SQL using R: Introduction to NoSQL, connecting R to NoSQL databases. Excel and R integration with R connector.

UNIT-IV

Correlation and Regression Analysis: Regression analysis, assumptions of OLS, regression, regression modelling. Correlation, ANOVA, forecasting, heteroscedasticity, autocorrelation, introduction to multiple regression etc.

UNIT-V

Understand the Verticals - Engineering, Financial and others: Understanding systems viz. engineering design, manufacturing, smart utilities, production lines, automotive, technology etc. understanding business problems related to various businesses.

4. Books and Materials

Text Book(s)

1. Owen Jones, Robert Maillardet and Andrew Robinson, *Introduction to Scientific Programming and Simulation Using R*, 2nd edition, CRC Press, 2014.

Reference Book(s)

1. NASSCOM, *Student's Handbook for Associate Analytics*, Mind map Consulting, 2014.
2. Jaynal Abedin and Kishor Kumar Das*, Data Manipulation with R*, 2nd edition, packet publishing, 2014.

COURSE STRUCTURE
A1560 – CLOUD CRYPTOGRAPHY

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
3	0	0	42	0	0	3	30	70	100

1. Course Description

Course Overview

The course covers recent progress in cryptography in the field of computing on encrypted data. Various mathematical concepts are applied on cipher text to provide confidentiality and security. The learners focus will be on identifying vulnerabilities and carry research which is helpful in the departments of cyber security.

Course Pre/corequisites

A1520-Cloud Computing

2. Course Outcomes (COs)

After completion of the course, the learner will be able to:

A1560.1 Apply various security mechanisms for the data stored in a cloud

A1560.2 Inspect various classical encryption techniques and block cipher structure for data transmission

A1560.3 Analyze advanced encryption standard, cryptographic hash functions and digital signatures for non-repudiation

A1560.4 Identify various attacks on virtualization systems

A1560.5 Adapt modern security standards to achieve greater security

3. Course Syllabus

UNIT-I

Security-Concepts: Confidentiality, privacy, integrity, authentication, non-repudiation, availability, access control, defence in depth, least privilege, what these concepts mean and their importance in PaaS, IaaS and SaaS. cryptographic systems.

UNIT-II

Multi-Tenancy Issues: Isolation of users/VMs from each other. How the cloud provider can provide this; virtualization system security issues, virtualization system vulnerabilities.

UNIT-III

Virtualization System-Specific Attacks: Guest hopping, attacks on the VM (delete the VM, attack on the control of the VM, code or file injection into the virtualized file structure), VM migration attack, hyper jacking.

UNIT-IV

Technologies for Virtualization-Based Security Enhancement: IBM security virtual server protection, virtualization-based sandboxing; storage security

UNIT-V

Legal And Compliance Issues : Responsibility, ownership of data, right to penetration test, local law where data is held, examination of modern security standards (eg PCIDSS), how standards deal with cloud services and virtualization.

4. Books and Materials

Text Book(s)

1. Tim Mather, Subra Kumaraswamy, ShahedLatif, *Cloud Security and Privacy: An Enterprise Perspective on Risks and Compliance*, O'Reilly Media; 1st edition, 2009.
2. Ronald L. Krutz, Russell Dean Vines, *Cloud Security*, 2010.

Reference Book(s)

1. JVmware, VMware, *Security Hardening Guide*, White Paper, June 2011.
2. Cloud Security Alliance 2010, *Top Threats to Cloud Computing*, Microsoft 2013.

COURSE STRUCTURE
A1561 – ETHICAL HACKING

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
3	0	0	42	0	0	3	30	70	100

1. Course Description

Course Overview

This course plays a vital role in preserving confidentiality and security of an individual as well as organizations to adopt safe practices and usage of IT infrastructure. It covers concepts of networking, network security and cryptography. In addition it also deals with various attacks, vulnerabilities and ways to secure them. The learner gets benefited not only to escape from security breaches but also can opt for a career in cyber security domain.

Course Pre/corequisites

A1518- Computer Networks

2. Course Outcomes (COs)

After completion of the course, the learner will be able to:

A1561.1 Analyze threats and attacks by cryptographic algorithms for robust applications

A1561.2 Perform security auditing and testing to achieve full proof security system

A1561.3 Identify issues related to ethical hacking to prevent system attacks

A1561.4 Apply network defence measures to prevent hacking

A1561.5 Implement penetration and security testing to overcome malware attacks

3. Course Syllabus

UNIT-I

Ethical Hacking Basics: Introduction to ethical hacking. Cryptography: cryptography and encryption. Encrypted communication and cryptography attacks.

UNIT-II

Foot printing and Port Scanning: Google Hacking. Scanning for targets: identify active machines. Enumeration: windows security basics –enumeration techniques.

UNIT-III

System Attack: Sniffing -communications basics – sniffing techniques and tools. system attack: windows system hacking. Social Engineering: human based attack.

UNIT-IV

Hacking Web Services & Session Hijacking: Web application vulnerabilities, cross-site scripting, cross-site request forging understanding session hijacking, phases involved in session hijacking.

UNIT-V

Malwares and Penetration Testing: Malware attacks: Trojans, viruses and worms. Penetration Testing: types of penetration testing. Penetration test tools.

4. Books and Materials

Text Book(s)

1. Patrick Engebretson, *The Basics of Hacking and Penetration Testing: Ethical Hacking and Penetration Testing Made Easy*, 2nd edition, Syngress, Elsevier, 2013.
2. Parteek Sharma, *Hacking Revealed*, 1st edition, White Falcon Publishing, 2018.

Reference Book(s)

1. Reginald Wong, *Mastering Reverse Engineering: Re-engineer your ethical hacking skills*, Packet Publishing, 2018.
2. Monnappa K A, *Learning Malware Analysis: Explore the concepts, tools, and techniques to analyze and investigate windows malware*, 1st edition, Packet Publishing, 2018.

COURSE STRUCTURE
A1562 – DevOps

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
3	0	0	42	0	0	3	30	70	100

1. Course Description

Course Overview

This course enlightens the agile relationship between development and IT operations and provides the knowledge about various DevOps tools. It focuses on professional principles that help business units collaborate inside the enterprise and break down traditional silos. The learner can lead his/her professional career in service and commercial enterprises.

Course Pre/corequisites

A1510- Software Engineering

2. Course Outcomes (COs)

After completion of the course, the learner will be able to:

A1562.1 Analyze DevOps methodologies in collaboration with the Development and Operations team

A1562.2 Apply configuration management strategies for better integrations and deployment

A1562.3 Make use of various DevOps tools to ease of collaboration and development

A1562.4 Determine the speed of productivity for in-time delivery

A1562.5 Implement application deployment and configuration for uninterrupted usage

3. Course Syllabus

UNIT-I

SDLC: Introduction to SDLC, agile model.

Introduction to Devops: Introduction, Devops features, work management, source code management, build automation, delivery automation, understanding code quality, automation of CI/CD.

UNIT-II

Source Code Management: What is version control and GIT, standard branching workflows, Branching Workflow - GitHub flow.

UNIT-III

Build Automation - CI: Build (CI) Orchestration using Jenkins automation server, build tools - Apache Maven, Gradle, Ant, NPM/Node.js, pipeline Basics- Jenkins master, node, agent, and executor, freestyle projects & pipelines.

UNIT-IV

Artifact Management: Nexus, JFrogArtifactory, JFrogArtifactory as Kubernetis registry, Helm chart for Microsoft azure pipeline.

Continuous Delivery: Software components can be released in short cycles, every change is automatically deployed to the Dev environment.

UNIT-V

Continuous Deployment: Extends continuous delivery, every change is automatically deployed to Production, CD Flow, containerization with Docker-Introduction to Docker, images & containers, Docker File, working with containers and publish to Docker Hub. Configuration management Ansible-Introduction to Ansible, Ansible tasks, Roles, Jinja templates, vaults, deployments using Ansible.

4. Books and Materials

Text Book(s)

1. Gene Kim, Jez Humble, Patrick Debois, John Willis, *The DevOps Handbook: How to Create World-Class Agility, Reliability,* 2016.

Reference Book(s)

1. Michael Huttermann, *DevOps for Developers*, 2012.
2. Joakim Verona**,** *Practical DevOps,* packet open source publications*,* 2016.

PROFESSIONAL ELECTIVE-4

COURSE STRUCTURE

A1563 – DATA VISUALIZATION TECHNIQUES

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
3	0	0	42	0	0	3	30	70	100

1.Course Description

Course Overview

This course teaches how to design a data presentation that really makes an impact beyond spreadsheets and tables. In addition, this course provides the knowledge of Tableau's fundamental concepts and features: how to connect to data sources and present data using easy-to-understand visualizations. In this course, students are acquainted with principles of communicating data and in-depth tour of common visualization methods.

Course Pre/corequisites

Familiarity with data types, spreadsheets and statistics is necessary.

2. Course Outcomes (COs)

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

A1563.1 Make use of Tableau for effective communication of data.

A1563.2 Create advanced visualizations, formatting and calculations using Tableau.

A1563.3 Analyze changes in data visualization over time.

A1563.4 Create different types of dash boards.

A1563.5 Analyze and recommend effective business decisions/solutions using a systematic, evaluative, and information-based approach.

3. Course Syllabus

UNIT-I

Communicating Data : A Step in the Process, A Model of Communication, Three Types of Communication Problems , Six Principles of Communicating Data.

UNIT-II

Introduction to Tableau : Using Tableau, Tableau Story, Tableau Products, Connecting to Data, The Tableau User Interface.

UNIT-III

Multiple Quantities : Scatter plots, Who Is Who?, Making it Exploratory, Adding Background Images, Stacked Bars, Regression and Trend Lines, The Quadrant Chart.

UNIT-IV

Changes in data visualization Over Time : The Origin of Time Charts, The Line Chart, The Dual-Axis Line Chart, The Connected Scatter plot, The Date Field Type and Seasonality, The Timeline, The Slope graph.

UNIT-V

Dashboards : Dashboards in Tableau, Types of Dashboards, Context Is King, Building Dashboards : Building an Exploratory Dashboard.

4. Books and Materials

Text Book(s) :

1. Ben Jones, *Communicating Data with Tableau: Designing, Developing, and Delivering Data Visualizations*, O'Reilly Media, 2014.

Reference Book(s)

1. Joshua N. Milligan, *Learning Tableau 2019 - Third Edition*, Packt Publishing, 2019.
2. Alexander Loth, *Visual Analytics with Tableau*, John Wiley & Sons, 2019.
3. Jennifer Jane Stirrup, *Tableau Dashboard Cookbook*, Packt Publishing, 2016.

COURSE STRUCTURE
A1564-SOFTWARE DEFINED NETWORKS

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
3	0	0	42	0	0	3	30	70	100

1. Course Description

Course Overview

This course introduces about software defined networking, an emerging paradigm in computer networking that allows a logically centralized software program to control the behavior of an entire network.

Course Pre/corequisites

Data Communication Networks

Computer Networks

2. Course Outcomes (COs)

After completion of the course, the learner will be able to:

A1564.1	Explain the key benefits of SDN by the separation of data and control planes.
A1564.2	Interpret the SDN data plane devices and Openflow Protocols.
A1564.3	Implement the operation of SDN control plane with different controllers.
A1564.4	Apply techniques that enable applications to control the underlying network using SDN.
A1564.5	Describe Network Functions Virtualization components and their roles in SDN

3. Course Syllabus

UNIT I

SDN Background and Motivation: Evolving network requirements-The SDN Approach: Requirements, SDN Architecture, Characteristics of Software-Defined Networking, SDN and NFV-Related Standards: Standards-Developing Organizations, Industry Consortia, Open Development Initiatives.

UNIT II

SDN Data plane and OpenFlow: SDN data plane: Data plane Functions, Data plane protocols, Openflow logical network Device: Flow table Structure, Flow Table Pipeline, The Use of Multiple Tables, Group Table- OpenFlow Protocol.

UNIT III

SDN Control Plane: SDN Control Plane Architecture: Control Plane Functions, Southbound Interface, Northbound Interface, Routing, ITU-T Model- OpenDaylight-REST- Cooperation and Coordination among Controllers.

UNIT IV

SDN Application Plane: SDN Application Plane Architecture: Northbound Interface, Network Applications, User Interface- Network Services Abstraction Layer: Abstractions in SDN, Frenetic- Traffic Engineering Measurement and Monitoring- Security- Data Center Networking- Mobility and Wireless.

UNIT V

Network Functions Virtualization : Background and Motivation for NFV- Virtual Machines- NFV Concepts: Simple Example of the Use of NFV, NFV Principles, High-Level NFV Framework, NFV Benefits and Requirements- NFV Reference Architecture: NFV Management and Orchestration.

4. Books and Materials

Text Books

1. William Stallings, “Foundations of Modern Networking”, Pearson Ltd.,2016.
2. Software Defined Networks: A Comprehensive Approach by Paul Goransson and Chuck Black, Morgan Kaufmann Publications, 2014
3. SDN - Software Defined Networks by Thomas D. Nadeau & Ken Gray, O'Reilly, 2013

Reference Books

1. Feamster, Nick, Jennifer Rexford, and Ellen Zegura. "The road to SDN: an intellectual history of programmable networks." ACM SIGCOMM Computer Communication Review 44.2 (2014): 87-98.
2. Kreutz, Diego, et al. "Software-defined networking: A comprehensive survey." Proceedings

COURSE STRUCTURE

A1565 NATURAL LANGUAGE PROCESSING

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
3	0	0	42	0	0	3	30	70	100

1. Course Description

Course Overview

The main objective of this course is to learn the fundamentals of natural language processing and use of CFG and PCFG in NLP. This course also provides role of semantics of sentences and pragmatics. This provides how to use NLP techniques to IR applications

Course Pre/corequisites

Formal Language and Automata theory

2. Course Outcomes (COs)

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

A1565.1 Understand various phases in natural language processing.

A1565.2. Understand different linguistic resources software tools.

A1563.3 Understand parts of speech tagging with HMM, TBL.

A1564.4. Illustrate natural language grammar and context free grammar.

A1565.5. Understand applications of NLP and machine translation.

3. Course Syllabus

UNIT I

Introduction: Human languages, models, ambiguity, processing paradigms; Phases in natural language processing, applications. Text representations in computers, encoding schemes.

UNIT II

Linguistics resources: Introduction to corpus, elements in balanced corpus, TreeBank, PrpBank, WordNet,VerbNet etc. Resource management with XML, Management of linguistic data with the help of GATE, NLTK.

Regular expressions, Finite State Automata , word recognition, lexicon. Morphology, acquisition models, Finite State Transducers. N-grams, smoothing, entropy, HMM, ME, SVM,CRF.

UNIT III

Part of Speech tagging: Stochastic POS tagging, HMM,Transformation based tagging (TBL), Handling of unknown words, named entities, multi word expressions.

A survey on natural language grammars, lexeme, phonemes, phrases and idioms, word order, agreement, tense, aspect and mood and agreement, Context Free Grammar, spoken language syntax.
Parsing-Unification, probabilistic parsing, TreeBank.

UNIT IV

Semantics-meaning representation: semantic analysis, lexical semantics, WordNet.
Word Sense Disambiguation-Selectional restriction, machine learning approaches, dictionary based approaches. Discourse-Reference resolution, constraints on co-reference, algorithm for pronoun resolution, text coherence, discourse structure. Applications of NLP-Spell-checking, Summarization.

UNIT V

Information retrieval:
Vector space model, term weighting, homonymy, polysemy, synonymy, improving user queries, Machine Translation-Overview

4. Books and Materials

Text Book(s) :

1.Daniel Jurafsky, James H. Martin—Speech and Language Processing: An Introduction to Natural Language Processing, Computational Linguistics and Speech, Pearson Publication, 2014.
2.Steven Bird, Ewan Klein and Edward Loper, —Natural Language Processing with Python, First Edition, OReilly Media, 2009.

Reference Book(s)

1. Breck Baldwin, —Language Processing with Java and LingPipe Cookbook, Atlantic Publisher, 2015.
2. Richard M Reese, —Natural Language Processing with Java, OReilly Media, 2015.
3. Nitin Indurkhya and Fred J. Damerau, —Handbook of Natural Language Processing, Second Edition, Chapman and Hall/CRC Press, 2010.
4.Tanveer Siddiqui, U.S. Tiwary, —Natural Language Processing and Information Retrieval, Oxford University Press, 2008.

COURSE STRUCTURE

A1566 – SOLUTION STACK

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
3	0	0	42	0	0	3	30	70	100

1. Course Description

Course Overview

This course introduces various intermediate and advanced web development practices for the student to become an expert in all the aspects of web development. In this course the student will be able to learn Frontend technologies like HTML, CSS and JavaScript whereas Backend –technology Node.js and finally Data-base – MongoDB.

Course Pre/corequisites

A1516 Web Programming Labarotary

2. Course Outcomes (COs)

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

A1566.1 Develop front end of an application using HTML, CSS and JavaScript along with ReactJs

A1566.2 Develop back end of an application using NodeJs

A1566.3 Implement MVC and responsive design to scale well across PC, tablet and Mobile Phone

A1566.4 Develop a website and deploy on a web server

A1566.5 Authenticate, store, and structure user data.

3. Course Syllabus

UNIT I

HTML : Introduction to HTML, Browsers and HTML, Editor's Offline and Online, Tags, Attribute and Elements, Doctype Elements, Comments, Headings, Paragraphs and Formatting Text, Lists and Links, Images and Tables.

UNIT-II

CSS : Introduction CSS, Applying CSS to HTML, Selectors, Properties and Values, CSS Colors and Backgrounds, CSS Box Model, CSS Margins, Padding, and Borders, CSS Text and Font Properties, CSS General Topics.

UNIT-III

JavaScript : Introduction to JavaScript, Applying JavaScript (internal and external), Understanding JS Syntax, Introduction to Document and Window Object, Variables and Operators, Data Types and Num Type Conversion, Math and String Manipulation, Objects and Arrays, Date and Time, Conditional Statements, Switch Case , Looping in JS, Functions.

UNIT-IV

NodeJs : Node js Overview, Node js - Basics and Setup, Node js Console, Node js Command Utilities Node js Modules, Node js Concepts, Node js Events, Node js with Express js, Node js Database Access.

UNIT-V

MongoDB: SQL and NoSql Concepts, Create and Manage MongoDB, Migration of Data into MongoDB, MongoDB with PHP, MongoDB with NodeJS, Services Offered by MongoDB.

4. Books and Materials

Text Book(s)

1. Edwin Ross Torres , “Full Stack Web Development: Round One - Begin!”, Independently published, 2020.

Reference Book(s)

1. Frank Zammetti,“Modern Full-*Stack Development: Using TypeScript, React, Node.js, Webpack and Docker*”, Apress; 1st ed. Edition, 2020.
2. Chris Northwood , “The Full Stack Developer: Your Essential Guide to the Everyday Skills Expected of a Modern Full Stack Web Developer”, Apress; 1st ed. Edition, 2018.

PROFESSIONAL ELECTIVE-5

COURSE STRUCTURE

A1567 – DEEP LEARNING

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
3	0	0	42	0	0	3	30	70	100

1. Course Description

Course Overview

The objective of this course is to cover the fundamentals of neural networks as well as some advanced topics such as recurrent neural networks, long short term memory cells and convolution neural networks. The course also requires students to implement programming assignments related to these topics**.**

Course Pre/corequisites

A1533 Machine Learning

2. Course Outcomes (COs)

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

A1567.1	Understand the historical trends in deep learning and use Tensor flow for performing Linear Regression, Gradient Descent, optimizers, graph visualization
A1567.2	Summarize the fundamentals of Artificial Neural Networks.
A1567.3	Understand the training of Deep Neural Nets.
A1567.4	Understand the Convolutional Neural Networks Architecture
A1567.5	Understand the Recurrent Neural Networks and deep RNN training.

3. Course Syllabus

UNIT-I

Introduction to Deep Learning : Introduction, Historical trends in Deep Learning Up and Running with Tensor Flow Installation, Creating Your First Graph and Running It in a Session, Managing Graphs, Lifecycle of a Node Value, Linear Regression with Tensor Flow. Implementing Gradient Descent, Feeding Data to the Training Algorithm, Saving and Restoring Models, Visualizing the Graph and Training Curves Using Tensor Board, Name Scopes, Modularity, Sharing Variables.

UNIT-II

Introduction to Artificial Neural Networks From Biological to Artificial Neurons, Training an MLP with Tensor Flow's High-Level API, Training a DNN Using Plain Tensor Flow, Fine-Tuning Neural Network Hyper parameters

UNIT-III

Training Deep Neural NetsVanishing/Exploding Gradients Problems, Reusing Pretrained Layers, Faster Optimizers, Avoiding Overfitting Through Regularization

UNIT-IV

Convolutional Neural Networks The Architecture of the Visual Cortex, Convolutional Layer, Pooling Layer., CNN Architectures : LeNet-5, AlexNet, GoogLeNet, ResNet.

UNIT-V

Recurrent Neural Networks Recurrent Neurons, Basic RNNs in TensorFlow, Training RNNs, Deep RNNs

4. Books and Materials

Text Book(s)

1. “Deep Learning” Ian Good fellow Yoshua Bengio Aaron Courville, MIT Press book.
2. “Hands-On Machine Learning with Scikit-Learn and TensorFlow” March 2017: First Edition

Reference Book(s)

1. “Neural Networks and Deep Learning”, Michael Nielsen.
2. “Neural Networks and Deep Learning “ Aggarwal, Charu C.Springer International Publishing.

COURSE STRUCTURE

A1568– BLOCK CHAIN TECHNOLOGY

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
3	0	0	42	0	0	3	30	70	100

1. Course Description

Course Overview

This course is intended to study the foundations of Block chain technology. In this course, the student will explore various aspects of Block chain technology. By implementing, the student will have an idea about private and public blockchain, and intelligent contract. The student should have an idea to design and deploying the smart contracts.

Course Pre/corequisites

A1531 Cryptography and Network Security

2. Course Outcomes(COs)

After completion of the course, the learner will be able to:

A1568.1 Understand and explore the process of Block chain technology in payment and funding processing.

A1568.2 Analyze the working of Smart Contracts

A1568.3 Perform basic operations in hyper ledges and block chain networks.

A1568.4 Apply Ethereum and its Smart Contracts in application development

A1568.5 Describe and deploy the smart contracts.

A1568.6 Identify the risks involved in building Block chain applications.

3. Course Syllabus

UNIT I

Introduction, Scenarios, Challenges Articulated, Blockchain, Blockchain Characteristics, Opportunities Using Blockchain, History of Blockchain. Evolution of Blockchain: Evolution of Computer Applications, Centralized Applications, Decentralized Applications, Stages in Blockchain Evolution, Consortia, Forks, Public Blockchain Environments, Type of Players in Blockchain Ecosystem, Players in Market.

UNIT II

Blockchain Concepts: Introduction, Changing of Blocks, Hashing, Merkle-Tree, Consensus, Mining and Finalizing Blocks, Currency aka tokens, security on blockchain, data storage on blockchain, wallets, coding on blockchain: smart contracts, peer-to-peer network, types of blockchain nodes, risk associated with blockchain solutions, life cycle of blockchain transaction.

UNIT III

Architecting Blockchain solutions: Introduction, Obstacles for Use of Blockchain, Blockchain Relevance Evaluation Framework, Blockchain Solutions Reference Architecture, Types of Blockchain Applications. Cryptographic Tokens, Typical Solution Architecture for Enterprise Use Cases, Types of

Blockchain Solutions, Architecture Considerations, Architecture with Blockchain Platforms, Approach for Designing Blockchain Applications.

UNIT IV

Ethereum Blockchain Implementation: Introduction, Tuna Fish Tracking Use Case, Ethereum Ecosystem, Ethereum Development, Ethereum Tool Stack, Ethereum Virtual Machine, Smart Contract Programming, Integrated Development Environment, Truffle Framework, Ganache, Unit Testing, Ethereum Accounts, MyEtherWallet, Ethereum Networks/Environments, Infura, Etherscan, Ethereum Clients, Decentralized Application, Metamask, Tuna Fish Use Case Implementation, Open Zeppelin Contracts

UNIT V

Hyperledger Blockchain Implementation: Introduction, Use Case – Car Ownership Tracking, Hyperledger Fabric, Hyperledger Fabric Transaction Flow, and FabCar Use Case Implementation, Invoking Chaincode Functions Using Client Application.

4. Books and Materials

TextBook(s)

1) Ambadas, Arshad Sarfarz Ariff, Sham “Blockchain for Enterprise Application Developers”, Wiley

2) Andreas M. Antonpoulos, “Mastering Bitcoin: Programming the Open Blockchain”, O’Reilly

Reference Book(s)

1) Blockchain: A Practical Guide to Developing Business, Law, and Technology Solutions, Joseph Bambara, Paul R. Allen, Mc Graw Hill.

2) Blockchain: Blueprint for a New Economy, Melanie Swan, O’Reilly

COURSE STRUCTURE

A1569 – CYBER SECURITY

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
3	0	0	42	0	0	3	30	70	100

1. Course Description

Course Overview

This course drawing upon a wealth of experience from academia, industry, and government service, Cyber Security details and dissects, in current organizational cyber security policy issues on a global scale—taking great care to educate students on the history and current approaches to the security of cyberspace. It includes thorough descriptions—as well as the pros and cons—of an excess of issues, and document policy alternatives for the sake of clarity with respect to policy alone. It also delves into organizational implementation issues, and equips students with descriptions of the positive and negative impact of specific policy choices.

Course Pre/corequisites

A1518 Computer Networks

2. Course Outcomes (COs)

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

A1569.1 Analyze cyber-attack on different online web applications.

A1569.2 Apply different techniques to classify different types of cybercrimes.

A1569.3 Get an understanding over different government cyber laws and cyber forensics techniques.

A1569.4 Understand how to protect them self and ultimately society from cyber-attacks.

A1569.5 Understanding cybercrime investigating methods using previous case studies.

3. Course Syllabus

UNIT-I

INTRODUCTION: Cyber Security, Cyber Security policy, Domain of Cyber Security Policy, Laws and Regulations, Enterprise Policy, Technology Operations, Technology Configuration, Strategy Versus Policy, **CYBER SECURITY EVOLUTION:** Productivity, Internet, E-commerce, Counter Measures and Challenges.

UNIT-II

CYBER SECURITY OBJECTIVES AND GUIDANCE: Cyber Security Metrics, Security Management Goals, Counting Vulnerabilities, Security Frameworks, E-Commerce Systems, Industrial Control Systems, Personal Mobile Devices, Security Policy Objectives.

UNIT-III

GUIDANCE FOR DECISION MAKERS: Tone at the Top, Policy as a Project, Cyber Security Management, Arriving at Goals, Cyber Security Documentation. The catalog approach: Catalog Format, Cyber Security Policy Taxonomy.

UNIT-IV

CYBER SECURITY POLICY CATALOG: Cyber Governance Issues, Net Neutrality, Internet Names and Numbers, Copyright and Trademarks, Email and Messaging, Cyber User Issues, Malvertising, Impersonation, Appropriate Use, Cyber Crime, Geolocation, Privacy, Cyber Conflict Issues, Intellectual property Theft, Cyber Espionage, Cyber Sabotage, Cyber Welfare.

UNIT-V

CYBER MANGEMENT ISSUES: Fiduciary Responsibility, Risk Management, Professional Certification, Supply Chain, Security Principles, Research and Development, Cyber Infrastructure Issue, Banking and finance, Health care, Industrial Control systems.

4. Books and Materials

Text Book(s)

1. Jennifer L. Bayuk , J. Healey , P. Rohmeyer , Marcus Sachs , Jeffrey Schmidt , Joseph Weiss " Cyber Security Policy Guidebook" John Wiley & Sons 2012.

Reference Book(s)

1. Richard A. Clarke, Robert Knake " Cyberwar: The Next Threat to National Security & What to DoAbout It" Ecco 2010
2. Dan Shoemaker Cyber security The Essential Body Of Knowledge, 1st ed. Cengage Learning 2011
3. Anti-Hacker Tool Kit (Indian Edition) by Mike Shema, Publication Mc Graw Hill.
4. Cyber Security Understanding Cyber Crimes, Computer Forensics and Legal Perspectives by Nina Godbole and Sunit Belpure, Publication Wiley.
5. Rick Howard "Cyber Security Essentials" Auerbach Publications 2011.

COURSE STRUCTURE

A1570 –USER INTERFACE DESIGN

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
3	0	0	42	0	0	3	30	70	100

1. Course Description

Course Overview

The goals of interface design are simple, to make working with a computer easy, productive, and enjoyable. This User Interface Design course provides the basic and in-depth knowledge about User Interface design. It enables the students to take up the design of the user interface, menu creation and windows creation and connection between menu and windows.

Course Pre/corequisites

The course has no specific prerequisite and corequisite.

2. Course Outcomes (COs)

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

A1507.1 Understand the concepts and principles of graphical user interface and its design process.

A1507.2 Select appropriate tool for user interface design.

A1507.3 Identify appropriate user devices for better user interaction.

A1507.4 Create effective screen design using screen elements, windows and components.

3. Course Syllabus

UNIT-I

The User Interface-Introduction and Overview, **The importance of user interface** -Defining the user interface, The importance of Good design, Characteristics of graphical and web user interfaces, Principles of user interface design.

UNIT-II

The User Interface Design process- Obstacles, Usability, Human characteristics in Design, Human Interaction speeds, Business functions-Business definition and requirement analysis, Basic business functions, Design standards.

UNIT-III

System menus and navigation schemes- Structures of menus, Functions of menus, Contents of menus, Formatting of menus, Phrasing the menu, Selecting menu choices, Navigating menus, Kinds of graphical menus.

UNIT-IV

Windows - Characteristics, Components of window, Window presentation styles, Types of window, Window management, Organizing window functions, Window operations, Web systems, Characteristics of device based controls.

UNIT-V

Screen based controls- Operable control, Text control, Selection control, Custom control, Presentation control, Windows Tests-prototypes, kinds of tests.

4. Books and Materials

Text Book(s)

1. Wilbert O. Galitz. *The Essential Guide to User Interface Design*. John Wiley and Sons, Second Edition, 2002.

Reference Book(s)

1. Ben Sheiderman. *Design the User Interface*. Pearson Education, 1998.

2. Alan Cooper. *The Essential of User Interface Design*. Wiley- Dream Tech Ltd. ,2002.

OPEN ELECTIVES

COURSE STRUCTURE

A1181 – BASIC CIVIL ENGINEERING

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
3	0	0	42	0	0	3	30	70	100

1. Course Description

Course Overview

This course is designed to impart the basic knowledge about civil engineering to the students of other branches of engineering. The course includes materials for construction, basic surveying and other basic concepts of irrigation, water supply and geotechnical engineering. It provides the significance of the civil engineering profession satisfying societal needs.

Course Pre/corequisite

The course has no specific prerequisite and corequisite

2. Course Outcomes (COs)

After completion of the course, the learner will be able to:

A1181.1 Classify various materials and components used in building construction

A1181.2 List out different domains like structural, transportation and geotechnical engineering in civil engineering stream

A1181.3 Identify types of soils and foundations for various structures

A1181.4 Measure the linear and angular parameters using concepts of surveying

A1181.5 Develop water supply system for domestic and irrigational needs

3. Course Syllabus

UNIT-I

Introduction to civil engineering & construction materials: Importance and scope of civil engineering, characteristics, types and their uses of stones, bricks, timber and cement.

UNIT-II

Components of building: Components of sub structure and super structure and their functions, types of forces, stress, strain, concrete and steel, ingredients of concrete and its importance in construction .

UNIT-III

Survey and highway engineering: Definition and classification of surveying, linear and angular measurements, leveling-modern instruments, modes of transportation, classification of highways - classification of pavements, curves, super elevation.

UNIT-IV

Geotechnical engineering: Origin of soil, types of soil, bearing capacity of soil, types of foundation, shallow and deep.

UNIT-V

Irrigation and water supply: Definition and classification of irrigation, irrigation structures, dams, weirs, cross drainage works, canal drops and quality of water-treatment methods

4. Books and Materials

Text Book(s)

1. B C Punmia, Ashok K Jain, Arun K Jain. *Basic Civil Engineering*, Laxmi Publications (P) Ltd, 1st edition, 2003.
2. G K Hiraskar, *Basic Civil Engineering,* Dhanpat Rai Publication, 1st edition, 2004.

Reference Book(s)

1. K.R. Arora. *Soil Mechanics and Foundation Engineering*, Standard Publishers and Distributors, Delhi, 7th edition 2014.
2. B C Punmia Lal, *Irrigation And Water Power Engineering*, Laxmi Publications Pvt. Ltd., New Delhi, 16th edition, 2005.

COURSE STRUCTURE

A1182 – BUILDING PLANNING & CONSTRUCTION

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
3	0	0	42	0	0	3	30	70	100

1. Course Description

Course Overview

The objective of the course is to learn about building by-laws laid by planning authorities, apply the principles and methods to be followed in constructing various components of a building & understand about masonry types in brick and stone construction. This course provides sequential approach towards constructional activities like flooring, carpentry, plumbing and electrical works etc.

Course Pre/corequisites

The course has no specific prerequisite and corequisite

2. Course Outcomes (COs)

After completion of the course, the learner will be able to:

A1182.1 Plan buildings by adhering to laws laid by regulatory bodies

A1182.2 Classify different masonry types of brick and stones used in construction

A1182.3 Select appropriate floors and roofs for a proposed building

A1182.4 Identify building materials which can be employed in construction

A1182.5 Make use of damp proofing techniques to prevent ingress of water in buildings

3. Course Syllabus

UNIT-I

Residential buildings: Different types of residential buildings, selection of site for residential building, components of building, by-laws and regulations, orientation of buildings

UNIT-II

Masonry: Definitions of terms used in masonry, materials used, types of masonry, bonds

UNIT-III

Floors and Roofs: Components of a floor, materials used for floor construction, different types of flooring, Ground and upper floors, types of roofs, basic roofing elements and coverings

UNIT-IV

Doors and Windows: Location of roofs and windows, definition of technical terms, size of doors and windows, types of doors and windows, ventilators, fixtures and fastenings

UNIT-V

Damp proofing: Causes and effects of dampness on buildings, materials and methods used for damp proofing, fire hazards, fire resisting properties of common building materials

4. Books and Materials

Text Book(s)

1. Kumara Swamy N & Kameswara Rao A, *Building planning and Drawing*, Charotar Publishers, 6th edition, 1998.
2. B.C. Punmia, Ashok Kr. Jain, Arun Kr. Jain, *Building Construction*, Laxmi Publications, 10th edition, 2008.

Reference Book(s)

1. S.K. Duggal, *Building Materials*, New Age International Publishers, 4th edition, 2010.
2. D.N. Ghose, *Materials of construction*, Tata-McGraw-Hill Publishing Company Limited, 1st edition, 1989.

COURSE STRUCTURE

A1183 – DISASTER MANAGEMENT

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
3	0	0	42	0	0	3	30	70	100

1. Course Description

Course Overview

This course provides knowledge on environmental hazards and disasters. The syllabus includes the basics of endogenous and exogenous hazards and gives a suitable picture on the different types of hazard and disasters. This course will enable the student to apply different management techniques to the hazards and disasters.

Course Pre/corequisites

The course has no specific prerequisite and corequisite.

2. Course Outcomes (COs)

After completion of the course, the learner will be able to:

A1183.1 Classify different kind of hazards/disasters and their effects on environment

A1183.2 Analyze the causes of hazards/disasters which effects human life

A1183.3 Apply disaster management through engineering applications

A1183.4 Apply suitable mitigation measures to minimize the effects of hazards and disasters

3. Course Syllabus

UNIT-I

Environmental hazards & disasters: Environmental stress, types of hazards and disasters, different approaches & relation with human ecology - human ecology & its application in geographical researches.

UNIT-II

Endogenous hazards: Volcanic eruption, earthquakes, landslides, volcanic hazards/ disasters, human adjustment, perception & mitigation of earthquake, man induced hazards /disasters- physical hazards/ disasters.

UNIT-III

Exogenous hazards/ disasters: Infrequent events, cumulative atmospheric hazards/ disasters human adjustment, perception & mitigation.

UNIT-IV

Soil erosion: Mechanics, forms - factors & causes of soil erosion, conservation measures of soil erosion, chemical hazards/ disasters

UNIT-V

Sedimentation processes - global & regional sedimentation problems, sedimentation & environmental problems, corrective measures of erosion & sedimentation, biological hazards/ disasters, population explosion

4. Books and Materials

Text Book(s)

1. Rajib Shah, *Disaster Management*, Universities Press, India, 2nd edition, 2003.
2. Tushar Bhattacharya, *Disaster Science and Management*, TMH Publications, 1st edition, 2012.

Reference Book(s)

1. Donald Hyndman & David Hyndman, *Natural Hazards & Disasters*, Cengage Learning, 4th edition, 2013.
2. R.B. Singh, *Disaster Management*, Rawat Publication, New Delhi, 1st edition, 2006.

COURSE STRUCTURE

A1184 – WATER RESOURCES CONSERVATION

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
3	0	0	42	0	0	3	30	70	100

1. Course Description

Course Overview

This course introduces the great need to conserve and plan the water resources in more efficient way because of urbanization and depletion of water resources. The course content enables the students to learn water hydrology, importance of water conservation and methods to conserve water resources.

Course Pre/corequisites

The Course has no specific prerequisite and corequisite

2. Course Outcomes (COs)

After completion of the course, the learner will be able to:

A1184.1 Interpret ground and surface water utilization for conservation of water resources

A1184.2 Apply the concepts of artificial ground water recharge to increase ground water level

A1184.3 Make use of the concepts of harvesting for preservation of water

A1184.4 Utilize new technologies like ion exchange and UV radiation techniques to recycle and reuse waste water

A1184.5 Plan efficient use of water resources with minimum energy

3. Course Syllabus

UNIT-I

Ground and surface water utilization- Hydrologic cycle, water budget, ground water level fluctuations and environmental influence.

UNIT-II

Artificial ground water recharge- Concept and methods of artificial ground water recharge mounds & induced recharge, wastewater recharge for reuse, water spreading, farm ponds and percolation tanks.

UNIT-III

Water harvesting- Rainwater harvesting, catchment harvesting, harvesting structures, soil moisture conservation, and check dams

UNIT-IV

Reuse & recycle of waste water-Types of reuse, application of treated waste water, purity of reclaimed water, guidelines and regulations, new technologies used in recycling of waste water.

UNIT-V

Watershed management- Concept of watershed management, policies and decision making

4. Books and Materials

Text Book(s)

1. Ramakrishnan S. *Ground water*, Sci -Tech Publications, 2nd edition, 2010.

Reference Book(s)

1. S.N.Chatterjee. *Water Resources, Conservation and management*, Atlantic Publishers, 1st edition, 2018.
2. Murthy J.V.S, *Watershed Management*, New Age International Publishers, 2nd edition, 2017.
3. Murthy V.V.N*, Land and Water Management*, Kalyani Publications, 1st edition, 2018.

COURSE STRUCTURE

A1281 – FUNDAMENTALS OF ELECTRICAL ENGINEERING

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
3	0	0	42	0	0	3	30	70	100

1. Course Description

Course Overview

This course is to familiarize the students about the basics of electrical engineering, circuit theory and electrical machines. This course introduces the fundamental concepts, basic knowledge of electrical quantities, network theorems for the analysis of basic DC and AC circuits. It also deals with the working principle, construction and operation of DC machines and AC machines.These machines are used in domestic and industrial applications.

Course Pre/corequisites

The course has no specific prerequisite and corequisite.

2. Course Outcomes (COs)

After completion of the course, the learner will be able to:

A1281.1 Apply network reduction techniques and knowledge of alternating quantities to calculate current, voltage and power for complex circuits.

A1281.2 Analyse the electrical circuits using nodal analysis, mesh analysis and network theorems.

A1281.3 Demonstrate the working principle and operation of DC machines, AC machines and single phase transformers.

A1281.4 Test the Performance of DC machines, AC machines and single phase transformers.

3. Course Syllabus

UNIT-I

DC Circuits: Circuit concept, types of network elements, ohm's law, types of sources voltage – current relationship for passive element (R,L&C),Kirchhoff's laws, network reduction techniques: series, parallel, combination of series and parallel, Delta - Star transformation, loop and nodal analysis.

UNIT-II

AC Circuits: Representation of alternating quantities, peak, average, RMS, form factor and peak factor for sinusoidal wave form. J-notation, analysis of single-phase AC circuits consisting of pure R, L& C circuits, combination of RL,RC, and RLC(only series) circuits.

UNIT-III

Network Theorems: Thevenin's, Norton's, Superposition and maximum power transfer theorems (DC Excitation only).

UNIT-IV

D.C Generators: Constructional details of D.C. generator, principle of operation of D.C. generators, types of D.C generators, E.M.F equation.

D.C Motors: Principle of operation of DC motors, back emf, Torque equation, swinburne's test, speed control of DC motors by armature and field control methods.

UNIT-V

1-Phase Transformers: Principle of operation, constructional details, E.M.F. equation, losses and efficiency, OC& SC tests.

3-Phase Induction Motors: Principle of operation, types of induction motors, slip, torque equation, torque-slip characteristics.

3-Phase Alternators: Principle of operation-constructional details-EMF equation.

4. Books and Materials

Text Book(s)

1. V.K.Mehta and Rohith Mehta, *Basic Electrical Engineering*, S.Chand Publishers, 14th edition, 1988.
2. M.S. Naidu and S. Kamakshaiah, *Introduction to Electrical Engineering*, Tata McGraw Hill Publishers, 1st edition, 2004.

Reference Book(s)

1. A.Sudhakar, Shyammohan S Palli, *Circuits and Networks*, Tata McGraw-Hill, 4th edition, 2010.
2. D. C. Kulshreshtha,*Basic Electrical Engineering*, McGraw Hill, 2009.
3. L. S. Bobrow, *Fundamentals of Electrical Engineering*, Oxford University Press, 2011.

COURSE STRUCTURE

A1282 –RENEWABLE ENERGY SOURCES

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
3	0	0	42	0	0	3	30	70	100

1. Course Description

Course Overview

The purpose of this course is to enable the student to acquire knowledge onvarious Power Generation Systems. The primary objective of this course is to introduce solar energy, its radiation, collection, storage and application. It also deals with production of quality of energy, types of generation plants and their principles of operation, methods of energy storage and economics of generation.

Course Pre/corequisites

The course has no specific prerequisite and corequisite.

2. Course Outcomes (COs)

After completion of the course, the learner will be able to:

A1282.1. Apply the principles of Renewable energy sources for the construction of Power generating station.

A1282.2. Analyze the various energy conversion systems and their limitations.

A1282.3. Analyze renewable energy sources for various environmental conditions

A1282.4. Analyse the generation principles and operation of variety of sources of energy

3. Course Syllabus

UNIT-I

Principles of Solar Radiation: Role and potential of new and renewable source, the solar energy option, environmental impact of solar power, physics of the sun, the solar constant, extra-terrestrial and terrestrial solar radiation, solar radiation on titled surface, instruments for measuring solar radiation and sun shine, solar radiation data.

UNIT-II

Solar Energy Collection, Storage & Applications: Flat plate and concentrating collectors, classification of concentrating collectors, orientation and thermal analysis, advanced collectors. Storage & Applications: different methods, sensible, latent heat and stratified storage, solar ponds. solar applications- solar heating/cooling technique, solar distillation and drying, photovoltaic energy conversion.

UNIT-III

Wind Energy & Bio Mass: Sources and potentials, horizontal and vertical axis windmills, performance characteristics, Betz criteria. Bio-Mass: Principles of Bio-Conversion, Anaerobic/aerobic digestion, types of Bio-gas digesters, gas yield, combustion characteristics of bio-gas, utilization for cooking, I.C.Engine operation and economic aspects.

UNIT-IV

Other Sources of Energy: Resources, types of wells, methods of harnessing the energy, potential in India. Ocean Energy: OTEC, principles utilization, setting of OTEC plants, thermodynamic cycles.

UNIT-V

Tidal and wave energy: Potential and conversion techniques, mini-hydel power plants, and their economics.

Energy Storage and Economy: Energy Storage - energy in transportation - magneto hydrodynamic power generation- hydrogen economy.

4. Books and Materials

Text Book(s)

1. G.D. Rai, *Non-Conventional Energy Sources*, Khanna Publishers, Fourth Edition 2008.
2. JhonTwidell and tony Weir, *Renewable Energy Resources*, Second Edition, Taylor and Francis Group, 2006.

Reference Book(s)

1. Twidell &Weir, *Renewable Energy Sources*, Tata McGraw Hill Education Private Limited, New Delhi, Fourth Edition, 2009.
2. S. N. Bhadra, D. Kastha & S. Banerjee, *Wind Electrical Systems* – Oxford University Press, 2013.

COURSE STRUCTURE

A1283-ELECTRICAL MEASURING INSTRUMENTS

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
3	0	0	42	0	0	3	30	70	100

1. Course Description

Course Overview

The purpose of this course is to familiarize the students about the different electrical measuring instruments used to measure electrical quantities. The minimisation of different errors and their effects in measuring instruments are discussed. Here the concepts of single phase and three phase circuits are discussed to determine the voltage, current, power and energy. Also, the concepts of bridges are discussed, which are used for the measurement of unknown resistance, inductance and capacitance. These electrical measuring instruments are used in domestic and industrial applications.

Course Pre/corequisites

No pre/corequisites

2. Course Outcomes (COs)

After completion of the course, the learner will be able to:

A1283.1 Categorise various electrical instruments used for measuring electrical parameters.

A1283.2 Design appropriate arrangement for extension of range in measuring instruments.

A1283.3 Analyze the errors and compensations in various electrical measuring instruments

A1283.4 Measure current, voltage, power and energy in 1-phase and 3-phase circuits.

A1283.5 Estimate the unknown quantities of resistance, inductance and capacitance using bridges

3. Course Syllabus

UNIT-I

Measuring Instruments: Classification–deflecting, control and damping torques – ammeters and voltmeters, PMMC, moving iron and dynamometer type instruments – expression for the deflecting torque and control torque – errors and compensations, extension of range using shunts and series resistance.

UNIT-II

Instrument Transformers and Potentiometers

Instrument transformers: Current transformer and potential transformer, ratio and phase angle error, error compensation problems.

Potentiometers: Principle and operation of D.C. Crompton's potentiometer – standardization – measurement of unknown resistance, current, voltage.

UNIT-III

Measurement of Power: Single phase dynamometer wattmeter, LPF and UPF, double element and three element dynamometer wattmeter, expression for deflecting and control torques – Extension of range of wattmeter using instrument transformers – measurement of active and reactive powers in balanced and unbalanced systems.

UNIT-IV

Measurement of Energy: Single phase induction type energy meter – driving and braking torques – errors and compensations – testing by phantom loading. Three phase energy meter.

UNIT-V

DC and AC Bridges

DCBridges: Method of measuring low, medium and high resistance – Whetstone's bridge – Kelvin's double bridge for measuring low resistance, measurement of high resistance – loss of charge method, Megger method.

AC Bridges: Measurement of Inductance - Maxwell's Bridge, Anderson's Bridge. Measurement of Capacitance –Desauty's Bridge– Schering Bridge.

4. Books and Materials

Text Book(s)

1. A.K. Sawhney, *A course on Electrical and Electronics Measurements & Instrumentation*, DhanpatRai and Co. Publishers, 19th edition, 2015.
2. J.B. Gupta, *A course on Electrical and Electronics Measurements & Instrumentation*, S.K. Kataria publishers, 14th edition, 2014.

Reference Book(s)

1. U.A. Bakshi, A. V. Bakshi, *Electrical measurements and Instrumentation*, Technical publications, 1stedition, 2009.
2. E. W. Golding & F.C. Widdis, *Electrical Measurements and Measuring Instruments*, Wheeler publishers, 5thedition, 1997.
3. H S Kalsi, Electronic Instrumentation, Tata McGraw-Hill, 3rd edition, 2010.

COURSE STRUCTURE

A1381 – OPTIMIZATION TECHNIQUES

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
3	0	0	42	0	0	3	30	70	100

1. Course Description

Course Overview

This course deals with modelling and optimization of the problems with limited resources. It provides the tools and techniques to solve the real-world problems by finding the optimal solutions to the models subject to constraints of time, labour, money, material and other resources. This course helps students in better decision making regarding optimum usage of available resources.

Course Pre/corequisites

The course has no specific prerequisite and Corequisite

2. Course Outcomes (COs)

After completion of the course, the learner will be able to:

A1381.1 Apply various operations research models and methods to real world problems.

A1381.2 Solve Linear Programming, assignment, sequencing, game theory, queuing, transportation and project management problems for optimum solution.

A1381.3 Evaluate various alternatives available to find optimal solution for real world problems.

A1381.4 Choose the best strategies to maximize the profit or minimize loss in the presence of a competitor.

A1381.5 Decide the best operating policy for the efficient use of resources.

3. Course Syllabus

UNIT-I

Operations Research - Scope, O.R models, linear programming - formulation, graphical method, simplex method, big -M method and special cases.

Assignment Models- Formulation, optimal solution by Hungarian method, maximization problem, balanced and unbalanced problems, restriction models.

UNIT-II

Sequencing Models - Introduction, Johnson's Rule, processing n jobs through two machines, processing n jobs through three machines and processing n jobs through m machines.

Transportation Problem - Introduction, finding initial basic feasible solutions, optimality test, alternate solutions and unbalanced transportation problem.

UNIT-III

Game Theory - Introduction, minimax (maximin) method of optimal strategies, saddle point, value of the game, rectangular games without saddle point, dominance principle, graphical method.

UNIT-IV

Queuing Theory - Introduction, terminology, single channel models with finite queue length and non-finite queue length.

UNIT-V

Introduction to Project Management – Terminology, methods of finding critical path -critical path method (CPM), project evaluation and review technique (PERT) - probability of completing the project within scheduled time and crashing.

4. Books and Materials

Text Book(s)

1. S.D. Sharma, *Operations Research*, New Delhi: Kedarnath Publications, 2017.
2. S.R.Yadav and A.K.Malik, *Operations Research*, New Delhi: Oxford University Press, 2014.

Reference Book(s)

1. Hamdy Abdelaziz Taha, *Operations Research*: *an Introduction*, 9th edition, Pearson, Boston, 2015.
2. Prem Kumar Gupta & D S Hira, *Operations Research*, Revised edition, New Delhi: S.Chand Publishing, 2015.

COURSE STRUCTURE
A1382-MECHANICAL TECHNOLOGY

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
3	0	0	42	0	0	3	30	70	100

1. Course Description

Course Overview

This course provides knowledge to select the required material for different engineering applications. It also deals with basic concepts of internal combustion engines, compressors, power transmission systems and welding processes. The student will be able to apply the knowledge of engines, materials and welding processes which can be used in domestic and industrial applications.

Course Pre/ corequisites

The course has no specific prerequisite and corequisite

2. Course Outcomes (COs)

After completion of the course, the learner will be able to:

A1382.1 Identify the types of engines and their cycles.

A1382.2 Classify thereciprocating air compressors and their working principles.

A1382.3 Discus the constructional features of domestic refrigeration and air conditioning systems.

A1382.4 Inspect the mechanism of power transmission elements of various engineering systems.

A1382.5 Select suitable engineering materials and welding methods for real time applications.

3. Course Syllabus

UNIT-I

I.C. Engines: working principle, 4 stroke and 2 stroke engines, comparison.

UNIT-II

Reciprocating Air compressors – description and working of single stage and multistage reciprocating air compressors – inter cooling.

UNIT-III

Refrigeration systems: study of household refrigerator, window air conditioner, split air conditioner ratings and selection criteria of above devices

UNIT-IV

Transmission of power: Belt, Rope, Chain and gear drive.

UNIT-V

Engineering materials and welding processes: Engineering materials, properties of materials, gas welding, arc welding, soldering and brazing.

4. Books and Materials

Text Book(s):

1. R.S Khurmi& JS Gupta, Thermal *Engineering,* New Delhi S. Chand, 2012
2. P.L.Ballaney, *Refrigeration and Air Conditioning,* 2nd edition, 2012.

Reference Book(s)

1. R.K. Jain and S.C. Gupta, *Production Technology,* New Delhi, Khanna Publishers,2012.
2. S.N. Lal, *Elements of Mechanical Engineering*, Cengage Learning, 2013.

COURSE STRUCTURE

A1383 - INTRODUCTION TO AUTOMOBILE SYSTEMS

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
3	0	0	42	0	0	3	30	70	100

1. Course Description

Course Overview

This course provides a broad knowledge about the automobile mechanisms like transmission, final drive, braking system, front axle, steering, frame and chassis. It also covers emission and electrical systems used in automobiles. This knowledge will be helpful to the student in co-relating various systems with each other and understanding the individual systems in a better manner while using them in daily life.

Course Pre/corequisites

The course has no specific prerequisite and corequisite

2. Course Outcomes (COs)

After completion of the course, the learner will be able to:

A1383.1 Identify the different parts of the automobile systems used in daily life.

A1383.2 Analyze brakes, steering, axles, suspension and frames of an engine for better performance.

A1383.3 Inspect the mechanism of power transmission elements, and applications of various engineering systems.

A1383.4 Compare the significance of various engines in terms of their performance.

A1383.5 Classify various electrical systems that are used for efficient functioning of automobiles.

3. Course Syllabus

UNIT-I

Introduction- History, industrial revolution, development in automobile industry, leading manufacturers.

Classification of vehicles- on the basis of load, wheels, final drive, fuel used, position of engine and steering transmission, body and load, layout of an automobile chassis. Function of major components of a vehicle such as frame, transmission (clutch and gear box), braking system, types of suspension, principle and its components.

UNIT-II

Introduction to thermodynamics- First and second laws of thermodynamics, Otto cycle, diesel cycle. Types of automotive fuels, properties of fuels, air requirement for complete combustion of fuel.

UNIT-III

Introduction to IC engines-Concept of two stroke and four stroke petrol and diesel engines and their applications to automobiles, various terms, specification of automobile engines.

UNIT-IV

Emissions from automobiles – Pollution standards national and international, pollution control techniques, multipoint fuel injection for SI engines- common rail diesel injection, emissions from alternative energy sources– hydrogen, biomass, alcohols, LPG, CNG.

UNIT-V

Electrical system- Charging circuit, generator, current and voltage regulator, starting system, bendix drive, mechanism of solenoid switch, lighting systems, horn, wiper, fuel gauge, oil pressure gauge, engine temperature indicator.

4. Books and Materials

Text Book(s):

1. Kirpal Singh, Automotive *Mechanics – Vol. 1 & Vol. 2*, Standard Publishers Distributors, 13th edition, 2013.
2. R.S Khurmi & JS Gupta, Thermal *Engineering,* New Delhi S. Chand, 2012

Reference Book(s)

1. PL Ballaney, *Thermal Engineering*, New Delhi, Khanna Publishers, 2013.
2. M.L. Mathur, F.S. Mehta and R.P. Tiwari, *Elements of Mechanical Engineering,*New Delhi, Jain Brothers,2013.

COURSE STRUCTURE

A1481 – BASIC ELECTRONICS

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
3	0	0	42	0	0	3	30	70	100

1. Course Description

Course Overview

This course provides fundamentals of electronics and an understanding of a range of discrete semiconductor devices, including design, construction and testing of experimental electronic devices. This course makes the students, get expertise in analysing principle of operation of p-n junction diode, special diodes, rectifiers, BJT and FET.

Course Pre/corequisites

1. A1003 -Engineering Physics

2. Course Outcomes (COs)

After completion of the course, the learner will be able to:

A1481.1 Analyze the operation and characteristics of diodes and transistors.

A1481.2 Analyze various applications of diodes and transistors.

A1481.3 Make use of Boolean algebra postulates to minimize boolean functions.

A1481.4 Construct and analyze various combinational and sequential circuits used in digital systems.

3. Course Syllabus

UNIT-I

Diode: Formation, forward and reverse bias, V-I characteristics, application as a switch, V-I characteristics of Zener diode, Zener diode as a regulator.

UNIT-II

Rectifiers: Construction, operation of Half wave, Full wave and Bridge rectifier.

UNIT-III

Transistors: formation, types, configurations, applications of BJT, FET, MOSFET.

Amplifiers: Basics, different types of amplifiers and their applications in public addressing systems.

UNIT-IV

Number systems: Review of number systems and their conversions, Representation of negative numbers, binary codes.

Boolean algebra: Theorems and properties, canonical and standard forms of SOP/POS form, digital logic gates, universal gates.

UNIT-V

Combinational circuits: basic logic gates, adders, subtractors, multiplexers and comparators.

Sequential circuits: SR, JK, T, and D latches and flip-flops.

4. Books and Materials

Text Book(s)

1. J. Millman, C. Halkias, *Electronic Devices and Circuits*, TMH, 4th edition, 2010.
2. M. Morris Mano, Michael D. Ciletti, *Digital Design*, 4th edition, Pearson Education/PHI, India, 2008.

Reference Book(s)

1. R.L. Boylestad and Louis Nashelsky, *Electronic Devices and Circuits*, Pearson Publications, 9th edition, 2006.
2. J.B.Gupta, *Electronic Devices and Circuits*, 3rd edition, S.K.Kataria & Sons, 2008.

COURSE STRUCTURE

A1482 – INTRODUCTION TO COMMUNICATION SYSTEMS

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
3	0	0	42	0	0	3	30	70	100

1. Course Description

Course Overview

This course provides the basic concepts of communication systems such as signals, modulation, demodulation and multiplexing. This course also provides different modulation techniques used in analog and digital communication systems. In this course, students also learn about the operation of AM and FM receivers.

Course Pre/corequisites

The course has no specific prerequisite and corequisite.

2. Course Outcomes (COs)

After completion of the course, the learner will be able to:

A1482.1 Analyze the operation of basic communication system.

A1482.2 Compute the Fourier transform, energy and power of communications signals.

A1482.3 Compare the performance of different modulation schemes used in communication systems

A1482.4 Differentiate time division and frequency division multiplexing techniques.

A1482.5 Select an appropriate modulation technique while designing a communication system.

3. Course Syllabus

UNIT-I

Operations on signals: Fourier series, fourier transform, energy, power, bandwidth, sampling.

UNIT-II

Communication Systems: Components, analog and digital messages, channel effect, signal to noise ratio and capacity.

UNIT-III

Modulation and Detection: Definition, transmission, multiplexing, demodulation.

Amplitude Modulation: Time domain representation, spectrum of AM, single tone AM, modulation and demodulation of DSB, DSBSC, SSB, VSB.

UNIT-IV

Angle Modulation: Phase modulation, frequency modulation.

Pulse Modulation: Pulse Amplitude Modulation (PAM), Pulse Width Modulation (PWM) and Pulse Position Modulation (PPM).

UNIT-V

Digital Modulation schemes: ASK, FSK, PSK, M-ary PSK, QPSK.

Receivers and Multiplexing: AM receiver, FM receiver, Frequency-Division Multiplexing (FDM), Time-Division Multiplexing (TDM).

4. Books and Materials

Text Book(s)

1. Simon Haykinand Michael Moher. *Introduction to Analog and Digital Communications*, JOHN WILEY & SONS, INC., 2nd edition, 2007.
2. B.P.Lathi and Zhi Ding. *Modern Digital and Analog Communication Systems*, Oxford University Press, 4th edition, 2010.

Reference Book(s)

1. Sham Shanmugam, *Digital and Analog Communication Systems*, Wiley-India edition, 2006.
2. A. Bruce Carlson, and Paul B. Crilly. *Communication Systems– An Introduction to Signals and Noise in Electrical Communication*, McGraw-Hill International Edition, 5th edition, 2010.
3. Herbert Taub and Donald L Schilling, *Principles of Communication Systems*, TataMcGraw- Hill, 3rd edition, 2009.

COURSE STRUCTURE

A1483: FUNDAMENTALOF IOT

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
3	0	0	42	0	0	3	30	70	100

1. Course Description

Course Overview

This course covers the development of internet of things (IoT) products and services including devices for sensing, actuation, processing and communication. This course helps the students to describe the technology around the Internet of Things (IoT). In this course students study, python concepts, how to interface I/O devices, sensors using arduino uno and raspberry pi. This course has simple examples with integration of techniques turned into an application.

Course Pre/corequisites

The course has no specific prerequisite and corequisites.

2. Course Outcomes (COs)

After completion of the course, the learner will be able to:

A1483.1 Analyze IoT applications using IoT enablers and connectivity layers, components.

A1483.2 Distinguish sensors and actuators in terms of their functions and applications.

A1483.3 Interface I/O devices, Sensors using Arduino UNO.

A1483.4 Develop Raspberry Pi interfacing programs using python concepts.

A1483.5 Apply Raspberry Pi and arduino uno programming for IoT bases projects

3. Course Syllabus

UNIT-I

Introduction to IoT: Characteristics of IoT, applications of IoT, IoT categories, IoT enablers and connectivity layers, IoT components.

UNIT-II

Sensors and Actuators: Sensors-definition, characteristics of sensor, classification of sensors, Actuators-definition, types of Actuators.

UNIT-III

Programming with Arduino: Introduction to Arduino UNO, Arduino IDE, basic commands, serial commands. LED interface, switch interface, serial interface, temperature sensor interface

UNIT-IV

Python: Overview of python, features, comments, variables, operators, data types, if statement, functions, for loop, while loop, strings, lists, tuples, dictionaries.

UNIT-V

Programming with Raspberry Pi: Introduction to Raspberry Pi, installation of raspbian OS, connecting to laptop, terminal commands, LED interface, button interface, DHT sensor interface.

4. Books and Materials

Text Book(s)

1. Jeeva Jose, *Internet of Things,* 1st edition, Khanna Book Publishing, 2019.
2. Rajesh Singh, Anita Gehlot, Lovi Raj Gupta, Bhupendra Singh, Mahendra Swain, *Internet of Things with Raspberry Pi and Arduino,* 1st edition, CRC Press, 2019.

Reference Book(s)

1. Vijay Madisetti, ArshdeepBahga, *Internet of Things — A Hands on Approach*, 1st edition, University Press, 2014.
2. Adrian McEwen, Hakim Cassimally, *Designing the Internet of Things*, 1st edition, John Wiley and Sons, 2014.

COURSE STRUCTURE
A1581 –BASIC DATA STRUCTURES

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
3	0	0	42	0	0	3	30	70	100

1. Course Description

Course Overview

The aim of this course is to provide insight in organizing data types logically to access and configure the data. The concepts of linear and non-linear data structure algorithms are discussed. It improves the problem-solving ability of a learner to a great extent which can be applied in various fields of engineering.

Course Pre/corequisites

The course has no specific prerequisite and co-requisites.

2. Course Outcomes (COs)

After completion of the course, the learner will be able to:

A1581.1 Analyze the time and space complexities of algorithms

A1581.2 Apply various operations on linear data structures

A1581.3 Design searching and sorting techniques for a given application

A1581.4 Develop nonlinear programming for optimization techniques

3. Course Syllabus

UNIT-I

Introduction and Overview: Definition, concepts of data structures, overview and implementation of data structures.

UNIT-II

Linear Data Structures: Stacks- Introduction, definition, representation of stack, operations on stacks, applications of stacks, **queues-** introduction, definition, representations of queues, various queue structures, applications of queues.

UNIT-III

Linked lists: Definition, single linked list, circular linked list, double linked list, circular double linked list, application of linked lists.

UNIT-IV

Sorting and Searching: Sorting- Bubble Sort, selection sort, insertion sort, merge sort, quick sort, time complexity. **Search-** sequential search, binary search, time complexity.

UNIT-V

Trees and Graphs: Trees- Examples, vocabulary and definitions, binary tree applications, tree traversals, binary search trees. **Graph-** vocabulary and definitions, applications: BFS and DFS.

4. Books and Materials

Text Book(s)

1. Debasis Samanta, *Classic Data Structures*, Second Edition, PHI, 2014.

Reference Book(s)

1. G A Vijaya lakshmi Pai, *Data Structures and Algorithms*, TMH, 2008.
2. Horowitz, Sahni and Anderson Freed, *Fundamentals of Data Structures in C*, Second Edition, Universities Press, 2012.

COURSE STRUCTURE

A1583 – BASICS OF SOFTWARE ENGINEERING

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
3	0	0	42	0	0	3	30	70	100

1. Course Description

Course Overview

This course deals with engineering principles and programming languages applied in software development. These principles include analyzing user requirements, designing, building, and testing software. The knowledge acquired through this course is used to handle big projects efficiently with minimizing cost and reduced complexity.

Course Pre/corequisites

The course has no specific prerequisite and co-requisites.

2. Course Outcomes (COs)

After completion of the course, the learner will be able to:

A1583.1 Apply the phases of software development life cycle in application development

A1583.2 Identify software requirements for construction

A1583.3 Design requirement engineering process for change management

A1583.4 Apply the design concepts for design models

A1583.5 Construct the various testing techniques for software systems

3. Course Syllabus

UNIT-I

Introduction: Software engineering and process models: introduction, changing nature of software, software myths.

Process Models: Waterfall model, incremental process models, evolutionary process models, the unified process, agile process models.

UNIT-II

Software Requirements: Functional and non-functional requirements, user requirements, system requirements, the software requirements document.

UNIT-III

Requirement Engineering Process: Feasibility studies, requirements elicitation and analysis, requirement validation, requirement management.

UNIT-IV

Design: Design process and design quality, design concepts-abstraction, information hiding, functional independence, refactoring, modularity, refinement, design classes, design model.

UNIT-V

Testing: Testing strategies-A Strategic approach to software testing, test strategies for conventional software, white box testing, black box testing, validation testing, system testing.

4. Books and Materials

Text Book(s)

1. Roger S.Pressman, *Software Engineering*, A Practitioner's Approach, McGraw Hill, International Edition, 8th edition, 2015.

Reference Book(s)

1. Sommerville, *Software Engineering*, Pearson Education, 7th edition, 2008.

COURSE STRUCTURE
A1584 –PYTHON FOR EVERYONE

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
3	0	0	42	0	0	3	30	70	100

1. Course Description

Course Overview

The aim of this course is to provide the fundamentals of Python language. It covers data types, operators, control statements, data structures, functions, modules, exception handling and file handling concepts. This course helps the student in selecting a domain path leading to software engineering in the segment of Artificial intelligence, Data Science and IoT.

Course Pre/corequisites

The course has no specific prerequisite and co-requisite.

2. Course Outcomes (COs)

After completion of the course, the learner will be able to:

A1584.1 Apply the basic constructs of Python to solve problems

A1584.2 Organize lists, tuples and dictionaries appropriately to solve complex problems

A1584.3 Build functions to increase code reusability

A1584.4 Implement modular programming for organized software development

A1584.5 Make use of exception handling for robust programming.

3. Course Syllabus

UNIT-I

Introduction to python programming: History of python, basics, python character set, tokens, data types, input and output functions, formatting numbers and strings, operators.

UNIT-II

Control statements: Decision making statements, loop control statements, nested loops, break and continue statements.

Data Structures: Sequence, lists, tuples, sets, dictionaries. functional programming: filter(), map(), reduce() , Python Strings.

UNIT-III

Functions- Basics of functions, syntax, local and global scope of a variable, recursions, lambda functions, parameters and arguments in functions.

Modules: The from…import statement, making your own modules, dir() function, the python module, modules and namespaces, packages, standard library modules.

UNIT-IV

Exceptions: Introduction, handling exceptions, multiple except blocks, else clause, raising exceptions, finally block, Re-raising exception.

UNIT-V

File Handling: Introduction, need of file handling, text input and output files, seek function, binary files, and extracting data from a file.

4. Books and Materials

Text Book(s)

1. Ashok Namdev Kamthane, Amit Ashok Kamthane, *Programming and problem solving with python,* McGraw-Hill Education, 2018.

Reference Book(s)

1. Martin C.Brown, *The Complete Reference: Python*, McGraw-Hill, 2018.
2. ReemaThareja, *Python programming using problem solving approach*, Oxford, 2019.

COURSE STRUCTURE

A1585 – COMPUTER ORGANIZATION AND OPERATING SYSTEMS

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
3	0	0	42	0	0	3	30	70	100

1. Course Description

Course Overview

This course is a combination of computer organization and operating system concepts. It provides the concepts of computer architecture and organization which focuses on register transfers, micro-operations and computer arithmetic concepts. Operating systems covers the basic operating system abstractions, mechanisms, and their implementations. The learner of this course can choose his/her carrier as system architect or as system programmer.

Course Pre/corequisites

The course has no specific prerequisite and co-requisites.

2. Course Outcomes (COs)

After completion of the course, the learner will be able to:

A1585.1 Analyze the fundamentals of computer organization in designing a system

A1585.2 Apply the concepts of programming language to solve system problems

A1585.3 Make use of the operating systems design structure and its services for system programming

A1585.4 Develop process scheduling algorithms and inter-process communication systems for resource management

A1585.5 Classify memory management techniques and virtual memory mechanisms for apt implementations

3. Course Syllabus

UNIT-I

Basic Computer Organization and Design: Instruction codes, computer registers, computer instructions, timing and control, instruction cycle, memory reference instructions, input/output and interrupt, complete computer description, design of basic computer.

UNIT-II

Programming The Basic Computer: Introduction, machine language, assembly language, the assembler, programming arithmetic and logic operations.

UNIT-III

Introduction: What operating systems do, operating system -structure, operations, services, user operating system interface, system calls, types of system calls.

Process Management: Process concept, process scheduling, scheduling criteria, scheduling algorithms, operations on processes, inter process communication, examples of IPC systems, process synchronization, critical section problem, semaphores, and monitors.

UNIT-IV

Memory Management: Main memory-background, swapping, contiguous memory allocation, segmentation, paging, virtual memory-background, demand paging, page replacement, allocation of frames.

UNIT-V

Deadlocks: System model, deadlock characterization, methods for handling deadlocks, deadlock prevention, deadlock avoidance, deadlock detection, recovery from deadlock.

4. Books and Materials

Text Book(s)

1. M. Morris Mano, *Computer System Architecture*, Pearson Education, 5th edition, 2016.

Reference Book(s)

1. Willam Stallings, *Computer Organization and Architecture Designing for Performance*, Pearson, PHI, 6th edition, 2010.
2. Silberschatz, Galvin and Gagne, *Operating System Concepts*, 9th edition, 2013, Wiley India Edition.

COURSE STRUCTURE
A1582 – FUNDAMENTAL OF DBMS

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
3	0	0	42	0	0	3	30	70	100

1. Course Description

Course Overview

This course enlightens the learners with the fundamentals of database and its applications. It covers various data models, Entity Relationship diagrams, SQL queries and indexing techniques. The learners of this course can choose the domain of Data Engineering and can opt their carrier path in database administration or data analytics.

Course Pre/corequisites

The course has no specific prerequisite and co-requisites.

2. Course Outcomes (COs)

After completion of the course, the learner will be able to:

A1582.1 Apply suitable data models for given application

A1582.2 Design database using integrity constraints and ACID properties

A1582.3 Construct optimized SQL queries to solve real time problems

A1582.4 Apply suitable normal form to eliminate data redundancy

A1582.5 Choose appropriate index structure to improve performance

3. Course Syllabus

UNIT-I

Introduction: Basics of database system applications, principle of database systems, view of data - data abstraction, instances and schemas, data models, database languages - DDL, DML, ER diagrams.

UNIT-II

Relational Model: Fundamentals of relational model - integrity constraints over relations, enforcing integrity constraints, querying relational data, logical data base design, views, ACID properties.

UNIT-III

SQL: Basic SQL queries, introduction to sub queries, correlated sub queries, set - comparison operators, aggregate operators, NULL values, logical operators, joins.

UNIT-IV

Normalizations: Redundancy issues, decompositions, functional dependencies, various normal forms.

UNIT-V

Data on External Storage: File organization and various indexing structures.

4. Books and Materials

Text Book(s)

1. Raghurama Krishnan, *Johannes Gehrke, Database Management Systems,* McGrawHill Education, 3rd edition, 2014.

Reference Book(s)

1. A.Silberschatz, H.F. Korth, S.Sudarshan, *Database System Concepts*, McGraw Hill, 6th edition, 2012.
2. Ramez Elmasri, Shamkat B. Navathe, *Database Systems,* Pearson Education, 6th edition 2009.

COURSE STRUCTURE

A1586 – FUNDAMENTALS OF ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
3	0	0	42	0	0	3	30	70	100

1. Course Description

Course Overview

This course provides the insight of basic Artificial Intelligence concepts along with fundamentals of machine learning, deep learning and neural networks. It covers math-heavy topics, such as regression and classification illustrated by Python examples. In addition, it also focuses on AI with search techniques and machine learning types. This course helps the students to choose their career path in trending Artificial Intelligence related technologies.

Course Pre/corequisites

The course has no specific prerequisite and co-requisites.

2. Course Outcomes (COs)

After the completion of the course, the learner will be able to:

A1586.1 Analyze different fields in which AI is applied

A1586.2 Apply suitable search strategies in finding better solution for a given problem

A1586.3 Identify linear regression with single and multiple variables

A1586.4 Perform predictive analysis using decision trees and random forest classifier

A1586.5 Implement deep learning neural network models with Tensor Flow

3. Course Syllabus

UNIT-I

Principles of Artificial Intelligence: Introduction, fields and applications of artificial intelligence, ai tools and learning models, the role of python in artificial intelligence

UNIT-II

AI With Search Techniques: Introduction, heuristics, uniformed and informed search strategies, Path finding with the A* algorithm.

UNIT-III

Regression: Introduction, linear regression with one variable, linear regression with multiple variables, polynomial and support vector regression.

UNIT-IV

Classification: Introduction, the fundamentals of classification, classification with support vector machines, introduction to decision trees, random forest classifier.

UNIT-V

Machine Learning With Neural Networks: Introduction, Machine Learning Types, TensorFlow for Python, Introduction to Neural Networks, Deep Learning.

4. Books and Materials

Text Book(s)

1. Zsolt Nagy, *Artificial Intelligence and Machine Learning Fundamentals*, Packet Publishing, 2018.

Reference Book(s)

1. Dr. Dheeraj Mehrotra, *Basics of Artificial Intelligence & Machine Learning*, Notion Press, 1st edition 2019.
2. Neil Wilkins, *Artificial Intelligence: An Essential Beginner's Guide to AI, Machine Learning, Neural Networks, Deep Learning*, Bravex Publications, 2019.

COURSE STRUCTURE
A1081- MANAGEMENT SCIENCE

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
3	0	0	42	0	0	3	30	70	100

1. Course Description

Course Overview

The primary objective of this course is to provide the knowledge of management in success of business. Further, students will be able to apply the concepts, theories, principles of management in various functional areas of an organization such as in designing organization structures for managing the operations, human resource, marketing and production departments. the student will able to evaluate cost and time of each business project by using PERT and CPM techniques and also formulate the new strategies that enhance competitive edge.

Course Pre/corequisites

The course has no specific prerequisite and corequisites

2. Course Outcomes (COs)

After the completion of the course, the learner will be able to:

A1081.1 Apply the concepts, theories, and principles of management in professional life.

A1081.2 Design suitable organization structure for managing the operations in the organization.

A1081.3 Apply principles of management to the various functional areas of an organization such as human resource, marketing and production.

A1081.4 Evaluate cost and time of each business project by using PERT and CPM techniques.

A1081.5 Formulate the new strategies that enhance competitive edge.

3. Course Syllabus

UNIT-I

Introduction to Management

Concept-nature and importance of management, functions - evaluation of scientific management, modern management - motivation theories-leadership styles-decision making process-designing organization structure-principles and types of organization.

UNIT-II

Operations Management and Marketing Management

Operations Management: Plant location and layout, methods of production, work-study-statistical quality control through control charts, objectives of inventory management, need for inventory control -EOQ&ABC analysis (Simple Problems)

Marketing Management: Meaning, nature, functions of marketing, marketing mix, channels of distribution - advertisement and sales promotion - marketing strategies - product life cycle.

UNIT-III

Human Resource Management

Significant and Basic functions of HRM-Human Resource Planning (HRP), job evaluation, recruitment and selection, placement and induction-wage and salary administration. employee training and development – methods - performance appraisal - employee grievances - techniques of handling grievances.

UNIT-IV

Strategic Management and Project Management

Strategic Management: Vision, mission, goals and strategy- corporate planning process-environmental scanning-SWOT analysis-different steps in strategic formulation, implementation and evaluation.

Project Management: Network analysis-PERT, CPM, identifying critical path-probability-project cost analysis, project crashing (simple problems).

UNIT-V

Contemporary Management Issues Practices

Basic concepts of MIS-Materials Requirement Planning (MRP),Just-In-Time(JIT)System, Total Quality Management(TQM)-Six Sigma and Capability Maturity Models (CMM) evies, Supply Chain Management, Enterprise Resource Planning (ERP), Performance Management, Business Process Outsourcing(BPO), business process re-engineering, bench marking, and balance score card.

4. Books and Materials

Text Books:

1. A.R Aryasri, *Management Science,* 4th edition, New Delhi: Tata Mcgraw Hill, 2013.

Reference Books:

1. Ashima B. Chhalill, P. Vijaya Kumar, N. Appa Raohalill, *Introduction to Management Science*, 1st edition, New Delhi: Cengaage, 2012.
2. Vijay Kumar & Apparo: *Introduction to Management Science*, New Delhi Cengage, 2011.

COURSE STRUCTURE

A1082- RESEARCH METHODOLOGY

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
3	0	0	42	0	0	3	30	70	100

1. Course Description

Course Overview

The primary objective of this course is to have a general understanding of statistics as applicable to business and its use in areas of engineering research. The course addresses the methods of research with an emphasis on various stages that are necessary to obtain and process information to enable well informed decision-making. It allows the students to grasp and comprehend the methods and techniques used in research and provide with the knowledge and skill to undertake research.

Course Pre/corequisites

The course has no specific prerequisite and corequisite

2. Course Outcomes (COs)

After completion of the course, the learner will be able to:

A1082.1 Interpret the importance of literature survey to identify the research problem.

A1082.2 Develop suitable research methodologies to conduct engineering research.

A1082.3 Apply the principles of research to gather the required data from various sources.

A1082.4 Evaluate the gathered data by using appropriate statistical techniques.

A1082.5 Prepare and present the research report effectively with the help of visual aids.

3. Course Syllabus

UNIT-I

Research Methodology:

Objectives and motivation of research, types of research, research approaches, significance of research, research methods verses methodology, research and scientific method, important of research methodology, research process, criteria of good research, problems encountered by researchers in India, benefits to the society in general. Defining the research problem: definition of research problem, problem formulation, necessity of defining the problem, technique involved in defining a problem.

UNIT-II

Literature Survey:

Importance of literature survey, sources of information, assessment of quality of journals and articles, information through internet. Literature review: need of review, guidelines for review, record of research review.

UNIT-III

Research Design:

Meaning of research design, need of research design, feature of a good design important concepts related to research design, different research designs, basic principles of experimental design, developing a research plan, design of experimental set-up, use of standards and codes.

UNIT-IV

Data Collection:

Collection of primary data, secondary data, data organization, methods of data grouping, diagrammatic representation of data, graphic representation of data. Sample design, need for sampling, some important sampling definitions, estimation of population, role of statistics for data analysis, parametric v/s non parametric methods, and descriptive statistics, measures of central tendency and dispersion, hypothesis testing, use of statistical software. Data analysis: deterministic and random data, uncertainty analysis, tests for significance: chisquare, student's t-test, regression modelling, direct and interaction effects, ANOVA, F-test, time series analysis, autocorrelation and autoregressive modelling.

UNIT-V

Research Report Writing:

Format of the Research report, synopsis, dissertation, and thesis its differentiation, references/bibliography/webliography, technical paper writing/journal report writing, making presentation, use of visual aids. Research proposal preparation: writing a research proposal and research report, writing research grant proposal.

4. Books and Materials

Text Books:

1. O.R Krishnaswami and M. Ranganatham, *Methodology of Research in Social Sciences,* Mumbai: Himalaya Publishing House, ISBN 81-8318-454-5, 2005.

Reference Books:

1. C.R Kothari, *Research Methodology, Methods & Technique*; Hyderabad: New Age International Publishers, 2004.
2. R. Ganesan, *Research Methodology for Engineers*, New Delhi: MJP Publishers, 2011.
3. Ratan Khananabis and Suvasis Saha, *Research Methodology*, Universities Press, Hyderabad, 2015.
4. Y. P. Agarwal, *Statistical Methods: Concepts, Application and Computation*, Sterling Publications Pvt., Ltd., New Delhi, 2004.

COURSE STRUCTURE

A1083- INTELLECTUAL PROPERTY RIGHTS

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
3	0	0	42	0	0	3	30	70	100

1. Course Description

Course Overview

The primary objective of the course is to have a general understanding of the basics of intellectual property rights, copy right laws, trademarks and issues related to patents. The course addresses the means of innovations with an emphasis on trade secrete that are necessary to obtain IPR through protect their innovations. It also encourages the students to take up innovations and establish start-ups.

Course Pre/corequisites

The course has no specific prerequisite and corequisite

2. Course Outcomes (COs)

After completion of the course, the learner will be able to:

A1083.1 Analyze ethical and professional issues which arise in the intellectual property law context.

A1083.2 Apply intellectual property law principles (including copyright, patents, designs and trademarks) to real problems.

A1083.3 Analyze the social impact of intellectual property law and policy.

A1083.4 Make use of copyrighted material so that it does not obstruct the progress of human knowledge.

A1083.5 Analyze IPR policies before filing patentable inventions and discoveries.

3. Course Syllabus

UNIT-I: Introduction to Intellectual Property: Introduction, types of intellectual property, international organizations, agencies and treaties, importance of intellectual property rights.

UNIT-II: Trade Marks: Purpose and function of trademarks, acquisition of trade mark rights, protectable matter, selecting and evaluating trade mark, trade mark registration processes.

UNIT-III: Law of Copy Rights : Fundamental of copy right law, originality of material, rights of reproduction, rights to perform the work publicly, copy right ownership issues, copy right registration, notice of copy right, international copy right law. Law of patents: foundation of patent law, patent searching process, ownership rights and transfer.

UNIT-IV: Trade Secrets: Trade Secrete Law, determination of trade secrete status, liability for misappropriations of trade secrets, protection for submission, trade secrete litigation. Unfair competition: misappropriation right of publicity, false advertising.

UNIT-V: New Developments of Intellectual Property: New developments in trade mark law; copy right law, patent law, intellectual property audits. International overview on intellectual property,

international – trade mark law, copy right law, international patent law, and international development in trade secrets law.

4. Books and Materials

Text Books:

1. K Bansl & P Bansal, *Fundamentals of Intellectual Property for Engineers,* BS Publications, ISBN: 9788178002774, 8178002779, edition: 2013.

Reference Books:

1. Deborah E. Bouchoux, *Intellectual Property: the Law of Trademarks Copyrights Patents and Trade Secrets*, 4th edition, New Delhi: Cengage India, 2015.
2. Prabuddha Ganguli, *Intellectual Property Rights– Unleashing the Knowledge Economy,* McGraw Hill Education; 1st edition, 1st July 2017.
3. *Integrating Intellectual Property Rights and Development Policy: Report of the Commission on Intellectual Property Rights,* London September 2002 (web source: http://www.iprcommission.org/papers/pdfs/final_report/ciprfullfinal.pdf).

COURSE STRUCTURE

A1084 –NATIONAL SERVICE SCHEME

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
3	0	0	42	0	0	3	30	70	100

1. Course Description

Course Overview

The main objectives of National Service Scheme (NSS) are :understand the community in which they work, understand themselves in relation to their community, identify the needs and problems of the community and involve them in problem-solving, develop among themselves a sense of social and civic responsibility, utilize their knowledge in finding practical solutions to individual and community problems, develop competence required for group-living and sharing of responsibilities, gain skills in mobilizing community participation, acquire leadership qualities and democratic attitudes, develop capacity to meet emergencies and natural disasters and, practice national integration and social harmony

Course Pre/corequisite(s)

This course has no specific prerequisite and corequisite

2. Course Outcomes

After completion of the course, the learner will be able to

A1084.1 Classify the organisational structure of NSS and its activities.

A1084.2 Identify the methods of mobilization and importance of youth Leadership.

A1084.3 Develop a sense of social and civic responsibility and provide solutions to individual and community problems

A1084.4 Recognize the need for lifelong learning capabilities with the concepts of volunteerism and its functions.

A1084.5 Develop capacity to meet emergencies and natural disasters

3. Course Syllabus

Unit-I

Introduction and Basic Concepts of NSS - History, philosophy, aims & objectives of NSS, Emblem, flag, motto. Song, badge etc. , Organizational structure, rules and responsibilities of various NSS functionaries.

Unit-II

NSS Programmes and Activities - Concept of regular activities, special camping, Day Camps, Basis of adoption of village/slums. Methodology of conducting Survey, Financial pattern of the scheme, Other youth prog./schemes of Goal, Coordination with different agencies, Maintenance of the Diary.

Unit-III

Understanding Youth - Definition, profile of youth. categories of youth, Issues, challenges and opportunities for youth, Youth as an agent of social change.

Importance and Role of Youth Leadership -Meaning and types of leadership, Qualities of good leaders; traits of leadership, Importance and rule of youth leadership

Unit-IV

Community Mobilisation - Mapping of community stakeholders, Designing the message in the context of the problem and the culture of the Community, Identifying methods of mobilization.

Unit-V

Volunteerism and Shramdan -Indian Tradition of volunteerism, Needs & Importance of volunteerism, Motivation and Constraints of Volunteerism, sharamadn as a part of Volunteerism.

4. Books and Materials

Text Books:

1. KhwajalaGhulamaSaiyidain, National Service Scheme: A Report, Published by Ministry of Education, Govt. of India, 1961.
2. N. F. Kaikobad, Krishan K. Kapil ,Training and consultancy needs in national service scheme, by. Published by the Tata Institute of Social Sciences(TISS), 1971.
3. National Service Scheme: guide-lines to project-masters, by Andhra University, Dept. of Sociology & Social Work. Published by Dept. of Sociology & Social Work, Andhra University, 1971.

COURSE STRUCTURE

A1085 – YOGA

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
3	0	0	42	0	0	3	30	70	100

1. Course Description

Course Overview

Yoga is an invaluable gift of ancient Indian tradition. It embodies unity of mind and body; thought and action; restraint and fulfilment; harmony between man and nature and a holistic approach to health and well-being. Yoga is not about exercise but to discover the sense of oneness with ourselves, the world and Nature. By changing our lifestyle and creating consciousness, it can help us to deal with climate change. Stress and Depression have become silent killers. Yoga offers a solution to these ailments. Practicing Yoga helps fight stress and find peace. All you need is willingness to-practice it.

Course Pre/corequisite(s)

There is no specific prerequisite and corequisite

2. Course Outcomes

After completion of the course, the learner will be able to do

A1085.1 Improve physical conditioning related to flexibility through participation in yoga.

A1085.2 Develop and maintain a personal yoga practice.

A1085.3 Recognize and apply the value and benefits of an on-going yoga practice

A1085.4 Select asanas appropriate for personal needs

A1085.5 Identify and apply relaxation techniques for stress reduction

3. Course Syllabus

Unit-I

Introduction of human body and its systems, definition of anatomy and physiology and importance in Yogic practices, respiratory system, digestive system, endocrine system Origin of Yoga & its brief development, Meaning of Yoga & its importance, Yoga as a Science of Art (Yoga Philosophy), Meaning of meditation and its types and principles

Unit-II

Classification of Yoga/Types of Yoga - Hatha Yoga , Raja Yoga, Laya Yoga, Bhakti Yoga, Gyan Yoga, Karma Yoga,Asthang Yoga

Unit-III

Classification of Asanas and its Mechanism, Cultural Asana(standing, sitting, supinline, praline position & topsy-turvy), Meditative Asana and Relaxative Asana, Nervous System, Circulatory System

Unit-IV

Introduction of Kriya, Bandha and Mudra, importance of KRIYA and its scientific approach, importance of BANDHA and its scientific approach, importance of MUDRA and its scientific approach

Unit-V

Effect of Asanas on various Systems, Difference between Asana and Exercise, Difference between Pranayama and deep breathing, Yogic Diet.

4. Books and Materials

Text Books:

1. Georg Feuerstein (2002) The Yoga Tradition: Its History, Literature, Philosophy and Practice. New Delhi. Bhavana Books & Prints.
2. Joshi, K.S. (1985) Yoga in daily life, Delhi : Orient paper backs
3. Taimni I.K. (1961/1999) The Science of Yoga (The Yoga Sutras of Patanjali),The Theosophical Publishing House, Adyar.

COURSE STRUCTURE

A1086 - DESIGN THINKING

Hours Per Week			Hours Per Semester			Credits	Assessment Marks		
L	T	P	L	T	P	C	CIE	SEE	Total
3	0	0	42	0	0	3	30	70	100

1. Course Description

Course Overview

This course introduces design thinking and its application to developing new products, services, and the organization of businesses. Design thinking is a human-centric, interdisciplinary approach towards innovation. Design thinking as practiced in this course blends creative thinking and logical or rational thinking, and involves a process consisting of empathizing, ideating, and prototyping. Students will learn design principles, methodologies, and frameworks, and apply them through exercises and projects. The course is divided into four main aspects, all interconnected but which we also separately emphasize. They are: (1) design methodologies, (2) the "thing" to be designed (i.e., products, services, or the business itself, e.g. the business model), (3) human attitudes and behaviors (towards the designs), and (4) design contexts.

Course Pre/corequisites

This course has no specific prerequisite and corequisite

2. Course Outcomes (COs)

After completion of the course, the learner will be able to:

A1086.1 Appreciate various design processes for creativity and innovation

A1086.2 Develop design ideas through different techniques

A1086.3 Identify the significance of reverse engineering about products

A1086.4 Make use of design drawings to communicate ideas effectively

A1086.5 Build organizations that support creative and innovative thinking

3. Course Syllabus

UNIT-I

Introduction to Design Thinking, Definition, Why is Design Thinking important, How is Design Thinking different, Process of design - Introduction – Product Life Cycle - Design Ethics, creativity, innovation and design, Design Process - Creativity and Innovation in Design Process - Design limitation,Preparing mind for Innovation-The physics of innovation.

UNIT-II

Idea generation- The Idea, generation process, mind mapping tool. Experimentation-What works, Learning launch tool, Strategic Opportunities. Creative people, creative organizations, Ideas, and tools to help both people and organisations work more creatively

UNIT-III

Creative Thinking - Generating Design Ideas - Lateral Thinking –Analogies – Brainstorming - Mind mapping - National group Technique – Synectics - Development of work - Analytical Thinking - Group Activities Recommended.

UNIT-IV

Reverse engineering - Introduction - Reverse Engineering Leads to New Understanding about Products -Reasons for Reverse Engineering - Reverse Engineering Process - Step by Step – Case Study.

UNIT-V

fBasics of drawing to develop design Ideas- Introduction - Many Uses of Drawing - Communication through Drawing – Drawing Basis – Line - Shape/ Form – Value – Colour – Texture –Overview of drawing -Practice using Auto CAD recommended.

4. Books and Materials:

Text Books:

1. John.R.Karsnitz, Stephen O'BrienandJohnP.Hutchinson,"*EngineeringDesign*", Cengagelearning(Internationaledition) SecondEdition,2013.
2. Yousef Haikand Tamer M.Shahin, "*Engineering Design Process*", Cengage Learning,SecondEdition, 2011.

Reference Books

1. https://courses.edx.org/register?course_id=coursev1%3AUQx%2BCORPINN1x%2B2T2020&enrollment_action=enroll&email_opt_in=false
2. https://www.coursera.org/programs/coursera-response-program-for-pcek-zbrht?collectionId=&productId=bfnQqUbbEeeMtBKozo_2UA&productType=course&showMiniModal=true
3. www.tutor2u.net/business/presentations/.../productlifecycle/default.html orhttps://www.mindtools.com/brainstm.html
4. https://www.quicksprout.com/.../how-to-reverse-engineer-your-competit www.vertabelo.com/blog/documentation/reverse-engineeringhttps://support.microsoft.com/en-us/kb/273814
5. https://support.google.com/docs/answer/179740?hl=en https://www.youtube.com/watch?v=2mjSDIBaUlMthevirtualinstructor.com/foreshortening.html
6. https://docs.oracle.com/cd/E11108_02/otn/pdf/.../E11087_01.pdfwww.bizfilings.com›Home › Marketing›ProductDevelopment
7. https://canvas.uw.edu/courses/1023376/assignments/syllabus