SRI KRISHNADEVARAYA UNIVERSITY :: ANANTAPUR
College of Engineering & Technology
Academic Regulations 2019 (R19) for
B. Tech (Regular-Full time)

(With effect from the Academic Year 2019-20 for the students admitted into I year I semester)

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 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 period permitted for graduation.

ii. Registers for 160 credits and secures all 160 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. Programs offered by the College:

The following programs are offered at present as specializations for the B. Tech. course from 2019-2020

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S. No.	Branch	Program Code
01.	Computer Science & Engineering	01
02.	Electronics and Communication Engineering	02
03.	Mechanical Engineering	03
04.	Electrical and Electronics Engineering	04
05.	Civil Engineering	05

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

The entire course of study is of four academic years in semester pattern (for regular students) and of three academic years in semester pattern (for lateral entry students).

4. About Program related terms:

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/Tutorial) 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 criterion:

	Semester	
	Hours / Week	Credits
Theory (Lecture/Tutorial)	02	02
	03	03
	04	04
Practical	02	01
	03	1.5
	04	02
Project stage - I	04	02
Project stage – II	14	07

5. Weights for Course Evaluation:

5.1 **Course Pattern:**

i. The entire course of study is for four academic years. Semester pattern shall be followed in all the academic years.
ii. 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.
iii. 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.

5.2 **Evaluation Process:**

The performance of a student in each semester for academic year I,II,III,IV shall be evaluated subject wise with a maximum of 100 marks for theory and 75 marks for practical subject. Project stage-I, Socially relevant project and Internship shall be evaluated for 50 marks each & Project stage-II shall be evaluated for 200 marks whereas mandatory courses with no credits shall be evaluated for 30 internal marks.

1. For theory subjects the distribution shall be 30 marks for Internal Evaluation and 70 marks for the End-Examination.
2. For practical subjects the distribution shall be 25 marks for Internal Evaluation and 50 marks for the End- Examination.

5.3 **Internal Examination Evaluation:**

i. For theory subjects, during the semester there shall be 2 midterm examinations. Each midterm examination consists of subjective paper for 25 marks with duration of 1hour 30 minutes.

   First midterm examination shall be conducted for the first half of the syllabus in the middle of the semester and second midterm examination shall be conducted for the second half of the syllabus towards the end of the semester. A weightage of 0.75 for better score and 0.25 for the other score will be considered for awarding the sessional marks in both the midterm examinations. There shall be two assignments in each semester for award of 05marks so that midterm component will be 30marks (25 for midterm examinations + 05 marks for assignments).

   ***Note 1:** The subjective paper shall contain Section A with 2 questions of equal weightage of 10 marks and student shall answer any one.Section B shall contain 4 questions equal weightage of 5 marks and student shall answer any three .Any fraction (0.5 & above) shall be rounded off to the next higher mark.
   ***Note 2:** The assignment shall contains 5 questions of equal weightage of 1 mark each. Which are essay type questions/numerical problems/software development.

   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.

   Final Internal marks shall be arrived at by considering the marks secured by the student in both the mid examinations with 75% weightage given to the better mid exam and 25% to the other.

   For Example:

   Marks obtained in first mid : 24

Marks obtained in second mid : 20
Final Internal Marks: (24x0.75) + (20x0.25) = 23

If the student is absent for any one midterm examination, the final internal marks shall be arrived at by considering 75% weightage to the marks secured by the student in the appeared examination and zero to the other. For Example:

Marks obtained in first mid : Absent
Marks obtained in second mid : 24
Final Internal Marks: (24x0.75)+ (0x0.25) =18

5.4 **End Examination Evaluation:**

i. End examination of theory subjects shall have the following pattern:
   a. There shall be 8 questions and each question carries 14 marks and Student shall answer any five of them.

5.5 For practical subjects there shall be a continuous evaluation during the semester for 25 sessional marks and 50 end examination marks. Day-to-day work in the laboratory shall be evaluated for 25 marks by the concerned laboratory teacher based on the regularity/record/viva/Internal test. The end examination shall be conducted by the concerned laboratory teacher and a senior expert in the subject from the same department.

5.6 There shall be mandatory courses with zero 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 to have passed the mandatory course only when he/she secures 40% or more in the internal examinations. In case, the student fails, a re-examination shall be conducted for failed candidates every six months/semester at a mutually convenient date of college/student satisfying the conditions mentioned in item 1 & 2 of the regulations.

5.7 The Engineering Drawing/Graphics course, offered is to be treated as a Theory Course. Evaluation method adopted shall be same as for any other Theory Course. The Internal evaluation for sessionals will be 15 marks for day-to-day work in the class that shall be evaluated by the concerned subject teacher based on the reports/submissions prepared in the class. And there shall be two midterm exams in a semester for a duration of 2 hrs each, evenly distributed over the syllabi, for 15 marks giving a weightage of 0.75 for the better score and 0.25 for the other score will be considered. The sum of day to day evaluation and the internal tests will be the final sessionals for the subject

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5.8 The laboratory records and internal test papers shall be preserved for a minimum of 2 years in the respective departments as per the Institution norms and shall be produced to the Committees as and when the same are asked for.

5.9 Procedure for Conduct and Evaluation of MOOC:

- There shall be a Discipline Centric Elective Course through Massive Open Online Course (MOOC) in IV Year 2nd semester as Program Elective course. The student shall register for the course (Minimum of 40 hours) offered by authorized Institutions/Agencies, through online with the approval of Head of the Department. 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 given in 5.3. Further, the external examination for the MOOC subject will be conducted in line with other regular subjects (5.4) based on the syllabi of the respective subject provided in the curriculum. A MOOC course may be studied either in online or in conventional manner (or) MOOC online courses conducted under SWAYAM can be given weightage as per the norms.
- From second year onwards, every student should register at least one online course in

each semester as mandatory and audit course. he/she should submit course completion certificate in each semester.

5.10 There shall be two Open Electives and three inter-disciplinary electives which are **Choice Based Credit Courses (CBCC)** from III Year I Semester onwards, wherein the students have to choose inter-disciplinary electives offered by various other departments. These courses can be pursued in MOOC manner or the Conventional manner.

5.11 A **Socially relevant Project** is introduced in II Year 2nd, III Year 1st, III Year 2nd and IV Year 1st Semester for 0.5 credits in each semester. The student has to spend 15 Hrs./semester on any socially relevant project and submit a report for evaluation. This shall be evaluated for 50 marks in each of the above semesters by a committee consisting of Head of the department, Project mentor and one senior faculty member of the department. A student shall acquire 0.5 credits assigned, when he/she secures 40% or more marks for the total of 50 marks. In case, if a student fails, he/she shall resubmit the report. There shall be no external evaluation.

5.12 There shall be one **Comprehensive online examination** with zero credits conducted by the institution at the end of III Year 2nd semester with 100 objective questions for 100 marks on the subjects studied up to III Year 2nd semester.
Student shall be declared to have passed the Comprehensive online examination only when he/she secures 40% or more marks in the examination. In case, the student fails, he/she shall reappear as and when III Year 2nd semester supplementary examinations are conducted.

5.13 An **Internship/Industrial Training/Research Projects in National Laboratories/Academic Institutions** is introduced for 2 credits in the curriculum. It is introduced at the end of III Year 2nd semester i.e., during summer vacation for a period of 4 weeks. The student shall submit a diary and a technical report for evaluation. This shall be evaluated in the IV Year 1st semester for 50 marks by a committee consisting of Head of the Department along with two senior faculty members of the Department. A student shall acquire 2 credits assigned, when he/she secures 40% or more marks for the total of 50 marks. In case, if a student fails, he/she shall reappear as and when the IV Year 1st semester supplementary examinations are conducted. There shall be no external evaluation.

5.14 **Procedure for Conduct and Evaluation of Project Stage – I:**

There shall be a presentation of **Abstract of the main project** in the IV Year 1st 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. It shall be evaluated for 50 marks. A student shall acquire 2 credits assigned to the Project stage-I, when he/she secures 40% or more marks for the total of 50 marks. The Project stage-I shall be evaluated at the end of IV Year 1st semester by the department committee. There shall be no external evaluation for Project stage-I.

In case, if a student fails in Project stage-I, a reexamination shall be conducted within a month. In case if he/she fails in the reexamination also, he/she shall not be permitted to register for Project Stage-II. Further, such students shall reappear as and when IV Year 1st semester supplementary examinations are conducted.

5.17 **Procedure for Conduct and Evaluation of Project Stage – 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 nominated by the head of the Institution**.** Project work shall start

in IV Year 1st semester and shall continue in the IV Year 2nd semester. The evaluation of project work shall be conducted at the end of the IV Year 2nd semester.The Internal Evaluation shall be made by the departmental committee (Head of the Department, senior faculty member of the department and Supervisor), on the basis of two seminars given by each student on the topic of his/her project.

6. Attendance Requirements in Academics:

6.1. 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.

6.2. 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.

6.3 Shortage of Attendance below 65% in aggregate shall in NO CASE be condoned.

6.4 A stipulated fee shall be payable towards condonation of shortage of attendance to the Institution.

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

6.6 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.

6.7 The aggregate percentage of attendance can be rounded to next integer for the purpose of considering for condonation/detention.

For example:

- A candidate getting ≥64.5 may be condoned, may be rounded to 65. No attendance shall be added but for condoning purpose can only be considered.

7. Minimum Academic Requirements and Award of the Degree:

The following academic requirements have to be satisfied in addition to the attendance requirements mentioned in section 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 and end examination marks taken together.

7.2 A student shall be promoted from II Year 2nd to III Year 1st Semester only if he/she fulfils the academic requirement of securing **24 credits** in the subjects that have been studied up to II Year 1st Semester.

7.3 A student shall be promoted from III Year 2nd semester to IV Year 1st semester only if he/she fulfils the academic requirements of securing **42 credits** in the subjects that have been studied up to III Year 1st semester

And in case a 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 1st semester or IV Year 1st semester as the case may be.

7.4 A student shall register and put up minimum attendance in all 160 credits and earn all the 160 credits.

7.5 Students who fail to earn 160 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. With–holding of Results:

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

9. Award of Grades:

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.

Structure of Grading of Academic Performance

Range in which the marks in the subject fall	Grade	Grade points Assigned
≥ 90	S (Superlative)	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)	5
< 40	F (Fail)	0
Absent	Ab (Absent)	0

i. A student obtaining Grade 'F' or Grade 'Ab' in a subject shall be considered failed and will be required to reappear for that subject when it is offered the next supplementary examination.

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

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

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

$$SGPA = \Sigma (C_i \times G_i)/\Sigma C_i$$

where, C_i is the number of credits of the i^{th} subject and G_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.,

$$CGPA = \Sigma (C_i \times S_i)/ \Sigma C_i$$

where "S_i" is the SGPA of the i^{th} semester and C_i is the total number of credits upto 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.

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

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

10. Award of Class:

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

Class Awarded	CGPA Secured
First Class with Distinction	≥ 7.5
First Class	$\geq 6.5 < 7.5$
Second Class	$\geq 5.5 < 6.5$
Pass Class	$\geq 4.5 < 5.5$

11. Gap Year Concept:

Gap year concept for Student Entrepreneur in Residence is 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 full-time entrepreneurship. 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. The Principal of the college shall take the decision on proposals submitted by the students. An evaluation committee constituted by the Principal of the College shall evaluate the proposal submitted by the student and the committee shall decide whether to permit the student(s) to avail the Gap Year or not.

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, subject to Section 2 and they will follow the academic regulations into which they are readmitted.

Candidates who are permitted to avail Gap Year shall be eligible for rejoining into the succeeding year of their B. Tech from the date of commencement of class work, subject to Section **2** and they will follow the academic regulations into which they are readmitted.

13. Minimum Instruction Days for a Semester:

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. General Instructions:

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

b. Malpractices rules-nature and punishments are appended.

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

d. In the case of any doubt or ambiguity in the interpretation of the above rules, the decision of the Principal is final.

e. The Principal may change or amend the academic regulations of common B.o.S or syllabi at any time and the changes or amendments shall be made applicable to all the students on rolls with effect from the dates notified by the Principal.

f. The above rules and regulations are to be approved/ratified by the College Academic Council as and when any modifications are to be done.

ACADEMIC REGULATIONS FOR B. TECH.(R19) (LATERAL ENTRY SCHEME)

(Effective for the students getting admitted into II year through Lateral Entry Scheme from the Academic Year 2020-2021 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 the student fulfills the following academic regulations:

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

b) Registers for *120* credits and secures all *120* credits from II to IV year of Regular B. Tech. program.

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

3. The regulations **3** to **6** except 5.1 are to be adopted as that of B. Tech. (Regular).

4. Minimum Academic Requirements:

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

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.

ii A student shall be promoted from III year 2nd Semester to IV year 1st Semester only if the student fulfills the academic requirements of securing **25 credits** of the subjects that have been studied up to III Year 1st 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.

5. Course Pattern

5.1. The entire course of study is three academic years on semester pattern.

5.2. 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.

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

6. The regulations **8** 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).

7. Minimum Academic Requirements and Award of the Degree:

The following academic requirements have to be satisfied in addition to the attendance requirements mentioned in section 6.

RULES FOR
DISCIPLINARY ACTION FOR MALPRACTICES / IMPROPER CONDUCT IN EXAMINATIONS

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

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

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

Note: -

Whenever the performance of a student is cancelled in any subject/subjects due to Malpractice, he has to register for End Examinations in that subject/subjects consequently and has to fulfill all the norms required for the award of Degree.

B. Tech Course Structure – R19
COMPUTER SCIENCE AND ENGINEERING

Common for All Branches of Engineering				
S.No	**Course No**	**Course Name**	**Category**	**L-T-P-C**
1		Physical Activities – Sports, Yoga and Meditation, Plantation	MC	0-0-12-0
2		Career Counseling	MC	4-0-4-0
3		Orientation to all branches – career options, tools, etc.	MC	6-0-0-0
4		Orientation on admitted Branch – corresponding labs, tools and platforms	EC	4-0-6-0
5		Proficiency Modules & Productivity Tools	ES	4-2-4-0
6		Assessment on basic aptitude and mathematical skills	MC	4-0-6-0
7		Remedial Training in Foundation Courses	MC	4-2-4-0
8		Human Values & Professional Ethics	MC	6-0-0-0
9		Communication Skills – focus on Listening, Speaking, Reading, Writing skills	BS	4-2-4-0
10		Concepts of Programming	ES	4-0-4-0
Total				40-6-44-0

Sri Krishnadevaraya University College of Engineering & Technology					
Dept. of Computer Science and Engineering					
I Year 1st Semester 1					
S.No	**Course No**	**Course Name**	**Category**	**L-T-P**	**Credits**
1.		Mathematics- I	BS	3-1-0	4
2.		Applied Physics	BS	2-1-0	3
3.		Problem Solving & Programming	ES	3-1-0	4
4.		Communicative English 1	HS	2-0-0	2
5.		Computer Science & Engineering Workshop	LC	0-0-2	1
6.		Applied Physics Lab	BS	0-0-3	1.5
7.		Problem Solving & Programming Lab	ES	0-0-3	1.5
8.		Communicative English Lab-1	HS	0-0-2	1
9.		Constitution of India	MC	3-0-0	0
				Total	**18**

Category	**CREDITS**
Basic Science course	8.5
Engineering Science Courses(Including LC)	6.5
Humanities and social science	3
TOTAL CREDITS	**18**

Sri Krishnadevaraya University College of Engineering & Technology					
Dept. of Computer Science and Engineering					
I Year 2nd Semester					
S.No	**Course No**	**Course Name**	**Category**	**L-T-P**	**Credits**
1		Probability and Statistics	BS	3-1-0	4
2		Engineering Chemistry	BS	2-1-0	3
3		Data Structures	ES	3-0-0	3
4		Basic Electrical & Electronics Engineering	ES	3-0-0	3
5		Engineering Graphics	ES	1-0-4	3
6		Engineering Workshop	LC	0-0-2	1
7		Engineering Chemistry Lab	BS	0-0-3	1.5
8		Data Structures Lab	ES	0-0-4	2
9		Basic Electrical & Electronics Engineering Lab	ES	0-0-3	1.5
10		Environmental Sciences	MC	3-0-0	0
				Total	**22**

Category	**CREDITS**
Basic Science course	8.5
Engineering Science Courses(Including LC)	13.5
TOTAL CREDITS	**18**

Sri Krishnadevaraya University College of Engineering & Technology					
Dept. of Computer Science and Engineering					
II Year 1st Semester					
S.No	**Course No**	**Course Name**	**Category**	**L-T-P**	**Credits**
1.		Mathematical Foundation of Computer Science	BS	3-0-0	3
2.		Database Management Systems	PC	3-0-0	3
3.		Python Programming	ES	3-0-0	3
4.		Design and Analysis of Algorithms	PC	3-0-0	3
5.		Object Oriented Programming Through Java	PC	2-0-0	2
6.		Digital Logic Design	PC	3-0-0	3
7.		Python Programming Lab	ES	0-0-3	1.5
8.		Database Management Systems Lab	PC	0-0-3	1.5
		Object Oriented Programming Through Java Lab	PC	0-0-3	1.5
9.		Essence of Indian Traditional Knowledge	MC	3-0-0	0
				Total	**21.5**

Sri Krishnadevaraya University College of Engineering & Technology

Category	**CREDITS**
Basic Science course	3
Professional core Courses	14
Engineering Science Courses	4.5
TOTAL CREDITS	**21.5**

Sri Krishnadevaraya University College of Engineering & Technology					
Dept. of Computer Science and Engineering					
II Year 2nd Semester					
S.No	**Course No**	**Course Name**	**Category**	**L-T-P**	**Credits**
1		Number Theory & Applications	BS	3-0-0	3
2		Formal Languages and Automata Theory	PC	3-0-0	3
3		Computer Organization	PC	3-0-0	3
4		Software Engineering	PC	3-0-0	3
5		Operating Systems	PC	3-0-0	3
6		Managerial Economics and Financial Analysis	HS	3-0-0	3
7		Operating Systems Lab	PC	0-0-3	1.5
8		Software Engineering Lab	PC	0-0-3	1.5
				Total	**21**

Category	**CREDITS**
Professional core Courses	15
Humanities and Social Sciences	3
Basic Science course	3
TOTAL CREDITS	**21**

Dept. of Computer Science and Engineering					
III Year 1st Semester 1					
S.No	**Course Code**	**Course Name**	**Category**	**L-T-P**	**Credits**
1.		Life Science for Engineers	BS	3-0-0	3
2.		Principles of Programming Languages	PC	3-0-0	3
3.		Computer Networks	PC	3-0-0	3
4.		Unix Programming	PC	3-0-0	3
5.		Object Oriented Analysis and Design Advanced Computer Architecture Mobile Application Development	PE-I	3-0-0	3
6.		Open Elective-I	OE-I	3-0-0	3
7.		Computer Networks Lab	PC	0-0-3	1.5
8.		UML Lab	PC	0-0-3	1.5
9.		Socially Relevant Project(15hrs/Sem)	PR	0-0-0	0.5
				Total Credits	**21.5**

Category	**CREDITS**
Professional core courses	12
Professional Elective courses	03
Basic Science Course	03
Open Elective Course/Job oriented elective	03
Socially Relevant Project(15hrs/Sem)	0.5
TOTAL	21.5

Sri Krishnadevaraya University College of Engineering & Technology					
Dept. of Computer Science and Engineering					
III Year 2nd Semester					
S.No	**Course Code**	**Course Name**	**Category**	**L-T-P**	**Credits**
1		Compiler Design	PC	3-0-0	3
2		Artificial Intelligence	PC	3-0-0	3
3		Data ware Housing and Data Mining	PC	3-0-0	3
4		Management Science	HS	3-0-0	3
5		Software Testing Natural Language Processing Web Technologies	PE-II	3-0-0	3
6		Open Elective -II	OE-II	3-0-0	3
7		ST /NLP/ WT Lab	PC	0-0-3	1.5
8		CD and DM Lab	PC	0-0-3	1.5
9		Socially Relevant Project(15hrs/Sem)	PR	0-0-0	0.5
10		Industrial Training/ Internship/ Research Projects in National Laboratories/Academic Institutions	- - -	- - -	- - -
11		Comprehensive Online Examination			
				Total credits	**21.5**

Category	**CREDITS**
Professional Core Courses	12
Professional Elective Courses	03
Open Elective Course/Job oriented elective	03
Humanities and Social Science Course	03
Socially Relevant Project(15hrs/Sem)	0.5
TOTAL	21.5

Sri Krishnadevaraya University College of Engineering & Technology					
Dept. of Computer Science and Engineering					
IV Year 1st Semester					
S.No	**Course No**	**Course Name**	**Category**	**L-T-P**	**Credits**
1.		Cryptography & Network Security	PC	3-0-0	3
2.		Cloud Computing	PC	3-0-0	3
3.		Internet of Things	PC	3-0-0	3
4.		Software Project Management Internetworking with TCP/IP Machine Learning	PE-III	2-0-0	2
5.		Software Architecture Network Management Computer Vision	PE-IV	3-0-0	3
6.		DEV OPS Big Data Analytics Data Science	PE-V	3-0-0	3
7.		Project I	PR	0-0-0	2
8.		Socially Relevant Project(15hrs/Sem)	PR	0-0-0	0.5
9		Industrial Training/ Internship/ Research Projects in National Laboratories/Academic Institutions	PR	-	2
				Total	**21.5**

Category	**CREDITS**
Professional Core Courses	09
Professional Elective Courses	08
Project I	2
Socially Relevant Project(15hrs/Sem)	0.5
Industrial/Research Internship	2
TOTAL CREDITS	**21.5**

Sri Krishnadevaraya University College of Engineering & Technology					
Dept. of Computer Science and Engineering					
IV Year 2nd Semester					
S.No	**Course No**	**Course Name**	**Category**	**L-T-P**	**Credits**
1		Open Elective Course/Job oriented elective(MOOC) Cloud Computing Block Chain Technology Introduction to Operation Management	PE-VI	3-0-0	3
2		Professional Elective courses(MOOC) Augmented Reality & Virtual Reality Introduction to Hadoop and Map Reduce Design Patterns	OE-III	3-0-0	3
3		Project II			7
				Total	**13**

Category	**CREDITS**
Professional Elective courses	3
Open Elective Course/Job oriented elective	3
Project II	7
TOTAL CREDITS	**13**

Open Electives offered by Dept. of C.S.E

1. Database Management Systems
2. Unix Programming
3. Object Oriented Programming through Java
4. Cyber Security
5. Computer Networks
6. Software Engineering
7. Cloud Computing
8. Introduction to Operations Management
9. Block Chain Technology

Open Electives offered by Dept. of E.E.E

1. Introduction to Hybrid Electric Vehicles
2. Electrical Engineering Materials
3. Generation of Electric Power
4. Control Systems
5. Renewable Energy Sources
6. Fundamentals of Power Electronics

Open Electives offered by Dept. of E.C.E

1. Fundamentals of Digital Electronics
2. Fundamentals of Communication Systems
3. Signals and Systems
4. Microprocessors and Microcontrollers
5. Electronic Measurements and Instrumentation
6. Embedded Systems
7. Basics of VLSI
8. Principles of Digital Signal Processing
9. Introduction to Image Processing

Open Electives offered by Dept. of Civil Engineering

1. Environmental Impact Assessment
2. Noise and Air Pollution
3. Disaster Mitigation And Management
4. Ground Improvement Techniques
5. Environmental Pollution Control
6. Remote Sensing and GIS

Open Electives offered by Dept. of Mech. Engineering

1. Manufacturing Process
2. Entrepreneurship
3. IC Engines
4. Automobile Engineering
5. Non Conventional Sources of Energy
6. Non Destructive Evaluation

Sri Krishnadevaraya University College of Engineering & Technology					
Dept. of Computer Science and Engineering					
I Year 1st Semester 1					
S.No	**Course No**	**Course Name**	**Category**	**L-T-P**	**Credits**
1.		Mathematics- I	BS	3-1-0	4
2.		Applied Physics	BS	2-1-0	3
3.		Problem Solving & Programming	ES	3-1-0	4
4.		Communicative English 1	HS	2-0-0	2
5.		Computer Science & Engineering Workshop	LC	0-0-2	1
6.		Applied Physics Lab	BS	0-0-3	1.5
7.		Problem Solving & Programming Lab	ES	0-0-3	1.5
8.		Communicative English Lab-1	HS	0-0-2	1
9.		Constitution of India	MC	3-0-0	0
				Total	**18**

Category	**CREDITS**
Basic Science course	8.5
Engineering Science Courses(Including LC)	6.5
Humanities and social science	3
TOTAL CREDITS	**18**

Sri Krishnadevaraya University College of Engineering & Technology

B.Tech – I Year 1st Sem	**(Computer Science & Engineering)**	**L**	**T**	**P**	**C**
	Mathematics-I	**3**	**1**	**0**	**4**
	(Calculus & Algebra)				

(Common to all branches of Engineering)

Course Objectives:

- This course will illuminate the students in the concepts of calculus and linear algebra.
- To equip the students with standard concepts and tools at an intermediate to advanced level mathematics to develop the confidence and ability among the students to handle various real world problems and their applications.

Bridge Course: Limits, continuity, Types of matrices

Unit I: Matrix Operations and Solving Systems of Linear Equations

Rank of a matrix by echelon form, solving system of homogeneous and non-homogeneous equations linear equations. Eigen values and Eigen vectors and their properties, Cayley-Hamilton theorem (without proof), finding inverse and power of a matrix by Cayley-Hamilton theorem, diagonalisation of a matrix, quadratic forms and nature of the quadratic forms, reduction of quadratic form to canonical forms by orthogonal transformation.

Learning Outcomes:

At the end of this unit, the student will be able to

- solving systems of linear equations, using technology to facilitate row reduction determine the rank, eigenvalues and eigenvectors, diagonal form and different factorizations of a matrix;
- identify special properties of a matrix, such as positive definite, etc., and use this information to facilitate the calculation of matrix characteristics;

Unit II:Mean Value Theorems

Rolle's Theorem, Lagrange's mean value theorem, Cauchy's mean value theorem, Taylor's and Maclaurin's theorems with remainders (without proof);

Learning Outcomes:

At the end of this unit, the student will be able to

- Translate the given function as series of Taylor's and Maclaurin's with remainders
- analyze the behaviour of functions by using mean value theorems

Unit III: Multivariable calculus

Partial derivatives, total derivatives, chain rule, change of variables, Jacobians, maxima and minima of functions of two variables, method of Lagrange multipliers.

Learning Outcomes:

At the end of this unit, the student will be able to

- Find partial derivatives numerically and symbolically and use them to analyze and interpret the way a function varies.
- Acquire the Knowledge maxima and minima of functions of several variable
- Utilize Jacobian of a coordinate transformation to deal with the problems in change of variables

Unit IV: Double Integrals

Double integrals, change of order of integration, double integration in polar coordinates, areas enclosed by plane curves.

Learning Outcomes:

At the end of this unit, the student will be able to

- Evaluate double integrals of functions of several variables in two dimensions using Cartesian and polar coordinates
- Apply double integration techniques in evaluating areas bounded by region

Unit V: Multiple Integrals and Special Functions

Evaluation of triple integrals, change of variables between Cartesian, cylindrical and spherical polar co-ordinates, Beta and Gamma functions and their properties, relation between beta and gamma functions.

Learning Outcomes:

At the end of this unit, the student will be able to

- Conclude the use of special function in multiple integrals
- evaluate multiple integrals in Cartesian, cylindrical and spherical geometries

Textbooks:

1. Erwin Kreyszig, Advanced Engineering Mathematics, 10/e, John Wiley & Sons, 2011.
2. B. S. Grewal, Higher Engineering Mathematics, 44/e, Khanna Publishers, 2017.

References:

1. R. K. Jain and S. R. K. Iyengar, Advanced Engineering Mathematics, 3/e, Alpha Science International Ltd., 2002.
2. George B. Thomas, Maurice D. Weir and Joel Hass, Thomas Calculus, 13/e, Pearson Publishers, 2013.
3. Glyn James, Advanced Modern Engineering Mathematics, 4/e, Pearson publishers, 201.

Course Outcomes:

At the end of the course, the student will be able to

- develop the use of matrix algebra techniques that is needed by engineers for practical applications
- Utilize mean value theorems to real life problems
- familiarize with functions of several variables which is useful in optimization
- Students will also learn important tools of calculus in higher dimensions. Students will become familiar with 2- dimensional coordinate systems
- Students will become familiar with 3- dimensional coordinate systems and also learn the utilization of special functions

Sri Krishnadevaraya University College of Engineering & Technology

B.Tech – I Year 1st Sem (Computer Science & Engineering)	**L**	**T**	**P**	**C**
	2	**1**	**0**	**3**

Applied Physics
(ECE, CSE & EEE Branches)

Course Objectives:

- To identify the importance of the optical phenomenon i.e. interference, diffraction and polarization related to its Engineering applications.
- To explain the significant concepts of dielectric and electromagnetic theory and its propagation this leads topotential applications.
- To impart knowledge in basic concepts of lasers and optical fiber and its propagation along with its Engineering applications.
- To identify the importance of semiconductors in the functioning of electronic devices.
- To teach the concepts related to magnetic materials and superconductivity which lead to their fascinatingapplications.

Unit-I: Wave Optics

Interference-Principle of Superposition-Interference of light-Conditions for sustained Interference - Interference in thin films (reflected light)-Newton's Rings-Determination of Wavelength- Engineering applications of Interference.

Diffraction-Fraunhofer Diffraction-Single and Double slits - Diffraction Grating- Engineering applications of diffraction

Polarization-Polarization by reflection and double refraction-Nicol's Prism--Half wave and Quarter wave plate-Engineering applications of Polarization.

Learning Outcomes:

The students will be able to

- explain the need of coherent sources and the conditions for sustained interference
- identify engineering applications of interference including homodyne and heterodyne detection
- analyzethe differences between interference and diffraction with applications
- illustrate the concept of polarization of light and its applications
- classify ordinary polarized light and extraordinary polarized light

Unit-II: Dielectric & Electromagnetic waves

Introduction--Dielectric Polarization-Dielectric polarizability, Susceptibility and Dielectric constant-Types of polarizations: Electronic, Ionic and Orientation polarisations (Qualitative) - Lorentz (internal) field-Clausius -Mossotti equation-Applications of Dielectrics-Ferro-electricity.

Gauss' theorem for divergence and Stokes' theorem for curl- Fundamental laws of Electric and Magnetic Fields-Derivation of Maxwell's Equations (Integral form and Differential form) - Electromagnetic wavepropagation (conducting and non-conducting media)-Propagation of Electromagnetic waves in dielectric medium.

Learning Outcomes:

The students will be able to

- explain the concept of dielectric constant and polarization in dielectric materials
- summarize various types of polarization of dielectrics
- interpret Lorentz field and Clausius- Mossotti relation in dielectrics
- apply the Gauss' theorem for divergence and Stokes' theorem for curl
- valuate the Maxwell's equations, Maxwell's displacement current and correction in Ampere's law
- asses the electromagnetic wave propagation and its power in non-conducting medium, conducting and dielectric medium

Unit – III: Lasers & Fiber Optics

Introduction-Spontaneous and Stimulated emission of radiation -Einstein's coefficients - Population inversion - Pumping Mechanisms -He-Ne laser- Semiconductor laser - Applications of laser.

Introduction to Optical Fibers-Total Internal Reflection-Critical angle of propagation-Acceptance Angle-Numerical Aperture-Classification of fibers based on Refractive index profile –Propagation of electromagnetic wave through optical fiber–modes-Block Diagram of Fiber optic Communication - Medical Applications.

Learning Outcomes:
The students will be able to

- Understand the basic concepts of LASER light Sources
- Apply the concepts to learn the types of lasers
- Identifies the Engineering applications of lasers
- explain the working principle of optical fibers
- classify optical fibers based on refractive index profile and mode of propagation
- identify the applications of optical fibers in medical, communication and other fields
- Apply the fiber optic concepts in various fields .

Unit – IV: Quantum Mechanics & Semiconductors
Dual nature of matter- Schrodinger's time independent wave equation- Schrodinger's time dependent wave equation-Significance of wave function-Particle in one dimensional infinite potential well.

Intrinsic semiconductors - density of charge carriers-Fermi energy – Electrical conductivity – extrinsic semiconductors - P-type & N-type - Density of charge carriers Dependence of Fermi energy on carrier concentration and temperature-Hall effect-Hall coefficient - Applications of Hall effect - Drift and Diffusion currents- Einstien's relation - Applications of Semiconductors.

Learning Outcomes:
The students will be able to

- classify the energy bands of semiconductors
- outline the properties of n-type and p-type semiconductors and charge carriers
- interpret the direct and indirect band gap semiconductors
- identify the type of semiconductor using Hall effect
- identify applications of semiconductors in electronic devices

Unit – V: Magnetic Materials & Superconductors
Introduction-Magnetic dipole moment-Magnetization-Magnetic susceptibility and permeability-Classification of Magnetic Materials-Hysteresis-soft and hard magnetic materials.

Superconductors-Properties-Critical magnetic field-Meissnereffect-Josephson Effect (AC & DC)-Types of Superconductors-SQUID- Applications of superconductors.

Learning Outcomes:
The students will be able to

- classify the magnetic materials based on susceptibility
- explain the applications of dielectric and magnetic materials
- Apply the concept of magnetism to magnetic devices
- explain how electrical resistivity of solids changes with temperature
- classify superconductors based on Meissner's effect explain Meissner's effect & Josephson effect in superconductors

Text Books:

1. M. N. Avadhanulu, P.G. Kshirsagar& TVS Arun Murthy" AText book of Engineering Physics"- S. Chand Publications, 11th Edition 2019.
2. B.K. Pandey and S. Chaturvedi, Engineering Physics, Cengage Learning, 2012.

Reference Books:

1. Shatendra Sharma, Jyotsna Sharma, "Engineering Physics", Pearson Education,2018
2. David J.Griffiths, "Introduction to Electrodynamics"- 4/e, Pearson Education,2014
3. D.K Battacharya and Poonam Tandon "Engineering Physics", Oxford University Press.
4. Applied Physics – P.K.Palanisamy SciTech Publications Pvt. Ltd.,
5. Engineering Physics- K. Vijay Kumar, S. Chand Publications

Course Outcomes:

The students will be able to

- identify the wave properties of light and the interaction of energy with the matter
- apply electromagnetic wave propagation in different guided media
- asses the electromagnetic wave propagation and its power in different media
- calculate conductivity of semiconductors
- interpret the difference between normal conductor and superconductor
- demonstrate the application of nanomaterials

Sri Krishnadevaraya University College of Engineering & Technology

B.Tech – I Year 1st Sem (Computer Science & Engineering)	**L**	**T**	**P**	**C**
Problem Solving and Programming	**3**	**1**	**0**	**4**

(Common to all Branches Of Engineering)

Course Objectives:

1. Introduce the internal parts of a computer, and peripherals.
2. Introduce the Concept of Algorithm and use it to solve computational problems
3. Identify the computational and non-computational problems
4. Teach the syntax and semantics of a C Programming language
5. Demonstrate the use of Control structures of C Programming language
6. Illustrate the methodology for solving Computational problems

Unit 1:

Computer Fundamentals: What is a Computer, Evolution of Computers, Generations of Computers, Classification of Computers, Anatomy of a Computer, Memory revisited, Introduction to Operating systems, Operational overview of a CPU.

Introduction to Programming, Algorithms and Flowcharts: Programs and Programming, Programming languages, Compiler, Interpreter, Loader, Linker, Program execution, Fourth generation languages, Fifth generation languages, Classification of Programming languages, Structured programming concept, Algorithms, Pseudo-code, Flowcharts, Strategy for designing algorithms, Tracing an algorithm to depict logic, Specification for converting algorithms into programs.

Unit Outcomes:

Student should be able to

1. Identify the different peripherals, ports and connecting cables in a PC
2. Illustrate the working of a Computer
3. Select the components of a Computer in the market and assemble a computer
4. Solve complex problems using language independent notations

Unit 2:

Introduction to computer problem solving: Introduction, the problem-solving aspect, top down design, implementation of algorithms, the efficiency of algorithms, the analysis of algorithms.

Fundamental algorithms: Exchanging the values of two variables, counting, summation of a set of numbers, factorial computation, sine function computation, generation of the Fibonacci sequence, reversing the digits of an integer.

Learning Outcomes: Student should be able to

1. Solve Computational problems
2. Apply Algorithmic approach to solving problems
3. Analyze the algorithms

Unit 3:

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.

Input and output: standard input and output, formatted output-Printf, formatted input-Scanf.

Control Flow: Statements and blocks, if-else, else-if, switch, Loops-while and for, Loops-Dowhile, break and continue, Goto and labels.

Functions and Program Structure: Basics of functions, functions returning non-integers, external variables, scope variables, header variables, register variables, block structure, initialization, recursion, the C processor.

Learning Outcomes: Student should be able to

1. Recognize the programming elements of C Programming language
2. Select the control structure for solving the problem
3. Apply modular approach for solving the problem

Unit 4:

Factoring methods: Finding the square root of a number, the smallest divisor of a number, the greatest common divisor of two integers, generating prime numbers.

Pointers and arrays: Pointers and addresses, pointers and function arguments, pointers and arrays, address arithmetic, character pointers and functions, pointer array; pointers to pointers, Multi-dimensional arrays, initialization of arrays, pointer vs. multi-dimensional arrays, command line arguments, pointers to functions, complicated declarations.

Array Techniques: Array order reversal, finding the maximum number in a set, removal of duplicates from an order array, finding the kth smallest element

Learning Outcomes: Student should be able to

1. Solve mathematical problems using C Programming language
2. Structure the individual data elements to simplify the solutions
3. Facilitate efficient memory utilization

Unit 5:

Sorting and Searching: Sorting by selection, sorting by exchange, sorting by insertion, sorting by partitioning, binary search.

Structures: Basics of structures, structures and functions, arrays of structures, pointers to structures, self-referential structures, table lookup, typedef, unions, bit-fields.

Learning Outcomes: Student should be able to

1. Select sorting algorithm based on the type of the data
2. Organize heterogeneous data
3. Design a sorting algorithm

Text Books:

1. Pradip Dey, and Manas Ghosh, "Programming in C", 2018, Oxford University Press.
2. R.G. Dromey, "How to Solve it by Computer". 2014, Pearson.
3. Brian W. Kernighan, and Dennis M. Ritchie, "The C Programming Language", 2nd Edition, Pearson.

Reference Books:

1. RS Bichkar "Programming with C", 2012, Universities Press.
2. Pelin Aksoy, and Laura Denardis, "Information Technology in Theory", 2017, Cengage Learning.
3. Byron Gottfried and Jitender Kumar Chhabra, "Programming with C", 4th Edition, 2019, McGraw Hill Education.

Course Outcomes:

1. Construct his own computer using parts .
2. Recognize the importance of programming language independent constructs
3. Solve computational problems
4. Select the features of C language appropriate for solving a problem
5. Design computer programs for real world problems
6. Organize the data which is more appropriated for solving a problem

Sri Krishnadevaraya University College of Engineering & Technology

B.Tech – I Year 1st Sem (Computer Science & Engineering)	**L**	**T**	**P**	**C**
Communicative English I	**2**	**0**	**0**	**2**
(Common to All Branches of Engineering)				

Introduction

The course is designed to train students in receptive (listening and reading) as well as productive and interactive (speaking and writing) skills by incorporating a comprehensive, coherent and integrated approach that improves the learners' ability to effectively use English language in academic/ workplace contexts. The shift is from learning about the language to using the language. On successful completion of the compulsory English language course/s in B.Tech., learners would be confident of appearing for international language qualification/proficiency tests such as IELTS, TOEFL, or BEC, besides being able to express themselves clearly in speech and competently handle the writing tasks and verbal ability component of campus placement tests. Activity based teaching-learning methods would be adopted to ensure that learners would
engage in actual use of language both in the classroom and laboratory sessions.

Course Objectives

- Facilitate effective listening skills for better comprehension of academic lectures and English spoken by native speakers
- Focus on appropriate reading strategies for comprehension of various academic texts and authentic materials
- Help improve speaking skills through participation in activities such as role plays, discussions and structured talks/oral presentations
- Impart effective strategies for good writing and demonstrate the same in summarizing, writing well organized essays, record and report useful information
- Provide knowledge of grammatical structures and vocabulary and encourage their appropriate use in speech and writing

Unit 1

Lesson : Exploration – A Proposal to Girdle – Explored Avenues

Listening: Identifying the topic, the context and specific pieces of information by listening to short audio texts and answering a series of questions.**Speaking:**Asking and answering general questions on familiar topics such as home, family, work, studies and interests; introducing oneself and others. **Reading:** Skimming to get the main idea of a text; scanning to look for specific pieces of information. **Reading for Writing:** Beginnings and endings of paragraphs -
introducing the topic, summarizing the main idea and/or providing a transition to the next paragraph. **Grammar and Vocabulary:** Content words and function words; word forms: verbs, nouns, adjectives and adverbs; nouns: countable and uncountable; singular and plural; basic sentence structures; simple question form - wh-questions; word order in sentences.

Learning Outcomes

At the end of the module, the learners will be able to

- understand social or transactional dialogues spoken by native speakers of English and identify the context, topic, and pieces of specific information
- ask and answer general questions on familiar topics and introduce oneself/others
- employ suitable strategies for skimming and scanning to get the general idea of a text and locate specific information
- recognize paragraph structure and be able to match beginnings/endings/headings with paragraphs
- form sentences using proper grammatical structures and correct word forms

Unit 2

Lesson : On Campus – The District School as It was by One Who Went to It – Strategies to organise ideas

Listening: Answering a series of questions about main idea and supporting ideas after listening to audio texts. **Speaking:** Discussion in pairs/ small groups on specific topics followed by short structured talks.**Reading:** Identifying sequence of ideas; recognizing verbal techniques that help to link the ideas in a paragraph together. **Writing:** Paragraph writing (specific topics) using suitable cohesive devices; mechanics of writing - punctuation, capital letters. **Grammar and Vocabulary:** Cohesive devices - linkers, sign posts and transition signals; use of articles and zero article; prepositions.

Learning Outcomes

At the end of the module, the learners will be able to

- comprehend short talks on general topics
- participate in informal discussions and speak clearly on a specific topic using suitable discourse markers
- understand the use of cohesive devices for better reading comprehension
- write well structured paragraphs on specific topics
- identify basic errors of grammar/ usage and make necessary corrections in short texts

Unit 3

Lesson : Working Together – The future of work – Successful Great Partnership

Listening: Listening for global comprehension and summarizing what is listened to. **Speaking:** Discussing specific topics in pairs or small groups and reporting what is discussed **Reading:** Reading a text in detail by making basic inferences -recognizing and interpreting specific context clues; strategies to use text clues for comprehension.**Writing:** Summarizing - identifying main idea/s and rephrasing what is read; avoiding redundancies and repetitions. **Grammar and Vocabulary:** Verbs - tenses; subject-verb agreement; direct and indirect speech, reporting verbs for academic purposes.

Learning Outcomes

At the end of the module, the learners will be able to

- comprehend short talks and summarize the content with clarity and precision
- participate in informal discussions and report what is discussed
- infer meanings of unfamiliar words using contextual clues
- write summaries based on global comprehension of reading/listening texts
- use correct tense forms, appropriate structures and a range of reporting verbs in speech and writing

Unit4

Lesson : Fabric of Change – H.G.Wells and the Uncertainties of Progress – Diversity in Work Place

Listening: Making predictions while listening to conversations/ transactional dialogues without video; listening with video. **Speaking:** Role plays for practice of conversational English in academic contexts (formal and informal) - asking for and giving information/directions. **Reading:**Studying the use of graphic elements in texts to convey information, reveal trends/patterns/relationships, communicate processes or display complicated data.**Writing:** Information transfer; describe, compare, contrast, identify significance/trendsbased on information provided in figures/charts/graphs/tables.**Grammar and Vocabulary:**Quantifying expressions - adjectives and adverbs; comparing and contrasting; degrees of comparison; use of antonyms

Learning Outcomes

At the end of the module, the learners will be able to

- infer and predict about content of spoken discourse
- understand verbal and non-verbal features of communication and hold formal/informal conversations
- interpret graphic elements used in academic texts
- produce a coherent paragraph interpreting a figure/graph/chart/table
- use language appropriate for description and interpretation of graphical elements

Unit 5

Lesson : Tool For Life – Leaves from the Mental Portfolio of a Eurasian – Learning by Doing

Listening: Identifying key terms, understanding concepts and answering a series of relevant questions that test comprehension. **Speaking:** Formal oral presentations on topics from academic contexts -

without the use of PPT slides. **Reading:** Reading for comprehension. **Writing:** Writing structured essays on specific topics using suitable claims and evidences **Grammar and Vocabulary:** Editing short texts –identifying and correcting common errors in grammar and
usage (articles, prepositions, tenses, subject verb agreement)

Learning Outcomes

At the end of the module, the learners will be able to

- take notes while listening to a talk/lecture and make use of them to answer questions
- make formal oral presentations using effective strategies
- comprehend, discuss and respond to academic texts orally and in writing
- produce a well-organized essay with adequate support and detail
- edit short texts by correcting common errors

***Course Materials would be compiled and provided to learners and teachers**

Text Books

- English All Round - Communication Skills for Undergraduate Learners , Prabavathi Y M Lalitha Sridevi, Orient Black Swan Publishers

Reference Books

- Bailey, Stephen. Academic writing: A handbook for international students. Routledge, 2014.
- Chase, Becky Tarver. Pathways: Listening, Speaking and Critical Thinking. Heinley ELT; 2nd Edition, 2018.
- Skilful Level 2 Reading & Writing Student's Book Pack (B1) Macmillan Educational. Hewings, Martin. Cambridge Academic English (B2). CUP, 2012.

Course Outcomes:

At the end of the course, the learners will be able to

- Understand the context, topic, and pieces of specific information from social or transactional dialogues spoken by native speakers of English
- Apply grammatical structures to formulate sentences and correct word forms
- Analyze discourse markers to speak clearly on a specific topic in informal discussions
- Evaluate reading/listening texts and to write summaries based on global comprehension of these texts. Create a coherent paragraph interpreting a figure/graph/chart/table
- produce a well-organized essay with adequate support and detail
- edit short texts by correcting common errors

Text Books

- Bailey, Stephen. Academic writing: A handbook for international students.Routledge, 2014.
- Chase, Becky Tarver. Pathways: Listening, Speaking and Critical Thinking. Heinley ELT; 2nd Edition, 2018.

Reference Books

- Skillful Level 2 Reading & Writing Student's Book Pack (B1) Macmillan Educational. Hewings, Martin. Cambridge Academic English (B2). CUP, 2012.
- English Alround, Communication Skills for Undergraduate Learners ,Prabavathi Y M Lalitha Sridevi,Orient Black Swan Publishers

Course Outcomes:

At the end of the course, the learners will be able to

- Understand the context, topic, and pieces of specific information from social or transactional dialogues spoken by native speakers of English
- Apply grammatical structures to formulate sentences and correct word forms
- Analyze discourse markers to speak clearly on a specific topic in informal discussions
- Evaluate reading/listening texts and to write summaries based on global comprehension of these texts.Create a coherent paragraph interpreting a figure/graph/chart/table

Sri Krishnadevaraya University College of Engineering & Technology

B.Tech – I Year 1st Sem (Computer Science & Engineering)	**L**	**T**	**P**	**C**
Computer Science & Engineering Workshop	**0**	**0**	**2**	**1**

Course Objectives:

To

1. Introduce the internal parts of a computer, peripherals, I/O ports, connecting cables
2. Teach basic command line interface commands on Linux
3. Teach the usage of Internet for productivity and self paced life long learning
4. Introduce Compression, Multimedia and Antivirus tools
5. Introduce Office Tools such as Word processors, Spreadsheets and Presentation tools

Unit 1: Computer Hardware

Types of Computing Devices such as PC, Laptops, Servers, Smart Phones, Tablets, other accessories, PC parts, Input/Output devices, I/O ports and interfaces, main memory, cache memory and secondary storage technologies, digital storage basics, networking components and speeds.

Unit Outcomes:

Student should be able to

1. Identify various kinds Computing devices and their components.
2. Identify the different peripherals, ports and connecting cables in a PC.
3. Assemble and disassemble components of a PC

Text Books:

References:

1. Introduction to computer-peter Norton
2. https://explorersposts.grc.nasa.gov/post631/2006-2007/computer_basics/ComputerPorts.doc
3. https://explorersposts.grc.nasa.gov/post631/2006-2007/bitsnbyte/Digital_Storage_Basics.doc

Unit 2: Operating Systems

Virtual Machine setup:

- Setting up and configuring a new Virtual Machine
- Setting up and configuring an existing Virtual Machine
- Exporting and packaging an existing Virtual Machine into a portable format

Operating System installation:

- Installing an Operating System such as Linux on Computer hardware.

Linux Operating System commands:

- General command syntax
- Basic help commands: whatis, man, info
- Filesystem: ls, mkdir, cd, touch, chmod, rm, mv, bc, finger, who, whoami, ps, du, df
- Date and Time: cal, date,
- Filters and Text processing: echo, cat, tac, rev, more, less, head, tail, nl, cut, paste, wc, sort, uniq, cp, cmp, diff, tr, ln, grep, fgrep, egrep, sed, awk, find, xargs, tee,
- File compression: tar, compress, uncompress, split, uuencode, uudecode, gzip, gunzip, read, expr, test, ping, ssh
- Miscellaneous: apt-get, vi editor
- Shell I/O redirection and piping, regular expressions, simple shell programs without control structures.

Search for "20 examples of grep in linux" and practice like this on all the given commands.
https://www.thegeekstuff.com/2009/07/linux-ls-command-examples
https://www.pcsuggest.com/basic-linux-commands/

https://www.linuxtechi.com/25-find-command-examples-for-linux-beginners/

Unit Outcomes:
Student should be able to:
1. construct a fully functional virtual machine
2. summarize various linux operating system commands

References:

1. https://www.vmware.com/pdf/VMwarePlayerManual10.pdf
2. https://zorinos.com/help/
3. https://zorinos.com/help/install-zorin-os/
4. https://geek-university.com/vmware-player/manually-install-a-guest-operating-system/
5. https://clearlinux.org/documentation/clear-linux/get-started/virtual-machine-install/vmw-player-preconf
6. https://www.thegeekstuff.com/2009/07/linux-ls-command-examples
7. https://www.pcsuggest.com/basic-linux-commands/
8. https://www.linuxtechi.com/25-find-command-examples-for-linux-beginners/

Unit 3: Networking and Internet
Networking Commands :
- ping, ssh, ifconfig, scp, netstat, ipstat, nslookup, traceroute, telnet, host, ftp, arp, wget,route

Internet Services:
- Web Browser usage and advanced settings like LAN, proxy, content, privacy, security, cookies, extensions/plugins
- Antivirus installation, configuring a firewall, blocking pop-ups
- Google search techniques(text based, voice based)
- alexa website traffic statistics
- Email creation and usage
- google hangout/skype/gotomeeting video conferencing
- archive.org for accessing archived resources on the web
- Creating a Digital Profile on LinkedIn, Twitter, Github

Unit Outcomes:
Students should be able to
1. resolve internet connectivity issues
2. secure a computer from cyber threats
3. apply google search techniques
4. create their own digital profile on social media

References:

1. http://www.googleguide.com/advanced_operators_reference.html
2. https://www.alexa.com/find-similar-sites
3. https://www.alexa.com/topsites examine links Global, By Country and By Category
4. Use https://archive.org/ to locate missing links in other sites.

Unit 4: Productivity Tools
Productivity Tools:
- archival and compression tools
- scanning and image editing tools
- photography with digital camera and photo editing tools
- OCR and text extraction
- audio players, recording using Mic, editing, podcast preparation
- video players, recording using webcam/camcorder, editing
- podcast, screencast, vodcast, webcasting

Unit Outcomes:

Students should be able to :

1. archive and unarchive data on the filesystem using relevant compression tools
2. edit photos & images in various formats using photo & image editing tools
3. recognize characters & extract text from scanned images
4. create audio files and podcasts
5. create video tutorials and publishing

References:

1. File Archivers: https://en.wikipedia.org/wiki/File_archiver .
   Comparison of file archivers: https://en.wikipedia.org/wiki/Comparison_of_file_archivers
2. Image editing: https://en.wikipedia.org/wiki/Image_editing
   Comparison of raster graphics editors:
   https://en.wikipedia.org/wiki/Comparison_of_raster_graphics_editors
3. Optical Character Recognition: https://en.wikipedia.org/wiki/Optical_character_recognition
4. Audio editing software: https://en.wikipedia.org/wiki/Audio_editing_software
   Comparison of free software for audio:
   https://en.wikipedia.org/wiki/Comparison_of_free_software_for_audio
5. Video editing software: https://en.wikipedia.org/wiki/Video_editing_software
   Comparison of video editing software:
   https://en.wikipedia.org/wiki/Comparison_of_video_editing_software
6. Podcast: https://en.wikipedia.org/wiki/Podcast, Screencast:
   https://en.wikipedia.org/wiki/Screencast, Webcast: https://en.wikipedia.org/wiki/Webcast

Unit 5: Office Tools

Cloud based productivity enhancement and collaboration tools:

- Store, sync, and share files with ease in the cloud
  - Google Drive
- Document creation and editing text documents in your web browser
  - Google docs
- Handle task lists, create project plans, analyze data with charts and filters
  - Google Sheets
- Create pitch decks, project presentations, training modules
  - Google Slides
- Manage event registrations, create quizzes, analyze responses
  - Google Forms
- Build public sites, internal project hubs
  - Google Sites
- Web-based service providing detailed information about geographical regions and sites around the world. Explore the globe by entering addresses and coordinates
  - Google Maps and Earth
- Online collaboration through cross-platform support
  - Jamboard
- Keep track of important events, sharing one's schedule, and create multiple calendars.
  - Google Calendar

Unit Outcomes:

Students should be able to :

1. use office tools for documentation
2. build interactive presentations
3. navigate through the globe
4. build websites
5. create quizzes & analyze responses

References:

1. Cloud computing, productivity and collaboration tools, software and products offered by Google:https://en.wikipedia.org/wiki/G_Suite,

2. G Suite Learning Center: https://gsuite.google.com/learning-center/products/#!/Course Outcomes:

Students should be able to :

1. assemble and disassemble components of a PC
2. construct a fully functional virtual machine
3. summarize various linux operating system commands
4. secure a computer from cyber threats
5. apply google search techniques
6. create their own digital profile on social media
7. edit photos & images in various formats using photo & image editing tools
8. recognize characters & extract text from scanned images
9. create audio files and podcasts
10. create video tutorials and publishing
11. use office tools for documentation
12. build interactive presentations
13. build websites
14. create quizzes & analyze responses

Sri Krishnadevaraya University College of Engineering & Technology

	L	T	P	C
B.Tech – I Year 1st Sem (Computer Science & Engineering)	**0**	**0**	**3**	**1.5**

Applied Physics Lab
(Common to ECE, CSE & EEE Branches)

Course Objectives:

- Understands the concepts of interference and diffraction and their applications.
- Understand the role of optical fiber parameters in communication.
- Recognize the importance of energy gap in the study of conductivity and hall effect in a semiconductor.
- Apply the principles of semiconductors in various electronic devices.
- Understand the role of Optical fiber parameters in engineering applications.
- Recognize the significance of laser by studying its characteristics and its application in finding the particle size.

Note: - In the following list of experiments, out of 15 experiments any 12 experiments must be performed in a semester.

List of Physics Experiments:

1. Determination of wavelength of LASER light using diffraction grating.
   Experimental outcomes:
   operates various instrument
   estimate the wavelength of laser source
   Identifies the formation of grating spectrum due diffraction.
2. Determination of particle size using LASER.
   Experimental outcomes:
   operates various instrument
   estimate the Particles size using laser
   Identifies the application of laser
3. Determine the thickness of the wire using wedge shape method
   Experimental outcomes:
   operates optical instrument like travelling microscope.
   estimate the thickness of the wire using wedge shape method
   Identifies the formation of interference fringes due to reflected light
4. Determination of the radius of curvature of the lens by Newton's ring method
   Experimental outcomes:
   operates optical instrument like travelling microscope.
   estimate the radius of curvature of the lens
   Identifies the formation of interference fringes due to reflected light
   plots the square of the diameter of a ring with no. of rings
5. Dispersive power of a diffraction grating
   Experimental outcomes:
   operates optical instrument like spectrometer.
   estimate the wavelength of the given source
   Identifies the formation of grating spectrum due diffraction.
6. Resolving power of a grating
   Experimental outcomes:
   operates optical instrument like spectrometer.
7. Magnetic field along the axis of a circular coil carrying current.
   Experimental outcomes:
   Operates various instruments and connect them as per the circuit.
   estimate the magnetic field along the axis of a circular coil carrying current.
   plots the intensity of the magnetic field of circular coil carrying current with distance
8. Rigidity modulus of material of a wire-dynamic method (Torsional pendulum)
   Experimental outcomes:
   Operates various instruments.

estimate the rigidity modules of a given wire
plots length of the pendulum (l) with time period T2

9. To determine the numerical aperture of a given optical fiber and hence to find its acceptance angle
   Experimental outcomes:
   Operates various instruments and connect them as per the circuit.
   estimate the numerical aperture and acceptance angle of a given optical fiber.
   Identifies the significance of numerical aperture and acceptance angle of a optical fiber in various engineering applications.
10. To determine the energy gap of a semiconductor
    Experimental outcomes:
    operates various instruments and connect them as per the circuit.
    estimate the energy gap of a semiconductor.
    Illustrates the engineering applications of energy gap .
    plots **1/T** with log R
11. Determination of Hall voltage and Hall coefficient of a given semiconductor using Hall effect.
    Operates various instruments and connect them as per the circuit.
    estimate the charge carrier concentration and mobility in a semiconductor.
    Illustrates the applications of hall effect.
    Plots the voltage with current and voltage with magnetic field
12. Determination of Dielectric constant of dielectric material using charging and discharging of capacitor.
    Experimental outcomes:
    Operates various instruments and connect them as per the circuit.
    estimate the dielectric constant of the given substance.
    Identifies the significance of dielectric constant in various devices.
13. Determination of hysteresis loss by tracing B-H Curve of ferromagnetic material.
    Experimental outcomes:
    Operates various instruments and connect them as per the circuit.
    estimate the hysteresis loss, coercivity and retentivity of the ferromagnetic material
    classifies the soft and hard magnetic material based on B-H curve.
    plots the magnetic field H and flux density B
14. Determination of pressure variation using Strain Guage sensor.
    Experimental outcomes:
    Operates various instruments.
    estimate the pressure variation using strain guage sensor.
    Illustrates the applications of strain gauge sensors.
15. To determine the self inductance of the coil (L) using Anderson's bridge.
    Experimental outcomes:
    operates various instruments and connect them as per the circuit.
    estimate the self inductance of the coil using Anderson's bridge.
    Identifies the significance of self inductance of the coil in electric devices.

Course Outcomes:

The students will be able to

- **operate** optical instruments like microscope and spectrometer
- **determine** thickness of a hair/paper with the concept of interference
- **estimate** the wavelength of different colours using diffraction grating and resolving power
- **plot** the intensity of the magnetic field of circular coil carrying current with distance
- **evaluate** the acceptance angle of an optical fiber and numerical aperture
- **determine** magnetic susceptibility of the material and its losses by B-H curve
- **determine** the resistivity of the given semiconductor using four probe method

References Books:

1. S. Balasubramanian, M.N. Srinivasan "A Text book of Practical Physics"- S Chand Publishers, 2017.
1. http://vlab.amrita.edu/index.php -Virtual Labs, Amrita University

Sri Krishnadevaraya University College of Engineering & Technology

B.Tech – I Year 1st Sem (Computer Science & Engineering)	**L**	**T**	**P**	**C**
Problem Solving And Programming Lab	**0**	**0**	**3**	**1.5**

(Common to All Branches of Engineering)

Laboratory Experiments #

1. Assemble and disassemble parts of a Computer
2. Design a C program which reverses the number
3. Design a C program which finds the second maximum number among the given list of numbers.
4. Construct a program which finds the kth smallest number among the given list of numbers.
5. Design an algorithm and implement using C language the following exchanges
   a ⟵ b ⟵ c ⟵ d
6. Develop a C Program which counts the number of positive and negative numbers separately and also compute the sum of them.
7. Implement the C program which computes the sum of the first n terms of the series
   Sum = 1 – 3 + 5 -7 + 9
8. Design a C program which determines the numbers whose factorial values are between 5000 and 32565.
9. Design an algorithm and implement using a C program which finds the sum of the infinite series $1 - x^2/2! + x^4/4! - x^6/6! + ...$
10. Design a C program to print the sequence of numbers in which each number is the sum of the three most recent predecessors. Assume first three numbers as 0, 1, and 1.
11. Implement a C program which converts a hexadecimal, octal and binary number to decimal number and vice versa.
12. Develop an algorithm which computes the all the factors between 1 to 100 for a given number and implement it using C.
13. Construct an algorithm which computes the sum of the factorials of numbers between m and n.
14. Design a C program which reverses the elements of the array.
15. Given a list of n numbers, Design an algorithm which prints the number of stars equivalent to the value of the number. The starts for each number should be printed horizontally.
16. Implement the sorting algorithms
    a. Insertion sort b. Exchange sort c. Selection sort d. Partitioning sort.
17. Illustrate the use of auto, static, register and external variables.
18. Design algorithm and implement the operations creation, insertion, deletion, traversing on a singly linked list.
19. Develop a C program which takes two numbers as command line arguments and finds all the common factors of those two numbers.
20. Design a C program which sorts the strings using array of pointers.

#50% of experiments from above list must be completed. Instructors may add some experiments to the above list.

Moreover, 50% of the experiments are to be changed every academic year. Instructors can choose the experiments, provided those experiments are not repetitions.

References:

1. B. Govindarajulu, “IBM PC and Clones Hardware Trouble shooting and Maintenance”, Tata McGraw-Hill, 2nd edition, 2002.
2. R.G. Dromey, “How to Solve it by Computer”. 2014, Pearson.

Sri Krishnadevaraya University College of Engineering & Technology

B.Tech – I Year 1st Sem (Computer Science & Engineering)	**L**	**T**	**P**	**C**
Communicative English Lab - I	**0**	**0**	**2**	**1**

(Common to All Branches of Engineering)

Course Objectives

➢Students will be exposed to a variety of self instructional, learner friendly modes of language learning

➢Students will cultivate the habit of reading passages from the computer monitor. Thus providing them with the required facility to face computer based competitive exams like GRE, TOEFL, and GMAT etc.

➢Students will learn better pronunciation through stress, intonation and rhythm

➢Students will be trained to use language effectively to face interviews, group discussions, public speaking

➢Students will be initiated into greater use of the computer in resume preparation, report writing, format making etc

Unit 1

1. Phonetics for listening comprehension of various accents
2. Reading comprehension
3. Describing objects/places/persons

Learning Outcomes

At the end of the module, the learners will be able to

- understand different accents spoken by native speakers of English
- employ suitable strategies for skimming and scanning on monitor to get the general idea of a text and locate specific information
- learn different professional registers and specific vocabulary to describe different persons, places and objects

Unit 2

1. JAM
2. Small talks on general topics
3. Debates

Learning Outcomes

At the end of the module, the learners will be able to

- produce a structured talk extemporarily
- comprehend and produce short talks on general topics
- participate in debates and speak clearly on a specific topic using suitable discourse markers

Unit 3

1. Situational dialogues – Greeting and Introduction
2. Summarizing and Note making
3. Vocabulary Building

Learning Outcomes

At the end of the module, the learners will be able to

- Learn different ways of greeting and introducing oneself/others
- summarize the content with clarity and precision and take notes while listening to a talk/lecture and make use of them to answer questions
- replenish vocabulary with one word substitutes, homonyms, homophones, homographs to reduce errors in speech and writing

Unit4

1. Asking for Information and Giving Directions
2. Information Transfer
3. Non-verbal Communication – Dumb Charade

Learning Outcomes

At the end of the module, the learners will be able to

 Learn different ways of asking information and giving directions
 Able to transfer information effectively
 understand non-verbal features of communication

Unit 5

1. Oral Presentations
2. Précis Writing and Paraphrasing
3. Reading Comprehension and spotting errors

Learning Outcomes

At the end of the module, the learners will be able to

 make formal oral presentations using effective strategies
 learn different techniques of précis writing and paraphrasing strategies
 comprehend while reading different texts and edit short texts by correcting common errors

Course Outcomes

- CO1: Remember and understand the different aspects of the English language proficiency with emphasis on LSRW skills
- CO2: Apply communication skills through various language learning activities
- CO3: Analyze the English speech sounds, stress, rhythm, intonation and syllable division for better listening and speaking comprehension.
- CO4: Evaluate and exhibit acceptable etiquette essential in social and professional settings
- CO5: Create awareness on mother tongue influence and neutralize it in order to improve fluency in spoken English.

Sri Krishnadevaraya University College of Engineering & Technology

B.Tech – I Year 1st Sem (Computer Science & Engineering)	**L**	**T**	**P**	**C**
Constitution of India	**3**	**0**	**0**	**0**

Course Objectives:

- To Enable the student to understand the importance of constitution
- To understand the structure of executive, legislature and judiciary
- To understand philosophy of fundamental rights and duties
- To understand the autonomous nature of constitutional bodies like Supreme Court and high court controller and auditor general of india and election commission of india.
- To understand the central and state relation financial and administrative.

UNIT-I

Introduction to Indian Constitution: Constitution' meaning of the term, Indian Constitution - Sources and constitutional history, Features - Citizenship, Preamble, Fundamental Rights and Duties, Directive Principles of State Policy.

LEARNING OUTCOMES:
After completion of this unit student will

- Understand the concept of Indian constitution
- Apply the knowledge on directive principle of state policy
- Analyze the History, features of Indian constitution
- Evaluate Preamble Fundamental Rights and Duties

UNIT-II
Union Government and its Administration Structure of the Indian Union: Federalism, Centre- State relationship, President: Role, power and position, PM and Council of ministers, Cabinet and Central Secretariat, Lok Sabha, Rajya Sabha, The Supreme Court and High Court: Powers and Functions;

LEARNING OUTCOMES:- After completion of this unit student will

- Understand the structure of Indian government
- Differentiate between the state and central government
- Explain the role of President and Prime Minister
- Know the Structure of supreme court and High court

UNIT-III

State Government and its Administration Governor - Role and Position - CM and Council of ministers, State Secretariat: Organisation, Structure and Functions

LEARNING OUTCOMES:- After completion of this unit student will

- Understand the structure of state government
- Analyze the role Governor and Chief Minister
- Explain the role of state Secretariat
- Differentiate between structure and functions of state secrateriate

UNIT-IV

A.Local Administration - District's Administration Head - Role and Importance, Municipalities - Mayor and role of Elected Representative - CEO of Municipal Corporation PachayatiRaj: Functions PRI: Zila Panchayat, Elected officials and their roles, CEO Zila Panchayat: Block level Organizational Hierarchy - (Different departments), Village level - Role of Elected and Appointed officials - Importance of grass root democracy

LEARNING OUTCOMES:- After completion of this unit student will

- Understand the local Administration
- Compare and contrast district administration role and importance
- Analyze the role of Myer and elected representatives of Municipalities
- Evaluate Zilla panchayat block level organisation

UNIT-V

Election Commission: Election Commission- Role of Chief Election Commissioner and Election Commissionerate State Election Commission:, Functions of Commissions for the welfare of SC/ST/OBC and women

LEARNING OUTCOMES:- After completion of this unit student will

- Know the role of Election Commission apply knowledge
- Contrast and compare the role of Chief Election commissioner and Commissiononerate
- Analyze role of state election commission
- Evaluate various commissions of viz SC/ST/OBC and women

REFERENCES:

1. Durga Das Basu, Introduction to the Constitution of India, Prentice – Hall of India Pvt. Ltd.. New Delhi
2. Subash Kashyap, Indian Constitution, National Book Trust
3. J.A. Siwach, Dynamics of Indian Government & Politics
4. D.C. Gupta, Indian Government and Politics
5. H.M.Sreevai, Constitutional Law of India, 4th edition in 3 volumes (Universal Law Publication)
6. J.C. Johari, Indian Government and Politics Hans
7. J. Raj Indian Government and Politics
8. M.V. Pylee, Indian Constitution Durga Das Basu, Human Rights in Constitutional Law, Prentice – Hall of India Pvt. Ltd.. New Delhi
9. Noorani, A.G., (South Asia Human Rights Documentation Centre), Challenges to Civil Right), Challenges to Civil Rights Guarantees in India, Oxford University Press 2012

E-RESOURCES:

1. nptel.ac.in/courses/109104074/8
2. nptel.ac.in/courses/109104045/
3. nptel.ac.in/courses/101104065/
4. www.hss.iitb.ac.in/en/lecture-details
5. www.iitb.ac.in/en/event/2nd-lecture-institute-lecture-series-indian-constitution

Course Outcomes: At the end of the semester/course, the student will be able to have a clear knowledge on the following:

- Understand historical background of the constitution making and its importance for building a democratic India.
- Understand the functioning of three wings of the government ie., executive, legislative and judiciary.
- Understand the value of the fundamental rights and duties for becoming good citizen of India.
- Analyze the decentralization of power between central, state and local self-government.
- Apply the knowledge in strengthening of the constitutional institutions like CAG, Election Commission and UPSC for sustaining democracy.

1. Know the sources, features and principles of Indian Constitution.
2. Learn about Union Government, State government and its administration.
3. Get acquainted with Local administration and Pachayati Raj.
4. Be aware of basic concepts and developments of Human Rights.
5. Gain knowledge on roles and functioning of Election Commission

Sri Krishnadevaraya University College of Engineering & Technology					
Dept. of Computer Science and Engineering					
I Year 2nd Semester					
S.No	**Course No**	**Course Name**	**Category**	**L-T-P**	**Credits**
1		Probability and Statistics	BS	3-1-0	4
2		Engineering Chemistry	BS	2-1-0	3
3		Data Structures	ES	3-0-0	3
4		Basic Electrical & Electronics Engineering	ES	3-0-0	3
5		Engineering Graphics	ES	1-0-4	3
6		Engineering Workshop	LC	0-0-2	1
7		Engineering Chemistry Lab	BS	0-0-3	1.5
8		Data Structures Lab	ES	0-0-4	2
9		Basic Electrical & Electronics Engineering Lab	ES	0-0-3	1.5
10		Environmental Sciences	MC	3-0-0	0
				Total	**22**

Category	**CREDITS**
Basic Science course	8.5
Engineering Science Courses(Including LC)	13.5
TOTAL CREDITS	**18**

Sri Krishnadevaraya University College of Engineering & Technology

B.Tech – I Year 2nd Sem (Computer Science & Engineering)	**L**	**T**	**P**	**C**
Probability and Statistics	**3**	**1**	**0**	**4**

Course Objectives:

1) To familiarize the students with the foundations of probability and statistical methods

2) To impart probability concepts and statistical methods in various applications Engineering

Unit 1: Descriptive statistics and methods for data science

Data science, Statistics Introduction, Population vs Sample, Collection of data, primary and secondary data, Type of variable: dependent and independent Categorical and Continuous variables, Data visualization, Measures of Central tendency, Measures of Variability (spread or variance) Skewness Kurtosis, correlation, correlation coefficient, rank correlation, regression coefficients, principle of least squares, method of least squares, regression lines.

Learning Outcomes:

- summarize the basic concepts of data science and its importance in engineering
- analyze the data quantitatively or categorically , measure of averages, variability
- adopt correlation methods and principle of least squares, regression analysis

UNIT 2: Probability

Probability, probability axioms, addition law and multiplicative law of probability, conditional probability, Baye's theorem, random variables (discrete and continuous), probability density functions, properties, mathematical expectation.

Learning Outcomes:

- define the terms trial, events, sample space, probability, and laws of probability
- make use of probabilities of events in finite sample spaces from experiments
- apply Baye's theorem to real time problems
- explain the notion of random variable, distribution functions and expected value

UNIT 3: Probability distributions

Probability distribution - Binomial, Poisson approximation to the binomial distribution and normal distribution-their properties.

Learning Outcomes:

- apply Binomial and Poisson distributions for real data to compute probabilities, theoretical frequencies
- interpret the properties of normal distribution and its applications

Unit4: Estimation and Testing of hypothesis, large sample tests

Estimation-parameters, statistics, sampling distribution, point estimation, Formulation of null hypothesis, alternative hypothesis, the critical and acceptance regions, level of significance, two types of errors and power of the test. Large Sample Tests: Test for single proportion, difference of proportions, test for single mean and difference of means. Confidence interval for parameters in one sample and two sample problems

Learning Outcomes:

- explain the concept of estimation, interval estimation and confidence intervals
- apply the concept of hypothesis testing for large samples

Unit 5: Small sample tests

Student t-distribution (test for single mean, two means and paired t-test), testing of equality of variances (F-test), $\chi 2$ - test for goodness of fit, $\chi 2$ - test for independence of attributes.

Learning Outcomes:

- apply the concept of testing hypothesis for small samples to draw the inferences
- estimate the goodness of fit

Text Books:

1. Miller and Freunds, Probability and Statistics for Engineers,7/e, Pearson, 2008.

2. S.C. Gupta and V.K. Kapoor, Fundamentals of Mathematical Statistics, 11/e, Sultan Chand & Sons Publications, 2012.

Reference Books:

1. S. Ross, a First Course in Probability, Pearson Education India, 2002.

2. W. Feller, an Introduction to Probability Theory and its Applications, 1/e, Wiley, 1968.

Course Learning Outcomes:

Upon successful completion of this course, the student should be able to

- make use of the concepts of probability and their applications
- apply discrete and continuous probability distributions
- classify the concepts of data science and its importance
- interpret the association of characteristics and through correlation and regression tools

- design the components of a classical hypothesis test
- infer the statistical inferential methods based on small and large sampling tests

Sri Krishnadevaraya University College of Engineering & Technology

	L	T	P	C
B.Tech – I Year 2nd Sem (Computer Science & Engineering)	**2**	**1**	**0**	**3**

Engineering Chemistry

(**Common CSE,ECE and EEE Branches**)

Course Objectives

- To familiarize engineering chemistry and its applications
- To train the students on the principle and applications of electrochemistry, polymers chemistry
- To introduce instrumental methods and advanced engineering materials

Unit 1 : Structure and Bonding Models:

Schrodinger wave equation (Eigen-value and Eigen-function). **Crystal field theory:** Crystal field theory and the energy level diagrams for transition metal ions,Salient features –splitting in octahedral and tetrahedral geometry**,** magnetic properties and colours.

Learning Outcomes:

- Apply : Schrodinger wave equation Eigen values and Eigen function
- Illustrate: Crystal field theory and energy level diagrams
- Discuss: The magnetic behavior and colour of complexes
- Explain: The Splitting of octahedral and tetrahedral geometry

Unit 2 : Polymer Chemistry

Polymers: Basic concepts of polymerization, types of polymerization addition and condensation polymerization. **Plastomers:** thermosetting and theromoplastics composition properties and engineering applications of PVC, teflon, bakelite and nylons. **Rubber:** rubber-processing of natural rubber and Vulcanisation of rubber, compounds of rubber, elastomers-buna **S**, buna **N** preparation, properties and its applications. **Conducting polymers:** Polyacetylene, polythiphene, polyphenylene and poly aniline, classifications of conducting polymers.Synthesis mechanism of conducting polymers and its applications

Learning Out comes:

- Explain: Different types of polymers and their applications
- Compare: Elastomers Buna-S and Buna-N
- Explain: Conducting polymers polyacetylene, polyaniline and polythiophene
- Discuss: Synthesis mechanism of conducting polymers.

Unit 3: Electrochemistry and Applications

Electrochemical cells: galvanic cells, types of electrodes (standard hydrogen, calomel and quinhydrone), EMF of cells. **Batteries:** Nickel-cadmium, lithium ion batteries advantages, disadvantages and its applications. **Fuel cells:** Hydrogen-oxygen and methane-oxygen fuel cells advantages, disadvantages and its applications

Learning Outcomes:

- Apply: Nernst equation for calculating electrode and cell potentials
- Apply: Pilling Bed worth rule for corrosion and corrosion prevention
- Demonstrate: The corrosion prevention methods and factors affecting corrosion
- Compare: Different batteries and their applications

Unit 4: Advanced Engineering Materials

Building materials: Portland cement composition, classification, preparation (dry and wet processes).Constituents, phases and reactivity of clinker, Setting and hardening of cement. **Refractories:** Definition,criteries of refractories, Classification, properties, Factors affecting the refractory materials and applications. Failures of refractories.

Learning Outcomes:

- Identify: The factory affecting the refractory material
- Identify: The constituents of Portland cement
- Enumerate: The reactions at setting and hardening of the cement
- Compare: Dry and wet processes of Portland cement

Unit 5: Instrumental methods and Applications

Electromagnetic spectrum and absorption of radiations. The absorption laws: Beer-Lambert's law. Ultraviolet and Visible Spectroscopy, Infrared Spectroscopy. Principle, instrumentation and applications of pH metry.

Learning Outcomes:

- Explain: The different types of spectral series in electromagnetic spectrum
- Outline: The different applications of analytical instruments
- Discuss: Difference between the UV-Visible and IR spectroscopy
- Understanding: To identify acid-base buffer pH meter

Text books:

1.A text book of engineering chemistry., Jain and Jain, Dhanpat Rai Publishing Company., 15th edition, New Delhi,**2008**.

2. Chemistry of engineering., Prof. K.N. Jayaveera, Dr. G.V. Subba Reddy and Dr. C. Ramachandraiah. McGraw hill higher education. Hyderabad, **2009.**

3. Peter Atkins, Julio de Paula and James Keeler, Atkin's Physical Chemistry, 10/e, Oxford University Press, 2010.

Reference books:

1.J.D Lee, Concise Inorganic Chemistry,5/e, OxfordUniversity Press,2008.

2.Skoog and West, Principles of instrumental Ananlysis, 6/e, Thomson,2007.

3.H.F.W. Taylor, Cement Chemistry, 2/e, Thomas Telford Publications, 1997.

4.Engineering chemistry K.B Chandra Sekhar et.al, SciTech Publications.

Course Out comes

- Demonstrate: The materials of construction for battery and electrochemical series
- Explain: The preparation, properties, and applications of thermosetting and thermoplastics
- Explain: The constituents of Portland cement and factory affecting the refractory material
- Explain: Difference between the UV-Visible and IR spectroscopy
- Discuss: The setting and hardening of cement and concrete phase

Useful Links

Subjects	Web Sites
Organic Chemistry Help	http://www.chemhelper.com
Model ChemLab	http://modelscience.com/products.html?source=google
Virtual Library	http://www.liv.ac.uk/Chemistry/Links/links.html
The World Wide Club for the chemical community	http://www.chemweb.com/
International Chemistry Departments	http://www.liv.ac.uk/Chemistry/Links/international.html
Chemistry Software for Chemists	http://www.chemistry-software.com/
Guide to academic and research jobs in Europe	http://www.academicjobseu.com/
Guide to PhD studentships and chemical sciences	http://www.findaphd.com/firstmain.asp
Guide to postdoctoral positions	http://www.findapostdoc.com/firstmain.asp
Wiley InterScience	http://www.interscience.wiley.com/cgi-bin/home
Bath University Library Catalogue	http://www.bath.ac.uk/library/webcat

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B.Tech – I Year 2nd Sem (Computer Science & Engineering)	**L**	**T**	**P**	**C**
Data Structures	**3**	**0**	**0**	**3**

(Common to All Branches of Engineering)

Course Objectives:

1. To teach the representation of solution to the problem using algorithm
2. To explain the approach to algorithm analysis
3. To introduce different data structures for solving the problems
4. To demonstrate modelling of the given problem as a graph
5. To elucidate the existing hashing techniques

Unit – I: Introduction Algorithm Specification, Performance analysis, Performance Measurement. Arrays: Arrays, Dynamically Allocated Arrays. Structures and Unions. Sorting: Motivation, Quick sort, How fast can we sort, Merge sort, Heap sort

Learning Outcomes:

Student should be able to

1. Analyze the given algorithm to find the time and space complexities.
2. Select appropriate sorting algorithm
3. Design a sorting algorithm

Unit – II: Stack, Queue and Linked lists Stacks, Stacks using Dynamic Arrays, Queues, Circular Queues Using Dynamic Arrays, Evaluation of Expressions, Multiple Stacks and Queues. Linked lists: Singly Linked Lists and Chains, Representing Chains in C, Linked Stacks and Queues, Additional List Operations, Doubly Linked Lists.

Learning outcomes:

Student should be able to

1. Evaluate expressions
2. Develop the applications using stacks and queues
3. Construct the linked lists for various applications

Unit – III:Trees Introduction, Binary Trees, Binary Tree Traversals, Additional Binary Tree Operations, Binary Search Trees, Counting Binary Trees, Optimal Binary search Trees, AVL Trees. B-Trees: BTrees, B + Trees

Learning outcomes

1. Explain the concept of a tree
2. Compare different tree structures
3. Apply trees for indexing

Unit – IV : Graphs and Hashing The Graph Abstract Data Type, Elementary Graph Operations, Minimum Cost Spanning Trees, Shortest Paths and Transitive Closure Hashing: Introduction to Hash Table, Static Hashing, Dynamic Hashing.

Learning outcomes:

Student should be able to

1. Recognize the importance of Graphs in solving real world problems
2. Apply various graph traversal methods to applications
3. Design a minimum cost solution for a problem using spanning trees
4. Select the appropriate hashing technique for a given application
5. Design a hashing technique

Unit – V: Files and Advanced sorting File Organization: Sequential File Organization, Direct File Organization, Indexed Sequential File Organization. Advanced sorting: Sorting on Several keys, List and Table sorts, Summary of Internal sorting, External sorting.

Learning outcomes: Student should be able to

1. Organize data in the form of Files
2. Apply sorting on large amount of data

Text Books:

1. Ellis Horowitz and Sartaj Sahni, “Fundamentals of Data Structures in C”, 2nd Edition, Galgotia Book Source, Pvt. Ltd., 2004.

2. Alan L. Tharp, “File Organization and Processing”, Wiley and Sons, 1988.

Reference Books:

1. D. Samanta, “Classic Data Structures”, 2nd Edition, Prentice-Hall of India, Pvt. Ltd., India, 2012. 3. Peter Bras, “Advanced Data Structures”, Cambridge University Press, 2016
2. Richard F.Gilberg, Behrouz A.Forouzan, “Data Structures A Pseudo code Approach with C”, Second Edition, Cengage Learning 2005.

Course Outcomes:

Students should be able to

1. Select Appropriate Data Structure for solving a real world problem
2. Select appropriate file organization technique depending on the processing to be done
3. Construct Indexes for Databases
4. Analyse the Algorithms
5. Develop Algorithm for Sorting large files of data

Sri Krishnadevaraya University College of Engineering & Technology

B.Tech – I Year 2nd Sem (Computer Science & Engineering)	**L**	**T**	**P**	**C**
Basic Electrical & Electronics Engineering	**3**	**0**	**0**	**3**

Course Objectives:

1. To introduce basics of electric circuits.
2. To teach DC and AC electrical circuit analysis.
3. To explain working principles of transformers and electrical machines.
4. To impart knowledge on low voltage electrical installations
5. To provide comprehensive idea about working principle, operation and applications of PN junction & zener diodes, BJT, FET, MOSFET and operational amplifier
6. To introduce fundamentals of digital electronics
7. To educate on principles of various communication systems
8. To teach efficacy of electronic principles which are pervasive in engineering applications

Unit 1 DC & AC Circuits:

Electrical circuit elements (R - L and C) - Kirchhoff laws - Series and parallel connection of resistances with DC excitation. Superposition Theorem - Representation of sinusoidal waveforms - peak and rms values - phasor representation - real power - reactive power - apparent power - power factor - Analysis of single-phase ac circuits consisting of RL - RC - RLC series circuits.

Unit Outcomes: Able to

- Recall Kirchoff laws
- Analyze simple electric circuits with DC excitation
- Apply network theorems to simple circuits
- Analyze single phase AC circuits consisting of series RL - RC - RLC combinations

Unit 2 DC & AC Machines:

Principle and operation of DC Generator - EMF equations - OCC characteristics of DC generator – principle and operation of DC Motor – Performance Characteristics of DC Motor - Speed control of DC Motor – Principle and operation of Single Phase Transformer - OC and SC test on transformer - principle and operation of Induction Motor [Elementary treatment only]

Unit Outcomes: Able to

- Explain principle and operation of DC Generator & Motor.
- Perform speed control of DC Motor
- Explain operation of transformer and induction motor.
- Explain construction & working of induction motor - DC motor

Unit 3 Basics of Power Systems:

Layout & operation of Hydro, Thermal, Nuclear Stations - Solar & wind generating stations – Typical AC Power Supply scheme – Elements of Transmission line – Types of Distribution systems: Primary & Secondary distribution systems.

Unit Outcomes: Able to

- Understand working operation of various generating stations
- Explain the types of Distribution systems

Unit 4 Analog Electronics

Overview of Semiconductors, PN junction diode, Zener diode, Applications of diode as switch and rectifier, Zener diode as regulator, special purpose diodes: schottky diode, tunnel diode, varactor diode, photodiode, phototransistor and LED.

BJT construction, operation, configuration and characteristics, JFET and MOSFET construction, operation, characteristics (CS configuration), applications
Operational Amplifiers: Introduction, block diagram, basic op-amp circuits: Inverting, Non Inverting, summer, subtractor, voltage follower.

Unit Outcomes:

- Describe operation and characteristics of diodes and transistors
- Make use of diodes and transistors in simple, typical circuit applications
- Understand operation of basic op-amp circuits

Unit 5 Digital Electronics

Introduction, Switching and Logic Levels, Digital Waveform, characteristics of digital ICs, logic gates, number systems, combinational circuits - adders, multiplexers, decoders; introduction to sequential circuits, flip flops, shift register, binary counter.

Unit Outcomes:

- Explain different logic gates using truth table
- Distinguish combinational and sequential circuits
- Analyze various combinational circuits such as adders, multiplexers and decoders
- Understand functionality of flip-flops, shift registers and counters

Course Outcomes:

- Apply concepts of KVL/KCL in solving DC circuits
- Choose correct rating of a transformer for a specific application
- Illustrate working principles of induction motor - DC Motor
- Identify type of electrical machine based on their operation.
- Describe working principles of protection devices used in electrical circuits.
- Describe operation and characteristics of diodes and transistors and basic opamps
- Analyze various combinational circuits and sequential circuits.

Text Books:

1. D. P. Kothari and I. J. Nagrath - "Basic Electrical Engineering" - Tata McGraw Hill - 2010.
2. V.K. Mehta & Rohit Mehta, "Principles of Power System" – S.Chand – 2018
3. D.P. Kothari, I.J.Nagrath, Basic Electronics, 2nd edition, McGraw Hill Education(India)Private Limited
4. S.K. Bhattacharya, Basic Electrical and Electronics Engineering, 2nd edition, Pearson India Private Limited.

Reference Books:

1. R. Muthusubramanian, S. Salivahanan, "Basic Electrical and Electronics Engineering", Tata McGraw-Hill Education, Reprint 2012.
2. David Bell, Electronic Devices and Circuits: Oxford University Press, 5th EDn., 2008.
3. L. S. Bobrow - "Fundamentals of Electrical Engineering" - Oxford University Press - 2011.
4. E. Hughes - "Electrical and Electronics Technology" - Pearson - 2010.
5. C.L. Wadhwa – "Generation Distribution and Utilization of Electrical Energy", 3rd Edition, New Age International Publications.

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B.Tech – I Year 2nd Sem (Computer Science & Engineering)	**L**	**T**	**P**	**C**
Engineering Graphics	**1**	**0**	**4**	**3**

(Common to All Branches of Engineering)

Course Objectives:

- Bring awareness that Engineering Drawing is the Language of Engineers.
- Familiarize how industry communicates technical information.
- Teach the practices for accuracy and clarity in presenting the technical information.
- Develop the engineering imagination essential for successful design.
- Instruct the utility of drafting & modeling packages in orthographic and isometric drawings.
- Train the usage of 2D and 3D modeling.
- Instruct graphical representation of machine components.

UNIT-1

Introduction to Engineering graphics: Principles of Engineering Graphics and their significance-Conventions in drawing-lettering - BIS conventions.a) Conic sections including the rectangular hyperbola- general method only, b) Cycloid, epicycloids and hypocycloid - Normal and Tangent. c) Involutes –Normal and Tangent.

UNIT-II

Projection of points, lines: Projection of points in any quadrant, lines inclined to one or both planes, finding true lengths, angle made by lines.

UNIT-III

Projections of regular planes: inclined to one plane and both planes by rotational method.

Projections of solids: Projections of regular solids inclined to one plane by rotational or Auxiliary views method. – Prism, Cylinder, Pyramid, Cone.

UNIT-IV

Sections of solids: Section planes and sectional view of right regular solids- prism, cylinder, Pyramid and cone. True shapes of the sections.

Development of surfaces: Development of surfaces of right regular solids-prism, cylinder, Pyramid, cone and their sectional parts.

Computer Aided Drafting:

Introduction to AutoCAD: Basic drawing and editing commands: line, circle, rectangle, erase, view, undo, redo, snap, object editing, moving, copying, rotating, scaling, mirroring, layers,
Templates, polylines, trimming, extending, stretching, fillets, arrays, dimensions.

UNIT-V

Orthographic Projections: Systems of projections, conventions and application to orthographic projections.

Isometric Projections: Principles of isometric projection- Isometric scale;
Isometric views: lines, planes, simple solids.

Text Books:

1. K.L.Narayana & P.Kannaiah, Engineering Drawing, 3/e, Scitech Publishers, Chennai, 2012.
2. Venugopal, Engineering Drawing and Graphics, 3/e, New Age Publishers, 2000

Reference Books:

1. Dhanajay A Jolhe, Engineering Drawing, Tata McGraw-Hill, Copy Right, 2009
2. N.D.Bhatt, Engineering Drawing, 53/e, Charotar Publishers, 2016.
3. Shah and Rana, Engineering Drawing, 2/e, Pearson Education, 2009
4. K.C.John, Engineering Graphics, 2/e, PHI, 2013
5. Basant Agarwal & C.M.Agarwal, Engineering Drawing, Tata McGraw-Hill, Copy Right, 2008.

Course Outcomes:

After completing the course, the student will be able to

- draw various curves applied in engineering. (L2)
- show projections of solids and sections graphically. (L2)
- draw the development of surfaces of solids. (L3)
- use computers as a drafting tool. (L2)
- draw isometric and orthographic drawings using CAD packages. (L3)

Note:

1. Manual (part A) and Computer Aided Drafting (part B) classes can be held in alternative weeks for optimal utilization of computer facilities.
2. External examinations to be conducted both manual and computer mode with equal weight of marks.

Additional Sources

1. Youtube: http-sewor,Carleton.cag,kardos/88403/drawings.html conic sections-online, red woods.edu

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B.Tech – I Year 2nd Sem (Computer Science & Engineering)	**L**	**T**	**P**	**C**
Engineering Workshop	**0**	**1**	**2**	**1**

Course Objective:

To familiarize students with wood working, sheet metal operations, fitting and electrical house wiring skills

Wood Working:

Familiarity with different types of woods and tools used in wood working and make following joints

a) Half – Lap joint
b) Mortise and Tenon joint
c) Corner Dovetail joint or Bridle joint

Sheet Metal Working:

Familiarity with different types of tools used in sheet metal working, Developments of following sheet metal job from GI sheets

a) Tapered tray b) Conical funnel c) Elbow pipe d) Brazing

Fitting:

Familiarity with different types of tools used in fitting and do the following fitting exercises

a) V-fit b) Dovetail fit c) Semi-circular fit d) Bicycle tire puncture and change of two wheeler tyre

Electrical Wiring:

Familiarities with different types of basic electrical circuits and make the following connections

a) Parallel and series b) Two way switch c) Godown lighting d) Tube light
e) Three phase motor f) Soldering of wires

Course Outcomes:

After completion of this lab the student will be able to

1. apply wood working skills in real world applications.
2. build different parts with metal sheets in real world applications.
3. apply fitting operations in various applications.
4. apply different types of basic electric circuit connections.
5. demonstrate soldering and brazing.

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B.Tech – I Year 2nd Sem (Computer Science & Engineering)

L	T	P	C
0	0	3	1.5

Engineering Chemistry Lab
(**Common CSE,ECE and EEE Branches**)

Course Objectives

- Verify the fundamental concepts with experiments

List of Experiments:

Chemical methods: Volumetric analysis

1. Estimation of Ferrous (Fe^{2+}) Ion using Standard Potassium Dichromate

Iodometry Titrations:

2.Estimation of Copper (Cu^{2+}) Ion using Standard Potassium Dichromate

(i) Part-I : Standardization of sodium thiosulphate ($Na_2S_2O_3$) solution with standard $K_2Cr_2O_7$

(ii) Part-II: Estimation of Copper

Complexometry Titrations:

3.Estimation of Calcium hardness of water using Standard EDTA solution

4.Estimation of Copper by using Standard EDTA solution

5.Dissolved Oxygen: To test the amount of dissolved oxygen present in the given water sample.

Physical methods: Instrumental Analysis

6. pH metric titration of (i) strong acid vs strong base, (ii) weak acid vs strong base

7. Determination of cell constant and conductance of solutions

8. Determination of colorimetric titration with $KMnO_4$ solution

9. Identification of simple organic compounds by UV, IR and NMR

10. Viscosity determination of Kerosin and Petrol by Red-wood viscometer

Course Out comes

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

- Determination: Hardness of water by using EDTA
- Estimation: Amount of dissolved oxygen given water sample
- Analysis: Difference between the UV-Visible and IR spectroscopy
- Explain: Identification of the UV-Visible and IR spectrum
- Identify: Acid -base buffer solution pH meter

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B.Tech – I Year 2nd Sem	**(Computer Science & Engineering)**	**L**	**T**	**P**	**C**
	Data Structures Lab	**0**	**0**	**3**	**1.5**

Course Objectives:

1. To introduce to the different data structures
2. To elucidate how the data structure selection influences the algorithm complexity
3. To explain the different operations that can be performed on different data structures
4. To introduce to the different search and sorting algorithms.

Laboratory Experiments

1. String operations using array of pointers
2. Searching Algorithms (With the Number of Key Comparisons) Sequential, Binary and Fibonacci Search Algorithms.
3. Sorting Algorithms: Insertion Sort, Selection Sort, Shell Sort, Bubble Sort, Quick Sort, Heap Sort, Merge Sort, and Radix Sort. Using the system clock, compute the time taken for sorting of elements. The time for other operations like I/O etc should not be considered while computing time.
4. Implementation of Singly Linked List, Doubly Linked List, Circular Linked List
5. Stack implementation using arrays
6. Stack implementation using linked lists
7. Queue implementation using arrays. Implement different forms of queue. While implementing you should be able to store elements equal to the size of the queue. No positions should be left blank.
8. Queue implementation using linked lists
9. Creation of binary search tree, performing operations insertion, deletion, and traversal.
10. Breadth first search
11. Depth first search
12. Travelling sales man problem
13. File operations
14. Indexing of a file
15. Reversing the links (not just displaying) of a linked list.
16. Consider a linked list consisting of name of a person and gender as a node. Arrange the linked list using 'Ladies first' principle. You may create new linked lists if necessary.
17. An expression can be represented in three ways: infix, prefix and postfix. All the forms are necessary in different contexts. Write modules to convert from one form to another form.
18. A table can be defined as a collection of rows and columns. Each row and column may have a label. Different values are stored in the cells of the table. The values can be of different data types. Numerical operations like summation, average etc can be performed on rows/columns which contain numerical data. Such operations are to be prevented on data which is not numeric. User may like to insert row/columns in the already existing table. User may like to remove row/column. Create table datatype and support different operations on it.

Course Outcomes:

At the end of the course students should be able to

1. Select the data structure appropriate for solving the problem
2. Implement searching and sorting algorithms
3. Design new data types
4. Illustrate the working of stack and queue
5. Organize the data in the form of files

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B.Tech – I Year 2nd Sem (Computer Science & Engineering)	**L**	**T**	**P**	**C**
Basic Electrical & Electronics Engineering Lab	**0**	**0**	**3**	**1.5**

Electrical Engineering Lab

Course Objectives:

1. To Verify Kirchoff's laws
2. To verify Superposition theorem.
3. To learn performance characteristics of DC Machines.
4. To perform open circuit & Short Circuit test on 1- Phase Transformer.
5. To Study the I – V Characteristics of Solar PV Cell

List of experiments: -

1. Verification of Kirchhoff laws.
2. Verification of Superposition Theorem.
3. Open circuit characteristics of a DC Shunt Generator.
4. Speed control of DC Shunt Motor.
5. OC & SC test of 1 – Phase Transformer.
6. Brake test on 3 - Phase Induction Motor.
7. I – V Characteristics of Solar PV cell
8. Brake test on DC Shunt Motor.

Course Outcomes: Able to

1. Verify Kirchoff's Laws & Superposition theorem.
2. Perform testing on AC and DC Machines.
3. Study I – V Characteristics of PV Cell

Electronics Engineering Lab

Course outcomes:

- Describe construction, working and characteristics of diodes, transistors and operational amplifiers
- Demonstrate how electronic devices are used for applications such as rectification, switching and amplification
- Build different building blocks in digital electronics using logic gates
- Explain functionality of flip-flops, shift registers and counters for data processing applications

List of Experiments:

1. Draw and study the characteristics of Semi-conductor diode and Zener Diode
2. Draw and study the input and output characteristics of Transistor in Common Emitter configuration
3. Draw and study the static and transfer characteristics of FET in Common Source Configuration
4. Construct half wave and full wave rectifier circuits. Find ripple factor and plot their output waveforms with and without filters
5. Study the application of Op-amp as an Inverting amplifier, Non-inverting amplifier, Voltage follower, Summer and Subtractor
6. Realization of logic gates, AND, OR, NOT, NAND, NOR, XOR

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B.Tech – I Year 2nd Sem (Computer Science & Engineering)	**L**	**T**	**P**	**C**
Environmental Science	**3**	**0**	**0**	**0**

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:

LEARNING OUTCOMES
Students will be able to

1. articulate the basic structure, functions, and processes of key social systems affecting the environment.
2. explain how water resources should be used.
3. articulate basic understanding of effects of modern agriculture on environment.
4. explain how various paradigms or world views and their implicit and explicit assumptions and values shape the viewer's perception of environmental problems and solutions.

UNIT – II: Ecosystems, Biodiversity, and its Conservation

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 : 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.

LEARNING OUTCOMES

Students will be able to

1. get a clear picture of structure and functions of ecosystems.
2. explain why renewable and non-renewable energy resources are important.
3. get awareness about land degradation, soil erosion & desertification.
4. gain a rigorous foundation in various scientific disciplines as they apply to environmental science, such as ecology, evolutionary biology, hydrology, and human behavior.

UNIT – III: Environmental Pollution and Solid Waste Management

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.

LEARNING OUTCOMES UNIT-3

Students will be able to

1. demonstrate knowledge and understanding of theories in the field of Biodiversity and Systematics in the broad sense.
2. conduct basic conservation biology research.
3. explain endangered and endemic species of India.
4. identify the threats to biodiversity.

UNIT – IV: Social Issues and the Environment

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.

LEARNING OUTCOMES:

Students will be able to

1. understand Cause, effects and control measures of air pollution.
2. understand soil, noise & water pollution.
3. explain the enforcement of Environmental legislation
4. understand solid waste management.

UNIT – V: Human Population and the Environment

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..

LEARNING OUTCOMES

Students will have

1. knowledge about watershed management and environmental ethics.
2. explain the reasons for global warming
3. explain principles and impact of disasters on environment.
4. explain disaster management cycle in India.

TEXT BOOKS :

1. Text book of Environmental Studies for Undergraduate Courses by Erach Bharucha for University Grants Commission, Universities Press.
2. Environmental Studies by Palaniswamy – Pearson education
3. Environmental Studies by Dr.S.Azeem Unnisa, Academic Publishing Company

REFERENCES :

1. Textbook of Environmental Science by Deeksha Dave and E.Sai Baba Reddy, Cengage Publications.
2. Text book of Environmental Sciences and Technology by M.Anji Reddy, BS Publication.
3. Comprehensive Environmental studies by J.P.Sharma, Laxmi publications.
4. Environmental sciences and engineering – J. Glynn Henry and Gary W. Heinke – Prentice hall of India Private limited.
5. A Text Book of Environmental Studies by G.R.Chatwal, Himalaya Publishing House
6. Introduction to Environmental engineering and science by Gilbert M. Masters and Wendell P. Ela - Prentice hall of India Private limited.

Sri Krishnadevaraya University College of Engineering & Technology					
Dept. of Computer Science and Engineering					
II Year 1st Semester					
S.No	**Course No**	**Course Name**	**Category**	**L-T-P**	**Credits**
1.		Mathematical Foundation of Computer Science	BS	3-0-0	3
2.		Database Management Systems	PC	3-0-0	3
3.		Python Programming	ES	3-0-0	3
4.		Design and Analysis of Algorithms	PC	3-0-0	3
5.		Object Oriented Programming Through Java	PC	2-0-0	2
6.		Digital Logic Design	PC	3-0-0	3
7.		Python Programming Lab	ES	0-0-3	1.5
8.		Database Management Systems Lab	PC	0-0-3	1.5
		Object Oriented Programming Through Java Lab	PC	0-0-3	1.5
9.		Essence of Indian Traditional Knowledge	MC	3-0-0	0
				Total	**21.5**

Category	**CREDITS**
Basic Science course	3
Professional core Courses	14
Engineering Science Courses	4.5
TOTAL CREDITS	**21.5**

Sri Krishnadevaraya University College of Engineering & Technology

B.Tech – II Year 1st Sem (Computer Science & Engineering)

L	T	P	C
3	0	0	3

Mathematical Foundations of Computer Science

Course Objectives

- To explain about the Boolean Algebra, Graph theory and Recurrence relations.
- To demonstrate the application of basic methods of discrete mathematics in Computer Science problem solving.
- To elucidate solving mathematical problems from algorithmic perspective.
- To introduce the mathematical concepts which will be useful to study advanced courses Design and Analysis of Algorithms, Theory of Computation, Cryptography and Software Engineering etc.
- To reveal how solutions of graph theory can be applied to computer science problems

UNIT- I

Statements and Notation, **Connectives**- Negation, Conjunction, Disjunction, Conditional and Bi-conditional, Statement formulas and Truth Tables. Well-formed formulas, Tautologies, Equivalence of Formulas, Duality Law, Tautological Implications.

Normal Forms: Disjunctive Normal Forms, Conjunctive Normal Forms, Principal Disjunctive Normal Forms (PDNF), Principal Conjunctive Normal Forms (PCNF), Ordering and Uniqueness of Normal Forms.

The Theory of Inference for the Statement Calculus: Rules of Inference, Consistency of Premises and Indirect Method of Proof.

The predicate Calculus, **Inference theory of the Predicate Calculus**.

Unit Outcomes:

- Describe logical sentences in terms of predicates, quantifiers, and logical connectives (L1) Evaluate basic logic statements using truth tables and the properties of logic (L5).
- Apply rules of inference to test the consistency of premises and validity of arguments (L3).
- Verify the equivalence of two formulas and their duals (L4).
- Find the Principal Conjunctive and Principal Disjunctive Normal Forms of a statement formula (L1).

UNIT-II

Set Theory: Basic concepts of Set Theory, Representation of Discrete structures, Relations and Ordering, Functions, Recursion.

Lattices and Boolean algebra: Lattices as Partially Ordered Sets, Boolean algebra, Boolean Functions, Representation and Minimization of Boolean Functions.

Algebraic Structures: Algebraic Systems: Examples and General Properties, Semi Groups and Monoids, Groups.

Unit Outcomes:

- Describe equivalence, partial order and compatible relations (L1).
- Compute Maximal Compatibility Blocks (L3).
- Identify the properties of Lattices (L2).
- Evaluate Boolean functions and simplify expression using the properties of Boolean algebra (L5).
- Infer Homomorphism and Isomorphism (L4).
- Describe the properties of Semi groups, Monoids and Groups (L1).

UNIT-III

Elementary Combinatorics: Basics of Counting, Combinations and Permutations, Enumeration of

Combinations and Permutations, Enumerating Combinations and Permutations with repetitions, Enumerating Permutations and Combinations with constrained Representations, Binomial Coefficients, The Binomial and Multinomial Theorems, The Principle of Inclusion and Exclusion.

Unit Outcomes:

- Explain fundamental principle of counting (L2).
- Examine the relation between permutation and combination (L4).
- Solve counting problems by applying elementary counting techniques using the product and sum rules (L3).
- Apply permutations, combinations, the pigeon-hole principle, and binomial expansion to solve counting problems (L3).

UNIT-IV:

Recurrence Relations: Generating Functions of Sequences, Calculating Coefficients of Generating Functions, Recurrence Relations, Solving Recurrence Relations by Substitution and Generating Functions, The method of Characteristic Roots, Solution of Inhomogeneous Recurrence Relations.

Unit Outcomes:

- Find the generating functions for a sequence (L1).
- Design recurrence relations using the divide-and-conquer algorithm (L6).
- Solve linear recurrence relations using method of Characteristic Roots (L3).
- Outline the general solution of homogeneous or Inhomogeneous Recurrence Relations using substitution and method of generating functions (L2).
- Solve problems using recurrence relations and recursion to analyze complexity of algorithms (L3).

UNIT-V:

Graphs: Basic Concepts, Isomorphism and Sub graphs, Trees and their Properties, Spanning Trees,

Directed Trees, Binary Trees, Planar Graphs, Euler's Formula, Multi graphs and Euler Circuits, Hamiltonian Graphs, Chromatics Number, The Four-Color Problem **Unit Outcomes:**

- Investigate if a given graph is simple or a multi graph, directed or undirected, cyclic or acyclic(L4).
- Describe complete graph and complete bipartite graphs (L1).
- Identify Euler Graphs, Hamilton Graph and Chromatic Number of a graph (L2).
- Apply the concepts of functions to identify the Isomorphic Graphs (L3).
- Apply depth-first and breadth-first search (L3).
- Apply Prim's and Kruskal's algorithms to find a minimum spanning tree (L3).

Course Outcomes:

After completion of this course the student would be able to

- Evaluate elementary mathematical arguments and identify fallacious reasoning (L5).
- Understand the properties of Compatibility, Equivalence and Partial Ordering relations, Lattices and has see Diagrams (L1).
- Understand the general properties of Algebric Systems, Semi Groups, Monoids and Groups (L1).
- Design solutions for problems using breadth first and depth first search techniques (L6) Solve the homogeneous and non-homogeneous recurrence relations (L3).
- Apply the concepts of functions to identify the Isomorphic Graphs (L2).
- Identify Euler Graphs, Hamilton Graph and Chromatic Number of a graph (L2).

Text Books:

1. Joe L. Mott. Abraham Kandel and Theodore P. Baker, "Discrete Mathematics for Computer Scientists & Mathematicians", 2nd Edition, Pearson, 2008. (for Units III toV).

2. J P Trembly and R Manohar, “Discrete Mathematical Structures with Applications to Computer Science”, 1st Edition, McGraw Hill, 2017(For Unit I&II).

Reference Books:

1. Ralph P. Grimaldi and B.V. Ramana, “Discrete and Combinatorial Mathematics, an Applied Introduction”, 5th Edition, Pearson, 2016.

2. NarsinghDeo, “Graph Theory with Applications to Engineering”, Prentice Hall,1979.

3. D.S. Malik and M.K. Sen, “Discrete Mathematics theory and Applications”, IstEdition, Cenegage Learning, 2012.

4. C L Liu and D P Mohapatra, “Elements of Discrete Mathematics, A computer Oriented approach”, 4th edition, MCGRAW-HILL, 2018.

Sri Krishnadevaraya University College of Engineering & Technology

B.Tech – II Year 1st Sem (Computer Science & Engineering)

L	T	P	C
3	0	0	3

Database Management Systems

Course Objectives

This course is designed to:

- Train in the fundamental concepts of database management systems, database modeling and design, SQL, PL/SQL and system implementation techniques. Enable students to model ER diagram for any customized application, inducting appropriate strategies for optimization of queries.
- Provide knowledge on concurrency techniques
- Demonstrate the organization of Databases

UNIT-I: Introduction: Database systems applications, Purpose of Database Systems, view of Data,

Database Languages, Relational Databases, Database Design, Data Storage and Querying,

Transaction Management, Database Architecture, Data Mining and Information Retrieval, Specialty Databases, Database users and Administrators,

Introduction to Relational Model: Structure of Relational Databases, Database Schema, Keys, Schema Diagrams, Relational Query Languages, Relational Operations At the end of the Unit, students will be able to:

- Distinguish between Database and File System
- Categorize different kinds of data models
- Define functional components of DBMS

UNIT-II: Introduction to SQL: Overview of the SQL Query Language, SQL Data Definition,

Basic Structure of SQL Queries, Additional Basic Operations, Set Operations, Null Values,

Aggregate Functions, Nested Sub-queries, Modification of the Database. Intermediate SQL**:** Joint Expressions, Views, Transactions, Integrity Constraints, SQL Data types and schemas, Authorization.

Advanced SQL: Accessing SQL from a Programming Language, Functions and Procedures, Triggers, Recursive Queries, OLAP, Formal relational query languages.

At the end of the Unit, students will be able to:

- Outline the elements of the relational model such as domain, attribute, tuple, relation and entity
- Distinguish between various kinds of constraints like domain, key and integrity
- Define relational schema
- Develop queries using Relational Algebra and SQL
- Perform DML operations on databases

UNIT-III: Database Design and the E-R Model: Overview of the Design Process, The Entity-Relationship Model, Constraints, Removing Redundant Attributes in Entity Sets, Entity- Relationship Diagrams, Reduction to Relational Schemas, Entity-Relationship Design Issues.

Relational Database Design:

Features of Good Relational Designs, Atomic Domains and First Normal Form, Decomposition

Using Functional Dependencies, Functional-Dependency Theory, Algorithms for Decomposition,

Decomposition Using Multi valued Dependencies, More Normal Forms.

At the end of the Unit, students will be able to:

- Develop E-R model for the given problem
- Derive tables from E-R diagrams
- Differentiate between various normal forms based on functional dependency
- Apply normalization techniques to eliminate redundancy

UNIT-IV: Query Processing: Overview, Measures of Query cost, Selection operation, sorting, Join Operation, other operations, Evaluation of Expressions.

Query optimization: Overview, Transformation of Relational Expressions, Estimating statistics of Expression results, Choice of Evaluation Plans, Materialized views, Advanced Topics in Query Optimization.

At the end of the Unit, students will be able to:

- Identify variety of methods for effective processing of given queries.
- Obtain knowledge related to optimization techniques.

UNIT V: Transaction Management:

Transactions: Concept, A Simple Transactional Model, Storage Structures, Transaction Atomicity and Durability, Transaction Isolation, Serializability, Isolation and Atomicity, Transaction Isolation Levels, Implementation of Isolation Levels, Transactions as SQL Statements.

Concurrency Control: Lock based Protocols, Deadlock Handling, Multiple granularities, Timestamp based Protocols, Validation based Protocols.

Recovery System: Failure Classification, Storage, Recovery and Atomicity, Recovery Algorithm, Buffer Management, Failure with Loss of Nonvolatile Storage, Early Lock Release and Logical Undo Operations.

At the end of the Unit, students will be able to:

- Understand various properties of transaction.
- Design atomic transactions for an application.
- Gain the knowledge about log mechanism and check pointing techniques for system recovery.

Course Outcomes

Students will be able to:

1. Design a database for a real world information system
2. Define transactions which preserve the integrity of the database
3. Generate tables for a database
4. Organize the data to prevent redundancy
5. Pose queries to retrieve the information from database.

TEXT BOOKS:

1. A.Silberschatz, H.F.Korth, S.Sudarshan, “Database System Concepts”, 6/e, TMH 2019

REFERENCE BOOKS:

1. Shamkant B. Navathe, “Database Management System” 6/e RamezElmasriPEA

2.“Database Principles Fundamentals of Design Implementation and Management”, Carlos Coronel, Steven Morris, Peter Robb, CengageLearning.

3. Raghurama Krishnan, Johannes Gehrke, “Database Management Systems”, 3/e,TMH

Sri Krishnadevaraya University College of Engineering & Technology

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3	0	0	3

Python Programming

Course Objectives:

- To learn the fundamentals of Python
- To elucidate problem-solving using a Python programming language
- To introduce a function-oriented programming paradigm through python
- To get training in the development of solutions using modular concepts
- To introduce the programming constructs of python

Unit – I

Introduction: What is a program, running python, Arithmetic operators, Value and Types.

Variables, Assignments and Statements: Assignment statements, Script mode, Order of operations, string operations, comments.

Functions: Function calls, Math functions, Composition, Adding new Functions, Definitions and Uses, Flow of Execution, Parameters and Arguments, Variables and Parameters are local, Stack diagrams, Fruitful Functions and Void Functions, Why Functions.

Unit Outcomes:

Student should be able to

- List the basic constructs of Python.
- Solve the problems by applying modularity principle.

Unit – II

Case study: The turtle module, Simple Repetition, Encapsulation, Generalization, Interface design, Refactoring, docstring.

Conditionals and Recursion: floor division and modulus, Boolean expressions, Logical operators, Conditional execution, Alternative execution, Chained conditionals, Nested conditionals, Recursion, Infinite Recursion, Keyboard input.

Fruitful Functions: Return values, Incremental development, Composition, Boolean functions, More recursion, Leap of Faith, Checking types

Unit Outcomes:

Student should be able to

- Apply the conditional execution of the program.
- Apply the principle of recursion to solve the problems.

Unit - III

Iteration: Reassignment, Updating variables, The while statement, Break, Square roots, Algorithms.

Strings: A string is a sequence, len, Traversal with a for loop, String slices, Strings are immutable, Searching, Looping and Counting, String methods, The in operator, String comparison.

Case Study: Reading word lists, Search, Looping with indices.

Lists: List is a sequence, Lists are mutable, Traversing a list, List operations, List slices, List methods, Map filter and reduce, Deleting elements, Lists and Strings, Objects and values, Aliasing, List arguments.

Unit Outcomes:

Student should be able to

- Use the data structure list.
- Design programs for manipulating strings.

Unit – IV

Dictionaries: A dictionary is a mapping, Dictionary as a collection of counters, Looping and dictionaries, Reverse Lookup, Dictionaries and lists, Memos, Global Variables.

Tuples: Tuples are immutable, Tuple Assignment, Tuple as Return values, Variable-length argument tuples, Lists and tuples, Dictionaries and tuples, Sequences of sequences.

Files: Persistence, Reading and writing, Format operator, Filename and paths, Catching exceptions, Databases, Pickling, Pipes, Writing modules.

Classes and Objects: Programmer-defined types, Attributes, Instances as Return values, Objects are mutable, Copying. Classes and Functions

Unit Outcomes:

Student should be able to

- Apply object orientation concepts.
- Use data structure dictionaries.
- Organize data in the form of files.

Unit – V

Classes and Functions: Time, Pure functions, Modifiers, Prototyping versus Planning
Classes and Methods: Object oriented features, Printing objects, The init method, The

str__method, Operator overloading, Type-based Dispatch, Polymorphism, Interface and Implementation

Inheritance: Card objects, Class attributes, Comparing cards, decks, Printing the Deck, Add Remove shuffle and sort, Inheritance, Class diagrams, Data encapsulation.

The Goodies: Conditional expressions, List comprehensions, Generator expressions, any and all, Sets, Counters, default dict, Named tuples, Gathering keyword Args,

Unit Outcomes:

Student should be able to

- Plan programs using object orientation approach. Illustrate the principle of inheritance.

Course Outcomes:

Student should be able to

- Apply the features of Python language in various real applications.
- Select appropriate data structure of Python for solving a problem.
- Design object oriented programs using Python for solving real-world problems.
- Apply modularity to programs.

TEXT BOOKS:

1. Allen B. Downey, "Think Python", 2nd edition, SPD/O'Reilly, 2016.

REFERENCE BOOKS:

1. Martin C.Brown, "The Complete Reference: Python", McGraw-Hill, 2018.
2. Kenneth A. Lambert, B.L. Juneja, "Fundamentals of Python", CENGAGE, 2015.
3. R. Nageswara Rao, "Core Python Programming", 2nd edition, Dreamtech Press,2019

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L	T	P	C
3	0	0	3

Design and Analysis of algorithms

Course Objectives:

- To demonstrate the importance of algorithms in computing.
- To explain the analysis of algorithms
- To illustrate the method of finding the complexity of algorithms
- To explain the advanced algorithm design and analysis techniques.
- To introduce special classes of algorithms NP – completeness and the classes P and NP.

UNIT I

Introduction: Algorithm, Algorithm specification, Performance analysis.

Divide and Conquer: General method, Binary Search, Finding the maximum and minimum, Merge sort, Quick Sort, Selection, Strassen's matrix multiplication.

At the end of the unit, students will be able to:

- Understand growth functions and Asymptotic notations
- Derive the recurrence equation for running time of a given algorithm and solve.
- Understand the general principle of Divide and Conquer and identify suitable problems to apply Divide and Conquer paradigm
- Analyze the time complexities of Binary Search, Finding the maximum and minimum, and Strassen's matrix multiplication algorithms.
- Compare complexities of Merge sort, Quick sort and Selection sort techniques

UNIT II

Greedy Method: 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 salesperson problem. At the end of the unit, students will be able to:

- Understand optimization problems and the general principles of Greedy and Dynamic Programming paradigms to solve them.
- Apply subset and ordering paradigms of greedy strategy for Knapsack problem, Job Scheduling with Deadlines, Minimum cost Spanning Trees, Optimal storage on tapes, and finding Single-source shortest paths.
- Define Principle of optimality with examples.
- Differentiate Greedy and Dynamic programming paradigms.
- Apply dynamic programming strategy for Optimal binary search trees, Multistage graphs, All-pairs shortest paths, 0/1 knapsack, the traveling salesperson problem.

UNIT III

Basic Traversal and Search Techniques: Techniques for binary trees, Techniques for Graphs,

Connected components and Spanning trees, Bi-connected components and DFS

Back tracking: General Method, 8 – queens problem, Sum of subsets problem, Graph coloring and Hamiltonian cycles, Knapsack Problem.

At the end of the unit, students will be able to:

- Define solution space tree.
- Illustrate graph search strategies: BFS, DFS and D-Search.
- Determine articulation points and bi-connected components in a given graph using Depth First Spanning Trees.
- Demonstrate the recursive and iterative backtracking algorithms.

- Apply backtracking strategy to solve N – queens problem, Sum of subsets problem and Knapsack problem.
- Apply backtracking to solve m-color ability optimization problem.
- Determine all possible Hamiltonian Cycles in a graph using back tracking algorithm.

UNIT IV

Branch and Bound: The method, Travelling salesperson, 0/1 Knapsack problem, Efficiency considerations.

Lower Bound Theory: Comparison trees, Lower bounds through reductions – Multiplying triangular matrices, inverting a lower triangular matrix, computing the transitive closure. At the end of the unit, students will be able to:

- Illustrate the state space search techniques; FIFO, LIFO and LC.
- Analyze the advantage of bounding functions in Branch and Bound technique to solve the Travelling Sales person problem.
- Compare the LC and FIFO branch and bound solutions for 0/1 knapsack problem.
- Understand lower bound theory concept in solving algebraic problems.

UNIT V

NP – Hard and NP – Complete Problems: NP Hardness, NP Completeness, Consequences of being in P, Cook‘s Theorem, Reduction Source Problems, Reductions: Reductions for some known problems

At the end of the unit, students will be able to:

- Differentiate deterministic and Non-deterministic algorithms.
- Define P, NP, NP –hard and NP-complete classes of problems.
- Understand the satisfiability problem.
- State Cook’s Theorem.
- Understand the reduction techniques.

Course Outcomes

- Determine the time complexity of an algorithm by solving the corresponding recurrence equation
- Apply the Divide and Conquer strategy to solve searching, sorting and matrix multiplication problems.
- Analyze the efficiency of Greedy and Dynamic Programming design techniques to solve the optimization problems.
- Apply Backtracking technique for solving constraint satisfaction problems.
- Analyze the LC and FIFO branch and bound solutions for optimization problems, and compare the time complexities with Dynamic Programming techniques.
- Define and Classify deterministic and Non-deterministic algorithms; P, NP, NP –hard and NP-complete classes of problems.

Text Books

1. Ellis Horowitz, Sartaj Sahni and Rajasekaran, “Fundamentals of Computer Algorithms”, 2nd Edition, 2012, University Press.

2. ParagHimanshu Dave and Himanshu Bhalchandra Dave, “Design and Analysis of Algorithms”, Second Edition, Pearson Education.

References

1. Anany Levitin, “Introduction to the Design and Analysis of Algorithms”, Third Edition, Pearson Education,2012.

2. Thomas H.Cormen, Charles E.Leiserson, Ronald L. Rivest and Clifford Stein, “Introduction to Algorithms”, Third Edition, PHI Learning Private Limited, 2012.

3. Alfred V. Aho, John E. Hopcroft and Jeffrey D. Ullman, “Data Structures and Algorithms”, Pearson Education, Reprint2006.

4. Donald E. Knuth, “The Art of Computer Programming”, Volumes 1&3 Pearson Education, 2009.

Sri Krishnadevaraya University College of Engineering & Technology

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L	T	P	C
2	0	0	2

Object Oriented Programming through Java

Course Objectives:

- To understand object oriented concepts and problem solving techniques
- To obtain knowledge about the principles of inheritance and polymorphism
- To implement the concept of packages, interfaces, exception handling and concurrency mechanism.
- To design the GUIs using applets and swing controls.
- To understand the Java Database Connectivity Architecture

UNIT - I

Introduction: Introduction to Object Oriented Programming, The History and Evolution of Java,

Introduction to Classes, Objects, Methods, Constructors, this keyword, Garbage Collection, Data Types,

Variables, Type Conversion and Casting, Arrays, Operators, Control Statements, Method Overloading, Constructor Overloading, Parameter Passing, Recursion, String Class and String handling methods.

Unit Outcomes:

Student should be able to

- Understand the syntax, semantics and features of Java Programming Language.
- Learn object oriented features and understanding type conversion and casting.
- Understand different types of string handling functions and its usage.

UNIT - II

Inheritance: Basics, Using Super, Creating Multilevel hierarchy, Method overriding, Dynamic

Method Dispatch, Using Abstract classes, Using final with inheritance, Object class,

Packages: Basics, Creating packages, Understanding CLASSPATH, Access Protection, Importing packages.

Interfaces: Definition, Implementing Interfaces, Extending Interfaces, Nested Interfaces, Applying Interfaces, Variables in Interfaces.

Unit Outcomes:

Student should be able to

- Implement types of Inheritance and developing new classes based on existing classes Distinguish between system packages and user defined packages.
- Demonstrate features of interfaces to implement multiple inheritances.

UNIT - III

Exception handling - Fundamentals, Exception types, Uncaught exceptions, using try and catch, multiple catch clauses, nested try statements, throw, throws and finally, built- in exceptions, creating own exception sub classes.

Stream based I/O (java.io) – The Stream classes-Byte streams and Character streams, Reading console Input and Writing Console Output, File class, Reading and writing Files, Random access file operations, The Console class.

Unit Outcomes:

Student should be able to

- Learn what exceptions are and how they are handled.
- Learn when to use exception handling and how to create user defined exceptions Learn the difference between various files and streams.

UNIT - IV

Multithreading: The Java thread model, Creating threads, Thread priorities, Synchronizing threads, Inter thread communication.

Event Handing: Events, Event sources, Event classes, Event Listeners, Delegation event model, handling mouse and keyboard events, Adapter classes.

Unit Outcomes:

Student should be able to

- Understand concurrency, parallelism and multithreading Learn what events are and how they are handled.

UNIT – V

Applet: Basics, Architecture, Applet Skeleton, requesting repainting,using the status window, passing parameters to applets.

GUI Programming with Swings – The origin and design philosophy of swing, components and containers, layout managers, event handling, using a push button, jtextfield, jlabel and image icon, the swing buttons, jtext field, jscrollpane, jlist, jcombobox, trees, jtable, An overview of jmenubar, jmenu and jmenuitem, creating a main menu, show message dialog, show confirm dialog, show input dialog, show optiondialog, jdialog, create a modeless dialog.

Accessing Databases with JDBC:

Types of Drivers, JDBC Architecture, JDBC classes and Interfaces, Basic steps in developing JDBC applications, Creating a new database and table with JDBC.

Unit Outcomes:

Student should be able to

- Learn how to use the Nimbus look-and-feel Understand the GUI programming.
- Understand basic steps in developing JDBC applications,

Course Outcomes:

After the completion of the course the student will be able To solve real world problems using OOP techniques.

- To apply code reusability through inheritance, packages and interfaces to solve problems using java collection framework and I/O classes.
- To develop applications by using parallel streams for better performance.
- To develop applets for web applications.
- To build GUIs and handle events generated by user interactions.
- To use the JDBC API to access database.

Text Books:

1. Herbert Schildt "Java The complete reference", 9th edition, McGraw Hill Education (India) Pvt. Ltd.
2. Paul Dietel, Harvey Dietel "Java How to Program", 10th Edition, Pearson Education.

REFERENCE BOOKS:

1. T. Budd "Understanding Object-Oriented Programming with Java", updated edition, Pearson Education.
2. Cay S. Horstmann, "Core Java Volume – 1 Fundamentals", Pearson Education.
3. Sagayaraj, Dennis, Karthik and Gajalakshmi, "Java Programming for core and advanced learners" University Press
4. Y. Daniel Liang, "Introduction to Java programming", Pearson Education.
5. P. Radha Krishna, "Object Oriented Programming through Java", University Press.
6. S. Malhotra, S. Chudhary, "Programming in Java", 2nd edition, Oxford Univ. Press.7. R.A. Johnson, "Java Programming and Object-oriented Application Development", Cengage Learning.

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L	T	P	C
3	0	0	3

Digital Logic Design

Course Objectives:

- Understanding basic number systems, codes and logical gates.
- Acquiring the skills to manipulate and examine Boolean algebraic expressions, logical operations, and Boolean functions
- Acquainting with classical hardware design for both combinational and sequential logic circuits
- Experiencing about synchronous circuits.
- Obtaining the knowledge about various types of memories.

UNIT - I

Digital Systems and Binary Numbers: Digital Systems, Binary Numbers, Number base conversions, Octal, Hexadecimal and other base numbers, complements, signed binary numbers, binary codes, binary storage and registers, binary logic.

Boolean algebra and logic gates: Basic theorems and properties of Boolean algebra, Boolean functions, canonical and standard forms, Digital Logic Gates.

Unit Outcomes:

Student is able to

- Summarize the binary number system
- Illustrate various binary codes
- Describe the basic postulates of Boolean Algebra
- Develop a logic diagram using gates from a Boolean function

UNIT - II

Gate–Level Minimization: The Map Method, Four-Variable K-Map, sum of products, product of sums simplification, Don't care conditions, Simplification by Quine- McClusky Method**,** NAND and NOR implementation and other two level implementations, Exclusive-OR function.

Unit Outcomes:

Student is able to

- Apply the map method for simplifying Boolean Expressions.
- Apply Don't care conditions to simplify a Karnaughmap.
- Design two-level Boolean functions with NAND gates and NOR gates

UNIT - III

Combinational Logic: Combinational Circuits, Analysis of Combinational Circuits, Design Procedure, Binary Adder-Subtractor, Decimal Adder, Binary Multiplier, Magnitude Comparator, Decoders, Encoders, Multiplexers and Demultiplexers.

Unit Outcomes:

Student is able to

- Select fundamental combinational logic circuits.
- Analyze and design combinational circuits.
- Design Boolean function with a multiplexer.

UNIT – IV

Synchronous Sequential Circuits: Latches, Flip-flops, analysis of clocked sequential circuits, **Register and Counters:** Registers, Shift registers, Ripple counters, Synchronous counters and other counters.

Unit Outcomes:

Student is able to

- Explain the functionalities of latch and different flip-flops.
- Analyze and design clocked sequential circuits.
- Describe the use of sequential circuit components in complex digital systems.

UNIT - V

Memory and Programmable Logic: Random-Access memory, Memory decoding, ROM, Programmable Logic Array, Programmable Array Logic, Sequential programmable devices.

Digital Integrated Circuits: RTL and DTL Circuits, Transistor-Transistor Logic (TTL), Emitter- Coupled Logic (ECL), MOS, CMOS Logic, Comparisons of Logic Families **Unit Outcomes:**

Student is able to

- Interpret the types of memories.
- Construct the Boolean functions with PLA and PAL.
- Describe the most common integrated circuit digital logic families.

Course Outcomes:

Students should be able to

- Analyze the number systems and codes.
- Decide the Boolean expressions using Minimization methods.
- Design the sequential and combinational circuits.
- Apply state reduction methods to solve sequential circuits.
- Describe various types of memories.

TEXT BOOKS:

1. M. Morris Mano, M.D. Ciletti, “Digital Design”, 5th edition, Pearson, 2018.

REFERENCE BOOKS:

1. Donald P Leach, Albert Paul Malvino, GoutamSaha, “Digital Principles and applications”, McGrawHill , 8thEdition,2015.

2. David J. Comer, “Digital Logic & State Machine Design”, Oxford University Press, 3rd Reprinted Indian Edition,2012

3. R.D. Sudhakar Samuel, “Digital Logic Design”, Elsevier Publishers.

Sri Krishnadevaraya University College of Engineering & Technology

B.Tech – II Year 1st Sem (Computer Science & Engineering)

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Python Programming Lab

Course Objectives:

- To train the students in solving computational problems
- To elucidate solving mathematical problems using Python programming language
- To understand the fundamentals of Python programming concepts and its applications.
- To understand the object-oriented concepts using Python in problem solving.

Laboratory Experiments

1. Install Python Interpreter and use it to perform different Mathematical Computations. Try to do all the operations present in a Scientific Calculator
2. Write a function that draws a grid like the following:

```
+ - - - - + - - - +
|       |||||
          |       |       |
          |       |       |
+ - - - - + - - - +
          |       |       |
          |       |       |
          |       |       |
          |       |       |
+ - - - - + - - - - +
```

3. Write a function that draws a Pyramid with #symbols

```
#
# # #
# # # # # # # # # # # #
```

.

Up to 15 hashes at the bottom

4. Using turtles concept draw a wheel of your choice
5. Write a program that draws Archimedean Spiral
6. The letters of the alphabet can be constructed from a moderate number of basic elements, like vertical and horizontal lines and a few curves. Design an alphabet that can be drawn with a minimal number of basic elements and then write functions that draw the letters. The alphabet can belong to any Natural language excluding English. You should consider at least Ten letters of the alphabet.
7. The time module provides a function, also named time that returns the current Greenwich Mean Time in “the epoch”, which is an arbitrary time used as a reference point. On UNIX systems, the epoch is 1 January1970.

```
>>> import time
>>>time.time()
1437746094.573595
```

8

Write a script that reads the current time and converts it to a time of day in hours, minutes, and seconds, plus the number of days since the epoch.

8. Given n+r+1 <= 2^r .n is the input and r is to be determined. Write a program which computes minimum value of r that satisfies the above.

9. Write a program that evaluates Ackermann function

10. The mathematician Srinivasa Ramanujan found an infinite series that can be used to generate a numerical approximation of 1/ π:

Write a function called estimate_pi that uses this formula to compute and return an estimate of π.

$$\frac{1}{\pi} = \frac{2\sqrt{2}}{9801} \sum_{k=0}^{\infty} \frac{(4k)!(1103 + 26390k)}{(k!)^4 396^{4k}}$$

It should use a while loop to compute terms of the summation until the last term is smaller than 1e-15 (which is Python notation for 10^{-15}). You can check the result by comparing it to math.pi.

11. Choose any five built-in string functions of C language. Implement them on your own in Python. You should not use string related Python built-in functions.

12. Given a text of characters, Write a program which counts number of vowels, consonants and special characters.

13. Given a word which is a string of characters. Given an integer say 'n', Rotate each character by 'n' positions and print it. Note that 'n' can be positive or negative.

14. Given rows of text, write it in the form of columns.

15. Given a page of text. Count the number of occurrences of each latter (Assume case insensitivity and don't consider special characters). Draw a histogram to represent the same

16. Write program which performs the following operations on list's. Don't use built-in functions

    a) Updating elements of a list
    b) Concatenation of list's
    c) Check for member in the list
    d) Insert into the list
    e) Sum the elements of the list
    f) Push and pop element of list
    g) Sorting of list
    h) Finding biggest and smallest elements in the list
    i) Finding common elements in the list

17. Write a program that reads a file, breaks each line into words, strips whitespace and punctuation from the words, and converts them to lowercase.

18. Go to Project Gutenberg (http://gutenberg.org) and download your favorite out-of-copyright book in plain text format. Read the book you downloaded, skip over the header information at the beginning of the file, and process the rest of the words as before. Then modify the program to count the total number of words in the book, and the number of times each word is used. Print the number of different words used in the book. Compare different books by different authors, written in different eras.

19. Go to Project Gutenberg (http://gutenberg.org) and download your favorite out-of-copyright book in plain text format. Write a program that allows you to replace words, insert words and delete words from the file.

20. Consider all the files on your PC. Write a program which checks for duplicate files in your PC and displays their location. Hint: If two files have the same checksum, they probably have the same contents.

21. Consider turtle object. Write functions to draw triangle, rectangle, polygon, circle and sphere.

Use object oriented approach.

22. Write a program illustrating the object oriented features supported by Python.

23. Design a Python script using the Turtle graphics library to construct a turtle bar chart representing the grades obtained by N students read from a file categorising them into distinction, first class, second class, third class and failed.

24. Design a Python script to determine the difference in date for given two dates in YYYY:MM:DD format(0 <= YYYY <= 9999, 1 <= MM <= 12, 1 <= DD <= 31) following the leap year rules.

25. Design a Python Script to determine the time difference between two given times in HH:MM:SS format.(0 <= HH <= 23, 0 <= MM <= 59, 0 <= SS <=59) **Unit Outcomes:**

Student should be able to

- Design solutions to mathematical problems.
- Organize the data for solving the problem.
- Develop Python programs for numerical and text based problems.
- Select appropriate programming construct for solving the problem.
- Illustrate object oriented concepts.

Reference Books:

1. Peter Wentworth, Jeffrey Elkner, Allen B. Downey and Chris Meyers, "How to Think Like a Computer Scientist: Learning with Python 3", 3rd edition, Available at
   http://www.ict.ru.ac.za/Resources/cspw/thinkcspy3/thinkcspy3.pdf
2. Paul Barry, "Head First Python a Brain Friendly Guide" 2nd Edition, O'Reilly,2016
3. DainelY.Chen "Pandas for Everyone Python Data Analysis" Pearson Education,2019

Sri Krishnadevaraya University College of Engineering & Technology

B.Tech – II Year 1st Sem (Computer Science & Engineering)

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Database Management Systems Lab

Course Objectives:

- To implement the basic knowledge of SQL queries and relational algebra.
- To construct database models for different database applications.
- To apply normalization techniques for refining of databases.
- To practice various triggers, procedures, and cursors using PL/SQL.
- To design and implementation of a database for an organization

Week-1: CREATION OF TABLES

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

Name	Type
Empno	Number
Ename	Varchar2(20)
Job	Varchar2(20)
Mgr	Number
Sal	Number

a. Add a column commission with domain to the Employee table.
b. Insert any five records into the table.
c. Update the column details of job
d. Rename the column of Employ table using alter command.
e. Delete the employee whose empno is19.

2. Create department table with the following structure.

Name	Type
Dept no	Number
Dept name	Varchar2(20)
location	Varchar2(20)

a. Add column designation to the department table.
b. Insert values into the table.
c. List the records of emp table grouped by dept no.
d. Update the record where dept no is9.
e. Delete any column data from the table 3.Create a table called Customer table

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

a. Insert records into the table.
b. Add salary column to the table.
c. Alter the table column domain.
d. Drop salary column of the customer table.
e. Delete the rows of customer table whose ust_city is ‘hyd’.
f. Create a table called branch table.

Name	Type
Branch name	Varchar2(20)
Branch city	Varchar2(20)
Asserts	Number

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

Name	Type
Sid	Number
Sname	Varchar2(20)
Rating	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.

6. Create a table called reserves table

Name	Type
Boat id	Integer
Sid	Integer
Day	Integer

a. Insert values into the reserves table.
b. Add column time to the reserves table.
c. Alter the column day data type to date.
d. Drop the column time in the table.`
e. Delete the row of the table with some condition.

Week-2: QUERIES USING DDL AND DML

1. a. Create a user and grant all permissions to the user.
   b. Insert the any three records in the employee table and use rollback. Check the result.
   c. Add primary key constraint and not null constraint to the employee table.
   d. Insert null values to the employee table and verify the result.
2. a. Create a user and grant all permissions to the user.
   b. Insert values in the department table and use commit.
   c. Add constraints like unique and not null to the department table.
   d. Insert repeated values and null values into the table.
3. a. Create a user and grant all permissions to the user.
   b. Insert values into the table and use commit.
   c. Delete any three records in the department table and use rollback.
   d. Add constraint primary key and foreign key to the table.
4. a. Create a user and grant all permissions to the user.
   b. Insert records in the sailor table and use commit.
   c. Add save point after insertion of records and verify save point.
   d. Add constraints not null and primary key to the sailor table.
5. a. Create a user and grant all permissions to the user.
   b. Use revoke command to remove user permissions.
   c. Change password of the user created.
   d. Add constraint foreign key and no tnull.
6. a. Create a user and grant all permissions to the user.
   b. Update the table reserves and use save point and rollback.
   c. Add constraint primary key , foreign key and not null to the reserves table
   d. Delete constraint not null to the table column

Week-3: QUERIES USING AGGREGATE FUNCTIONS

1. a. By using the group by clause, display the names who belongs to dept no 10 along with average salary.

b. Display lowest paid employee details under each department.

c. Display number of employees working in each department and their department number.

d. Using built in functions, display number of employees working in each department and their department name from dept table. Insert dept name to dept table and insert dept name for each row, do the required thing specified above.

e. List all employees which start with either B or C.

f. Display only these ename of employees where the maximum salary is greater than or equal to 5000.

2. a. Calculate the average salary for each different job.

b. Show the average salary of each job excluding manager.

c. Show the average salary for all departments employing more than three people.

d. Display employees who earn more than thelo west salary in department 30

e. Show that value returned by sign (n) function.

f. How many days between day of birth to current date 3. a. Show that two substring as single string.

b. List all employee names, salary and 15% rise in salary.

c. Display lowest paid emp details under each manager

d. Display the average monthly salary bill for each deptno.

e. Show the average salary for all departments employing more than two people.

f. By using the group by clause, display the eid who belongs to dept no 05 along with average salary.

4. a. Count the number of employees in department20

b. Find the minimum salary earned by clerk.

c. Find minimum, maximum, average salary of all employees.

d. List the minimum and maximum salaries for each job type.

e. List the employee names in descending order.

f. List the employee id, names in ascending order by empid.

5. a. Find the sids ,names of sailors who have reserved all boats called "INTERLAKE

Find the age of youngest sailor who is eligible to vote for each rating level with at least two such sailors.

b. Find the sname , bid and reservation date for each reservation.

c. Find the ages of sailors whose name begin and end with B and has at least 3characters.

d. List in alphabetic order all sailors who have reserved red boat.

e. Find the age of youngest sailor for each rating level.

6. a. List the Vendors who have delivered products within 6 months from order date.

b. Display the Vendor details who have supplied both Assembled and Subparts.

c. Display the Sub parts by grouping the Vendor type (Local or Non Local).

d. Display the Vendor details in ascending order.

e. Display the Sub part which costs more than any of the Assembled parts.

f. Display the second maximum cost Assembled part

Week-4: PROGRAMS ON PL/SQL

1. a. Write a PL/SQL program to swap two numbers.

b. Write a PL/SQL program to find the largest of three numbers.

2. a. Write a PL/SQL program to find the total and average of 6 subjects and display the grade.

b. Write a PL/SQL program to find the sum of digits in a given umber.

3. a. Write a PL/SQL program to display the number in reverse order.

b. Write a PL/SQL program to check whether the given number is prime or not.

4. a. Write a PL/SQL program to find the factorial of a given number.

b. Write a PL/SQL code block to calculate the area of a circle for a value of radius varying from 3 to 7.

Store the radius and the corresponding values of calculated area in an empty table named areas, consisting of two columns radius and area.

5. a. Write a PL/SQL program to accept a string and remove the vowels from the string. (When 'hello' passed to the program it should display 'Hll' removing e and o from the world Hello).

b. Write a PL/SQL program to accept a number and a divisor. Make sure the divisor is less than or equal to10. Else display an error message. Otherwise Display the remainder in words.

Week-5: PROCEDURES AND FUNCTIONS

1. Write a function to accept employee number as parameter and return Basic +HRA together as single column.

2. Accept year as parameter and write a Function to return the total net salary spent for a given year.

3. Create a function to find the factorial of a given number and hence find NCR.

4. Write a PL/SQL block o pint prime Fibonacci series using local functions.

5. Create a procedure to find the lucky number of a given birth date.

6. Create function to the reverse of given number

Week-6: TRIGGERS

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: CUSTOMERS table:

ID	NAME	AGE	ADDRESS	SALARY
1	Alive	24	Khammam	2000
2	Bob	27	Kadapa	3000
3	Catri	25	Guntur	4000
4	Dena	28	Hyderabad	5000
5	Eeshwar	27	Kurnool	6000
6	Farooq	28	Nellur	7000

2. Creation of insert trigger, delete trigger, update trigger practice triggers using the passenger database.

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 or not.

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 passenger respectively.

3. Insert row in employee table using Triggers. Every trigger is created with name any trigger have same name must be replaced by new name. These triggers can raised before insert, update or delete rows on data base. The main difference between a trigger and a stored procedure is that the former is attached to a table and is only fired when an INSERT, UPDATE or DELETE occurs.

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

5. 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.

6. Create a transparent audit system for a table CUST_MSTR. The system must keep track of the records that are being deleted or updated

Week-7: PROCEDURES

1. Create the procedure for palindrome of given number.

2. Create the procedure for GCD: Program should load two registers with two Numbers and then apply the logic for GCD of two numbers. GCD of two numbers is performed by dividing the greater number by the smaller number till the remainder is zero. If it is zero, the divisor is the GCD if not the remainder and the divisors of the previous division are the new set of two numbers. The process is repeated by dividing greater of the two numbers by the smaller number till the remainder is zero and GCD is found.

3. Write the PL/SQL programs to create the procedure for factorial of given number.

4. Write the PL/SQL programs to create the procedure to find sum of N natural number.

5. Write the PL/SQL programs to create the procedure to find Fibonacci series.

6. Write the PL/SQL programs to create the procedure to check the given number is perfect or not

Week-8: CURSORS

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 present in the item master table then the record is inserted in the item master table.

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 and dept no.

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 salary are updated we get a message 'None of the salaries were updated'. Else we get a message like for example, 'Salaries for 1000 employees are updated' if there are 1000 rows in 'employee' table

Week-9: CASE STUDY: BOOK PUBLISHING COMPANY

A publishing company produces scientific books on various subjects. The books are written by authors who specialize in one particular subject. The company employs editors who, not necessarily being specialists in a particular area, each take sole responsibility for editing one or more publications.

A publication covers essentially one of the specialist subjects and is normally written by a single author. When writing a particular book, each author works with on editor, but may submit another work for publication to be supervised by other editors. To improve their competitiveness, the company tries to employ a variety of authors, more than one author being a specialist in a particular subject for the above case study, do the following:

1. Analyze the data required.
2. Normalize the attributes.

Create the logical data model using E-R diagrams

Week-10: **CASE STUDY GENERAL HOSPITAL**

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 the following.

1. Analyze the data required.
2. Normalize the attributes.

Create the logical data model using E-R diagrams

Week-11: **CASE STUDY: CAR RENTAL COMPANY**

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, telephone number, driving license, number about each customer are kept in the database. For the above case study, do the following:

1. Analyze the data required.
2. Normalize the attributes.

Create the logical data model using E-R diagrams

Week-12: **CASE STUDY: STUDENT PROGRESS MONITORING SYSTEM**

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 studentsincludingtheirnumbers,names,addresses,degrees they read for,andtheirpastperformanc e i.e. modules taken and examination results. For the above case study, do the following:

1. Analyze the data required.
2. Normalize the attributes.
3. Create the logical data model i.e., ER diagrams.
4. Comprehend the data given in the case study by creating respective tables with primary keys and foreign keys wherever required.
5. Insert values into the tables created (Be vigilant about Master- Slavetables).
6. Display the Students who have taken M.Sc course
7. Display the Module code and Number of Modules taught by each Lecturer.
8. Retrieve the Lecturer names who are not Module Leaders.
9. Display the Department name which offers 'English 'module.
10. Retrieve the Prerequisite Courses offered by every Department (with Department names).
11. Present the Lecturer ID and Name who teaches 'Mathematics'.
12. Discover the number of years a Module is taught.
13. List out all the Faculties who work for 'Statistics 'Department.
14. List out the number of Modules taught by each Module Leader.
15. List out the number of Modules taught by a particular Lecturer.
16. Create a view which contains the fields of both Department and Module tables. (Hint- The fields like Module code, title, credit, Department code and its name).
17. Update the credits of all the prerequisite courses to 5. Delete the Module 'History' from the Module table.

Unit Outcomes:

Students should be able to

1. Design database for any real world problem
2. Implement PL/SQL programs
3. Define SQL queries
4. Decide the constraints
5. Investigate for data inconsistency

Reference Books:

1.RamezElmasri, Shamkant, B. Navathe, "Database Systems", Pearson Education, 6th Edition, 2013.

2.Peter Rob, Carles Coronel, "Database System Concepts", Cengage Learning, 7th Edition, 2008.

WebReferences:

http://www.scoopworld.in

Sri Krishnadevaraya University College of Engineering & Technology

B.Tech – II Year 1st Sem (Computer Science & Engineering)

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Object Oriented Programming through Java Lab

Course Objectives

- To introduce the concepts of Java.
- To Practice object-oriented programs and build java applications.
- To implement java programs for establishing interfaces.
- To implement sample programs for developing reusable software components.
- To establish database connectivity in java and implement GUI applications.

Week-1

a. Installation of Java software, study of any Integrated development environment, Use Eclipse or Net bean platform and acquaint with the various menus. Create a test project, add a test class and run it. See how you can use auto suggestions, auto fill. Try code formatter and code refactoring like renaming variables, methods and classes. Try debug step by step with java program to find prime numbers between 1 to n.

b. Write a Java program that prints all real solutions to the quadratic equation $ax^2+bx+c=0$. Read in a, b, c and use the quadratic formula.

c. Develop a Java application to generate Electricity bill. Create a class with the following members: Consumer no., consumer name, previous month reading, current month reading, type of EB connection

(i.e domestic or commercial). Commute the bill amount using the following tariff.

If the type of the EB connection is domestic, calculate the amount to be paid as follows:

- First 100 units - Rs. 1 per unit
- 101-200 units - Rs. 2.50 per unit
- 201 -500 units - Rs. 4 per unit
- >501units - Rs. 6 per unit

If the type of the EB connection is commercial, calculate the amount to be paid as follows:

- First 100 units - Rs. 2 per unit
- 101-200 units - Rs. 4.50 per unit
- 201 -500 units - Rs. 6 per unit
- >501units - Rs. 7 per unit

d. Write a Java program to multiply two given matrices.

Week-2

a. Write Java program on use of inheritance, preventing inheritance using final, abstract classes.

b. Write Java program on dynamic binding, differentiating method overloading and overriding.

c. Develop a java application to implement currency converter (Dollar to INR, EURO to INR, Yen) using Interfaces.

Week-3

a. 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.

b. Write a Java Program to create an abstract class named Shape that contains two integers and an empty method named print Area(). Provide three classes named Rectangle, Triangle and Circle such that each one of the classes extends the class Shape. Each one of the classes contains only the method print Area () that prints the area of the given shape.

c. Write a Java program to read the time intervals (HH:MM) and to compare system time if the system Time between your time intervals print correct time and exit else try again to repute the same thing. By using String Toknizer class.

Week-4

a. Write a Java program to implement user defined exception handling.

b. 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.

Week-5

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

b. 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.

Week-6

a. 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 where n is the sequence number of the partfile.

b. Write a Java program that reads a file name from the user, displays information about whether the file exists, whether the file is readable, or writable, the type of file and the length of the file in bytes.

Week-7

a. Write a java program that displays the number of characters, lines and words in a text file.

b. Write a java program that reads a file and displays the file on the screen with line number Before each line.

Week-8

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

b. Develop a Java application for stack operation using Buttons and JOption Pane input and Message dialogbox.

c. Develop a Java application to perform Addition, Division, Multiplication and subtraction Using J Option Pane dialog Box and Text fields.

Week-9

a. Develop a Java application for the blinking eyes and mouth should open while blinking.

b. Develop a Java application that simulates a traffic light. The program lets the user select one of three lights: Red, Yellow or Green with radio buttons. On selecting a button an appropriate message with ―STOP‖or ―READY‖or‖GO‖ should appear above the buttons in selected color. Initially, there is no message shown.

Week-10

a. Develop a Java application to implement the opening of a door while opening man should present before hut and closing man should disappear.

b. Develop a Java application by using Jtext Field to read decimal value and converting a decimal number into binary number then print the binary value in another Jtext Field.

Week-11

a. Develop a Java application that handles all mouse events and shows the event name at the center of the window when a mouse event is fired. Use adapter classes.

b. Develop a Java application to demonstrate the key event handlers.

Week-12

a. Develop a Java application to find the maximum value from the given type of elements using a generic function.

b. Develop a Java application that works as a simple calculator. Use a grid layout to arrange buttons for the digits and for the +, -,*, % operations. Add a text field to display the result. c. Develop a Java application for handling mouse events.

Week-13

a. Develop a Java application to establish a JDBC connection, create a table student with properties name, register number, mark1, mark2, mark3. Insert the values into the table by using the java and display the information of the students at front end.

Unit Outcomes:

On successful completion of this laboratory students will be able to:

- Recognize the Java programming environment.
- Develop efficient programs using multithreading.
- Design reliable programs using Java exception handling features.
- Extend the programming functionality supported by Java.
- Select appropriate programming construct to solve a problem.

Sri Krishnadevaraya University College of Engineering & Technology

B.Tech – II Year 1st Sem (Computer Science & Engineering)

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Essence of Indian Traditional Knowledge

Objectives:

To facilitate the students with the concepts of Indian traditional knowledge and to make them understand the Importance of roots of knowledge system.

- The course aim of the importing basic principle of third process reasoning and inference sustainability is at the course of Indian traditional knowledge system
- To understand the legal framework and traditional knowledge and biological diversity act 2002 and geographical indication act 2003.
- The courses focus on traditional knowledge and intellectual property mechanism of traditional knowledge and protection.
- To know the student traditional knowledge in different sector.

Unit-I:

Introduction to traditional knowledge: Define traditional knowledge, nature and characteristics, scope and importance, kinds of traditional knowledge, the physical and social contexts in which traditional knowledge develop, the historical impact of social change on traditional knowledge systems. Indigenous Knowledge (IK), characteristics, traditional knowledge vis-à-vis indigenous knowledge, traditional knowledge Vs western knowledge traditional knowledge vis-à-vis formal knowledge **Learning Outcomes:**

At the end of the unit the student will able to:

- understand the traditional knowledge.
- contrast and compare characteristics importance kinds of traditional knowledge.
- analyze physical and social contexts of traditional knowledge.
- evaluate social change on traditional knowledge.

Unit-II:

Protection of traditional knowledge: the need for protecting traditional knowledge Significance of TK Protection, value of TK in global economy, Role of Government to harness TK.

Learning Outcomes:

At the end of the unit the student will able to:

- know the need of protecting traditional knowledge.
- apply significance of TK protection.
- analyze the value of TK in global economy.
- evaluate role of government **Unit-III**:

Legal framework and TK: A: The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006, Plant Varieties Protection and Farmers Rights Act, 2001 (PPVFR Act); B:The Biological Diversity Act 2002 and Rules 2004, the protection of traditional knowledge bill, 2016. Geographical indications act 2003.

Learning Outcomes:

At the end of the unit the student will able to:

- Understand legal framework of TK.
- Contrast and compare the ST and other traditional forest dwellers
- Analyze plant variant protections
- Evaluate farmers right act

Unit-IV:

Traditional knowledge and intellectual property: Systems of traditional knowledge protection, Legal concepts for the protection of traditional knowledge, Certain non IPR mechanisms of traditional knowledge protection, Patents and traditional knowledge, Strategies to increase protection of traditional knowledge, global legal FORA for increasing protection of Indian Traditional Knowledge.

Learning Outcomes:

At the end of the unit the student will able to:

- Understand TK and IPR
- Apply systems of TK protection.
- Analyze legal concepts for the protection of TK.
- Evaluate strategies to increase the protection of TK.

Unit-V:

Traditional knowledge in different sectors: Traditional knowledge and engineering, Traditional medicine system, TK and biotechnology, TK in agriculture, Traditional societies depend on it for their food and healthcare needs, Importance of conservation and sustainable development of environment, Management of biodiversity, Food security of the country and protection of TK.

Learning Outcomes:

At the end of the unit the student will able to:

- know TK in different sectors.
- apply TK in engineering.
- analyze TK in various sectors.
- evaluate food security and protection of TK in the country.

Reference Books:

1. Traditional Knowledge System in India, by Amit Jha, 2009.
2. Traditional Knowledge System and Technology in India by Basanta Kumar Mohanta and Vipin Kumar Singh, Pratibha Prakashan 2012.
3. Traditional Knowledge System in India by Amit Jha Atlantic publishers, 2002
4. "Knowledge Traditions and Practices of India" Kapil Kapoor, Michel Danino

E-Resources:

1. https://www.youtube.com/watch?v=LZP1StpYEPM 2.http://nptel.ac.in/courses/121106003/

Course Outcomes: After completion of the course, students will be able to:

1. understand the concept of Traditional knowledge and its importance
2. know the need and importance of protecting traditional knowledge
3. know the various enactments related to the protection of traditional knowledge.
4. understand the concepts of Intellectual property to protect the traditional knowledge

Sri Krishnadevaraya University College of Engineering & Technology					
Dept. of Computer Science and Engineering					
II Year 2nd Semester					
S.No	**Course No**	**Course Name**	**Category**	**L-T-P**	**Credits**
1		Number Theory & Applications	BS	3-0-0	3
2		Formal Languages and Automata Theory	PC	3-0-0	3
3		Computer Organization	PC	3-0-0	3
4		Software Engineering	PC	3-0-0	3
5		Operating Systems	PC	3-0-0	3
6		Managerial Economics and Financial Analysis	HS	3-0-0	3
7		Operating Systems Lab	PC	0-0-3	1.5
8		Software Engineering Lab	PC	0-0-3	1.5
				Total	**21**

Category	**CREDITS**
Professional core Courses	15
Humanities and Social Sciences	3
Basic Science course	3
TOTAL CREDITS	**21**

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B.Tech – II Year 2nd Sem (Computer Science & Engineering)

L	T	P	C
3	0	0	3

Number Theory and Applications

Course Objective:

This course enables the students to learn the concepts of number theory and its applications to information security.

Unit-I-Integers, Greatest common divisors and prime Factorization

The well-ordering property-Divisibility-Representation of integers-Computer operations with integers-Prime numbers-Greatest common divisors-The Euclidean algorithm -The fundamental theorem of arithmetic-Factorization of integers and the Fermat numbers-Linear Diophantine equations

Unit Outcomes:

Students will be able to

1. Understand basics of number theory concepts.
2. Solve problems on prime numbers.
3. Understand Euclidean algorithm and its applications.

Unit-II-Congruences

Introduction to congruences -Linear congruences-The Chinese remainder theorem-Systems of linear congruences

Unit Outcomes:

Students will be able to

1. Understand Congruences and its basic properties.
2. Understand Chinese remainder theorem and its applications.

Unit-III Applications of Congruences

Divisibility tests-The perpetual calendar-Round-robin tournaments-Computer file storage and hashing functions. Wilson's theorem and Fermat's little theorem- Pseudo primes- Euler's theorem- Euler's p hi-function- The sum and number of divisors- Perfect numbers and Mersenne primes.

Unit Outcomes:

Students will be able to

1. Understand divisibility tests.
2. Apply the concept of congruences to various applications.
3. Understand various theorems on Number theory and its applications.

Unit-IV- Finite fields & Primality, factoring

Finite fields- quadratic residues and reciprocity-Pseudo primes-rho method-fermat factorization and factor bases.

Unit Outcomes:

Students will be able to

1. Understand the terminology of finitefields.
2. Understand rho method and fermatfactorization.

Unit-V- Cryptology

Basic terminology-complexity theorem-Character ciphers-Block ciphers-Exponentiation ciphers- Public-key cryptography-Discrete logarithm-Knapsack ciphers- RSA algorithm-Some applications to computer science.

Unit Outcomes:

Students will be able to

1. Understand the terminology of cryptology.
2. Understand different encryption mechanisms.

Course Outcomes:

After the completion of course, student will be able to
Understand number theory and its properties.

- Understand principles on congruences
- Develop the knowledge to apply various applications
- Develop various encryption methods and its applications.

Text Books:

1. Kenneth H Rosen "Elementary number theory and its applications", AT & T Information systems & Belllaboratories.
2. Neal Koblitz" A course in Number theory &Cryptography",Springer.

Reference Books:

1. Herbert S. Zuckerman, "An Introduction To The Theory Of Numbers", Hugh L. Montgomery, Ivan Niven, wileypublishers
2. Tom M Apostol "Introduction to Analytic number theory",Springer
3. VK Krishnan "Elementary number theory", Universities press

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Formal Language and Automata Theory

Course Objectives

- Students would be able to explain basic concepts in formal language theory, grammars, automata theory, computability theory, and complexity theory.
- The student will be able to explain the application of machine models and descriptors to compiler theory and parsing.
- Students will be able to relate practical problems to languages, automata, computability, and complexity.
- Students will demonstrate an increased level of mathematical sophistication.
- Students will be able to apply mathematical and formal techniques for solving problems in computer science.
- Students will be able to explain the relationship among language classes and grammars with the help of Chomsky Hierarchy.

UNIT I:

Fundamentals:

Strings, Alphabet, Language, Operations, Finite state machine, definitions, finite automaton model, acceptance of strings, and languages, deterministic finite automaton and non deterministic finite automaton, transition diagrams and Language recognizers.

Finite Automata:

NFA with Î transitions - Significance, acceptance of languages. Conversions & Equivalence: Equivalence between NFA with and without Î transitions, NFA to DFA conversion, minimization of FSM, equivalence between two FSM's, Finite Automata with output- Moore and Melay machines.

Unit Outcomes:

- Able to manipulate strings on a given alphabet by applying the operations there on.
- Able to visualize languages and finite state machines and their equivalence.
- Able to tell languages by the FSMs.
- Able to differentiate Deterministic and Non-Deterministic automata.
- Able to know the importance of finite automata in compiler design.
- Able to manipulate strings on a given alphabet by applying the operations there on.
- Able to visualize languages and finite state machines and their equivalence.
- Able to tell languages by the FSMs.
- Able to differentiate Deterministic and Non-Deterministic automata.
- Able to know the importance of finite automata in compiler design.

UNIT II:

Regular Languages:

Regular sets, regular expressions, identity rules, Constructing finite Automata for a given regular expressions, Conversion of Finite Automata to Regular expressions. Pumping lemma of regular sets, closure properties of regular sets.

Grammar Formalism:

Regular grammars-right linear and left linear grammars, equivalence between regular linear grammar and FA, inter conversion, Context free grammar, derivation trees, and sentential forms. Right most and left most derivation of strings.

Unit Outcomes:

- Able to know the importance of regular sets & expressions
- Able to construct FAs for REs and vice versa.
- Able to use pumping lemma for show that a language is not regular.
- Write regular grammar for regular language and be able to differentiate between left linear & right linear grammars.
- Prove the equivalence between regular linear grammar and FA
- Define CFG.
- Derive (L&R) of strings for given CFG.

UNIT III:

Context Free Grammars:

Ambiguity in context free grammars. Minimization of Context Free Grammars. Chomsky normal form, Greiback normal form, Pumping Lemma for Context Free Languages. Enumeration of properties of CFL.

Push Down Automata:

Push down automata, definition, model, acceptance of CFL, Acceptance by final state and acceptance by empty state and its equivalence. Equivalence of CFL and PDA, inter conversion. (Proofs not required). Introduction to DCFL and DPDA.

Unit Outcomes:

- Know the cause of ambiguity in CFG & minimize CFG.
- Write CFG in the normal forms.
- Use pumping lemma to prove that a language is not a CFL.
- Define and design a PDA for a given CFL.
- Prove the equivalence of CFL and PDA and their inter-conversions.
- Differentiate DCFL and DPDA

UNIT IV:

Turing Machine:

Turing Machine, definition, model, design of TM, Computable functions, recursively enumerable languages. Church's hypothesis, counter machine, types of Turing machines (proofs not required). , linear bounded automata and context sensitive language 4

Unit Outcomes:

- Define and design TM for a given computation, a total function, or a language.
- Convert algorithms into Turing Machines.
- Arrange the machines in the hierarchy with respect to their capabilities.

UNIT V:

Computability Theory:

Chomsky hierarchy of languages, decidability of, problems, Universal Turing Machine, undecidability of posts. Correspondence problem, Turing reducibility, Definition of P and NP problems, NP complete and NP hard problems.

Unit Outcomes:

- Know the hierarchy of languages and grammars.
- Know decidability of problems.
- Generalize Turing Machines into universal TMs
- Classify P and NP (complete & hard) Problems.

TEXT BOOKS:

1. "Introduction to Automata Theory Languages and Computation". Hopcroft H.E. and Ullman J. D. Pearson Education.
2. Introduction to Theory of Computation –Sipser 2nd edition Thomson.

REFERENCES:

1. Introduction to Formal Languages, Automata Theory and Computation – Kamala Krithivasan, Rama R
2. Introduction to Computer Theory, Daniel I.A. Cohen, John Wiley.
3. Theory of Computation : A Problem – Solving Approach- Kavi Mahesh, Wiley India Pvt. Ltd.
4. "Elements of Theory of Computation", Lewis H.P. & Papadimition C.H. Pearson /PHI.
5. Theory of Computer Science – Automata languages and computation -Mishra and Chandrashekaran, 2nd edition, PHI.
6. Introduction to languages and the Theory of Computation, John C Martin, TMH.

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3	0	0	3

Computer Organization

Course Objectives:

- To discuss organization and design of a digital computer.
- To explain how to use RTL to represent memory and Arithmetic/ Logic/ Shift operations
- To introduce computer languages, machine, symbolic and assembly levels
- To present organization of central processing unit and concepts of micro-programmed control
- To explain how input-output devices communicate with the other components and methods of data transfer
- To teach different types of addressing modes and memory organization.

Unit I

Data Representation: Data Types, Complements, Fixed-Point Representation, Conversion of Fractions, Floating-point Representation, Other Binary Codes Register Transfer and Micro-operations: Register Transfer Language, Register Transfer, Bus and Memory Transfers, Arithmetic Micro-operations, Logic Micro-operations, Shift Micro- operations, Arithmetic Logic Shift Unit.

Unit Outcomes:

- Represent various data types found in digital computers in binary form
- Emphasize representation of numbers employed in arithmetic operations and on binary coding of symbols used in data processing
- Express micro-operations in symbolic form by using register transfer language
- Develop composite arithmetic logic shift unit to show hardware design of micro- operations

Unit II

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 and Accumulator Logic.

Programming the Basic Computer: Machine Language, Assembly Language, the Assembler, Program Loops, programming arithmetic and logic operations

Unit Outcomes:

- Describe organization and design of a basic digital computer
- Illustrate techniques used in assembly language programming
- Show translation from symbolic code to an equivalent binary program using basic operations of an assembler

Unit III

Central Processing Unit: Introduction, General Register Organization, Stack Organization, Instruction Formats, Addressing Modes, Data Transfer and Manipulation, Program Control, Reduced Instruction Set Computer (RISC).

Unit Outcomes:

- Develop execution unit to show general register organization of a typical CPU
- Explain operation of a memory stack
- Illustrate various instruction formats together with a variety of addressing modes
- Discuss characteristics and advantages of reduced instruction set computer(RISC)

Unit IV

Micro-programmed Control: Control Memory, Address Sequencing, Micro-program example, Design of Control Unit.

Computer Arithmetic: Introduction, Addition and Subtraction, Multiplication Algorithms, Division Algorithms, Floating-Point Arithmetic Operations

Unit Outcomes:

- Develop specific micro-programmed control unit to show how to write microcode for a typical set of instructions
- Design control unit including the hardware for the micro-program sequencer
- Show procedures for implementing arithmetic algorithms for addition, subtraction, multiplication and division with digital hardware
- Discuss algorithms to specify the sequence of micro-operations and control decisions required for implementation

UNIT V

Input-Output Organization: Peripheral Devices, Input-Output Interface, Asynchronous Data Transfer, Modes of Transfer, Priority Interrupt, Direct Memory Access (DMA), Input-Output Processor (IOP), Serial Communication.

Memory Organization: Memory Hierarchy, Main Memory, Auxiliary Memory, Associative Memory, Cache Memory, Virtual Memory.

Unit Outcomes:

- Explain how processor interacts with external peripherals through Interface units
- Compare different modes of data transfer
- Illustrate procedures for serial data transmission
- Describe concept of memory hierarchy composed of cache memory, main memory, and auxiliary memory
- Explain organization and operation of associative memories

Course Outcomes:

CO1: Conceptualize basics of organizational and architectural issues of a digital computer

CO2: Emphasize representation of data types, numbers employed in arithmetic operations and binary coding of symbols used in data processing

CO3: Develop low-level programs to perform different basic instructions **CO4**: Evaluate various modes of data transfer between CPU and I/O devices **CO5**: Analyze various issues related to memory hierarchy **CO6**: Design basic computer system using the major components

TEXT BOOKS:

1. M. Morris Mano, "Computer System Architecture", 3rd edition, PearsonEducation, 2017.

REFERENCES:

1. Carl Hamacher, ZvonkoVranesic and SafwatZaky, "Computer Organization", 5th Edition McGrawHill,

2. John D. Carpinelli, "Computer Systems Organization and Architecture", 15th reprint Pearson Education,2018,

3. William Stallings, "Computer Organization and Architecture: Designing for Performance", 8thEdition, Pearson

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3	0	0	3

Software Engineering

Course Objectives:

- To learn the basic concepts of software engineering and life cycle models
- To explore the issues in software requirements specification and enable to write SRS documents for software development problems
- To elucidate the basic concepts of software design and enable to carry out procedural and object oriented design of software development problems
- To understand the basic concepts of black box and white box software testing and enable to design test cases for unit, integration, and system testing
- To reveal the basic concepts in software project management

Unit – I: Basic concepts in software engineering and software project management

Basic concepts: abstraction versus decomposition, evolution of software engineering techniques,

Software development life cycle (SDLC) models: Iterative waterfall model, Prototype model, Evolutionary model, Spiral model, RAD model, Agile models, software project management: project planning, project estimation, COCOMO, Halstead's Software Science, project scheduling, staffing, Organization and team structure, risk management, configuration management.

Unit Outcomes:

Student should be able to

1. Recognize the basic issues in commercial software development.
2. Summarize software life cycle models.
3. Infer Workout project cost estimates using COCOMO and schedules using PERT and GANTT charts.

Unit – II: Requirements analysis and specification

The nature of software, The Unique nature of Webapps, Software Myths, Requirements gathering and analysis, software requirements specification, Traceability, Characteristics of a Good SRS Document, IEEE 830 guidelines, representing complex requirements using decision tables and decision trees, overview of formal system development techniques. axiomatic specification, algebraic specification.

Unit Outcomes:

Student should be able to

1. Identify basic issues in software requirements analysis and specification.
2. Develop SRS document for sample problems using IEEE 830format.
3. Develop algebraic and axiomatic specifications for simple problems.

Unit – III : Software Design

Good Software Design, Cohesion and coupling, Control Hierarchy: Layering, Control Abstraction, Depth and width, Fan-out, Fan-in, Software design approaches, object oriented vs. function oriented design. Overview of SA/SD methodology, structured analysis, Data flow diagram, Extending DFD technique to real life systems, Basic Object oriented concepts, UML Diagrams, Structured design, Detailed design, Design review, Characteristics of a good user interface, User Guidance and Online

Help, Mode-based Vs Mode-less Interface, Types of user interfaces, Component-based GUI development, User interface design methodology: GUI design methodology.

Unit Outcomes

Student should be able to

1. Identify the basic issues in software design.
2. Apply the structured, object oriented analysis and design (SA/SD) technique.
3. Recognize the basic issues in user interface design.

Unit – IV : Coding and Testing

Coding standards and guidelines, code review, software documentation, Testing, Black Box Testing, White Box Testing, debugging, integration testing, Program Analysis Tools, system testing, performance testing, regression testing, Testing Object Oriented Programs.

Unit Outcomes:

Student should be able to

1. Identify the basic issues in coding practice.
2. Recognize the basic issues in software testing.
3. Design test cases for black box and white box testing.

Unit – V: Software quality, reliability, and other issues

Software reliability, Statistical testing, Software quality and management, ISO 9000, SEI capability maturity model (CMM), Personal software process (PSP), Six sigma, Software quality metrics, CASE and its scope, CASE environment, CASE support in software life cycle, Characteristics of software maintenance, Software reverse engineering, Software maintenance processes model, Estimation maintenance cost. Basic issues in any reuse program, Reuse approach, Reuse at organization level.

Unit Outcomes:

Student should be able to

1. Summarize various methods of software quality management.
2. Instruct the quality management standards ISO 9001, SEI CMM, PSP, and Six Sigma.
3. Outline software quality assurance, quality measures, and quality control.
4. Identify the basic issues in software maintenance, CASE support, and software reuse.

Course Outcomes:

Student should be able to

- Obtain basic software life cycle activity skills.
- Design software requirements specification for given problems.
- Implement structure, object oriented analysis and design for given problems.
- Design test cases for given problems.
- Apply quality management concepts at the application level.

Text Book:

1. Rajib Mall, “Fundamentals of Software Engineering”, 5th Edition, PHI,2018.
2. Pressman R, “Software Engineering- Practioner Approach”, McGraw Hill.

Reference Books:

1. Somerville, “Software Engineering”, Pearson 2.

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Operating Systems

Course Objectives:

The course is designed to

- Understand basic concepts and functions of operating systems Understand the processes, threads and scheduling algorithms.
- Provide good insight on various memory management techniques
- Expose the students with different techniques of handling deadlocks
- Explore the concept of file-system and its implementation issues
- Familiarize with the basics of Linux operating system
- Implement various schemes for achieving system protection and security

UNIT I

Operating Systems Overview: Introduction, Operating system functions, Operating systems operations, Computing environments, Open-Source Operating Systems

System Structures: Operating System Services, User and Operating-System Interface, systems calls, Types of System Calls, system programs, Operating system Design and Implementation, Operating system structure, Operating system debugging, System Boot.

Unit Outcomes:

- Identify major components of operating systems
- Understand the types of computing environments
- Explore several open source operating systems
- Recognize operating system services to users, processes and other systems

UNIT II

Process Concept: Process scheduling, Operations on processes, Inter-process communication, Communication in client server systems.

Multithreaded Programming: Multithreading models, Thread libraries, Threading issues, Examples.

Process Scheduling: Basic concepts, Scheduling criteria, Scheduling algorithms, Multiple processor scheduling, Thread scheduling, Examples.

Inter-process Communication: Race conditions, Critical Regions, Mutual exclusion with busy waiting, Sleep and wakeup, Semaphores, Mutexes, Monitors, Message passing, Barriers, Classical IPC Problems - Dining philosophers problem, Readers and writers problem.

Unit Outcomes:

- Understand the importance, features of a process and methods of communication between processes.
- Improving CPU utilization through multi programming and multithreaded programming
- Examine several classical synchronization problems

UNIT III

Memory-Management Strategies: Introduction, Swapping, Contiguous memory allocation, Paging, Segmentation, Examples.

Virtual Memory Management: Introduction, Demand paging, Copy on-write, Page replacement, Frame allocation, Thrashing, Memory-mapped files, Kernel memory allocation, Examples.

Unit Outcomes:

- Examine the various techniques of allocating memory to processes Summarize how paging works in contemporary computer systems Understanding the benefits of virtual memory systems.

UNIT IV

Deadlocks: Resources, Conditions for resource deadlocks, Ostrich algorithm, Deadlock detection And recovery, Deadlock avoidance, Deadlock prevention.

File Systems: Files, Directories, File system implementation, management and optimization. Secondary-Storage Structure: Overview of disk structure, and attachment, Disk scheduling, RAID structure, Stable storage implementation. **Unit Outcomes:**

Investigate methods for preventing/avoiding deadlocks

Examine file systems and its interface in various operating systems

Analyze different disk scheduling algorithms

UNIT V

System Protection: Goals of protection, Principles and domain of protection, Access matrix, Access control, Revocation of access rights.

System Security: Introduction, Program threats, System and network threats, Cryptography as a security, User authentication, implementing security defenses, firewalling to protect systems and networks, Computer security classification.

Case Studies: Linux, Microsoft Windows.

Unit Outcomes:

- Infer various schemes available for achieving system protection. Acquiring knowledge about various countermeasures to security attacks Outline protection and security in Linux and Microsoft Windows.

Course Outcomes

By the end of this course students will be able to:

- Realize how applications interact with the operating system Analyze the functioning of a kernel in an Operating system.
- Summarize resource management in operating systems
- Analyze various scheduling algorithms
- Examine concurrency mechanism in Operating Systems
- Apply memory management techniques in design of operating systems
- Understand the functionality of file system
- Compare and contrast memory management techniques.
- Understand the deadlock prevention and avoidance.
- Perform administrative tasks on Linux based systems.

Text Books:

1. Silberschatz A, Galvin P B, and Gagne G, Operating System Concepts, 9th edition, Wiley, 2016.

2.Tanenbaum A S, Modern Operating Systems, 3rd edition, Pearson Education, 2008. (Topics: Inter-process Communication and File systems.)

Reference Books:

1.Tanenbaum A S, Woodhull A S, Operating Systems Design and Implementation, 3rd edition, PHI, 2006.

2.Dhamdhere D M, Operating Systems A Concept Based Approach, 3rd edition, Tata McGraw-Hill, 2012.

3.Stallings W, Operating Systems -Internals and Design Principles, 6th edition, Pearson Education, 2009
4.Nutt G, Operating Systems, 3rd edition, Pearson Education, 2004

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B.Tech – II Year 2nd Sem (Computer Science & Engineering)	**L**	**T**	**P**	**C**
	3	**0**	**0**	**3**

Managerial Economics & Financial Analysis

Course Objectives:

- The objective of this course is to inculcate the basic knowledge to the students with the concepts of Economics & Demand to make them effective business decision makers.
- To understand fundamentals of Production & Cost Concepts which is an important subject helps to the Technocrats to take certain business decisions in the processes of optimum utilization of resources.
- To know the various types of Market Structures & pricing methods and its strategies & Trade Blocks.
- To give an overview on investment appraisal methods to promote the students to learn how to plan long-term investment decisions.
- To provide fundamental skills about accounting and to explain the process of preparing accounting statements & analysis for effective business decisions

Unit I: INTRODUCTION TO MANAGERIAL ECONOMICS

Managerial Economics – Definition- Nature- Scope - Contemporary importance of Managerial Economics - 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 -Relationship of Managerial Economics with Financial Accounting and Management.

UNIT II: THEORY OF PRODUCTION AND COST ANALYSIS

Production Function- Least cost combination- Short-run and Long- run production function- Isoquantsand Isocosts, 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.

UNIT III: INTRODUCTION TO MARKETS AND NEW ECONOMIC ENVIRONMENT

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.

UNIT IV: CAPITAL AND CAPITAL BUDGETING

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)

UNIT V: INTRODUCTION TO FINANCIAL ACCOUNTING AND ANALYSIS

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).

Course outcomes:

CO1: Capable of analyzing fundamentals of Economics such as Demand, Elasticity &Forecasting methods

CO2: To apply production, pricing & supply concepts for effective business administration

CO3: Students can able to identify the influence of various markets, the forms of business organization and it's International Economic Environment.

CO4: Analyze how to invest adequate amount of capital in order to get maximum return from selected business activity.

CO5:Prepare and analyze accounting statements like income & expenditure statement, balance sheet apart from the fundamental knowledge, to understand financial performance of the business and to initiate the appropriate decisions to run the business profitably.

TEXT BOOKS:

1. Varshney & Maheswari: Managerial Economics, Sultan Chand, 2013.
2. Ahuja H.L Managerial economics. S.Chand, 3/e, 2013

REFERENCES

1. Aryasri: Managerial Economics and Financial Analysis, 4/e, TMH, 2013
2. S.A. Siddiqui and A.S. Siddiqui: Managerial Economics and Financial Analysis, New Age International,. 2013
3. Joseph G. Nellis and David Parker: Principles of Business Economics, Pearson, 2/e, New Delhi.
4. Domnick Salvatore: Managerial Economics in a Global Economy, Cengage, 2013.

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B.Tech – II Year 2nd Sem (Computer Science & Engineering)

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Operating Systems Lab

Course Objectives:

- To provide an understanding of the design aspects of operating system concepts through
- Simulation Introduce basic UNIX commands, system call interface for process management, inter process.
- Communication and I/O in Unix Course Outcomes: Simulate and implement operating system concepts such as scheduling, deadlock.
- Management, file management and memory management. Able to implement C programs using Unix system calls

LIST OF EXPERIMENTS:

1. Write C programs to simulate the following CPU Scheduling algorithms a) FCFS b) SJF c) Round Robin d) priority
2. Write programs using the I/O system calls of UNIX/LINUX operating system (open, read, write, close, fcntl, seek, stat, opendir, readdir)
3. Write a C program to simulate Bankers Algorithm for Deadlock Avoidance and Prevention.
4. Write a C program to implement the Producer – Consumer problem using semaphores using UNIX/LINUX system calls.
5. Write C programs to illustrate the following IPC mechanisms a) Pipes b) FIFOs c) Message Queues d) Shared Memory
6. Write C programs to simulate the following memory management techniques a) Paging b) Segmentation
7. Write a C program to simulate the concept of Dining-philosophers problem
8. Write a C program to simulate the following contiguous memory allocation Techniques a) Worst fit b) Best fit c) First fit.
9. Write a C program to simulate disk scheduling algorithms. a) FCFS b) SCAN c) C-SCAN
10. Simulate all File Organization Techniques a) Single level directory b) Two level directory

TEXT BOOKS: 1. Operating System Principles- Abraham Silberchatz, Peter B. Galvin, Greg Gagne 7th Edition, John Wiley
2. Advanced programming in the Unix environment, W.R.Stevens, Pearson education.

REFERENCE BOOKS: Operating Systems – Internals and Design Principles, William Stallings, Fifth Edition– 2005, Pearson Education/PHI

Sri Krishnadevaraya University College of Engineering & Technology

B.Tech – II Year 2nd Sem (Computer Science & Engineering)

L	T	P	C
0	0	3	1.5

Software Engineering Lab

Course Objectives:

- To Learn and implement the fundamental concepts of software Engineering.
- To explore functional and non functional requirements through SRS.
- To practice the various design diagrams through appropriate tool.
- To learn to implement various software testing strategies.

List of Experiments:

1 Draw the Work Breakdown Structure for the system to be automated

2 Schedule all the activities and sub-activities Using the PERT/CPM charts

3 Define use cases and represent them in use-case document for all the stakeholders ofthe system to be automated

4 Identify and analyze all the possible risks and its risk mitigation plan for the system tobe automated

5 Diagnose any risk using Ishikawa Diagram (Can be called as Fish Bone Diagram or Cause& Effect Diagram)

6 Define Complete Project plan for the system to be automated using Microsoft Project Tool

7 Define the Features, Vision, Bussiness objectives, Bussiness rules and stakeholders in the vision document

8 Define the functional and non-functional requirements of the system to be automated by using Use cases and document in SRS document 9 Define the following tracebility matrices :

1. UsecaseVs. Features
2. Functional requirements Vs.Usecases

10 Estimate the effort using the following methods for the system to be automated:

1. Function point metric
2. Usecase point metric

11 Develop a tool which can be used for quantification of all the non-functional requirements

12 Write C/C++/Java/Python program for classifying the various types of coupling.

13 Write a C/C++/Java/Python program for classifying the various types of cohesion.

14 Write a C/C++/Java/Python program for object oriented metrics for design proposed Chidamber and kremer . (Popularly called as CK metrics) 66 Page

15 Convert the DFD into appropriate architecture styles.

16 Draw complete class diagram and object diagrams using Rational tools

17 Define the design activities along with necessary artifacts using Design Document.

18. Reverse Engineer any object-oriented code to an appropriate class and object diagrams.

19. Test a piece of code which executes a specific functionality in the code to be tested and asserts a certain behavior or state using Junit.

20. Test the percentage of code to be tested by unit test using any code coverage tools

21 Define an appropriate metrics for at least 3 quality attributes for any software application of your interest.

22 Define a complete call graph for any C/C++ code. (Note: The student may use any tool that generate call graph for source code)

Unit Outcomes

Student is able to

- Acquaint with historical and modern software methodologies
- Understand the phases of software projects and practice the activities of each phase
- Practice clean coding
- Take part in project management
- Adopt skills such as distributed version control, unit testing, integration testing, build management, and deployment

Sri Krishnadevaraya University College of Engineering & Technology					
Dept. of Computer Science and Engineering					
III Year 1st Semester 1					
S.No	**Course Code**	**Course Name**	**Category**	**L-T-P**	**Credits**
1.		Life Science for Engineers	BS	3-0-0	3
2.		Principles of Programming Languages	PC	3-0-0	3
3.		Computer Networks	PC	3-0-0	3
4.		Unix Programming	PC	3-0-0	3
5.		Object Oriented Analysis and Design Advanced Computer Architecture Mobile Application Development	PE-I	3-0-0	3
6.		Open Elective-I	OE-I	3-0-0	3
7.		Computer Networks Lab	PC	0-0-3	1.5
8.		UML Lab	PC	0-0-3	1.5
9.		Socially Relevant Project(15hrs/Sem)	PR	0-0-0	0.5
				Total Credits	**21.5**

Category	**CREDITS**
Professional core courses	12
Professional Elective courses	03
Basic Science Course	03
Open Elective Course/Job oriented elective	03
Socially Relevant Project(15hrs/Sem)	0.5
TOTAL	21.5

Sri Krishnadevaraya University College of Engineering & Technology

B.Tech III – I Sem (Computer Science and Engineering)

L	T	P	C
3	0	0	3

Life Sciences for Engineers

Unit I: Introduction to Basic Biology
Cell as Basic unit of life, cell theory, Cell shapes, Cell structure, Cell cycle. Chromosomes.Prokaryotic and eukaryotic Cell. Plant Cell, Animal Cell, Plant tissues and Animal tissues, Briefintroduction to five kingdoms of classification.

Unit II: Introduction to Biomolecules
Carbohydrates, lipids, proteins, Vitamins and minerals, Nucleic acids (DNA and RNA) and their types. Enzymes, Enzyme application in Industry. Large scale production of enzymes by Fermentation.

Unit III: Human Physiology
Nutrition: Nutrients or food substances. Digestive system, Respiratory system, (aerobic and anaerobic Respiration). Respiratory organs, respiratory cycle. Excretory system.

Unit IV: Introduction to Molecular Biology and recombinant DNA Technology
Prokaryotic gene and Eukaryotic gene structure. DNA replication, Transcription and Translation. rDNA technology. Introduction to gene cloning.

Unit V: Application of Biology
Brief introduction to industrial Production of Enzymes, Pharmaceutical and therapeutic Proteins,Vaccines and antibodies. Basics of biosensors, biochips, Bio fuels, and Bio Engineering. Basics of Production of Transgenic plants and animals.

Text books:
1. P.K.Gupta, Cell and Molecular Biology, 5th Edition, Rastogi Publications -
2. U. Satyanarayana. Biotechnology, Books & Allied Ltd 2017

Reference Books:
1. N. A. Campbell, J. B. Reece, L. Urry, M. L. Cain and S. A. Wasserman, “Biology: A Global Approach”, Pearson Education Ltd, 2018.
2. T Johnson, Biology for Engineers, CRC press, 2011
3. J.M. Walker and E.B. Gingold, Molecular Biology and Biotechnology 2nd ed.. Panima Publications. PP 434.
4. David Hames, Instant Notes in Biochemistry –2016
5. Phil Tunner, A. Mctennan, A. Bates & M. White, Instant Notes – Molecular Biology –-2014

Sri Krishnadevaraya University College of Engineering & Technology

B.Tech III – I Sem (Computer Science and Engineering)

L	T	P	C
3	0	0	3

Principles of Programming Languages

UNIT I

Preliminary Concepts: Reasons for studying, concepts of programming languages, Programming domains, Language Evaluation Criteria, influences on Language design, Language categories, Programming

Paradigms: Imperative, Object Oriented, functional Programming, Logic Programming. Programming Language Implementation, Compilation and Virtual Machines, Programming environments.

UNIT II

Syntax and Semantics: general Problem of describing Syntax and Semantics, formal methods of describing syntax, BNF, EBNF for common programming languages features.

Data types: Introduction, primitive, character, user defined, array, union, pointer and reference types, design and implementation uses related to these types. Names, Variable, concept of binding, type checking, strong typing, type compatibility, variable initialization.

UNIT III

Expressions and Statements: Arithmetic relational and Boolean expressions, Short circuit evaluation mixed mode assignment, Assignment Statements,

Control Structures: Statement Level, Compound Statements, Selection, Iteration, Unconditional Statements.

UNIT IV

Subprograms and Blocks: Fundamentals of sub-programs, Scope and lifetime of variable, static and dynamic scope, Design issues of subprograms and operations, parameter passing methods, overloaded sub-programs, generic sub-programs, parameters that are sub-program names.

Abstract Data types: Abstractions and encapsulation, introductions to data abstraction, design issues, language examples, object oriented programming in C++, Java.

Exception handling: Exceptions, exception Propagation, Exception handler in C++ and Java.

UNIT V

Logic Programming Language : Introduction and overview of logic programming, basic elements of prolog, application of logic programming.

Functional Programming Languages: Introduction, fundamentals of FPL, LISP, ML, Haskell, application of Functional Programming Languages.

Scripting Language: Pragmatics, Key Concepts, **Case Study :** Python – Values and Types, Variables , Storage and Control, Bindings and Scope, Procedural Abstraction, Data Abstraction.

TEXT BOOKS:

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

REFERENCES:

1. Programming Languages, Second Edition, A.B. Tucker, R.E. Noonan, TMH.

Sri Krishnadevaraya University College of Engineering & Technology

B.Tech III – I Sem (Computer Science and Engineering)

L	T	P	C
3	0	0	3

Computer Networks

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

UNIT II: The Data Link Layer: Data link Layer Design Issues, Elementary Data Link Protocols, SlidingWindow Protocols.
The Medium Access Control sub layer: Multiple Access protocols, Ethernet- Ethernet Cabling,Manchester Encoding, The Ethernet MAC Sub layer Protocol.Ethernet Performance, Switched Ethernet, Fast Ethernet. Wireless LANs- The 802.11 Protocol Stack, the802.11 Physical Layer, the 802.11 MAC Sub Layer Protocol, the 802.11 Frame Structure.

UNIT III: The Network Layer: Network Layer Design Issues, Routing Algorithms(Shortest path, Flooding,Distance Vector, Link state and Hierarchical routing, Broad cast routing, Multicast routing), CongestionControl Algorithms,Internetworking.

UNIT IV: The Transport Layer: The Transport Service, Elements of Transport Protocols, The Internet TransportProtocols: UDP, TCP.

UNTI V: The Application Layer: DNS-The Domain Name System, Electronic Mail, The World Wide Web.Network Security: Cryptography, Symmetric-Key Algorithms, Public-Key Algorithms, Digital Signatures.

TEXT BOOKS:
1. Computer Networks, Andrew S. Tanenbaum, Fouth Edition, Pearson Education.

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

Sri Krishnadevaraya University College of Engineering & Technology

B.Tech III – I Sem (Computer Science and Engineering)

L	T	P	C
3	0	0	3

Unix Programming

UNIT I

Introduction: Why Unix?, Computer System, The Unix Environment, Unix structure, Accessing Unix, Commoncommands: date, cal, who, passwd, echo, man, lpr. Other useful commands: tty, clear, sty, script, uname, bc, tar,gzip, cpio,finger,arp,ftp,telnet,rlogin. Vi editor: Editor concepts, The vi editor, Modes, Commands.

UNIT II

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

UNIT III

Introduction to Shells: Unix Session, Standard Streams, Redirection, Pipes, Tee Command, CommandExecution, Command-Line Editing, Quotes, Command Substitution, Job Control, Aliases, Variables, PredefinedVariables, Options, Shell/Environment Customization.
Filters: Filters and Pipes, Concatenating files, Display Beginning and End of files, Cut and Paste, Sorting,Translating Characters, Files with Duplicate Lines, Count characters, Words or Lines, Comparing Files.

UNIT IV

Grep : Operation, grep Family, Searching for File Content.
awk: Execution, Fields and Records, Scripts, Operations, Patterns, Actions, Associative Arrays, StringFunctions, String Functions, Mathematical Functions, User – Defined Functions, Using System commands inawk, Applications, awk and grep.

UNIT V

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

TEXT BOOKS:

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

Sri Krishnadevaraya University College of Engineering & Technology

B.Tech III – I Sem (Computer Science and Engineering)

L	T	P	C
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Object Oriented Analysis and Design

(Professional Elective-I)

UNIT – I

Introduction to UML: Importance of modeling, principles of modeling, object oriented modeling, Conceptualmodel of the UML, Architecture, Software Development Life Cycle.

UNIT - II

Basic Structural Modeling: Classes, Relationships, common Mechanisms, and diagrams.

Advanced Structural Modeling: Advanced classes, advanced relationships, Interfaces, Types and Roles,Packages.

UNIT - III

Class & Object Diagrams: Terms, concepts, modeling techniques for Class & Object Diagrams.

Basic Behavioral Modeling-: Interactions, Interaction diagrams. Use cases,
Use case Diagrams, Activity Diagrams.

UNIT - IV

Advanced Behavioral Modeling: Events and signals, state machines, processes and Threads, time and space,state chart diagrams.

UNIT-V

Architectural Modeling: Component, Deployment, Component diagrams and Deployment diagrams.

Case Study: The Unified Library application, ATM application.

TEXT BOOKS:

1. Grady Booch, James Rumbaugh, Ivar Jacobson: The Unified Modeling Language User Guide, PearsonEducation.

REFERENCE BOOKS:

1. Meilir Page-Jones: Fundamentals of Object Oriented Design in UML, Pearson Education.

2. Pascal Roques: Modeling Software Systems Using UML2, WILEYDreamtech India Pvt. Ltd.

3. AtulKahate: Object Oriented Analysis & Design, The McGraw – Hill Companies.

4. Mark Priestley: Practical Object-Oriented Design with UML,TATAMcGrawHill

5. Appling UML and Patterns: An introduction to Object – Oriented Analysis and Design and UnifiedProcess, Craig Larman, Pearson Education.

6. Hans-Erik Eriksson, Magnus Penker, Brian Lyons, David Fado: UML 2 Toolkit, WILEY-

Sri Krishnadevaraya University College of Engineering & Technology

B.Tech III – I Sem (Computer Science and Engineering)

L	T	P	C
3	0	0	3

Advanced Computer Architecture

(Professional Elective-I)

UNIT-I

TheoryofParallelism,Parallelcomputermodels,TheStateofComputing,MultiprocessorsandMulticomputers, Multivector and SIMD Computers, PRAM and VLSI models, Architecturaldevelopmenttracks,Programandnetworkproperties,Conditionsofparallelism,ProgrampartitioningandScheduling,ProgramflowMechanisms,SysteminterconnectArchitectures.

UNIT-II

Principals of Scalable performance, Performance metrics and measures, Parallel Processingapplications, Speed up performance laws, Scalability Analysis and Approaches, HardwareTechnologies,ProcessesandMemoryHierarchy,AdvancedProcessorTechnology,SuperscalarandVectorProcessors,MemoryHierarchy Technology,VirtualMemory Technology.

UNIT-III

Bus Cache and Shared memory,Back plane bus systems,CacheMemoryorganizations,Shared-Memory Organizations, Sequential and weak consistency models, Pipelining and superscalartechniques,LinearPipelineProcessors,NonLinearPipelineProcessors,InstructionPipelinedesign, Arithmetic pipeline design, superscalarpipelinedesign.

UNIT-IV

Parallel and Scalable Architectures ,Multiprocessors and Multicomputers,Multiprocessor system interconnects, cache coherence and synchronization mechanism, Three GenerationsofMulticomputers,MessagepassingMechanisms,MultivetorandSIMDcomputers,VectorProcessingPrincipals,MultivectorMultiprocessors,CompoundVectorprocessing,SIMDcomputerOrganizations,The connection machineCM-5

UNIT-V

Scalable, Multithreaded and Dataflow Architectures, Latency-hiding techniques, Principals of Multithreading, Fine-Grain Multi computers, Scalable and multithreaded Architectures, Data flow and hybrid Architectures.

TEXTBOOK:

1. AdvancedComputerArchitectureSecondEdition, KaiHwang, TataMcGrawHillPublishers.

REFERENCEBOOKS:

1. Computer Architecture, Fourth edition, J. L. Hennessy and D.A. Patterson. ELSEVIER.R18B.Tech. CSE Syllabus JNTUHYDERABAD
2. AdvancedComputerArchitectures,S.G.Shiva,SpecialIndianedition,CRC,Taylor&Francis.
3. IntroductiontoHighPerformanceComputingforScientistsandEngineers,G.HagerandG.Wellein,CRC Press, Taylor & Francis Group.
4. AdvancedComputerArchitecture,D.Sima,T.Fountain,P.Kacsuk,Pearsoneducation.
5. ComputerArchitecture,B.Parhami, OxfordUniv.Press.

Sri Krishnadevaraya University College of Engineering & Technology

B.Tech III – I Sem (Computer Science and Engineering)

L	T	P	C
3	0	0	3

Mobile Application Development
(Professional Elective-I)

UNIT I

J2ME Overview

Java 2 Micro Edition and the World of Java, Inside J2ME, J2ME and Wireless Devices
Small Computing Technology: Wireless Technology, Radio Data Networks, Microwave Technology, MobileRadio Networks, Messaging, Personal Digital Assistants

UNIT II

J2ME Architecture and Development Environment

J2ME Architecture, Small Computing Device Requirements, Run-Time Environment, MIDlet Programming,Java Language for J2ME, J2ME Software Development Kits, Hello World J2ME Style, Multiple MIDlets in aMIDlet Suite, J2ME Wireless ToolkitJ2ME Best Practices and Patterns: The Reality of Working in a J2ME World, Best Practices

UNIT III

Commands, Items, and Event ProcessingJ2ME User Interfaces, Display Class, the Palm OS Emulator, Command Class, Item Class, Exception HandlingHigh-Level Display: Screens: Screen Class, Alert Class, Form Class, Item Class, List Class, Text Box Class,Ticker ClassLow-Level Display: Canvas: The Canvas, User Interactions, Graphics, Clipping Regions, Animation

UNIT IV

Record Management System:

Record Storage, Writing and Reading Records, Record Enumeration, Sorting Records, Searching Records,Record ListenerJDBC Objects: The Concept of JDBC, JDBC Driver Types, JDBC Packages, Overview of the JDBC Process,Database Connection, statement Objects, Result set, Transaction Processing, Metadata, Data Types, Exceptions

UNIT V

Generic Connection Framework

The Connection, Hypertext Transfer Protocol, Communication Management Using HTTP Commands, SessionManagement, Transmit as a Background Process

TEXT BOOKS:

1. J2ME: The Complete Reference, James Keogh, Tata McGrawHill.
2. Programming for Mobile and Remote Computers,G.T.Thampi,dreamtech press.

Sri Krishnadevaraya University College of Engineering & Technology

B.Tech III – I Sem	**(Computer Science and Engineering)**	**L**	**T**	**P**	**C**
		0	**0**	**3**	**1.5**

Computer Networks Lab

LIST OF COMPUTER NETWORKS EXPERIMENTS:

1. Study different types of Network cables (Copper and Fiber) and prepare cables (Straight and Cross) to connect Two or more systems. Use crimping tool to connect jacks. Use LAN testerto connect the cables.
Install and configure Network Devices: HUB, Switch and Routers. Consider both manageable and non-manageable switches. Do the logical configuration of the system. Set the bandwidth of differentports.
InstallandConfigureWiredandWirelessNICandtransferfilesbetweensystemsinWiredLAN and Wireless LAN. Consider both adhoc and infrastructure mode ofoperation.

2. Work with the commands Ping, Tracert, Ipconfig, pathping, telnet, ftp, getmac, ARP, Hostname, Nbtstat, netdiag, and Nslookup

3. Use Sniffers for monitoring network communication(Ethereal)

4. FindalltheIPaddressesonyournetwork.Unicast,Multicast,andBroadcastonyournetwork.

5. Use Packet tracer software to build network topology and configure using Distance vector routing protocol.

6. UsePackettracersoftwaretobuildnetworktopologyandconfigureusingLinkStaterouting protocol.

7. Using JAVA RMI Write a program to implement BasicCalculator

8. Implement a Chatting application using JAVA TCP and UDPsockets.

9. Hello command is used to know whether the machine at the other end is working or not. Echo command is used to measure the round trip time to the neighbour. Implement Hello and Echo commands using JAVA.

10. Use Ethereal tool to capture the information about packets.

11. Install Network Simulator 2/3. Create a wired network using dumbbell topology. Attach agents, generate both FTP and CBR traffic, and transmit the traffic. Vary the data rates and evaluate the performance using metric throughput, delay, jitter and packet loss.

12. Create a static wireless network. Attach agents, generate both FTP and CBR traffic, and transmit the traffic. Vary the data rates and evaluate the performance using metric throughput, delay, jitter and packet loss.

13. Create a mobile wireless network. Attach agents, generate both FTP and CBR traffic, and transmit the traffic. Vary the data rates and evaluate the performance using metric throughput, delay, jitter and packet loss.

Sri Krishnadevaraya University College of Engineering & Technology

B.Tech III – I Sem	**(Computer Science and Engineering)**	**L**	**T**	**P**	**C**
		0	**0**	**3**	**1.5**

UML Lab

LIST OF EXPERIMENTS:

Draw standard UML diagrams using an UML modeling tool for a given case study and map design to code and implement a 3 layered architecture. Test the developed code and validate whether the SRS is satisfied.

1. Identify a software system that needs to be developed.
2. Document the Software Requirements Specification(SRS)for the identified system.
3. Identify use cases and develop the Use Case model.
4. Identify the conceptual classes and develop a Domain Model and also derive a Class Diagram from that.
5. Using the identified scenarios, find the interaction between objects and represent themusing

a. UML Sequence and Collaboration Diagrams

6. DrawrelevantStateChartandActivityDiagramsforthesamesystem.
7. Implement the system as per the detaileddesign
8. Test the software system for all the scenarios identified as per the usecase diagram
9. Improve the reusability and maintainability of the software system by applying appropriate design patterns.
10. Implement them odified system and test it for various scenarios
11. Write a program to find the solution for the knapsack problem using the greedy method.
12. Write a program to find minimum cost spanning tree using Prim’s algorithm
13. Write a program to find minimum cost spanning tree using Kruskal’s algorithm
14. Write a program to find a single source shortest path for a given graph.
15. Write a program to find the solution for job sequencing with deadlines problems.
16. Write a program to find the solution for a 0-1 knapsack problem using dynamic programming.
17. Write a program to solve Sum of subsets problem for a given set of distinct numbers using backtracking.
18. Implement N Queen's problem using Back Tracking.

Sri Krishnadevaraya University College of Engineering & Technology					
Dept. of Computer Science and Engineering					
III Year 2nd Semester					
S.No	**Course Code**	**Course Name**	**Category**	**L-T-P**	**Credits**
1		Compiler Design	PC	3-0-0	3
2		Artificial Intelligence	PC	3-0-0	3
3		Data ware Housing and Data Mining	PC	3-0-0	3
4		Management Science	HS	3-0-0	3
5		Software Testing Natural Language Processing Web Technologies	PE-II	3-0-0	3
6		Open Elective -II	OE-II	3-0-0	3
7		ST /NLP/ WT Lab	PC	0-0-3	1.5
8		CD and DM Lab	PC	0-0-3	1.5
9		Socially Relevant Project(15hrs/Sem)	PR	0-0-0	0.5
10		Industrial Training/ Internship/ Research Projects in National Laboratories/Academic Institutions	- - -	- - -	- - -
11		Comprehensive Online Examination			
				Total credits	**21.5**

Category	**CREDITS**
Professional Core Courses	12
Professional Elective Courses	03
Open Elective Course/Job oriented elective	03
Humanities and Social Science Course	03
Socially Relevant Project(15hrs/Sem)	0.5
TOTAL	21.5

Sri Krishnadevaraya University College of Engineering & Technology

B.Tech III – II Sem (Computer Science and Engineering)

L	T	P	C
3	0	0	3

Compiler Design

UNIT-I

Overview of compilation: Phases of compilation, Lexical analysis, regular Grammar & regular Expressions for common Programming language features, Pass & Phases translation, interpretation, bootstrapping, datas tructures in compilation, LEX

UNIT-II

Parsing: CFG, Top down parsing, backtracking, recursive descent parsing, Preprocessing steps required for predictive parsing, Predictive parsing, LL(1).

UNIT-III

Bottom up Parsing: Shift Reduce parsing, LR and LALR parsing, Error recovery in parsing, handling ambiguous grammar, YACC.

UNIT-IV

Semantic analysis: Intermediate forms of source Programs-abstract syntax tree, polish notation and Three address code. Attributed grammars, Syntax directed translation, Conversion of popular Programming language constructs into Intermediate code forms, Type checker.

UNIT-V

Symbol Tables: Symbol table format, organization for block structures languages, hashing, tree structuresrepresentation of space information. Block structures and non block structure storage allocation: static, Code optimization: Consideration for Optimization, Scope of Optimization, local Optimization, loopOptimization, global Optimization, machine dependent code Optimization.

TEXT BOOKS:

1. Principles of complier design –A.V.Aho.J.D.Ullman;Person Education.
2. Modern Compiler Implementation in C-Andrew N.Appel,Cambridge University Press.

REFERENCES:

1. Lex&yacc-John R.Levine, Tony Mason,Doug Brown, O'reilly
2. Modern Complier Degin-Dick Grune, Henry E.Bal, Cariel T.H.Jacobs, Wiley dreamtech.
3. Engineering a Complier –Cooper & Linda, Elsevier.
4. Compiler Construction, Louden, Thomson

Sri Krishnadevaraya University College of Engineering & Technology

B.Tech III – II Sem	**(Computer Science and Engineering)**	**L**	**T**	**P**	**C**
		3	**0**	**0**	**3**

Artificial Intelligence

UNIT- I

What is Artificial Intelligence? - The AI problems, the underlying Assumption, What is an AI Technique? The level of the model, Criteria for success, Problems, problem spaces, and search - defining the problem as a state space search, production systems, problem characteristics, production system characteristics, issues in the design of search programs.

UNIT - II

HEURISTIC SEARCH TECHNIQUES - Generate and test- travelling sales man problem, Hill climbing, Best first search, problem reduction, constraint satisfaction, Mean ends analysis 35

UNIT - III

KNOWLEDGE REPRESENTATION - Representations and mappings, approaches to knowledge representation, The Frame Problem. Using Predicate logic - Representing simple facts in logic, Representing Instance and Isa relationships, Resolution.
REPRESENTING KNOWLEDGE USING RULES - Procedural versus declarative knowledge, logic programming, forward versus backward reasoning, matching.

UNIT – IV

WEAK SLOT AND FILLER STRUCTURES - Semantic nets, Frames. STRONG SLOT AND FILLER STRUCTURES - Conceptual dependency, scripts, CYC GAME PLAYING - MIN MAX search procedure, Adding Alpha Beta cutoffs.

UNIT -V

Learning – Learning from Observations – Forms – inductive - Learning Decision Trees, Essemble Learning, Knowledge in Learning – A Logical Formulation of Learning, Knowledge in Learning, EBL, Learning Using Relevance information, Inductive Logic Learning, Passive Active and Generalization in Reinforcement Learning. case studies : MYCIN, PROSPECTOR, XCON.

TEXT BOOKS:

1. Elaine Richie Kevin Knight,”Artificial Intelligence”, TMH.
2. Stuart Russell, Peter Norvig,”Artificial Intelligence A Modern Approach”, Pearson Education

Sri Krishnadevaraya University College of Engineering & Technology

B.Tech III – II Sem	**(Computer Science and Engineering)**	**L**	**T**	**P**	**C**
		3	**0**	**0**	**3**

Data Warehousing & Data Mining

UNIT-I

Introduction: introduction to data mining- data mining- data mining functionalities: classification of data mining systems; data mining task primitives;

data warehouse and olap technology: data warehouse, multidimensional data model: from tables and spreadsheet to data cubes,stars,snowflakes and fact constellation schemas for multidimensional databases, measures: their categorization and computation, concept hierarchies, olap operations in the multidimensional data model; data warehouse architecture:

UNIT-II

Data preprocessing: why preprocess the data; descriptive data summarization: measuring the central tendency, measuring the dispersion of data, graphic displays of basic descriptive data summaries; data cleaning: missing values, noisy data cleaning as a process; data integration and transformation: data integration, data transformation, data reduction: data cube aggregation, attribute subset selection; dimensionality reduction, numerosity reduction;

UNIT-III

Mining frequent patterns, associations, and correlations: basic concepts; efficient and scalable frequent item set mining methods: the apriori algorithm, generating association rules from frequent item sets, improving efficiency of apriori, mining frequent item sets without candidate generation; mining various kinds of association rules: mining multilevel & multi-dimensional association rules; from association mining to correlation analysis: strong rules are not necessarily interesting, from association analysis to correlation analysis;

UNIT-IV

Classification i:overview of classification and prediction: what is classification, what is prediction?; issues regarding classification and prediction: preparing data for classification and prediction , comparing classification and prediction methods; Bayesian classification: Bayes' theorem, naïve Bayesian classification; classification by decision tree induction: decision tree induction,attribute selectionmeasures,tree pruning, scalability and decision tree induction; rule-based classification: using if-thenrules for classification, rule extraction from decision tree, rule induction using a sequntial coveringalgorithm; classification by back propagation: a multilayer feed-forward neural network, defining networktopology, backpropagation;

UNIT-V

Classification ii and prediction:support vector machines: the case when the data are linearlyseparable, the case when the data are linearly inseparable; lazy learners: k-nearest-neighbor classifiers,case-based reasoning; prediction:linear regression, nonlinear regression; accuracy and error measures:classifier accuracy measures, predictor error measures; evaluating the accuracy of a classifier or predictor:holdout method and random subsampling, cross validation, bootstrap;

Cluster analysis:overview of cluster analysis; types of data in cluster analysis: interval-scaledvariables, binary variables, categorical, ordinal, and ratio-scaled variables, variables of mixed types; acategorization of major clustering methods; partitioning methods: classical partitioning methods: k-meansand k-medoids, partitioning methods in large databases: from k-medoids to clarans; hierarchicalmethods: agglomerative and divisive hierarchical clustering, birch, rock; density-based methods:
dbscan; grid-based methods: sting; model-based clustering methods: expectation-maximization;

Text books:

1. Data Mining – Concepts And Techniques - Jiawei Han & Micheline Kamber Harcourt India, SecondEdition.

References:

1. Data Mining Introductory And Advanced Topics–Margaret H Dunham, PearsonEducation
2. Data Mining Techniques – Arun K Pujari, University Press.
3. Data Warehousing In The Real World – Sam Anahory & Dennis Murray. Pearson Edn Asia.
4. Data Warehousing Fundamentals – Paulraj Ponnaiah Wiley Student Edition
5. The Data Warehouse Life Cycle Tool Kit – Ralph Kimball Wiley Student Edition

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B.Tech III – II Sem (Computer Science and Engineering)

L	T	P	C
3	0	0	3

Management Science

UNIT I-INTRODUCTION TO MANAGEMENT:
Concepts of Management and organization- nature, importance and Functions of Management, Taylor's Scientific Management Theory, Fayol's Principles of Management, Mayo's Hawthorne Experiments, Maslow's Theory of Human Needs, Douglas McGregor's Theory X and Theory Y, Herzberg's Two-Factor Theory of Motivation, Systems Approach to Management and contingency approach, Leadership Styles.

UNIT II-DESIGNING ORGANIZATIONAL STRUCTURES:
Basic concepts related to Organisation - Departmentation and Decentralisation, Types of mechanistic and organic structures of organisation (Line organization, Line and staff organization, functional organization, Committee organization, matrix organization, Virtual Organisation, Cellular Organisation, team structure, boundaryless organization) and their merits, demerits and suitability.

UNIT III-OPERATIONS AND PROJECT MANAGEMENT:
Principles and Types of Plant Layout-Methods of production (Job, batch and Mass Production), Work Study - Basic procedure involved in Method Study and Work Measurement- Statistical Quality Control: chart, R chart, *c* chart, *p* chart, (simple Problems), Acceptance Sampling, Deming's contribution to quality.Project management: Network Analysis, Programme Evaluation and Review Technique (PERT), Critical Path Method (CPM), Project Cost Analysis, Project Crashing.

UNIT IV-MATERIALS MANAGEMENT:
Objectives, Need for Inventory control, EOQ, ABC Analysis, Purchase Procedure, Stores Management and Stores Records.

UNIT V-HUMAN RESOURCES MANAGEMENT (HRM):
Concept of HRM functions of HR Manager: Human resource planning, Recruitment, Selection process, Training and Development, Performance Appraisal, Placement, Wage and Salary Administration, Promotion, Transfer policies, Grievance Handling and employee Welfare Administration.
CONTEMPORARY MANAGEMENT PRACTICES: Basic concepts of MIS, Just-In-Time (JIT) System, Six sigma and Capability Maturity Model (CMM) Levels, Enterprise Resource Planning (ERP), Business Process outsourcing (BPO), Business Process Re-engineering

TEXT BOOKS:
1. Aryasri: Management Science, TMH, 2004.
2. Stoner, Freeman, Gilbert, Management, 6th Ed, Pearson Education, New Delhi, 2004.

REFERENCES:
1. Kotler Philip & Keller Kevin Lane: Marketing Mangement 12/e, PHI, 2005.
2. Koontz & Weihrich: Essentials of Management, 6/e, TMH, 2005.
3. Thomas N.Duening & John M.Ivancevich Management—Principles and Guidelines, Biztantra, 2003.

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3	0	0	3

Software Testing

(Professional Elective-II)

UNIT I:

Software Testing: Introduction, Evolution, Myths & Facts, Goals, Psychology, Definition, Model for testing, Effective Vs Exhaustive Software Testing. Software Testing Terminology and Methodology: Software Testing Terminology, Software Testing Life Cycle, relating test life cycle to development life cycle Software Testing Methodology. Verification & Validation Activities, Verification, Verification of Requirements, High level and low level designs, How to verify code, Validation

UNIT –II

Dynamic Testing: Black Box testing techniques: Boundary Value Analysis, Equivalence class Testing, State Table based testing, Decision table based testing, Cause-Effect Graphing based testing, Error guessing
White-Box Testing: need, Logic coverage criteria, Basis path testing, Graph matrices, Loop testing, data flow testing, mutation testing Static Testing: inspections, Structured Walk throughs, Technical reviews

UNIT III:

Validation activities: Unit testing, Integration Testing,. Function testing, system testing, acceptance testing Regression testing: Progressives Vs regressive testing, Regression test ability, Objectives of regression testing, When regression testing done?, Regression testing types, Regression testing techniques

UNIT IV:

Efficient Test Suite Management: Test case design, Why does a test suite grow, Minimizing the test suite and its benefits, test suite prioritization, Types of test case prioritization, prioritization techniques, measuring the effectiveness of a prioritized test suite

UNIT V:

Automation and Testing Tools: need for automation, categorization of testing tools, selection of testing tools, Cost incurred, Guidelines for automated testing, overview of some commercial testing tools. Testing Object Oriented Software: basics, Object oriented testing
Testing Web based Systems: Challenges in testing for web based software, quality aspects, web engineering, testing of web based systems, Testing mobile systems

Text Books:

1. Software Testing, Principles and Practices, Naresh Chauhan, Oxford
2. Foundations of Software testing, Aditya P Mathur, 2ed, Pearson
3. Software Testing- Yogesh Singh, CAMBRIDGE

Reference books

1. Software testing techniques – Baris Beizer, International Thomson computer press, second edition.
2. Software Testing, Principles, techniques and Tools, M G Limaye, TMH
3. Effective Methods for Software testing, Willian E Perry, 3ed, Wiley

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		3	**0**	**0**	**3**

Natural Language Processing

(Professional Elective-II)

UNIT-I:

Introduction to Natural language

The Study of Language, Applications of NLP, Evaluating Language Understanding Systems,Different Levels of Language Analysis, Representations and Understanding, Organization ofNaturallanguageUnderstandingSystems,LinguisticBackground:AnoutlineofEnglishSyntax.

Unit-II:Grammars andParsing

Grammars and Parsing- Top- Down and Bottom-Up Parsers, Transition Network Grammars,Feature Systems and Augmented Grammars, Morphological Analysis and the Lexicon, ParsingwithFeatures,AugmentedTransitionNetworks,BayeesRule,Shannongame,Entropyand Cross Entropy.

UNIT-III: Grammars for Natural Language

Grammars for Natural Language, Movement Phenomenon in Language, Handling questions in Context Free Grammars, Hold Mechanisms in ATNs, Gap Threading, Human Preferences in Parsing, Shift Reduce Parsers, Deterministic Parsers.

UNIT-IV:

Semantic interpretation

Semantic&Logicalform,Wordsenses&ambiguity,Thebasiclogicalformlanguage,Encodingam biguity in the logical Form, Verbs & States in logical form, Thematic roles, Speech acts &embedded sentences, Defining semantics structure model theory.

Language Modeling

Introduction, n-Gram Models, Language model Evaluation, Parameter Estimation, Language Model Adaption, Types of Language Models, Language-Specific Modeling Problems ,Multilingual and Cross lingual Language Modeling.

UNIT-V:

Machine Translation

Survey: Introduction, Problems of Machine Translation, Is Machine Translation Possible,BriefHistory, Possible Approaches, Current Status. Anusaraka or Language Accessor: Background, Cutting the GordianKnot,TheProblem,Structure of Anusaraka System, UserInterface ,Linguistic Area, Givingup Agreement in Anusarsaka Output, Language Bridges.

Multilingual Information Retrieval

Introduction, Document Preprocessing, Monolingual Information Retrieval, CLIR, MLIR ,Evaluation in Information Retrieval, Tools, Software and Resources.

Multilingual Automatic Summarization

Introduction, Approaches to Summarization, Evaluation, How to Build a Summarizer, Competitions and Datasets.

TEXTBOOKS:

1. JamesAllen,NaturalLanguageUnderstanding, 2ndEdition,2003,PearsonEducation.
2. MultilingualNaturalLanguageProcessingApplications:FromTheoryToPractice-DanielM.Bikel andImedZitouni, PearsonPublications.
3. NaturalLanguageProcessing,Apaninianperspective,AksharBharathi,Vineetchaitanya ,Prentice–HallofIndia.

REFERENCESBOOKS:

1. Charniack,Eugene,StatisticalLanguageLearning,MITPress,1993.
2. Jurafsky,DanandMartin,James,SpeechandLanguageProcessing,2ndEdition,Prentice Hall, 2008.
3. Manning,ChristopherandHenrich,Schutze,FoundationsofStatisticalNaturalLanguage Processing, MIT Press, 1999.

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Web Technologies

(Professional Elective-II)

UNIT I

Introduction to Web Technologies: Introduction to Web servers like Apache 1.1, IIS XAMPP(Bundle Server), WAMP(Bundle Server),Handling HTTP Request and Response, installations of above servers.

Introduction to PHP: The problem with other Technologies (Servelets and JSP), Downloading,installing, configuring PHP, Programming in a Web environment and The anatomy of a PHP Page

UNIT II

Overview of PHP Data types and Concepts: Variables and data types, Operators, Expressions and Statements, Strings, Arrays and Functions.

Overview of Classes, Objects, and Interfaces**:** Creating instances using Constructors, Controlling access to class members, Extending classes, Abstract classes and methods, using interfaces, Using class destructors, File Handling and Using Exceptions.

UNIT III

PHP Advanced Concepts: Using Cookies, Using HTTP Headers, Using Sessions, Authenticating users, Using Environment and Configuration variables, Working with Date and Time: Getting the Day and Week of the Year, Determining whether a given year is leap year – Getting times and Dates of Files - Setting time zones & GMT/UTC.

UNIT IV

Creating and Using Forms: Understanding Common Form Issues, GET vs. POST, Validating form input,Working with multiple forms, and Preventing Multiple Submissions ofa form.

UNIT V

PHP and Database Access: Basic Database Concepts, Connecting to a MYSQL database, Retrieving andDisplaying results, Modifying, Updating and Deleting data. MVC architecture.

PHP and Other Web Technologies**:** PHP and XML, PHP and AJAX

TEXT BOOKS:

1. Beginning PHP and MySQL, 3rd Edition, Jason Gilmore, Apress Publications (Dream tech.).
2. PHP 5 Recipes A problem Solution Approach Lee Babin, Nathan A Good, Frank M.Kromann and JonStephens.

REFERENCES:

1. Open Source Web Development with LAMP using Linux, Apache, MySQL, Perl and PHP, J.Lee andB.Ware(Addison Wesley) Pearson Education.
2. PHP 6 Fast and Easy Web Development, Julie Meloni and Matt Telles, Cengage Learning Publications.
3. PHP 5.1, I. Bayross and S.Shah, The X Team, SPD.
4. PHP and MySQL by Example, E.Quigley, Prentice Hall(Pearson).
5. PHP Programming solutions, V.Vaswani, TMH

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		0	**0**	**3**	**1.5**

Software Testing Lab & Web Technologies Lab

Sample problems on testing:

1. Write programs in 'C' Language to demonstrate the working of the followingconstructs:
   i) do...while ii) while….do iii) if…else iv) switch v)for
2. "A program written in 'C' language for Matrix Multiplication fails" Introspect thecauses for its failure and write down the possible reasons for itsfailure.
3. Take any system (e.g. ATM system) and study its system specifications and report the various bugs.
4. Write the test cases for any known application (e.g. Bankingapplication)
5. Create a test plan document for any application (e.g. Library ManagementSystem)
6. Study of any testing tool (e.g. Winrunner)
7. Study of any web testing tool (e.g.Selenium).

WEEK-1
Basic HTML Tags,Table Tags,List Tags,Image Tags, Forms .
WEEK-2
Implement forms using HTML,FRAMES,CSS.
WEEK-3
Install the following on local machine

- Apache web server
- Tomcat application server locally,
- Install MySQL
- PHP and configure it to work with Apache web server and MySQL

WEEK-4
Write an HTML page with Javascript that takes a number from one text field in the range 0-999 and display it in other text field in words.If the number is out of range ,it shold show "out of range" and if it is not a number ,it should show "not a number" message in the result box.

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0	0	3	1.5

Compiler Design & DM Lab

Sl.No.	List of Experiments
1	Design a lexical analyzer for given language and the lexical analyzer should ignore redundant spaces, tabs and new lines. It should also ignore comments. Although the syntax specification states that identifiers can bear bitrarily long, you may restrict the length to some reasonable value. Simulate the same in C language.
2	*****Write a C program to identify whether a given line is a comment or not.
3	*Write a C program to recognize strings under 'a','a*b+','abb'.
4	*Write a C program to test whether a given identifier is valid or not.
5	*Write a C program to simulate lexical analyzer for validating operators.
6	Implement the lexical analyzer using JLex, flex or other lexical analyzer generating tools.
7	Write a C program for implementing the functionalities of predictive parser for the mini language e specified in Note 1.
8	a) *Write a C program for constructing of LL(1)parsing. b) *Write a C program for constructing recursive descent parsing.
9	Write a C program to implement LALR parsing.
10	a) *Write a C program to implement operator precedence parsing. b) *Write C program to implement Programs emanticrules to calculate the expression that takes an expression with digits,+ and*and computes the value.
11	Convert the BNF rules into Yacc form and write code to generate abstract syntax tree for the mini language specified in Note1.
12	Write a C program to generate machine code from abstract syntax regenerated by the parser. The instructions set specified in Note 2 may be considered as the target code.

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		0	**0**	**3**	**1.5**

Data Mining Lab

Description:

The business of banks is making loans. Assessing the credit worthiness of an applicant is of crucial importance. You have to develop a system to help a loan officer decide whether the credit of a customer is good, or bad. A bank's business rules regarding loans must consider two opposing factors. On the one hand, a bank wants to make as many loans as possible. Interest on these loans is the banks profit source. On the other hand, a bank cannot afford to make too many bad loans. Too many bad loans could lead to the collapse of the bank. The bank's loan policy must involve a compromise: not too strict, and not too lenient.

To do the assignment, you first and foremost need some knowledge about the world of credit.

You can acquire such knowledge in a number of ways.

1. Knowledge Engineering. Find a loan officer who is willing to talk. Interview her and try to represent her knowledge in the form of production rules.

2. Books. Find some training manuals for loan officers or perhaps a suitable textbook on finance. Translate this knowledge from text form to production rule form.

3. Common sense. Imagine yourself as a loan officer and make up reasonable rules which can be used to judge the credit worthiness of a loan applicant.

4. Case histories. Find records of actual cases where competent loan officers correctly judged when, and when not to, approve a loan application.

The German Credit Data:

Actual historical credit data is not always easy to come by because of confidentiality rules.

Here is one such dataset, consisting of 1000 actual cases collected in Germany. Credit dataset (original) Excel spreadsheet version of the German credit data.

In spite of the fact that the data is German, you should probably make use of it for this assignment. (Unless you really can consult a real loan officer!)

A few notes on the German dataset

1. DM stands for Deutsche Mark, the unit of currency, worth about 90 cents Canadian (but looks and acts like a quarter).

2. owns_telephone. German phone rates are much higher than in Canada so fewer people own telephones.

3. foreign_worker. There are millions of these in Germany (many from Turkey). It is very hard to get German citizenship if you were not born of German parents.

4. There are 20 attributes used in judging a loan applicant. The goal is to classify the applicant into one of two categories, good or bad.

Sri Krishnadevaraya University College of Engineering & Technology					
Dept. of Computer Science and Engineering					
IV Year 1st Semester					
S.No	**Course No**	**Course Name**	**Category**	**L-T-P**	**Credits**
1.		Cryptography & Network Security	PC	3-0-0	3
2.		Cloud Computing	PC	3-0-0	3
3.		Internet of Things	PC	3-0-0	3
4.		Software Project Management Internetworking with TCP/IP Machine Learning	PE-III	2-0-0	2
5.		Software Architecture Network Management Computer Vision	PE-IV	3-0-0	3
6.		DEV OPS Big Data Analytics Data Science	PE-V	3-0-0	3
7.		Project I	PR	0-0-0	2
8.		Socially Relevant Project(15hrs/Sem)	PR	0-0-0	0.5
9		Industrial Training/ Internship/ Research Projects in National Laboratories/Academic Institutions	PR	-	2
				Total	**21.5**

Category	**CREDITS**
Professional Core Courses	09
Professional Elective Courses	08
Project I	2
Socially Relevant Project(15hrs/Sem)	0.5
Industrial/Research Internship	2
TOTAL CREDITS	**21.5**

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		3	**0**	**0**	**3**

Cryptography and Network Security

UNIT – I

Attacks on Computers and Computer Security: Introduction, The need for security, Security approaches, Principles of security, Types of Security attacks, Security services, Security Mechanisms, A model for Network Security

Cryptography: Concepts and Techniques: Introduction, plain text and cipher text, substitution techniques, transposition techniques, encryption and decryption, symmetric and asymmetric key cryptography, steganography, key range and key size, possible types of attacks.

UNIT – II

Symmetric key Ciphers: Block Cipher principles &Algorithms (DES, AES, Blowfish), Differential and Linear Cryptanalysis, Block cipher modes of operation, Stream ciphers, RC4,Location and placement of encryption function, Key distribution

Asymmetric key Ciphers: Principles of public key cryptosystems, Algorithms(RSA, Diffie- Hellman,ECC), Key Distribution

UNIT – III

Message Authentication Algorithms and Hash Functions: Authentication requirements, Functions, Message authentication codes, Hash Functions, Secure hash algorithm, Whirlpool, HMAC, CMAC, Digital signatures, knapsack algorithm.

UNIT – IV

E-Mail Security: Pretty Good Privacy, S/MIME

IP Security: IP Security overview, IP Security architecture, Authentication Header, encapsulating security payload, combining security associations, key management.

UNIT – V

Web Security: Web security considerations, Secure Socket Layer and Transport Layer Security, Secure electronic transaction

Intruders, Virus and Firewalls: Intruders, Intrusion detection, password management, Virus and related threats, Countermeasures, Firewall design principles, Types of firewalls

Case Studies on Cryptography and security: Secure Inter-branch Payment Transactions, Cross site Scripting Vulnerability, Virtual Elections.

TEXT BOOKS:

1. William Stallings, "Cryptography and Network Security", 5th Edition, Pearson Education, 2011.
2. Atul Kahate, "Cryptography and Network Security", 2nd Edition, Mc Graw Hill, 2010.
3. Bernard Menezes "Network Security and Cryptography", 1stEdition, CENGAGE Learning, 2010.

REFERENCES:

1. C K Shyamala, N Harini, Dr T R Padmanabhan, Wiley India, "Cryptography andNetwork Security",1st Edition, Wiley India Pvt Ltd, 2011.
2. ForouzanMukhopadhyay "Cryptography and Network Security", 2nd Edition , Mc GrawHill, 2010.
3. Mark Stamp, Wiley India, "Information Security, Principles and Practice", 2nd Edition,Wiley, 2011.

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3	0	0	3

Cloud Computing

UNIT-I

Introduction: What Is the Cloud? The Emergence of Cloud Computing, The Global Nature of the Cloud, Cloud-Based Service Offerings, Grid Computing or Cloud Computing?,Is the Cloud Model Reliable?, Benefits of Using a Cloud Model, What About Legal Issues When Using Cloud Models?, What Are the Key Characteristics of Cloud Computing?, Challenges for the Cloud.

The Evolution of Cloud Computing: Hardware Evolution, Internet Software Evolution, Server Virtualization.

UNIT-II

Web Services Delivered from the Cloud: Communication-as-a-Service (CaaS), Infrastructure-as-a-Service (IaaS), Monitoring-as-a-Service (MaaS), Platform-as-a-Service (PaaS), Software-as-a-Service (SaaS), **Building Cloud Networks:** The Evolution from the MSP Model to Cloud.

Computing and Software-as-a-Service, The Cloud Data Center, Collaboration, Service-Oriented Architectures as a Step Toward Cloud Computing, Basic Approach to a Data Center-Based SOA.

UNIT III

Federation, Presence, Identity, and Privacy in the Cloud: Federation in the cloud, Presence in the Cloud, Privacy and Its Relation to Cloud-Based Information Systems, Security in the Cloud: Cloud security challenges - Software- as-a-service security

UNIT IV

Common Standards in Cloud Computing: The open cloud consortium- The distributed management task force - standards for application developers - standards for messaging - standards for security

UNIT V

Cloud Computing case studies: Google App Engine, Google Web Toolkit, Microsoft Azure Services Platform, Windows Live, Exchange Online, SharePoint Services, Microsoft Dynamics CRM, Amazon EC2, Amazon Simple DB, Amazon S3, Amazon Cloud Front, Amazon SQS

TEXTBOOKS:

1) Cloud Computing implementation, management and security by Joh n W.Ruttinghouse, James F. Ransome.CRC Press, Taylor & Franc is group, 2010.

2) Cloud Computing a practical approach by Anthony T.velte, Toby J.velte Robert Elsenpeter. Tata Me Graw Hill edition, 2010

REFERENCES:

1) Cloud Application Architectures by George Reese. Oreilly publishers

2) Cloud computing and SOA convergence in your enterprise, by David S. Linthicum, Addison- Wesley

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		3	**0**	**0**	**3**

Internet of Things

UNIT I

Introduction to Internet of Things –Definition and Characteristics of IoT, Physical Design of IoT – IoT Protocols, IoT communication models, Iot Communication APIs IoT enabaled Technologies – Wireless Sensor Networks, Cloud Computing, Big data analytics, Communication protocols, Embedded Systems, IoT Levels and Templates

UNIT II

Domain Specific IoTs – Home, City, Environment, Energy, Retail, Logistics, Agriculture, Industry, health and Lifestyle

UNIT III

IoT and M2M – Software defined networks, network function virtualization, difference between SDN and NFV for IoT Basics of IoT System Management with NETCOZF, YANG- NETCONF, YANG, SNMP NETOPEER

UNIT IV

Introduction to Python - Language features of Python, Data types, data structures, Control of flow, functions, modules, packaging, file handling, data/time operations, classes, Exception handling Python packages - JSON, XML, HTTPLib, URLLib, SMTPLib

UNIT V

IoT Physical Devices and Endpoints - Introduction to Raspberry PI-Interfaces (serial, SPI, I2C)
Programming – Python program with Raspberry PI with focus of interfacing external gadgets, controlling output, reading input from pins. IoT Physical Servers and Cloud Offerings – Introduction to Cloud Storage models and communication.

TEXT BOOKS:

1. Internet of Things - A Hands-on Approach, Arshdeep Bahga and Vijay Madisetti, Universities Press, 2015, ISBN: 9788173719547
2. Getting Started with Raspberry Pi, Matt Richardson & Shawn Wallace, O'Reilly (SPD), 2014, ISBN: 9789350239759

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B.Tech IV – I Sem **(Computer Science and Engineering)**

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2	0	0	2

Software Project Management

(Professional Elective –III)

UNIT I Conventional Software Management: The Waterfall Model, Conventional software Management Performance. Evolution of Software Economics: Software Economics, Pragmatic Software Cost Estimation.

UNIT II Improving Software Economics: Reducing Software Product Size, Improving software Processes, Improving Team Effectiveness, Improving Automation, Achieving Required Quality, Peer Inspections.

UNIT III Conventional and Modern Software Management: Principles of Conventional Software Engineering, Principles of Modern Software Management, Transitioning to an Iterative Process. Life Cycle Phases: Engineering and Production Stages, Inception. Elaboration, Construction, Transition Phases. Artifacts of the Process: The Artifact Sets. Management Artifacts, Engineering Artifacts, Programmatic Artifacts. Model Based Software Architectures: A Management Perspective and Technical Perspective.

UNIT IV Workflows of The Process:Software Process Workflows. Iteration Workflows. Checkpoints of the Process: Major Milestones, Minor Milestones, Periodic Status Assessments. Iterative Process Planning: Work Breakdown Structures, Planning Guidelines, Cost and Schedule Estimating. Iteration Planning Process.Pragmatic Planning. Project Organizations and Responsibilities: Line-of-Business Organizations, Project Organizations, and Evolution of Organizations. Process Automation: Automation Building Blocks, The Project Environment.

UNIT V Project Control and Process Instrumentation: Seven Core Metrics, Management Indicators, Quality Indicators, Life Cycle Expectations Pragmatic Software Metrics, Metrics Automation. Tailoring the process: Process Discriminates, Example of Small-scale project versus Large-scale project.

TEXT BOOKS: 1. Software Project Management, Walker Royce, 1998, PEA.

REFERENCES:

1. Software Engineering Project Management, Richard H. Thayer, 1997, IEEE Computer Society.
2. Software Engineering and Management, Shere K. D, 1998, PHI.
3. Software Project Management: A Concise Study, S. A. Kelkar, PHI.
4. Software Project Management, Second Edition, Hughes Cotterell, TMH.
5. Software Project Management from Concept to Development, Kaeron Conway, Dream Tech

B.Tech IV – I Sem **(Computer Science and Engineering)**

L	T	P	C
2	0	0	2

Internetworking With TCP / IP

(Professional Elective –III)

Unit I: The OSI Model and the TCP/IP Protocols suite: Protocol layer, The OSI model,TCP/IP protocol suite, Addressing
Underlying Technologies: Wired local area networks, Wireless LANs, Point to point WANs, Switched WANs, Connecting devices
Introduction to Network Layer: Switching, Packet switching at network layer, Network layer services, Other network layer issues
IPV4 Address: Classful addressing, Classless addressing, Special address,NAT

Unit II: Delivery and Forwarding of IP Packets: Delivery, Forwarding, Structure of a router
Internet Protocol Version 4(IPv4): Datagrams, Fragmentation, Options, Checksum, IP over ATM, Security, IP Package
Internet Protocol Version 6(IPv6): Packet format, Transition from IPv4 to IPv6

Unit III: Address Resolution Protocol: Address mapping, The Arp Protocol, ATM layer, ARP packages
Internet Control Message Protocol Version 4(ICMPv4): Massages, Debugging tools, ICMP package
Mobile IP: Addressing, Agents, Three Phases, Inefficiency in mobile IP,

Unit IV: Unicast Routing Protocols: Intra and inter domain routing, Distance vector routing, RIP, Link state routing, OSPF, Path vector routing, BGP
Multicasting and Multicast Routing Protocols: Multicast address, IGMP, Multicast routing, Routing protocols, MBONE

Unit V: Introduction to the Transport Layer: Transport,layer services, Transport,layer protocols
User Datagrams Protocol (UDP): User datagram, UDP Applications, UDP package
Transmission Control Protocol: TCP services, TCP features, Segment, A TCP connection, State transition diagram, Window in TCP, Flow control, Error control, Congestion control, TCP timers, Options, TCP package
Stream Control Transmission Protocol (SCTP): SCTP services, SCTP features Packet format, An SCTP association, Sate transition diagram, Flow control, Error control, Congestion control
HOST Configuration (DHCP): DHCP operation, Configuration, **Secure Shell (SSH)**

TEXT BOOKS:

1. TCP/IP Protocol Suite, Behrouz A. Forouzan, TMH.

REFERENCES:

1. TCP/IP, Tittel Chappell, Cengage Learning.
2. TCP/IP Illustrated, Volume,1the Protocols, W. Richard Stevens, G. Gabrani, Pearson.
3. TCP/IP Application Layer Protocols for Embedded Systems, M.Tim Jones, Networking Series.
4. Internetworking With TCP/IP Volume 1: Principles Protocols, and Architecture, 5th edition, 2006. ISBN 0,13,187671,6.
5. Internetworking With TCP/IP Volume II: Design, Implementation, and Internals (with D. Stevens), Third edition, 1999. ISBN 0,13,973843,6.
6. Internetworking With TCP/IP Volume III: Client,Server Programming and Applications, Linux/POSIX Socket Version (with D. Stevens), 2000. 0,13,032071,4.
7. Internetworking With TCP/IP Volume III: Client,Server Programming and Applications, Window Sockets Version (with D. Stevens), 1997. ISBN 0,13,848714,6

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L T P C

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Machine Learning
(Professional Elective –III)

UNIT I

Introduction: Learning Problems – Perspectives and Issues – Concept Learning – Version Spaces and Candidate Eliminations – Inductive bias – Decision Tree learning – Representation – Algorithm – Heuristic Space Search.

UNIT II

NEURAL NETWORKS AND GENETIC ALGORITHMS: Neural Network Representation – Problems – Perceptrons – Multilayer Networks and Back Propagation Algorithms – Advanced Topics – Genetic Algorithms – Hypothesis Space Search – Genetic Programming – Models of Evolution and Learning.

UNIT III:

BAYESIAN AND COMPUTATIONAL LEARNING: Bayes Theorem – Concept Learning – Maximum Likelihood – Minimum Description Length Principle – Bayes Optimal Classifier – Gibbs Algorithm – Naïve Bayes Classifier – Bayesian Belief Network – EM Algorithm – Probability Learning – Sample Complexity – Finite and Infinite Hypothesis Spaces – Mistake Bound Model.

UNIT IV

INSTANCE BASED LEARNING: K- Nearest Neighbor Learning – Locally weighted Regression – Radial Bases Functions – Case Based Learning.

UNIT V

ADVANCED LEARNING : Learning Sets of Rules – Sequential Covering Algorithm – Learning Rule Set – First Order Rules – Sets of First Order Rules – Induction on Inverted Deduction – Inverting Resolution – Analytical Learning – Perfect Domain Theories – Explanation Base Learning – FOCL Algorithm – Reinforcement Learning – Task – Q- Learning – Temporal Difference Learning

Text Books:

1) T.M. Mitchell, “Machine Learning”, McGraw-Hill, 1997.

Reference Books:

1) Ethern Alpaydin, “Introduction to Machine Learning”, MIT Press, 2004.
2) Stephen Marsland, “Machine Learning -An Algorithmic Perspective”, Second Edition, Chapman and Hall/CRC Machine Learning and Pattern Recognition Series,2014.
3) Andreas C. Müller and Sarah Guido “Introduction to Machine Learning with Python: A Guide for Data Scientists”, Oreilly.

Sri Krishnadevaraya University College of Engineering & Technology

B.Tech IV – I Sem (Computer Science and Engineering)

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Software Architecture

(Professional Elective –IV)

UNIT-I

Introduction: The Architecture Business Cycle: Where do architectures come from? Software processes and the architecture business cycle; What makes a "good" architecture? What software architecture is and what it is not; Other points of view; Architectural patterns, reference models and reference architectures; Importance of software architecture; Architectural structures and views.

UNIT-II

Architectural Styles and Case Studies: Architectural styles; Pipes and filters; Data abstraction and object-oriented organization; Event-based, implicit invocation; Layered systems; Repositories; Interpreters; Process control; Other familiar architectures; Heterogeneous architectures. Case Studies: Keyword in Context; Instrumentation software; Mobile robotics; Cruise control; Three vignettes in mixed style.

UNIT-III

Quality: Functionality and architecture; Architecture and quality attributes; System quality attributes; Quality attribute scenarios in practice; Other system quality attributes; Business qualities; Architecture qualities. Achieving Quality: Introducing tactics; Availability tactics; Modifiability tactics; Performance tactics; Security tactics; Testability tactics; Usability tactics; Relationship of tactics to architectural patterns; Architectural patterns and styles.

UNIT-IV

Architectural Patterns: Introduction; From mud to structure: Layers, Pipes and Filters, Blackboard. Distributed Systems: Broker; Interactive Systems: MVC, Presentation-Abstraction-Control.

UNIT-V

Designing and Documenting Software Architecture: Architecture in the life cycle; Designing the architecture; Forming the team structure; Creating a skeletal system. Uses of architectural documentation; Views; Choosing the relevant views; Documenting a view; Documentation across views.

TEXT BOOKS:

1. Len Bass, Paul Clements, Rick Kazman: Software Architecture in Practice, 2nd Edition, Pearson Education, 2003.
2. Frank Buschmann, Regine Meunier, Hans Rohnert, Peter Sommerlad, Michael Stal: Pattern-Oriented Software Architecture, A System of Patterns, Volume 1, John Wiley and Sons, 2007.
3. Mary Shaw and David Garlan: Software Architecture- Perspectives on an Emerging Discipline, PHI, 2007.

REFERENCE BOOKS:

1. E. Gamma, R. Helm, R. Johnson, J. Vlissides: Design Patterns- Elements of Reusable Object-Oriented Software, Pearson Education,1995.

Web Reference: http://www.hillside.net/patterns/

Sri Krishnadevaraya University College of Engineering & Technology

B.Tech IV – I Sem (Computer Science and Engineering)

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Network Management

(Professional Elective –IV)

UNIT I DATA COMMUNICATIONS AND NETWORK MANAGEMENT

Data communications and network management overview: Analogy of telephone network management - Data and telecommunication network - Distributed computing - TCP/IP based networks - communication protocols and standards - network systems and services [with case histories]- Network management goals , organization architecture and perspectives

UNIT II SNMP AND NETWORK MANAGEMENT

Review of information network and technology - SNMP and network management - basic foundations: Standards, models and languages - network management organization and information models - communication and functional models

1. **UNIT III NETWORK MANAGEMENT TOOLS , SYSTEMS AND ENGINEERING**

System utilities management: basic tools - SNMP tools - Protocol analyzer - Network statistics measurement systems - MIB engineering - NMS design - Network management systems

UNIT IV NETWORK MANAGEMENT AND APPLICATIONS

TMN - TMN conceptual model - standards - architecture - management service architecture - integrated view and implementation.

Network management applications: configuration management - fault management - performance management - event correlation techniques – security management

UNIT V ATM AND BROADBAND NETWORK MANAGEMENT

ATM Technology - ATM network management - cable modem technology - cable access network management - DOCSIS standards - fixed broad band wireless access networks - mobile wireless networks.

Text Books

1. M. Subramanian, “Network management: principles and practice”, Adison-Wesley, 2000

Reference Books

1. James F. Kurose and Keith W. Rose, “Computer networking”, Pearson Education, LPE, 2003
2. J. Burke, “Network management concepts and practice, A Hands-on approach”, Pearson Education, 2000.
3. Larry L. Peterson and Bruce S. Davie, “Computer networks, a system approach”, 3rd edition, Elsevier.

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B.Tech IV – I Sem	**(Computer Science and Engineering)**	**L**	**T**	**P**	**C**
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COMPUTER VISION

(Professional Elective –IV)

UNIT I IMAGE PROCESSING FOUNDATIONS:

Review of image processing techniques – classical filtering operations – hresholding techniques – edge detection techniques – corner and interest point detection – mathematical morphology – texture

UNIT II SHAPES AND REGIONS:

Binary shape analysis – connectedness – object labeling and counting – size filtering – distance functions – skeletons and thinning – deformable shape analysis – boundary tracking procedures– active contours – shape models and shape recognition – centroidal profiles – handling occlusion – boundary length measures – boundary descriptors – chain codes – Fourier descriptors – region descriptors – moments

UNIT III HOUGH TRANSFORM:

Line detection – Hough Transform (HT) for line detection – foot-of-normal method – line localization – line fitting – RANSAC for straight line detection – HT based circular object detection – accurate center location – speed problem – ellipse detection – Case study: Human Iris location – hole detection – generalized Hough Transform (GHT) – spatial matched filtering GHT for ellipse detection – object location – GHT for feature collation

UNIT IV 3D VISION AND MOTION:

Methods for 3D vision – projection schemes – shape from shading – photometric stereo – shape from texture – shape from focus – active range finding – surface representations – point-based representation – volumetric representations – 3D object recognition – 3D reconstruction – introduction to motion – triangulation – bundle adjustment – translational alignment – parametric motion – splinebased motion – optical flow – layered motion

UNIT V APPLICATIONS:

Application: Photo album – Face detection – Face recognition – Eigen faces – Active appearance and 3D shape models of faces Application: Surveillance – foreground-background separation – particle filters – Chamfer matching, tracking, and occlusion – combining views from multiple cameras – human gait analysis Application: In-vehicle vision system: locating roadway – road markings – identifying road signs – locating pedestrians

REFERENCES:

1. D. L. Baggio et al., “Mastering OpenCV with Practical Computer Vision Projects”, Packt Publishing, 2012.
2. E. R. Davies, “Computer & Machine Vision”, Fourth Edition, Academic Press, 2012.
3. Jan Erik Solem, “Programming Computer Vision with Python: Tools and algorithms for analyzing images”, O'Reilly Media, 2012.
4. Mark Nixon and Alberto S. Aquado, “Feature Extraction & Image Processing for ComputerVision”, Third Edition, Academic Press, 2012.
5. R. Szeliski, “Computer Vision: Algorithms and Applications”, Springer 2011. 6. Simon J. D. Prince, “Computer Vision: Models, Learning, and Inference”, Cambridge University Press, 2012.

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B.Tech IV – I Sem	**(Computer Science and Engineering)**	**L**	**T**	**P**	**C**
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DEV OPS

(Professional Elective –V)

UNIT I

Phases of Software Development life cycle. Values and principles of agile softwaredevelopment.

UNIT II

Fundamentals of DevOps: Architecture, Deployments, Orchestration, Need,Instance of applications, DevOps delivery pipeline, DevOps eco system.

UNIT III

DevOps adoption in projects: Technology aspects, Agiling capabilities, Tool stackimplementation, People aspect, processes

UNIT IV

CI/CD: Introduction to Continuous Integration, Continuous Delivery and Deployment , Benefits of CI/CD, Metrics to track CICD practices

UNIT V

Devops Maturity Model: Key factors of DevOps maturity model, stages of Devopsmaturity model, DevOps maturity Assessment

Text Books:

1) The DevOps Handbook: How to Create World-Class Agility, Reliability, and Security in Technology Organizations, Gene Kim , John Willis , Patrick Debois , Jez Humb,1st Edition, O'Reilly publications, 2016.
2) What is Devops? Infrastructure as code, 1st Edition, Mike Loukides ,O'Reillypublications, 2012.

Reference Books:

1) Building a DevOps Culture, 1st Edition, Mandi Walls, O'Reilly publications, 2013.
2) The DevOps 2.0 Toolkit: Automating the Continuous Deployment Pipeline With Containerized Microservices, 1st Edition, Viktor Farcic, CreateSpace Independent Publishing Platform publications, 2016
3) Continuous Delivery: Reliable Software Releases Through Build, Test, and Deployment Automation, 1st Edition, Jez Humble and David Farley, 2010.
4) Achieving DevOps: A Novel About Delivering the Best of Agile, DevOps, and microservices, 1st Edition, Dave Harrison, Knox Lively, Apress publications, 2019

e-Resources:

1) https://www.javatpoint.com/devops
2) https://github.com/nkatre/Free-DevOps-Books-1/blob

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B.Tech IV – I Sem	**(Computer Science and Engineering)**	**L**	**T**	**P**	**C**
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Big Data Analytics

(Professional Elective –V)

UNIT I:
Overview of Big Data, Stages of analytical evolution, State of the Practice in Analytics

UNIT II:
The Data Scientist, Big Data Analytics in Industry Verticals, Data Analytics Lifecycle

UNIT III:
Operationalizing Basic Data Analytic Methods Using R, Advanced Analytics - Analytics for Unstructured Data- Map Reduce and Hadoop, The Hadoop Ecosystem,

UNIT IV:
In-database Analytics, Data Visualization Techniques, Stream Computing Challenges,

UNIT V:
Systems architecture, Main memory data management techniques, Energy-efficient data processing, Benchmarking, Security and Privacy, Failover and reliability

Text Books:

1. Bill Franks, Taming The Big Data Tidal Wave, 1st Edition, Wiley, 2012.
2. Frank J. Ohlhorst, Big Data Analytics,1st Edition, Wiley, 2012

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B.Tech IV – I Sem	**(Computer Science and Engineering)**	**L**	**T**	**P**	**C**
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Data Science

(Professional Elective –V)

UNIT-I

Introduction: What is Data Science? - Big Data and Data Science hype – and getting past the hype - Why now? – Datafication - Current landscape of perspectives - Skill sets needed Statistical Inference - Populations and samples - Statistical modeling, The Data Science Process.

UNIT-II

Exploratory Data Analysis and the Data Science Process - Basic tools (plots, graphs and summary statistics) of EDA - Philosophy of EDA - The Data Science Process - Case Study: RealDirect (online real estate firm) Three Basic Machine Learning Algorithms - Linear Regression - k-Nearest Neighbors (k-NN) - k-means

UNIT-III

One More Machine Learning Algorithm and Usage in Applications - Motivating application: Filtering Spam - Why Linear Regression and k-NN are poor choices for Filtering Spam - Naive Bayes and why it works for Filtering Spam - Data Wrangling: APIs and other tools for scrapping the Web

UNIT-IV

Feature Generation and Feature Selection (Extracting Meaning From Data) - Motivating application: user (customer) retention - Feature Generation (brainstorming, role of domain expertise, and place for imagination) - Feature Selection algorithms – Filters; Wrappers; Decision Trees; Random Forests

UNIT-V

Recommendation Systems: Building a User-Facing Data Product - Algorithmic ingredients of a Recommendation Engine - Dimensionality Reduction - Singular Value Decomposition - Principal Component Analysis - Exercise: build your own recommendation system. Data Visualization - Basic principles, ideas and tools for data visualization

TEXT BOOKS:

1. Cathy O'Neil and Rachel Schutt. Doing Data Science, Straight Talk From The Frontline. O'Reilly. 2014.

REFERENCE BOOKS:

1. Kevin P. Murphy. Machine Learning: A Probabilistic Perspective. ISBN 0262018020. 2013.
2. Foster Provost and Tom Fawcett. Data Science for Business: What You Need to Know about Data Mining and Data-analytic Thinking. ISBN 1449361323. 2013
3. Trevor Hastie, Robert Tibshirani and Jerome Friedman. Elements of Statistical Learning, Second Edition. ISBN 0387952845. 2009. (free online)
4. Avrim Blum, John Hopcroft and Ravindran Kannan. Foundations of Data Science.
5. Mohammed J. Zaki and Wagner Miera Jr. Data Mining and Analysis: Fundamental Concepts and Algorithms. Cambridge University Press. 2014
6. Jiawei Han, Micheline Kamber and Jian Pei. Data Mining: Concepts and Techniques, Third Edition. ISBN 0123814790. 2011.

Sri Krishnadevaraya University College of Engineering & Technology					
Dept. of Computer Science and Engineering					
IV Year 2nd Semester					
S.No	**Course No**	**Course Name**	**Category**	**L-T-P**	**Credits**
1		Open Elective Course/Job oriented elective(MOOC) Cloud Computing Block Chain Technology Introduction to Operation Management	PE-VI	3-0-0	3
2		Professional Elective courses(MOOC) Augmented Reality & Virtual Reality Introduction to Hadoop and Map Reduce Design Patterns	OE-III	3-0-0	3
3		Project II			7
				Total	**13**

Category	**CREDITS**
Professional Elective courses	3
Open Elective Course/Job oriented elective	3
Project II	7
TOTAL CREDITS	**13**

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		L	T	P	C
B.Tech IV – II Sem	**(Computer Science and Engineering)**	**3**	**0**	**0**	**3**

Augmented Reality & Virtual Reality

(Professional Elective –VI)

UNIT-I

How Humans interact with Computers: Common term definition, introduction, modalities through the ages (pre- 20th century, through world war-II, post world war-II, the rise of personal computing, computer miniaturization), why did we just go over all of this?, types of common HCI modalities, new modalities, the current state of modalities for spatial computing devices, current controllers for immersive computing systems, a note on hand tracking and hand pose recognition. Designing for our Senses, Not our Devices: Envisioning a future, sensory technology explained, who are we building this future for?, sensory design, five sensory principles, Adobe's AR story.

UNIT-II

Virtual Reality for Art: A more natural way of making 3D art, VR for animation. 3D art optimization: Introduction, draw calls, using VR tools for creating 3D art, acquiring 3D models vs making them from scratch. How the computer vision that makes augmented reality possible works: Who are we?, a brief history of AR, how and why to select an AR platform, mapping, platforms, other development considerations, the AR cloud

UNIT-III

Virtual reality and augmented reality: cross platform theory: Why cross platform? The role of game engines, understanding 3D graphics, portabiltity lessons from video game design, simplifying the controller input. Virtual reality toolkit: open source framework for the community: What is VRTK and why people use it?, the history of VRTK, welcome to the steam VR unity toolkit, VRTK v4, the future of VRTK, success of VRTK. Three virtual reality and augmented reality development practices: Developing for virtual reality and augmented reality, handling locomotion, effective use of audio, common interaction paradigms.

UNIT-IV

Data and machine learning visualization design and development in spatial computing: Introduction, understanding data visualization, principles for data and machine learning visualization design and development in spatial computing, why data and machine learning visualization works in spatial computing, 2D data visualization vs 3D data visualization in spatial computing, interactivity in data visualizations and in spatial computing, animation, failures in data visualization, good data visualization design optimize 3D spaces, data representations, info graphics, and interactions, defining distinctions in data visualization and big data for machine, how to create data visualization: data visualization creation pipeline, webXR, data visualization challenges in XR, data visualization industry use case examples of data visualization, 3D reconstruction and direct manipulation of real world data, data visualization is for everyone, hands on tutorials, how to create data visualization, resources.

UNIT-V

Character AI and Behaviors: Introduction, behaviors, current practice: Reactive AI, more intelligence in the system, Deliberative AI, machine learning. The virtual and augmented reality health technology ecosystem: VR/AR health technology application design, standard UX isn't intuitive, tutorial: insight Parkinson's experiment, companies, case studies from leading Academic institutions

Textbook: 1. Erin Pangilinan, Steve lukas, and Vasanth Mohan, "Creating Augmented & Virtual Realities", 1st edition, O'REILLY, 2019.

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B.Tech IV – II Sem	**(Computer Science and Engineering)**	**L**	**T**	**P**	**C**
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Introduction To Hadoop And Map Reduce

(Professional Elective –VI)

Unit 1: Data structures in Java: Linked List, Stacks, Queues, Sets, Maps; Generics: Generic classes and Type parameters, Implementing Generic Types, Generic Methods, Wrapper Classes, Concept of Serialization.

Unit 2: Working with Big Data: Google File System, Hadoop Distributed File System (HDFS) – Building blocks of Hadoop (Namenode, Datanode, Secondary Namenode, JobTracker, Task Tracker), Introducing and Configuring Hadoop cluster (Local, Pseudo-distributed mode, Fully Distributed mode), Configuring XML files.

Unit 3: Writing MapReduce Programs:A Weather Dataset, Understanding Hadoop API for MapReduce Framework (Old and New), Basic programs of Hadoop MapReduce: Driver code, Mapper code, Reducer code, RecordReader, Combiner, Partitioner

Unit 4: Hadoop I/O: The Writable Interface, WritableComparable and comparators, Writable Classes: Writable wrappers for Java primitives, Text, BytesWritable, NullWritable, ObjectWritable and GenericWritable, Writable collections, Implementing a Custom Writable: Implementing a RawComparator for speed, Custom comparators

Unit 5: Pig: Hadoop Programming Made Easier Admiring the Pig Architecture, Going with the Pig Latin Application Flow, Working through the ABCs of Pig Latin, Evaluating Local and Distributed Modes of Running Pig Scripts, Checking out the Pig Script Interfaces, Scripting with Pig Latin

Applying Structure to Hadoop Data with Hive: Saying Hello to Hive, Seeing How the Hive is Put Together, Getting Started with Apache Hive, Examining the Hive Clients, Working with Hive Data Types, Creating and Managing Databases and Tables, Seeing How the Hive Data Manipulation Language Works, Querying and Analyzing Data

Text Books

- Big Java 4th Edition, Cay Horstmann, Wiley John Wiley & Sons, INC
- Hadoop: The Definitive Guide by Tom White, 3rd Edition, O'reilly
- Hadoop in Action by Chuck Lam, MANNING Publ.
- Hadoop for Dummies by Dirk deRoos, Paul C.Zikopoulos, Roman B.Melnyk,Bruce Brown, Rafael Coss

Sri Krishnadevaraya University College of Engineering & Technology

B.Tech IV – II Sem (Computer Science and Engineering)

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Design Patterns

(Professional Elective –VI)

UNIT I

Introduction: What is Software Architecture? An Engineering Discipline for Software, The Status of Software Architecture.

Architectural Styles: Architectural Styles, Pipes and Filters, Data Abstraction and Object-Oriented Organization, Event-Based, Implicit Invocation, Layered Systems, Repositories, Interpreters, Process Control, Other Familiar Architectures, Heterogeneous Architectures.

Shared Information Systems: Shared Information Systems, Database Integration, Integration in Software Development Environments, Architectural Structures for Shared Information Systems.

UNIT II

Introduction: What Is a Design Pattern? Design Patterns in Smalltalk MVC, Describing Design Patterns, The Catalog of Design Patterns, Organizing the Catalog, How Design Patterns Solve Design Problems, How to Select a Design Pattern, How to Use a Design Pattern.

Creational Patterns: Abstract Factory, Builder, Factory Method, Prototype, Singleton, Discussion of Creational Patterns.

UNIT III

Structural Pattern Part-I: Adapter, Bridge, Composite.

Structural Pattern Part-II: Decorator, Facade, Flyweight, Proxy.

UNIT IV

Behavioral Patterns Part-I: Chain of Responsibility, Command, Interpreter, Iterator, Mediator, Memento, Observer.

UNIT V

Behavioral Patterns Part-II: State, Strategy, Template Method, Visitor, Discussion of Behavioral Patterns. **A Case Study (Designing a Document Editor):** Design Problems, Document Structure, Formatting, Embellishing the User Interface, Supporting Multiple Look-and-Feel Standards, Supporting Multiple Window Systems, User Operations, Spelling Checking and Hyphenation.

Text Books:

1. Design Patterns By Erich Gamma, Pearson Education
2. Software Architecture: Perspective on an Emerging Discipline By Mary Shaw, David Garlan, PHI

Reference Books:

1. Software Architecture in Practice by Len Bass, Paul Clements, Rick Kazman, Third Edition, Pearson Education.
2. Head First Design Patterns By Eric Freeman-Oreilly-spd.
3. Design Patterns Explained By Alan Shalloway, Pearson Education.
4. Pattern Oriented Software Architecture, F.Buschmann&others, John Wiley & Sons
5. Pattern‟s in JAVA Vol-I By Mark Grand, Wiley DreamTech.
6. Pattern‟s in JAVA Vol-II By Mark Grand, Wiley DreamTech.
7. JAVA Enterprise Design Patterns Vol-III By Mark Grand, Wiley DreamTech

SYLLABUS FOR
OPEN ELECTIVES OFFERED BY
DEPARTMENT OF E.C.E

Sri Krishnadevaraya University College of Engineering & Technology

B.Tech	(Electronics & Communication Engineering)	L	T	P	C
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Fundamentals of Digital Electronics

(Open Elective for non ECE Students)

UNIT-I- Binary Systems

Binary Systems Introduction of Digital Computers and Digital Systems Binary umbers Base Conversion Complements R's Complement (R-1)'s Complement Binary Codes Decimal Codes Error Detection codes Reflected Code

UNIT-II -Binary Logic And Boolean Algebra

Binary logic Logic Gates Postulates of Boolean algebra

Two value Boolean algebra Basic theorems of Boolean algebra De-Morgan's Theorems Boolean functions Boolean forms

UNIT-III -Boolean Function Implementation

Need for simplification K – Map method 2 – Variable K – map 3 – Variable K – map 4 – variable K – map K – Map using Don't care condition Universal Gates NAND Gate NOR Gate NAND Implementation NOR Implementation

UNIT-IV-Basic Combinational Logic

Design procedure of combinational logic Adder ,Half Adder ,Full Adder ,Subtractor ,Half Subtractor ,Full Subtractor Code Conversion BCD – Excess-3 conversion .

UNIT-VCombinational Logic Using MSI And LSI

Binary Parallel Adder ,Magnitude Comparator ,2 Input Comparator ,Decoder ,Encoder ,Multiplexer ,Demultiplexers

UNIT-VI-SEQUENTIAL CIRCUITS: Classification of sequential circuits, Basic Flip-Flops, Excitation andCharacteristic Tables.

TEXTBOOKS:

1. Switching & Finite Automata theory- ZviKohavi, TMH,2nd Edition.
2. Digital Design-Morris Mano, PHI, 3rd Edition,2006.
3. Switching Theory and Logic design-A. Anand Kumar,2008.

REFERENCES:

1. An Engineering Approach to Digital Design-Fletcher, PHI.
2. Fundamentals of Logic Design-Charles H.Roth.5th Edition, 2004, Thomson publications.

Digital Logic Applications and Design-John M.Yarbrough, 2006, Thomson Publications

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B.Tech	(Electronics & Communication Engineering)	L	T	P	C
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Fundamentals of Communication Systems
(Open Elective for non ECE Students)

UNIT I INTRODUCTION TO COMMNICATION SYSTEMS: Communication process, Elements of Communication Systems; Modulation: Need for Modulation, Forms of Modulation: AM, FM, PM, Advantages,Disadvantages and Applications.

UNIT II AMPLITUDE MODULATION AND DEMODULATION: Introduction, Mathematical Representation of AM, Modulation Factors, Percentage of Modulation, Power Relationships, Virtues and imitations of AM.DSB AM: Analog Message Conventions, AM Signals and Spectra, DSB signals and spectra.SSB AM: SSB Signals and Spectra, SSB generation, VSB Generation, Demodulation of AM, Square law detector.

UNIT III FREQUENCY, PHASE MODULATION AND DEMODULATION: FM:
Introduction,Mathematical Representation of FM, Modulation Index, Deviation Sensitivity, Deviation Ratio, Bandwidth of FM (Carson's rule), Narrow band FM, Wide band FM, Voltage and Power for FM, Pre-emphasis and Deemphasis,Illustrative Problems.PM: Introduction, Narrow Band PM, Phase Modulation and Indirect FM; FMdemodulators, Slope detector, Balanced slope discriminators, Phase difference discriminators, Ratio detector,PLL Detectors, Distortion and Transmission estimates.

UNIT IV TRANSMITTERS AND RECEIVERS: AM Transmitters: Balanced Modulator, Square Law Modulator, and Product Modulator.

Receivers: Super Heterodyne Receiver, Double Conversion Receiver and Independent Sideband Receiver.FM Transmitters: Direct FM and VCO's, Mixer, Divider, Multiplier. Receivers: Local Oscillator, Slope Detector,Phase Locked Loop, Introduction to IC 565 applications, FM demodulator.

UNIT V PULSE MODULATION TECHNIQUES: Definition, Types: PAM, PWM, PPM,
Sampling,Nyquist rate, Flat top sampling, Generation and Detection of PAM, PWM, PPM.

TEXT BOOKS:

1. A.Bruce Carlson, & Paul B. Crilly, "Communication Systems – An Introduction to Signals & Noise in Electrical Communication", McGraw-Hill International Edition, 5th Edition, 2010.
2. "Electronic Communications systems" Modulation and Transmission-Robert Schoenbeck, UBS Publications, New Delhi.

REFERENCES:

1. Simon Haykin, "Communication Systems", Wiley-India edition, 3rd edition, 2010
2. Sham Shanmugam, "Digital and Analog Communication Systems", Wiley-India edition, 2006.
3. B.P. Lathi, &Zhi Ding, "Modern Digital & Analog Communication Systems", Oxford University Press, International 4th edition, 2010.
4. Linear Integrated Circuits – D. Roy Chowdhury, New Age International (p) Ltd, 2nd Edition

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B.Tech	**(Electronics & Communication Engineering)**	**L**	**T**	**P**	**C**
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Signals and Systems
(Open Elective for non ECE Students)

UNIT - I Signals and Systems

Signals & Systems: Basic definitions and classification of Signals and Systems (Continuous time and discrete time), operations on signals, Concepts of Convolution and Correlation of signals, Analogy between vectors and signals-Orthogonality, mean square error..

UNIT - II Fourier Series and Fourier Transform

Fourier series: Trigonometric & Exponential, Properties of Fourier series, concept of discrete spectrum, Illustrative Problems.

Continuous Time Fourier Transform: Definition, Computation and properties of Fourier transform for different types of signals and systems, Inverse Fourier transform. Statement and proof of sampling theorem of low pass signals, Illustrative Problems.

UNIT - III Laplace Transform

Laplace Transform: Definition, ROC, Properties, Inverse Laplace transforms, the S-plane and BIBO stability, Transfer functions, System Response to standard signals, Solution of differential equations with initial conditions.

UNIT - IV Signal Transmission through LTI systems

Signal Transmission through Linear Systems: Linear system, impulse response, Response of a linear system for different input signals, linear time-invariant (LTI) system, linear time variant (LTV) system, Transfer function of a LTI system. Filter characteristics of linear systems. Distortion less transmission through a system, Signal bandwidth, System bandwidth, Ideal LPF, HPF and BPF characteristics, Causality and Paley-Wiener criterion for physical realization, Relationship between bandwidth and rise time, Energy and Power spectral densities, Illustrative Problems.

UNIT - V DTFT & Z-Transform

Discrete Time Fourier Transform: Definition, Computation and properties of Discrete Time Fourier transform for different types of signals and systems.

Z–Transform: Definition, ROC, Properties, Poles and Zeros in Z-plane, The inverse Z-Transform, System analysis, Transfer function, BIBO stability, System Response to standard signals, Solution of difference equations with initial conditions. Illustrative Problems.

Textbooks:

1. A.V. Oppenheim, A.S. Willsky and S.H. Nawab, “Signals and Systems”, 2nd Edition, PHI, 2009.
2. Simon Haykin and Van Veen, “Signals & Systems”, 2nd Edition, Wiley, 2005.
3. BP Lathi, “Principles of Linear Systems and Signals”, 2nd Edition, Oxford University Press, 015.
4. Matthew Sadiku and Warsame H. Ali, “Signals and Systems A primer with MATLAB”, CRC Press, 2016.
5. Hwei Hsu, “Schaum's Outline of Signals and Systems”, 4thEdition, TMH, 2019.

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B.Tech	**(Electronics & Communication Engineering)**	**L**	**T**	**P**	**C**
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Microprocessors and Microcontrollers
(Open Elective for non ECE Students)

UNIT-I

8086 MICROPROCESSOR: Evaluation of microprocessors. Overview of 8085. Register organization of 8086,architecture, signal description of 8086, physical memory organization, general bus operations, I/O addressing capability, special processor activities, 8086-Minimum mode and maximum mode of operation, Timing diagram.

UNIT-II

8086 INSTRUCTION SET AND ASSEMBLER DIRECTIVES: Addressing modes of 8086, Instruction set of 8086, Assembler Directives and operators.8086 Assembly language programs involving logical,branch and call instructions, sorting, evaluation of arithmetic expressions, string manipulation.

UNIT-III

PROGRAMMABLE PERIPHERAL DEVICES AND THEIR INTERFACING: Memory interfacing to 8086 (static RAM and EPROM). 8255 PPI-various modes of operation and interfacing to 8086. D/A and A/D converter interfacing, Stepper motor interfacing. Interrupt structure of 8086, Vector interrupt table. Interrupt service routines.8259 PIC architecture and interfacing cascading of interrupt controller and its importance

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UNIT-IV

8051 MICROCONTROLLER: Architecture of 8051 microcontroller. Pin Diagram of 8051, and external memories, counters and timers, serial communication, interrupts.

UNIT-V

8051 ASSEMBLY LANGUAGE PROGRAMMING: Instruction set of 8051, Addressing modes of 8051,Assembly Language Programming examples using 8051.Interfacing to LCD,Keyboard,ADC& DAC.

TEXT BOOKS:

1. Microprocessor Architecture, Programming and Applications with8085 By Ramesh S Gaonkar.
2. Advanced microprocessor and peripherals-A.K. Ray and K.M.Bhurchandi, 2nd edition, TMH, 2000.
3. 8051 microcontroller and embedded systems by mazidi and mazidi ,pearson education 2000.

REFERENCES:

1. Microprocessors Interfacing-Douglas V.Hall, Revised 2nd edition, 2007.
2. The 8088 and 8086 Microprocessors- Walter A. Triebel, Avtar Singh, PHI, 4th Edition, 2003.
3. 8051 Microcontroller-Internals, Instructions, Programming and Interfacing by SubrataGhoshal,

Sri Krishnadevaraya University College of Engineering & Technology

B.Tech	(Electronics & Communication Engineering)	L	T	P	C
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Electronic Measurements & Instrumentation
(Open Elective for non ECE Students)

UNIT I: ELECRICAL MEASUREMENTS: Electrical standards: ampere, voltage, resistance, capacitance & inductance standards-Suspension Galvanometer-Torque & deflection of the galvanometer-PMMC mechanism - DC Ammeters-DC voltmeters-Voltmeter sensitivity-Series and Shunt type ohm meters-Multimeters-Alternating current indicating instruments: electrodynamometer, rectifier type-Thermo instruments-Electrodynamometers in power measurements-Watt hour meter-Power factor meter.

UNIT II: BRIDGE MEASUREMENTS: Resistance Measurement: Wheat stone bridge, Kelvin bridge-AC bridges: Condition for bridge balance- Inductance measurement: Maxwell Bridge, Hay Bridge-Capacitance measurement: Schering Bridge- Frequency measurement: Wein Bridge- Problems of shielding and grounding.

UNIT III: ELECTRONIC MEASUREMENTS: FET input electronic volt-ohm-ammeters- AC voltmeters: rectifier type, true RMS type- Digital voltmeters: Ramp, Dual slope integration & SAR types

UNIT IV: OSCILLOSCOPES: Oscilloscope block diagram- Vertical deflection system-Delay line-Horizontal deflection system-Vertical I/p and sweep generator signal synchronization-Oscilloscope probes: 1:1 probes,attenuator probes, active probes, current probes- Oscilloscope controls-Measurement of voltage, frequency, phase .

UNIT V: SIGNAL GENERATORS AND ANALYZERS: Low-frequency signal generators- Function generators- Pulse generators- RF signal generators.

UNIT VI: FREQUENCY & TIME MEASUREMENT: Time & frequency standards – Frequency measurement - time base - Period measurement - Measurement errors.

TEXT BOOKS:

1. Modern Electronic Instrumentation and Measurement Techniques- Albert D. Helfrick, Willium D. Cooper-PHI-2002
2. Electronic Instrumentation and Measurements- David A. Bell-PHI-2nd edition-2003.

REFERENCES:

1. A course in Electrical and Electronic Mesurements and Instrumentation- A.K. Sawhney- DhanpatiRai&CO-7th edition-2005
2. Electronic Instrumentation- H Kalsi- TMH-3rd edition
3. Electronic Measurements and Instrumentation- Oliver and Cage- TMH

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B.Tech	(Electronics & Communication Engineering)	L	T	P	C
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Embedded Systems
(Open Elective for non ECE Students)

Unit - I

Embedded Computing: Introduction, Complex Systems and Microprocessor, The Embedded System Design Process, Formalisms for System Design, Design Examples.

Unit - II

The 8051 Architecture : Introduction, 8051 Micro controller Hardware, Input / Output Ports and Circuits, External Memory, Counter and Timers, Serial data Input /Output, Interrupts.

Unit - III

Basic Assembly Language Programming Concepts: The Assembly Language Programming Process, Programming Tools and Techniques, Programming the 8051. Data Transfer and Logical Instructions. Arithmetic Operations, Decimal Arithmetic. Jump and Call Instructions, Further Details on Interrupts. Applications: Interfacing with Keyboards, Displays, D/A and A/D Conversions

Unit IV

Introduction to Real – Time Operating Systems: Tasks and Task States, Tasks and Data, Semaphores, and Shared Data; Message Queues, Mailboxes and Pipes, Timer Functions, Events, Memory Management, Interrupt Routines in an RTOS Environment.

Unit , V

Basic Design Using a Real,Time Operating System: Principles, Semaphores and Queues, HardReal,Time Scheduling Considerations, Saving Memory and Power,

TEXT BOOKS :

1. Computers and Components, Wayne Wolf, Elseveir.
2. The 8051 Microcontroller , Kenneth J.Ayala, Thomson.

REFERENCES :

1. Embedding system building blocks, Labrosse, via CMP publishers.
2. Embedded Systems, Raj Kamal, TMH.
3. Micro Controllers, Ajay V Deshmukhi, TMH.
4. Embedded System Design, Frank Vahid, Tony Givargis, John Wiley.
5. Microcontrollers, Raj kamal, Pearson Education.
6. An Embedded Software Primer, David E. Simon, Pearson Education

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B.Tech	(Electronics & Communication Engineering)	L	T	P	C
	Basics of VLSI	**3**	**0**	**0**	**3**

(Open Elective for non ECE Students)

UNIT – I

Introduction: Introduction to MOS Technology – MOS, PMOS, NMOS, CMOS and BiCMOStechnologies, fabrication fundamentals: Oxidation, Lithography, Diffusion, Ionimplantation, Metallization and Encapsulation.

Basic Electrical Properties: Basic Electrical Properties of MOS,CMOS and BiCMOS Circuits, IDS-VDSrelationships, MOS transistor threshold Voltage, gm, gds, figure of merit ωo, Passtransistor, NMOS inverter, Various pull - ups, Determination of pull-up to pulldown ratio (Zpu / Zpd) , CMOS Inverter analysis and design, BiCMOS inverters,Latch-up in CMOS circuits.

UNIT – II

VLSI Circuit Design Processes:VLSI Design Flow, MOS Layers, Stick Diagrams, Design Rules and Layouts,Lambda based design rules, Contact cuts , CMOS Lambda based design rules,Layout Diagrams for logic gates, Transistor structures, wires and vias, Scaling ofMOS circuits- Scaling models, scaling factors, scaling factors for device parameters, Limitations of Scaling.

UNIT – III

Gate Level Design and Layout: Architectural issues, Switch logic networks: Gate logic, Alternate gate circuit:Pseudo-NMOS Dynamic CMOS logic. Basic circuit concepts, Sheet ResistanceRS and its concept to MOS, Area Capacitance Units, Calculations, The delay unitT, Inverter Delays, Driving large Capacitive Loads, Wiring Capacitances, Fan-inand fan-out, Choice of layers

UNIT – IV

Subsystem Design: Subsystem Design, Shifters, Adders, ALUs, Multipliers: Array multiplier, SerialParallel multiplier, Parity generator, Comparators, Zero/One Detectors, Up/DownCounter, Memory elements: SRAM, DRAM, ROM, Serial Access Memories.

UNIT – V

Semiconductor Integrated Circuit Design:PLDs, FPGAs, CPLDs, Standard Cells, Programmable Array Logic,Programmable Logic Array Design Approach.

TEXT BOOKS:

1.Kamran Eshraghian, “Essentials of VLSI circuits and systems”, EshraghianDouglesand A. Pucknell, PHI, 2005 Edition

2.Wayne Wolf, “Modern VLSI Design”, 3rd Edition, Pearson Education, 1997.

REFERENCE BOOKS:

1. John .P. Uyemura, “CMOS logic circuit Design”, Springer, 2007.
2. Neil H. E Weste, “CMOS VLSI Design – A Circuits and Systems Perspective”, 3rd edition, DavidHarris, Ayan Banerjee, Pearson, 2009.

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B.Tech	(Electronics & Communication Engineering)	L	T	P	C
		3	0	0	3

Principles of Digital Signal Processing
(Open Elective for non ECE Students)

UNIT- I:

INTRODUCTION TO SIGNALS

Classification of Signals: Analog, Discrete, Digital, Deterministic & Random, Periodic & Aperiodic, Even & Odd, Energy & Power signals. Basic operations on signals: Time shifting, Time scaling, Time reversal, Amplitude scaling and Signal addition. Elementary Signals: Unit step, Unit ramp, Unit parabolic, Impulse, Sinusoidal function, Exponential function, Gate function, Triangular function, Sinc function and Signum function.

UNIT – II:

DISCRETE TIME SIGNALS AND SYSTEMS

Discrete Time Signals: Elementary discrete time signals, Classification of discrete time signals: power and energy signals, even and odd signals. Simple manipulations of discrete time signals: Shifting and scaling of discrete-time signals.

Discrete Time Systems: Input-Output description of systems, Block diagram representation of discrete time systems, Linear Constant Coefficient Difference Equations, Classification of discrete time systems: linear and nonlinear, time-invariant and variant systems, causal and non causal, stable and unstable systems.

UNIT- III:

LAPLACE TRANSFORMS AND Z- TRANSFORMS

Laplace Transforms: Laplace transforms, Partial fraction expansion, Inverse Laplace transform, Concept of Region of Convergence (ROC), Constraints on ROC for various classes of signals, Properties of Laplace transforms.

Z-Transforms: Concept of Z-transform of a discrete sequence, Region of convergence in Z- Transform, constraints on ROC for various classes of signals, inverse Z-transform, properties of Z-Transforms.

UNIT – IV:

FAST FOURIER TRANSFORMS

Discrete Time Fourier Transform (DTFT), Discrete Fourier Transform (DFT), Radix-2 Fast Fourier Transforms (FFT), Decimation in Time and Decimation in Frequency FFT Algorithms: radix-2 DIT-FFT, DIF-FFT, and Inverse FFT: IDFT-FFT.

UNIT – V:

IIR AND FIR DIGITAL FILTERS

IIR DIGITAL FILTERS: Analog filters approximations: Butterworth and Chebyshev, Design of IIR digital filters from analog filters. Realization of IIR filters: Direct form-I, Direct form-II, cascade form and parallel form.

FIR DIGITAL FILTERS: Characteristics of FIR digital filters, frequency response. Design of FIR digital filters using window techniques: Rectangular window, Triangular or Bartlett window, Hamming window, Hanning window, Blackman window. Realization of FIR filters: Linear phase and Lattice structures.

TEXT BOOKS:

1. B. P. Lathi, “Signals, Systems and Communications”, BS Publications, 2008.
2. John G. Proakis, Dimitris G. Manolakis, “Digital signal processing, principles, Algorithms and applications” , 4th edition , Pearson Education/PHI, 2007.
3. A.V. Oppenheim and R.W. Schaffer, “Discrete Time Signal Processing”, 2nd edition., PHI.

REFERENCES:

1. A.V. Oppenheim, A.S. Will sky and S.H. Nawab, “Signals and Systems”, PHI, 2nd Edition, 2013.
2. A. Anand Kumar, “Signals and Systems”, PHI Publications, Third Edition, 2013
3. P. Ramesh Babu. “Digital Signal Processing”.
4. Andreas Antoniou, “Digital signal processing”, Tata McGraw Hill, 2006.
5. R S Kaler, M Kulkarni,, Umesh Gupta, “A Text book on Digital Signal processing” –I K International Publishing House Pvt. Ltd.

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B.Tech	(Electronics & Communication Engineering)	L	T	P	C
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Introduction to Image Processing
(Open Elective for non ECE Students)

UNIT-I:

INTRODUCTION TO DIGITAL IMAGE PROCESSING

Introduction: Digital image representation, Fundamental steps in image processing, Elements of digital image processing, Elements of visual perception, Simple image model, Sampling and Quantization, Basic relationships between pixels, Image transformations.

Applications: Medical imaging, Robot vision, Character recognition, Remote sensing.

UNIT–II:

IMAGE ENHANCEMENT

Need for image enhancement, Point processing, Histogram processing, Spatial filtering- Smoothing and Sharpening.

UNIT-III:

COLOR IMAGE PROCESSING

Colour fundamentals, Colour models, Color transformations, Pseudo colour image processing, Full colour image processing.

UNIT–IV:

IMAGE COMPRESSION

Redundancies, Fidelity criteria, Image compression model, Lossless compression: Huffman coding, Arithmetic coding. Lossy compression: Lossy Predictive Coding, JPEG Compression Standard.

UNIT–V:

IMAGE SEGMENTATION

Detection of discontinuities: point, line and edge detection, Edge linking and Boundary detections: Local Processing, Global processing via Hough transform, Thresholding, Region oriented segmentation: Region growing, Region splitting and merging.

TEXT BOOKS:

1.Rafael C. Gonzalez and Richard E. Woods, “Digital Image Processing”, 3rd Edition, Pearson Education, 2011.

REFERENCE BOOKS:

1. S Jayaraman, S Esakkirajan and T Veerakumar, “Digital Image Processing”, TMH, 2011.

S. Sridhar, “Digital Image Processing”, 2nd Edition, Oxford Pu

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Sri Krishnadevaraya University College of Engineering & Technology

B.Tech **(Electrical and Electronics Engineering)**

L	T	P	C
3	0	0	3

Introduction to Hybrid Electric Vehicles

(Open Elective offered for non EEE Students)

UNIT I: Electric Vehicle Propulsion and Energy Sources

Introduction to electric vehicles, vehicle mechanics - kinetics and dynamics, roadway fundamentals propulsion system design - force velocity characteristics, calculation of tractive power and energy required, electric vehicle power source - battery capacity, state of charge and discharge, specific energy, specific power, Ragone plot. battery modeling - run time battery model, first principle model, battery management system-soc measurement, battery cell balancing. Traction batteries - nickel metal hydride battery, Li-Ion, Lipolymer battery.

UNIT II: Electric Vehicle Power Plant And Drives

Introduction electric vehicle power plants. Induction machines, permanent magnet machines, switch reluctance machines. Power electronic converters-DC/DC converters - buck boost converter, isolated DC/DC converter. Two quadrant chopper and switching modes. AC drives- PWM, current control method. Switch reluctance machine drives - voltage control, current control.

UNIT III: Hybrid And Electric Drive Trains

Introduction hybrid electric vehicles, history and social importance, impact of modern drive trains in energy supplies. Hybrid traction and electric traction. Hybrid and electric drive train topologies. Power flow control and energy efficiency analysis, configuration and control of DC motor drives and induction motor drives, permanent magnet motor drives, switch reluctance motor drives, drive system efficiency.

UNIT IV: Electric and Hybrid Vehicles - Case Studies

Parallel hybrid, series hybrid -charge sustaining, charge depleting. Hybrid vehicle case study – Toyota Prius, Honda Insight, Chevrolet Volt. 42 V system for traction applications. Lightly hybridized vehicles and low voltage systems. Electric vehicle case study - GM EV1, Nissan Leaf, Mitsubishi Miev. Hybrid electric heavy duty vehicles, fuel cell heavy duty vehicles.

UNIT V: Electric And Hybrid Vehicle Design :

Introduction to hybrid vehicle design. Matching the electric machine and the internal combustion engine. Sizing of propulsion motor, power electronics, drive system. Selection of energy storage technology, communications, supporting subsystem. Energy management strategies in hybrid and electric vehicles - energy management strategies- classification, comparison, implementation.

Text Books :

1. Iqbal Hussein, “Electric and Hybrid Vehicles: Design Fundamentals”, 2nd edition, CRC Press, 2003.
2. Amir Khajepour, M. Saber Fallah, Avesta Goodarzi, “Electric and Hybrid Vehicles: Technologies, Modeling and Control - A Mechatronic Approach”, illustrated edition, John Wiley & Sons, 2014.
3. Mehrdad Ehsani, YimiGao, Sebastian E. Gay, Ali Emadi, “Modern Electric, Hybrid Electric and Fuel Cell Vehicles: Fundamentals, Theory and Design”, CRC Press, 2004.

References:

1. James Larminie, John Lowry, “Electric Vehicle Technology”, Explained, Wiley, 2003.

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		L	T	P	C
B.Tech	**(Electrical and Electronics Engineering)**	**3**	**0**	**0**	**3**

Electrical Engineering Materials

(Open Elective offered for non EEE Students)

UNIT-I Conducting Materials

Introduction – classification of materials – Metals and Non metals, physical, thermal, mechanical and electrical properties of materials – classification of electrical materials – concept of atom – electron configuration of atom, conductors, general properties of conductors, factors effecting resistivity of electrical materials –electrical/mechanical/thermal properties of copper, aluminium, iron, steel, lead, tin and their alloys – applications.

UNIT-II Dielectric and High Resistivity Materials

Introduction – solid, liquid and gaseous dielectrics, leakage current, permittivity, dielectric constant, dielectric loss – loss angle – loss constant, Breakdown voltage and dielectric strength of-solid, liquid and gaseous dielectrics, effect of break down– electrical and thermal effects, Polarization – electric, ionic and dipolar polarization. Effect of temperature and Frequency on dielectric constant of polar dielectrics. High Resistivity materials – electrical / thermal / mechanical properties of Manganin, Constantan, Nichrome, Tungsten, Carbon and Graphite and their applications in electrical equipment.

UNIT-III Solid Insulating Materials

Introduction – characteristics of a good electrical insulating materials – classification of insulating materials – electrical, thermal, chemical and mechanical properties of solid insulating materials - Asbestos, Bakelite, rubber, plastics, thermo plastics. Resins, polystyrene, PVC, porcelain, glass, cotton and paper.

UNIT-IV Liquid & Gas Insulating Materials

Liquid insulating materials – Mineral oils, synthetic liquids, fluorinated liquids – Electrical, thermal and chemical properties – transformer oil – properties – effect of moisture on insulation properties Gaseous insulators – classification based on dielectric strength – dielectric loss, chemical stability properties and their applications.

UNIT-V Domestic Wiring

Wiring materials and accessories – Types of wiring – Types of Switches - Specification of Wiring – Stair case wiring - Fluorescent lamp wiring- Godown wiring – Basics of Earthing – single phase wiring layout for a residential building.

Text Books:

1. G.K. Mithal, “Electrical Engineering Materials”, Khanna publishers, 2nd edition, 1991.
2. R.K. Rajput, A course in “Electrical Engineering Materials”, Laxmi publications, 2009.

Reference Books:

1. C.S. Indulkar and S. Thiruvengadam,“An Introduction to Electrical Engineering Materials” S Chand & Company, 2008.
2. Technical Teachers Training Institute, “Electrical engineering Materials”, 1st Edition, Madras, McGraw Hill Education, 2004.
3. by S.P. Seth, “A course in Electrical Engineering Materials Physics Properties & Applications”, Dhanapat Rai & Sons Publications, 2018.

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B.Tech	(Electrical and Electronics Engineering)	L	T	P	C
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Generation of Electric Power

(Open Elective offered for non EEE Students)

UNIT-I: THERMAL POWER GENERATING SYSTEMS

Block Diagram of Thermal Power Station (TPS) showing paths of Coal, Steam, Water, Air, Ash and Flue Gasses - Brief Description of TPS Components: Economizers, Boilers, Super Heaters, Turbines, Condensers, Chimney and Cooling Towers.

UNIT-II: NUCLEAR POWER GENERATING SYSTEMS

Nuclear Power: Nuclear Fission and Chain Reaction.- Nuclear Fuels.- Principle of Operation of Nuclear Reactor.-Reactor Components: Moderators, Control Rods, Reflectors and Coolants.- Radiation Hazards: Shielding and Safety Precautions.- Types of Nuclear Reactors and Brief Description of PWR, BWR and FBR.

UNIT –III: HYDRO POWER GENERATING STATIONS

Hydro Power: Selection of Site, Classification, Layout, Description of Main Components.

UNIT-IV: SOLAR & WIND POWER GENERATING SYSTEMS

Solar Power Generation: Role and Potential of Solar Energy Options, Principles of Solar Radiation,Flat Plate and Concentrating Solar Energy Collectors, Different Methods of Energy Storage – PV Cell-V-I Characteristics.

Wind Power Generation: Role and potential of Wind Energy Option, Horizontal and Vertical AxisWind Mills- Performance Characteristics- Power- Speed & Torque- Speed Characteristics-Pitch & Yaw Controls – Power Electronics Application – Economic Aspects.

UNIT-V: ECONOMIC ASPECTS OF POWER GENERATION

Load Curve, Load Duration and Integrated Load Duration Curves-Load Demand, Diversity, Capacity, Utilization and Plant Use Factors- Numerical Problems. Costs Of Generation and their Division Into Fixed, Semi-Fixed and Running Costs. Tariff Methods: Desirable Characteristics of a Tariff Method.-Flat

TEXT BOOKS:

1. A Text Book on Power System Engineering by M.L.Soni, P.V.Gupta, U.S.Bhatnagar and A.Chakraborti, Dhanpat Rai & Co. Pvt. Ltd., 1999.
2. Electric Power Generation Distribution and Utilization by C.L Wadhwa, New Age International (P) Ltd., 2005.
3. Non Conventional Energy Sources by G.D. Rai, Khanna Publishers, 2000.

REFERENCE BOOKS:

1.Renewable Energy Resources – John Twidell and Tony Weir, Second Edition, Taylor and Francis Group, 2006.
2. Electrical Power Generation, Transmission and Distribution by S.N.Singh., PHI, 2003.

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B.Tech	(Electrical and Electronics Engineering)	L	T	P	C
		3	0	0	3

Control Systems

(Open Elective offered for non EEE Students)

UNIT – I INTRODUCTION AND TRANSFER FUNCTION REPRESENTATION

Concepts of Control Systems- Open Loop and closed loop control systems and their differences- Different examples of control systems- Classification of control systems, Feed-Back Characteristics, Effects of feedback. Mathematical models – Differential equations, Impulse Response and transfer functions - Translational and Rotational mechanical systems . Transfer Function of DC Servo motor - AC Servo motor- Synchro transmitter and Receiver, Block diagram representation of systems considering electrical systems as examples -Block diagram algebra – Representation by Signal flow graph - Reduction using Mason's gain formula.

UNIT-II-TIME RESPONSE ANALYSIS

Standard test signals - Time response of first order systems – Characteristic Equation of Feedback control systems, Transient response of second order systems - Time domain specifications – Steady state response - Steady state errors and error constants – Effects of proportional derivative, proportional integral systems.

UNIT – III -STABILITY ANALYSIS IN S-DOMAIN

The concept of stability – Routh's stability criterion – qualitative stability and conditional stability – limitations of Routh's stability. Root Locus Technique**:**The root locus concept - construction of root loci-effects of adding poles and zeros to G(s)H(s) on the root loci.

UNIT – IV FREQUENCY RESPONSE ANALYSIS

Introduction, Frequency domain specifications-Bode diagrams-Determination of Frequency domain specifications and transfer function from the Bode Diagram-Phase margin and Gain margin-Stability Analysis from Bode Plots.

UNIT – V STABILITY ANALYSIS IN FREQUENCY DOMAIN AND DESIGN TECHNIQUES

Polar Plots-Nyquist Plots-Stability Analysis. Compensation techniques – Lag, Lead, Lead-Lag Controllers design in frequency Domain, PID Controllers. State Space Analysis of Continuous Systems-Concepts of state, state variables and state model, derivation of state models from block diagrams, Diagonalization- Solving the Time invariant state Equations- State Transition Matrix

TEXT BOOKS:

1. Automatic Control Systems 8th edition– by B. C. Kuo 2003– John wiley and son's.,
2. Control Systems Engineering – by I. J. Nagrath and M. Gopal, New Age International (P) Limited, Publishers, 2nd edition.

REFERENCE BOOKS:

1. Modern Control Engineering – by Katsuhiko Ogata – Prentice Hall of India Pvt. Ltd., 3rd edition, 1998.
2. Control Systems by N.K.Sinha, New Age International (P) Limited Publishers, 3rd Edition, 1998.
3. Control Systems Engg. by NISE 3rd Edition – John wiley
4. "Modelling & Control Of Dynamic Systems" by Narciso F. Macia George J. Thaler, Thomson Publishers

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B.Tech	**(Electrical and Electronics Engineering)**	**L**	**T**	**P**	**C**
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Renewable Energy Sources

(Open Elective offered for non EEE Students)

UNIT – I PRINCIPLES OF SOLAR RADIATION:

Role and potential of new and renewable source, the solar energy option, Environmental impact of solar power, physics of the sun, the solar constant, extraterrestrial and terrestrial solar radiation, solar radiation on titled surface, instruments for measuring solar radiation and sun shine, solar radiation data.

UNIT-II SOLAR ENERGY COLLECTION STORAGE AND APPLICATIONS

Flat plate and concentrating collectors, classification of concentrating collectors, orientation and thermal analysis, advanced collectors. Different methods, Sensible, latent heat and stratified storage, solar ponds. Solar Applications- solar heating/cooling technique, solar distillation and drying, photovoltaic energy conversion.

UNIT-III WIND ENERGY:

Sources and potentials, horizontal and vertical axis windmills, performance characteristics, Betz criteria

UNIT-IV 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-V GEOTHERMAL ENERGY:

Resources, types of wells, methods of harnessing the energy, potential in India.

OCEAN ENERGY AND **DIRECT ENERGY CONVERSION** - OTEC, Principles utilization, setting of OTEC plants, thermodynamic cycles. Tidal and wave energy: Potential and conversion techniques, mini-hydel power plants, and their economics.Need for DEC, Carnot cycle, limitations, principles of DEC.

TEXT BOOKS:

1. Non-Conventional Energy Sources by G.D. Rai, Khanna Publishers
2. Renewable Energy Resources – Twidell & Wier, CRC Press(Taylor & Francis)

REFERENCE BOOKS:

1. Renewable energy resources by Tiwari and Ghosal, Narosa.
2. Renewable Energy Technologies by Ramesh & Kumar, Narosa.
3. Non-Conventional Energy Systems by K Mittal, Wheeler
4. Renewable energy sources and emerging technologies by D.P.Kothari,K.C.Singhal, PHI

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B.Tech	(Electrical and Electronics Engineering)	L	T	P	C
		3	0	0	3

Fundamentals of Power Electronics

(Open Elective offered for non EEE Students)

UNIT-I: POWER SWITCHING DEVICES

Diode, Thyristor, MOSFET, IGBT: I-V Characteristics; Firing circuit for thyristor; Voltage and current commutation of a thyristor; Gate drive circuits for MOSFET, IGBT and GTO.

UNIT-II: THYRISTOR RECTIFIERS

Single-phase half-wave and full-wave rectifiers, Single-phase full-bridge thyristor rectifier with R-load and highly inductive load; Three-phase full-bridge thyristor rectifier with R-load and highly inductive load; Input current wave shape and power factor-Numerical problems.

UNIT – III CHOPPERS

Choppers – Time ratio control and Current limit control strategies – Step down choppers Derivation of load voltage and currents with R, RL and RLE loads- Step up Chopper– Load voltage expression & numerical problems.

UNIT-IV:INVERTERS

Single phase Voltage Source inverters – operating principle -basic series inverter, single phase parallel inverter – basic principle of operation only, Numerical problems.

UNIT-V: AC VOLTAGE CONTROLLERS & CYCLO CONVERTERS:

AC voltage controllers – Principle of phase control – Principle of integral cycle control - Single phase two SCRs in anti parallel – With R and RL loads – modes of operation of Triac – Triac with R and RL loads – RMS load voltage, current and power factor - wave forms – Numerical problems. Cyclo converters - Midpoint and Bridge connections - Single phase to single phase step-up and step-down cyclo converters with Resistive and inductive load, Principle of operation, Waveforms, output voltage equation.

TEXT BOOKS:

1.M. H. Rashid, “Power Electronics: Circuits, Devices and Applications”, 2nd edition, Prentice Hall of India, 1998

2.P.S.Bimbhra,”Power Electronics”, 4th Edition, Khanna Publishers, 2010.

3.M. D. Singh & K. B. Kanchandhani, “Power Electronics”, Tata Mc Graw Hill Publishing Company, 1998.

REFERENCE BOOKS:

4.Ned Moha, “Power Electronics”, Wiley, 2011.

5.. Robert W. Erickson and Dragan Maksimovic, “Fundamentals of Power Electronics” 2nd Edition, Kluwer Academic Publishers, 2004.

6. Vedam Subramanyam, “Power Electronics”, New Age International (P) Limited, 1996.

7. V.R.Murthy, “Power Electronics”, 1st Edition, Oxford University Press, 2005.

8. P.C.Sen, “Power Electronics”, Tata Mc Graw-Hill Education, 1987.

SYLLABUS FOR
OPEN ELECTIVES OFFERED BY
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Sri Krishnadevaraya University College of Engineering & Technology

		L	T	P	C
B.Tech	**(Computer Science and Engineering)**	**3**	**0**	**0**	**3**

Database Management Systems

(Open Elective for non CSE Students)

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

UNIT-II Introduction to the Relational Model – Integrity Constraint Over relations – Enforcing Integrity constraints – Logical database Design – Introduction to Views – Destroying /altering Tables and Views .Relational Algebra – Selection and projection set operations – renaming – Joins – Division – Relational calculus : Tuple relational Calculus – Domain relational calculus.
The Form of a Basic SQL Query – Examples of Basic SQL Queries – Introduction to Nested Queries – Correlated Nested Queries, Set – Comparison Operators – Aggregate Operators – NULL values – Logical connectivites – AND, OR and NOT – Outer Joins –
Disallowing NULL values – Triggers and Active Data bases.

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

UNIT-IV Overview Of Transaction Management: The ACID Properties, Transactions and Schedules, Concurrent Execution of transactions-Lock Based Concurrency Control, Performance of Locking, Transaction Support in SQL, Introduction to crash recovery, Concurrency Control: 2PL, serializability and recoverability, Introduction Lock Management, Lock Conversions, Dealing with Deadlocks, Concurrency control without locking.

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

TEXT BOOKS:

1. Data base Management Systems, Raghurama Krishnan, Johannes Gehrke, TATA McGrawHill 3rd Edition
2. Data base System Concepts, Silberschatz, Korth, McGraw hill, V edition.

REFERENCES:

1. Data base Systems design, Implementation, and Management, Peter Rob & CarlosCoronel 7th Edition.
2. Fundamentals of Database Systems, Elmasri Navrate Pearson Education.
3. Introduction to Database Systems, C.J.Date Pearson Education
4. Introduction to Database Management, M.L. Gillenson and others, Wiley Student Edition.
5.Database Development and Management, Lee Chao, Auerbach publications, Taylor & Francis Group.
6. Database Management Systems, G.K. Gupta, TMH

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B.Tech	**(Computer Science and Engineering)**	**L**	**T**	**P**	**C**
		3	**0**	**0**	**3**

Unix Programming

(Open Elective for non CSE Students)

UNIT I

Introduction: Why Unix?, Computer System, The Unix Environment, Unix structure, Accessing Unix, Commoncommands: date, cal, who, passwd, echo, man, lpr. Other useful commands: tty, clear, sty, script, uname, bc, tar,gzip, cpio,finger,arp,ftp,telnet,rlogin. Vi editor: Editor concepts, The vi editor, Modes, Commands.

UNIT II

File Systems: File Names, File Types, Regular Files, Directories, File System Implementation, Operationsunique to regular files, Operations unique to directories, Operations common to both.

Security & File Permissions: users and groups, security levels, changing permissions, user masks, changingownership and group.

UNIT III

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

Filters: Filters and Pipes, Concatenating files, Display Beginning and End of files, Cut and Paste, Sorting,Translating Characters, Files with Duplicate Lines, Count characters, Words or Lines, Comparing Files.

UNIT IV

Grep : Operation, grep Family, Searching for File Content.

awk: Execution, Fields and Records, Scripts, Operations, Patterns, Actions, Associative Arrays, StringFunctions, String Functions, Mathematical Functions, User – Defined Functions, Using System commands inawk, Applications, awk and grep.

UNIT V

Interactive Korn Shell: Korn Shell Features, Two Special Files, Variables, Output, Input, Exit Status of aCommand, eval command, Environmental Variables, Options, Startup Scripts, Command History, CommandExecution Process.

Korn Shell Programming: Basic Script concepts, Expressions, Decisions: Making Selections, Repetition,special Parameters and Variables, changing Positional Parameters, Argument Validation, Debugging Scripts,Script Examples.

TEXT BOOKS:

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

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Object Oriented Programming through Java

(Open Elective for non CSE Students)

UNIT I Java Basics - Introduction, comments, data types, variables, constants, scope andlife time of variables, operators, type conversion and casting, control flowconditionalstatements, break and continue, simple java program, arrays. OOP concepts, parameter passing,static fields and methods, access control, this, overloading methods and constructors, recursion, garbagecollection, Strings, string functions.

UNIT II Inheritance–Inheritance concept, Member access rules, types of Inheritance,super uses, final classes and methods, casting, polymorphism- dynamic binding, method overriding, abstractclasses and methods, the Object class and its methods.
Interfaces – Interfaces vs. Abstract classes, implementing interfaces, accessingimplementations through interface references, extending interface.
Packages- Creating and Accessing a Package, Understanding CLASSPATH, importing packages.

UNIT III Files– streams, text Input/output, binary input/output, random access file operations, Filemanagement using File class, Using java.io. **Networkingin Java**– Introduction, Client/Server Interaction with Stream Socket Connections, Connectionless Client/Server Interaction withDatagrams, Using java.net.Exception handling – benefits of exception handling, exception hierarchy, checked exceptions and unchecked exceptions, usage of try, catch, throw, throws and finally, rethrowing exceptions, built in exceptions, creating own exceptions.

UNIT IV Multithreading - Differences between multiple processes and multiple threads, threadstates, creating threads, interrupting threads, thread priorities, synchronizing threads, interthreadcommunication, thread groups, daemon threads.**Event Handling** - Events, Event sources, Event classes, Event Listeners, Relationship between Eventsources and Listeners, Delegation event model, handling mouse and keyboard events, Adapter classes.

UNIT V GUI Programming with Java- The AWT class hierarchy, Introduction to Swing, Swing vs.AWT,MVC architecture, Hierarchy for Swing components, Containers – Top-level containers – JFrame,JApplet, JWindow, JDialog, JPanel, A simple swing application, swing components- Jbutton, JToggleButton,JCheckBox, JRadioButton, JLabel, JTextField, JTextArea, JList, JComboBox, JMenu, capabilities –colorcontrol, Font control, Drawing lines, rectangles and ovals, Drawing arcs, Layout management - Layout managertypes – border, grid, flow, box.

TEXT BOOKS

1. Java; the complete reference, 7th editon, Herbert schildt, TMH.
2. Understanding OOP with Java, updated edition, T. Budd, pearsoneduction.

REFERENCES

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

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Cyber Security

(Open Elective for non CSE Students)

UNIT-I

Classical Encryption Techniques: Symmetric Cipher Model, Substitution Techniques, Transposition Techniques, Block Ciphers And Data Encryption Standard; Traditional Block Cipher Structure, The Des Algorithm And Example.

UNIT-II

Public Key Cryptography And RSA: Principles Of Public Key Cryptosystem, The RSA Algorithm, Diffe – Hellman Key Exchange. Elliptic Curve Cryptography, Secure Hash Algorithm (SHA) SHA-512 Logic, SHA – 512 Round Function, Message Authentication Requirements, Functions HMAC

UNIT –III

Overview Of Vulnerability Scanning: Open Port / Service Identification, Banner / Version Check, Traffic Probe, Vulnerability Probe, Vulnerability Examples, OpenVAS, Metasploit.

UNIT –IV

Firewalls And Packet Filters : Firewall Basics, Packet Filter Vs Firewall, How A Firewall Protects A Network, Packet Characteristic To Filter, Stateless Vs Stateful Firewalls, Network Address Translation (NAT) And Port Forwarding

UNIT –V

Networks Vulnerability Scanning: Netcat, Socat Understanding Port And Services Tools – Datapipe, Fpipe , Scanning For Web Vulnerabilities Tools: Nikto, W3af, HTTP UtilIties – Curl, OpenSSL And Stunnel, Application Inspection Tools – Zed Attack Proxy, Sqlmap

TEXT BOOKS:

1. Cryptography & Network Security; William Stallings Lie, Pearson Education
2. Anti-Hacker Tool Kit (Indian Edition) By Mike Shema, Publication Mc Graw Hill.
3. Cyber Security Understanding Cyber Crimes, Computer Forensics And Legal Perspectives By Nina Godbole And Sunit Belpure, Publicaiton Wiley

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Computer Networks

(Open Elective for non CSE Students)

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

UNIT II: The Data Link Layer: Data link Layer Design Issues, Elementary Data Link Protocols, SlidingWindow Protocols.
The Medium Access Control sub layer: Multiple Access protocols, Ethernet- Ethernet Cabling,Manchester Encoding, The Ethernet MAC Sub layer Protocol.Ethernet Performance, Switched Ethernet, Fast Ethernet. Wireless LANs- The 802.11 Protocol Stack, the802.11 Physical Layer, the 802.11 MAC Sub Layer Protocol, the 802.11 Frame Structure.

UNIT III: The Network Layer: Network Layer Design Issues, Routing Algorithms(Shortest path, Flooding,Distance Vector, Link state and Hierarchical routing, Broad cast routing, Multicast routing), CongestionControl Algorithms,Internetworking.

UNIT IV: The Transport Layer: The Transport Service, Elements of Transport Protocols, The Internet TransportProtocols: UDP, TCP.

UNTI V: The Application Layer: DNS-The Domain Name System, Electronic Mail, The World Wide Web.Network Security: Cryptography, Symmetric-Key Algorithms, Public-Key Algorithms, Digital Signatures.

TEXT BOOKS:

1. Computer Networks, Andrew S. Tanenbaum, Fouth Edition, Pearson Education.

REFERENCES:

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

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Software Engineering

(Open Elective for non CSE Students)

UNIT I

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

UNIT II

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

UNIT III

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

UNIT IV

Design Engineering: Design process and Design quality, Design concepts, the design model.

Creating an architectural design: Software architecture, Data design, Architectural styles and patterns.

Performing User interface design: Golden rules, User interface analysis and design, interface analysis, interface design steps, Design evaluation.

UNIT V

Testing Strategies: A strategic approach to software testing, teststrategies for conventional software, Black-Box and White-Box testing, Validation testing, System testing, the art of Debugging.

Metrics for Process and Products: Software Quality, Software Measurement, Metrics for software quality.

Quality Management: Quality concepts, Software quality assurance, Software Reviews, Formal technical reviews, Statistical Software quality Assurance, The ISO 9000 quality standards.

TEXT BOOKS:

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

REFERENCES:

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

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Cloud Computing

(Open Elective for non CSE Students)

UNIT-I

Introduction: What Is the Cloud? The Emergence of Cloud Computing, The Global Nature of the Cloud, Cloud-Based Service Offerings, Grid Computing or Cloud Computing?,Is the Cloud Model Reliable?, Benefits of Using a Cloud Model, What About Legal Issues When Using Cloud Models?, What Are the Key Characteristics of Cloud Computing?, Challenges for the Cloud.

The Evolution of Cloud Computing: Hardware Evolution, Internet Software Evolution, Server Virtualization.

UNIT-II

Web Services Delivered from the Cloud: Communication-as-a-Service (CaaS), Infrastructure-as-a-Service (IaaS), Monitoring-as-a-Service (MaaS), Platform-as-a-Service (PaaS), Software-as-a-Service (SaaS),

Building Cloud Networks: The Evolution from the MSP Model to Cloud.

Computing and Software-as-a-Service, The Cloud Data Center, Collaboration, Service-Oriented Architectures as a Step Toward Cloud Computing, Basic Approach to a Data Center-Based SOA.

UNIT III

Federation, Presence, Identity, and Privacy in the Cloud: Federation in the cloud, Presence in the Cloud, Privacy and Its Relation to Cloud-Based Information Systems, Security in the Cloud: Cloud security challenges - Software- as-a-service security

UNIT IV

Common Standards in Cloud Computing: The open cloud consortium- The distributed management task force - standards for application developers - standards for messaging - standards for security

UNIT V

Cloud Computing case studies: Google App Engine, Google Web Toolkit, Microsoft Azure Services Platform, Windows Live, Exchange Online, SharePoint Services, Microsoft Dynamics CRM, Amazon EC2, Amazon Simple DB, Amazon S3, Amazon Cloud Front, Amazon SQS

TEXTBOOKS:

1) Cloud Computing implementation, management and security by Joh n W.Ruttinghouse, James F. Ransome.CRC Press, Taylor & Franc is group, 2010.

2) Cloud Computing a practical approach by Anthony T.velte, Toby J.velte Robert Elsenpeter. Tata Me Graw Hill edition, 2010

REFERENCES:

1) Cloud Application Architectures by George Reese. Oreilly publishers

2) Cloud computing and SOA convergence in your enterprise, by David S. Linthicum, Addison- Wesley

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Introduction Operations Management

(Open Elective for non CSE Students)

UNIT–I :

Introduction: Role and Scope of production Management – Concepts of productivity production System – production decision levels.

UNIT–II :

Plant Location: Plant Layout – Facilities Management Maintenance Management – Equipment Replacement.

UNIT–III : Design of Work System: Job design –Measurement of Work (Work Study) – Methods study – Time Study) – Value analysis, Value engineering.

UNIT–IV : Production: Planning and control – Job Shop, Flow shop scheduling, line balancing - Line of Balance – PERT – CPM.

UNIT–V : Quality control: Inspection – charts – Acceptance Sampling – Variables and Attributes – Six Sigma.

Materials Management: Concepts – principles – Classification - Inventory Management methods – Stores Management.

***Reference Books*:**

1. Roberta S. Russel And Bermard W. Taylor, Operations Management (Pearson Education).
2. R. Panner Selman: Production And Operation Management (PHI).
3. S.N. Chary: Production And Operation Management, (Tata Mc Graw Hill).
4. K. Aswathappa, K. Sriddhara Bhatt; "Production & Operations Management", 2nd Edition Himalaya Publication.

Adam Ebert: Production And Operation Management (Phi)

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Block Chain Technology

(Open Elective for non CSE Students

UNIT-I

Blockchain concepts: Blockchain, Blockchain application example: Escrow, Blockchain stack, from web 2.0 to the next generation decentralized web, domain specific Blockchain application, Blockchain benefits and challenges. Blockchain application templates: Blockchain application components, design methodology for Blockchain applications, Blockchain applications templates.

Unit II:

Setting up Ethereum development tools: Ethereum clients,Ethereum languages, TestRPC, Mist Ethereumwalle, meta mask, web3 JavaScript API, truffle. Ethereum Accounts: Ethereum Accounts, keypairs, working with EOA Accounts, working with contract accounts.

Unit III:

Smart contracts: Smart contract, structure of a contract, setting up and interacting with a contract using Geth client, setting up and interacting with a contract using Mist Wallet

Unit IV:

Smart contracts (continued): Smart contract examples, Smart contract patterns. Decentralized Applications: implementing Dapps, case studies,

Unit V:

Mining: Concensus on Blockchain network, mining, Block validation, state storage in Ethereum.

Text book:

1. Arshadeepbahga, Vijay madisetti, “Blockchain Applications A hands-on approach”, VPT 2017.
2. Chandramouli Subramanian, Asha A George, Abhilash K A and MeenaKarthikeyan, “Blockchain Technology”, Universty Press, 2021

Reference Books

1. Imran Bashir, “Mastering Blockchain” Packt Publishing Ltd, March 2017.
2. Melanie swan, “Blokchain blueprint for a new economy”, O’REILLY

SYLLABUS FOR
OPEN ELECTIVES OFFERED BY
DEPARTMENT OF CIVIL ENGINEERING

Sri Krishnadevaraya University College of Engineering & Technology

B.Tech	(Civil Engineering)	L	T	P	C
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Environmental Impact Assessment

(Open Elective offered for non Civil Students)

Unit-I:

INTRODUCTION:

Basic concept of EIA, Initial environmental Examination, Elements of EIA, factors affecting EIA. Impact evaluation and analysis, preparation of Environmental Base map. Classification of environmental parameters.

Unit-II:

EIA METHODOLOGIES:

E I A Methodologies: introduction, Criteria for the selection of EIA Methodology, E I A methods, Ad-hoc methods, matrix methods, Network method Environmental Media Quality Index method, overlay methods and cost/benefit Analysis**.**

Unit-III:

IMPACT OF DEVELOPMENTAL ACTIVITIES AND LAND USE:

Introduction and Methodology for the assessment of soil and ground water. Delineation of study area, Identification of actives. Procurement of relevant soil quality, Impact prediction, Assessment of Impact and significance. Identification and Incorporation of mitigation measures. E I A in surface water, Air and Biological environment: Methodology for the assessment of Impacts on surface water environment, Air pollution sources, generalized approach for assessment of Air pollution Impact**.**

Unit-IV:

ASSEMENT OF IMPACT ON VEGETATION AND WILDLIFE:

Introduction - Assessment of Impact of development Activities on Vegetation and wildlife, environmental Impact of Deforestation, Causes and effects of deforestation.

ENVIRONEMNTAL AUDIT : Introduction - Environmental Audit & Environmental legislation objectives of Environmental Audit, Types of environmental Audit, Audit protocel, stages of Environmental Audit, onsite activities, evaluation of Audit data and preparation of Audit report.

Unit-V:

CASE STUDIES:

. Case studies and preparation of Environmental Impact assessment statement for various Industries, namely thermal power plants, steel plants, highway and pharmaceutical industries.

TEXT BOOKS:

1. Environmental Impact Assessment Methodologies, by Y. Anjaneyulu, B.S. Publication, Sultan Bazar, Hyderabad.
2. Environmental Science and Engineering, by J. Glynn and Gary W. Hein Ke – Prentice Hall Publishers

REFERENCES:

1. Environmental Science and Engineering, by Suresh K. Dhaneja – S.K.,Katari & Sons Publication., New Delhi.
2. Environmental Pollution and Control, by Dr H.S. Bhatia – Galgotia Publication (P) Ltd, Delhi.

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Noise And Air Pollution

(Open Elective offered for non Civil Students)

Unit-I:

NOISE POLLUTION: Sources of noise pollution in urban areas, effect of noise pollution on urban environment, status of noise pollution in major cities.

Unit-II:

ACOUSTICAL CONCEPTS: Nature of sound, sound propagation characteristics, Propagation of sound in air absorption of sound in air, Hearing mechanics. Measurement scale, Equal loudness contours. **NOISE CHARACTERISTICS AND SOURCES OF NOISE**: Noise characterization – Sources of noise**.**

Unit-III:

NOISE CONTROL TECHNIQUES: Mechanism of noise generation- Control methodology, Noise control at source – Noise control along the path- Control on the receiver end. NOISE STRATEGY. **FUTURE GUIDELINES**: Current trend, Noise control measures – Environmental noise management – Noise labelling – Diagnostics – Noise strategy, Problems for future investigations**.**

Unit-IV:

AIR POLLUTION SOURCES: Sources and classification of air pollution, natural and manmade, primary, secondary pollutants, and various classifications of air pollutant standards as per Central Pollution Control Board CPCB.

Unit-V:

AIR POLLUTION DUE TO AUTOMOBILES: Exhaust emissions; crank case emission, evaporative emissions, air-fuel ratio. Spark timing, control of exhaust emissions. Air quality and emission standards, air pollution legislations and regulations.

TEXT BOOKS:

1. M.N. Rao and H.V.N. Rao, Air Pollution, Tata McGraw.
2. C.S. Rao, Environmental Pollution Control, 2/e, Wiley Eastern.
3. Air Pollution & Control Kvsg Murali Krishna Published by Kaushal & Co

REFERENCES:

1. A.C. Stern, Air Pollution, Vol, I-Viii, Academic Press, 1984.
2. K.V.G.S. Murali Krishna Air Pollution and control, Kakinada, 1995.
3. An introduction to Air pollution by R.K. Trivedy and P.K. Goel, B.S. Publications.
4. Air Pollution and Control by K.V.S.G.Murali Krishna, Kousal & Co. Publications, New Delhi.
5. Enivronmental meteorology by S.Padmanabham murthy , I.K.Internationals Pvt Ltd,New Delhi.

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Disaster Mitigation And Management

(Open Elective offered for non Civil Students)

Unit-I:

Environmental Hazards & Disasters: Meaning of Environmental hazards, Environmental Disasters and Environmental stress. Concept of Environmental Hazards, Environmental stress & Environmental Disasters. Different approaches & relation with human Ecology, Landscape Approach ,Ecosystem Approach, Perception approach - Human ecology & its application in geographical researches.

Unit-II

Types of Environmental hazards & Disasters: Natural hazards and Disasters, Man induced hazards & Disasters, Natural Hazards- Planetary Hazards/ Disasters, Extra Planetary Hazards/ disasters, Planetary Hazards, Endogenous Hazards - Exogenous Hazards

Unit-III:

ENDOGENOUS HAZARDS: Endogenous Hazards - Volcanic Eruption, Earthquakes, Landslides, Volcanic Hazards/ Disasters , Causes and distribution of Volcanoes - Hazardous effects of volcanic eruptions Environmental impacts of volcanic eruptions - Earthquake Hazards/ disasters - Causes of Earthquakes, Distribution of earthquakes, Hazardous effects of earthquakes, Earthquake Hazards in India, Human adjustment, perception & mitigation of earthquake.

Unit-IV:

EXOGENOUS HAZARDS: Exogenous hazards/ disasters, Infrequent events- Cumulative atmospheric hazards/ disasters Infrequent events: Cyclones, Lightning, Hailstorms Cyclones: Tropical cyclones & Local storms - Destruction by tropical cyclones & local storms (causes, distribution human adjustment, perception & mitigation)

Cumulative atmospheric hazards/ disasters: Floods, Droughts, Cold waves, Heat waves, Floods, Causes of floods- Flood hazards India- Flood control measures (Human adjustment, perception & mitigation).Droughts:- Impacts of droughts- Drought hazards in India- Drought control measures- Extra Palnetary Hazards/ Disasters- Man induced Hazards /Disasters- Physical hazards/ Disasters-Soil Erosion

Unit-V:

Soil Erosion: Mechanics & forms of Soil Erosion, Factors & causes of Soil Erosion, Conservation measures of Soil Erosion. Chemical hazards/ disasters, Release of toxic chemicals, nuclear explosion, Sedimentation processes. Sedimentation processes, Global Sedimentation problems- Regional Sedimentation problems-Sedimentation & Environmental problems- Corrective measures of Erosion & Sedimentation. Biological hazards/ disasters, Population Explosion.

TEXT BOOKS:

1. Disaster Management by Rajib Shah, Universities Press, India, 2003
2. Disaster Mitigation: Experiences And Reflections by Pardeep Sahni
3. Natural Hazards & Disasters by Donald Hyndman & David Hyndman – Cengage Learning

REFERENCES:

1. Kates,B.I & White, G.F The Environment as Hazards, oxford, New York, 1978.
2. R.B. Singh (Ed) Disaster Management, Rawat Publication, New Delhi, 2000.
3. H.K. Gupta (Ed) Disaster Management, Universiters Press, India, 2003.
4. R.B. Singh, Space Technology for Disaster Mitigation in India (INCED), University of Tokyo, 1994.
5. Dr.Satender,Disaster Management t in Hills, Concept Publishing Co., New Delhi, 2003.

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Ground Improvement Techniques

(Open Elective offered for non Civil Students)

UNIT- I

In situ densification methods- in situ densification of granular soils- vibration at ground surface and at depth, impact at ground and at depth – in situ densification of cohesive soils – pre loading – vertical drains – sand drains and geo drains – stone columns.

UNIT -II

Dewatering – sumps and interceptor ditches – single and multi stage well points – vacuum well points – horizontal wells – criteria for choice of filler material around drains – electro osmosis

UNIT- III

Stabilization of soils – methods of soil stabilization – mechanical – cement – lime – bitumen and polymer stabilization – use of industrial wastes like fly ash and granulated blast furnace slag.

UNIT- IV

Reinforce earth – principles – components of reinforced earth – design principles of reinforced earth walls – stability checks – soil nailing.

UNIT- V

Geo-synthetics, Geo-textiles – types – functions, properties and applications – Geo-grids, Geo-membranes and gabions, properties and applications.

Grouting. objectives of grouting – grouts and their applications – methods of grouting – stage of grouting, hydraulic fracturing in soils and rocks – post grout tests

TEXT BOOKS:

1. Manfred R. Haussmann, Engineering Principles of Ground Modification, McGraw Hill Pub. Co.,NewYork, 1990
2. Purushotham Raj, Ground Improvement Techniques, Laxmi Publications, New Delhi.

REFERENCES:

1. G. L. Siva Kumar Babu, An introduction to Soil Reinforcement and Geosynthetics, Universities Press.
2. M. P. Moseley, Ground Improvement, Blackie Academic and Professional, USA.
3. Nihar Ranjan Patro, Ground Improvement Techniques, Vikas Publishing House (p) Limited, New Delhi.
4. R. M. Koerner, Designing with Geo-synthetics, Prentice Hall.

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Environmental Pollution Control

(Open Elective offered for non Civil Students)

UNIT- I

Introduction:

Importance and Necessity of Protected Water Supply systems, Objectives of Protected water supply system, Flow chart of public water supply system, Role of Environmental Engineer.

UNIT -II

WATER DEMAND AND QUANTITY STUDIES : Estimation of water demand for a town or city, Types of water demands, Per capita Demand, Factors affecting the Per Capita Demand.

UNIT- III

WASTE WATER TREATMENT: Layout and general outline of various units in a waste water treatment plant – primary treatment: design of screens – grit chambers – skimming tanks – trickling filters – standard and high rate – Construction and design of Oxidation ponds.

UNIT- IV

SOLID WASTE MANAGEMENT: Characteristics, generation, collection and transportation of solid wastes, engineered systems for solid waste management.

UNIT- V

AIR POLLUTION: Types of pollutants, their sources and impacts, air pollution control, air quality standards and limits.

NOISE POLLUTION: Impacts of noise, permissible limits of noise pollution, measurement of noise and control of noise pollution.

TEXT BOOKS:

1. Water supply and sanitary Engineering by G.S. Birdi, Dhanpat Rai & Sons Publishers.
2. Water Supply Engineering, Vol. 1, waste water Engineering, Vol. II, B.C.Punmia, Ashok Jain & Arun Jain, Laxmi Publications Pvt.Ltd, New Delhi
3. Water supply and sanitary Engineering by S.K.Garg,

REFERENCES:

1. Water and Waste Water Technology by Mark J Hammar and Mark J. Hammar Jr
2. Waste water treatment- concepts and design approach by G.L. Karia and R.A. Christian, Prentice Hall of India

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Remote Sensing and GIS

(Open Elective offered for non Civil Students)

UNIT – I

Introduction to photogrammetry:

Principles & types of aerial photograph, geometry of vertical aerial photograph, Scale & Height measurement on single vertical aerial photograph, Height measurement based on relief displacement, Fundamentals of stereoscopy, fiducially points, parallax measurement using fiducially line.

UNIT – II

Remote sensing:

Basic concepts and foundation of remote sensing – elements involved in remote sensing, electromagnetic spectrum, remote sensing terminology and units. Energy resources, energy interactions with earth surface features and atmosphere, resolution, sensors and satellite visual interpretation techniques, basic elements, converging evidence, interpretation for terrain evaluation, spectral properties of water bodies, introduction to digital data analysis.

UNIT – III

Geographic information system:

Introduction, GIS definition and terminology, GIS categories, components of GIS, fundamental operations of GIS, A theoretical framework for GIS. Data collection and input overview, data input and output. Keyboard entry and coordinate geometry procedure, manual digitizing and scanning, Raster GIS, Vector GIS – File management, Spatial data – Layer based GIS, Feature based GIS mapping.

UNIT – IV

GIS spatial analysis:

Computational Analysis Methods (CAM), Visual Analysis Methods (VAM), Data storage-vector data storage, attribute data storage, overview of the data manipulation and analysis. Integrated analysis of the spatial and attribute data.

UNIT – V

Water resources applications:

Land use/Land cover in water resources, Surface water mapping and inventory -Watershed management for sustainable development and Watershed characteristics - Reservoir sedimentation, Fluvial Geomorphology - Ground Water Targeting, Identification of sites for artificial Recharge structures - Inland water quality survey and management, water depth estimation and bathymetry.

TEXT BOOKS:

1. B. Bhatta, Remote Sensing and GIS by Oxford University Press, New Delhi.
2. Satheesh Gopi, Advanced surveying: Total station GIS and remote sensing, Pearson publication.

REFERENCES:

1. George Joseph, Fundamentals of remote sensing, Universities press, Hyderabad.
2. C. P. Lo Albert, K.W. Yonng, Concepts & Techniques of GIS, Prentice Hall (India) Publications.
3. M. Anji Reddy Remote sensing and GIS, B. S. Publications, New Delhi.

L. R. A. Narayana, Remote Sensing and its applica

SYLLABUS FOR
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DEPARTMENT OF MECH. ENGINEERING

Sri Krishnadevaraya University College of Engineering & Technology

B.Tech	(Mechanical Engineering)	L	T	P	C
	Manufacturing Processes	3	0	0	3

(Open Elective offered for non Mech. Students)

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UNIT I

Introduction: Importance and selection of manufacturing processes.

Casting Processes: Introduction to casting process, process steps; pattern: types, materials and allowance; Cores: Types of cores, core prints, principles and design of gating system; Solidification of casting: Concept, solidification of pure metal and alloy; Special casting processes: Shell casting, investment casting, die casting, centrifugal casting, casting defects and remedies. .

UNIT II

Metal Forming: Introduction, nature of plastic deformation, hot and cold working of metals, mechanics of metal forming; Rolling: Principle, types of rolling mill and products, roll passes, forces in rolling and power requirements; Extrusion: Basic extrusion process and its characteristics, hot extrusion and cold extrusion, wire drawing, tube drawing.

Forging: Principles of forging, tools and dies. Types: Smith forging, drop forging, forging hammers, rotary forging and forging defects. Sheet metal forming: Mechanics of sheet metal working, blanking, piercing, bending, stamping.

. **UNIT III**

Metal Joining Processes: Classification of welding processes, types of welds and welded joints and V-I characteristics, arc welding, weld bead geometry, submerged arc welding, gas tungsten arc welding, gas metal arc welding. applications, advantages and disadvantages of the above processes, other fabrication processes. Heat affected zones in welding; soldering and brazing: Types and their applications, Welding defects: causes and remedies.

UNIT IV : Plastic Processing, Ceramics and Powder Metallurgy:

Plastics: Types, properties and their applications, processing of plastics, extrusion of plastics, transfer molding and compression molding, injection molding, thermoforming, rotational molding and blow molding

Ceramics: Classification of ceramic materials, properties and their application, ceramic powder preparation; Processing of ceramic parts: Pressing, casting, sintering; Secondary processing of ceramics: Coatings, finishing.

Powder Metallurgy: Principle, manufacture of powders, steps involved.

UNIT V

Unconventional Machining Processes: Electrical discharge machining (EDM), principle and processes parameters, electro-chemical machining (ECM) Laser beam machining (LBM), plasma arc machining (PAM) and electron beam machining

Principles and process parameters of Abrasive jet machining (AJM), water jet machining, ultrasonic machining

Text Books:

1. Rao P.N., Manufacturing Technology – Volume I, 5/e, McGraw-Hill Education, 2018.
2. Kalpakjain S and Schmid S.R., Manufacturing Engineering and Technology, 7/e, Pearson, 2018.

Reference Books:

1. Millek P. Groover, Fundamentals of Modern Manufacturing: Materials, Processes and Systems, 4/e, John Wiley and Sons Inc, 2010.
2. Sharma P.C., A Text book of Production Technology, 8/e, S Chand Publishing, 2014.
3. Ian Gibson, David W. Rosen, Brent Stucker, Additive Manufacturing Technologies: Rapid Prototyping to Direct Digital Manufacturing, 1st Edition, Springer, 2010.

Sri Krishnadevaraya University College of Engineering & Technology

B.Tech	**(Mechanical Engineering)**	**L**	**T**	**P**	**C**
		3	**0**	**0**	**3**

Entrepreneurship

(Open Elective offered for non Mech. Students)

UNIT I

Introduction to Entrepreneurship, Definition of Entrepreneur, Entrepreneurial Traits, Entrepreneur vs. Manager, Entrepreneur vs Intrapreneur. The Entrepreneurial decision process. Role of Entrepreneurship in Economic Development, Ethics and Social responsibility of Entrepreneurs. Opportunities for Entrepreneurs in India and abroad. Woman as Entrepreneur.

UNIT II

Creating and Starting the Venture, Sources of new Ideas, Methods of generating ideas, creating problem solving, product planning and development process, channels of distribution, marketing functions.

UNIT III

Financing and managing the new venture, Sources of capital, venture capital, Record keeping, recruitment, motivating and leading teams, and financial controls. Marketing and sales controls. E-commerce and Entrepreneurship, Internet advertising.

UNIT IV

small scale enterprises. Characteristics of small scale industry, role and importance of small business, problems of small business enterprises, sickness in small scale enterprises, Institutional support to entrepreneurship

UNIT V

Choosing location and layout, Issues related to Selection of layout.

Labour legislation, Salient Provision under Indian Factories Act, Industrial Disputes Act, Employees State Insurance Act, Workmen's Compensation Act and payment of Bonus Act.

This course replaces the course offered in earlier years as 'Entrepreneurship& Management'

TEXTBOOKS:

1. Entrepreneurship, Robert Hisrich, & Michael Peters, 5/e TMH.
2. Entrepreneurship, Dollinger, Pearson, 4/e, 2004.

REFERENCES:

1. Dynamics of Entrepreneurial Development and Management, Vasant Desai, Himalaya Publ. House, 2004.
2. Entrepreneurship management Bolanath dutta

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B.Tech	**(Mechanical Engineering)**	**L**	**T**	**P**	**C**
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IC Engines

(Open Elective offered for non Mech. Students)

UNIT – I

I.C.Engines: Energy conversion– basic engine components - Working principle of two stroke and four stroke engines - comparison of two stroke and four stroke, SI and CI engines – Classification of I.C. Engines, Valve and port timing diagrams, application of I.C Engines.

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UNIT-II

Power Cycles: Carnot cycle, Air standard cycles -Description and representation of Otto cycle, Diesel cycle & Dual cycles on P–V and T-S diagram -Thermal Efficiency – Comparison of Otto, Diesel and Dual cycles. Simple problems on Otto, Diesel and Dual cycles

UNIT – III

Testing and Performance: Engine Performance Parameters - Determination of, Brake power, friction power and indicated power – Performance test – Heat balance sheet- problems.

.

UNIT – IV

Engine Systems: Working principle of Magneto & Battery Ignition System **-** Simple Carburetor – fuel Injection System - Air & Thermostat cooling system -Lubrication system.

Super Charging: Introduction, types of superchargers, methods of supercharging, advantages and limitations of supercharging.

UNIT – V

Combustion in S.I. Engines: Homogeneous Mixture - Stages of combustion –Abnormal Combustion - Phenomenon of Knocking, Combustion Chambers- types, Rating of S.I Engine fuels.

TEXT BOOKS:

1. I.C. Engines / V. GANESAN- TMH
2. Thermal Engineering / R.K Rajput / Lakshmi Publications.

REFERENCES:

1. I.C Engines – Mathur & Sharma – Dhanpath Rai & Sons.
2. Engineering fundamentals of I.C Engines – Pulkrabek / Pearson /PHI

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B.Tech	**(Mechanical Engineering)**	**L**	**T**	**P**	**C**
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Automobile Engineering

(Open Elective offered for non Mech. Students)

UNIT - I

Introduction to vehicle structure and engine components: Vehicle construction - Chassis and body - Specifications - Engine - Types - Construction - Location of engine - Cylinder arrangement - Construction details - Cylinder block - Cylinder head - Cylinder liners - Piston – piston rings - Piston pin - Connecting rod - Crankshaft - Valves. Lubrication system - Types - Oil pumps - Filters - Cooling system - Types - Water pumps - Radiators - Thermostats - Anti-freezing compounds.

UNIT - II

Ignition, fuel supply and emission control system: Ignition system - Coil and Magneto - Spark plug - Distributor – Electronic ignition system - Fuel system - Carburetor - Fuel pumps - Fuel injection systems - Mono point and Multi point – Unit injector – Nozzle types - Electronic Fuel Injection system (EFI) – GDI, MPFI, DTSI-Automobile Emissions - Source of formation – Effects on human health and environment - Control techniques - Exhaust Gas Recirculation (EGR) - Catalytic converter - Emission tests and standards (Indian and Europe)

UNIT - III

Transmission system: Clutches - Function - Types - Single plate, Multiple plate and Diaphragm Clutch – Fluid coupling - Gearbox - Manual - Sliding - Constant - Synchromesh - Overdrive – Automatic transmission - Torque converter - Epicylic and Hydromatic transmission – Continuously variable transmission - Universal joint - Propeller shaft - Hotchkiss drive – Final drive - Rear axle assembly - Types -Differential - Need - Construction – Non-slip differential – Differential locks - Four wheel drive.

UNIT - IV

Steering, suspension and braking system: Principle of steering - Steering Geometry and wheel alignment - Steering linkages – Steering gearboxes - Power steering - front axle - Suspension system - Independent and Solid axle – coil, leaf spring and air suspensions - torsion bar - shock absorbers – Wheels and Tires - Construction - Type and specification - Tire wear and causes - Brakes - Needs – Classification –Drum and Disc Mechanical - Hydraulic and pneumatic - Vacuum assist – Retarders – Anti-lock Braking System(ABS)

UNIT - V

Automobile electrical systems, instrumentation and advances in automobile engineering: Battery-General electrical circuits-Dash board instrumentation - Passenger comfort – Safety and security - HVAC - Seat belts - Air bags - Automotive Electronics - Electronic Control Unit (ECU) - Variable Valve Timing (VVT) - Active Suspension System (ASS) - Electronic Brake Distribution (EBD) – Electronic Stability Program(ESP) Traction Control System (TCS) - Global Positioning System (GPS) - X-by-wire - Electric - Hybrid vehicle.

TEXTBOOKS:

1. William.H.Crouse, Automotive Mechanics, 10/e Edition, McGraw-Hill, (2006).
2. David A. Corolla, Automotive Engineering: Powertrain, Chassis System and Vehicle Body, Butterworth-Heinemann Publishing Ltd, (2009).
3. Richard Stone, Jeffrey K. Ball, Automotive Engineering Fundamentals" SAE International (2004).

REFERENCES:

1. Bosch, Automotive Hand Book, (2007), 6/e SAE Publications year.
2. K. Newton and W. Steeds, The motor vehicle, 13/e Butterworth-Heinemann Publishing Ltd. (year).
3. Kirpal Singh, Automobile Engineering, Vol.1&2, Standard Publications year.

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B.Tech	**(Mechanical Engineering)**	**L**	**T**	**P**	**C**
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Non Conventional Sources of Energy

(Open Elective offered for non Mech. Students)

UNIT – I:

Principles of Solar Radiation : Introduction - solar constant - Role and potential of new and renewable source, Environmental impact of solar power, physics of the sun, instruments for measuring solar radiation .

UNIT – II:

Solar Energy Collectors : Introduction – type - Flat plate and concentrating (Parabolic) collectors - Merits & Demerits of Flat plate and Concentrating (Parabolic) Collectors.

UNIT – III:

Solar Energy Storage and Applications: Introduction - Different methods - Solar Applications- solar heating/cooling technique, solar distillation and drying, photovoltaic energy conversion- photovoltaic Cells

UNIT – IV:

Wind Energy: Introduction – Basic Principle of wind energy conversion - Basic components **–** classification – Horizontal & Vertical Axis wind mill **–** Merit & demerits. Wind energy collectors advantages, disadvantages.

UNIT – V:

Geothermal Energy: Introduction – nature of geothermal fields – geothermal sources – hybrid systems –merits and demerits- applications.

Ocean Energy: Introduction – OTEC (open, closed & hybrid cycle) – Energy from Tides – components – Operating methods – Ocean waves – wave energy conversion devices.

Biomass: Principles of Bio-Conversion - Anaerobic/Aerobic Digestion – Design of a community Biogas plant for a village-classification of biomass gasifiers- up draught, down draught & cross draught gasifiers.

Text Books:

1. Renewable energy resources/ Tiwari and Ghosal/ Narosa.
2. Renewable Energy Sources /Twidell & Weir.
3. Non-Conventional Energy Sources /G.D. Rai.

REFERENCE BOOKS:

1. Solar Energy /Sukhatme.
2. Solar Power Engineering / B.S Magal Frank Kreith & J.F Kreith

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B.Tech	**(Mechanical Engineering)**	**L**	**T**	**P**	**C**
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Non Destructive Evaluation

(Open Elective offered for non Mech. Students)

UNIT I

Introduction: An Overview, Factors influencing the Reliability of NDE, Defects in materials, Defects in composites. NDT methods used for evaluation of materials and composites.

Visual Inspection: Basic principle and applications.

UNIT II

Liquid Penetrant Testing: Principle, scope. Equipment & techniques, Tests stations, Advantages, types of penetrant and developers. Illustrative examples – Heavy castings of large size, frame of jet engine, porosity testing of nickel alloys, leak testing. Zyglo test.

UNIT III

Radiographic Inspection: Principles of X – ray radiography, equipment, Absorption, Scattering, X-ray film processing, General radiographic procedures, Reading and Interpretation of Radiographs, Industrial radiographic practice, Limitations and Applications, Welding defects detection. Gamma ray radiography.

UNIT IV

Ultrasonic Testing: Principle of wave propagation, Ultrasonic equipment, Variables affecting an ultrasound test, Basic methods: Pulse Echo and Through Transmission, Types of scanning.

Applications of UT: Testing of products, Welding Inspection, Tube Inspection, Thickness Measurement, Elastic Constant Determination, Ultrasonic testing of composites.

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UNIT V

Magnetic Particle Inspection: Methods of generating magnetic field, Demagnetization of materials, Magnetic particle test: Principle, Test Equipment and Procedure, Interpretation and evaluation.

Introduction to Accostic Emission Testing and Thermography.

Eddy Current Testing: Principle of eddy current, Factors affecting eddy currents, Test system and test arrangement, Standardization and calibration, Application and effectiveness. Comparison and Selection of NDT Methods, Codes and Standards.

TEXT BOOKS:

1. Non-Destructive Testing by Baldev Raj et. al., Narosa Publishing House.
2. J Prasad, GCK Nair , Non destructive test and evaluation of Materials, Tata mcgraw-Hill Education Publishers, 2008.
3. Josef Krautkrämer, Herbert Krautkrämer, Ultrasonic testing of materials, 3/e, Springer-Verlag, 1983.
4. X. P. V. Maldague, Non destructive evaluation of materials by infrared thermography, 1/e, Springer-Verlag, 1993.

REFERENCES:

1. Non-Destructive Testing by P. Halmshaw
2. Metals Handbook Vol.II, Nondestructive inspection and quality control
3. Non-Destructive Testing by Warren J.Mcgomnagle, Mc Grawhill
4. Gary L. Workman, Patrick O. Moore, Doron Kishoni, Non-destructive, Hand Book, Ultrasonic Testing, 3/e, Amer Society for Nondestructive, 2007.
5. ASTM Standards, Vol 3.01, Metals and alloys