



Sri Krishnadevaraya University College of Engineering & Technology
Ananthapuramu-515003(A.P) India
Computer Science & Engineering

Draft Academic Regulations of M.Tech. (Full Time/Regular) Programme
(Effective for the students admitted into M.Tech. I year from the Academic Year 2024-25 onwards)

Sri Krishnadevaraya University College of Engineering & Technology offers Two Years (Four Semesters) full-time Master of Technology (M.Tech.) Degree programme, under Choice Based Credit System (CBCS) in different branches of Engineering and Technology with different specializations.

Sri Krishnadevaraya University College of Engineering & Technology, Ananthapuramu shall confer M. Tech. degree on candidates who are admitted to the programme and fulfill all the requirements for the award of the degree.

1. Award of the M.Tech. Degree

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

- 1.1 Pursues a course of study for not less than two academic years and not more than four academic years.
1.2 Registers for 70 credits and secures all 70 credits.

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

3. Programme of Study:

The following M.Tech. Specializations are offered at present in different branches of Engineering and Technology:

Table with 3 columns: S.No., Branch, Name of the Specialization. Rows include Computer Science and Engineering, Electronics and Communication Engineering, and Electrical and Electronics Engineering.

4. Eligibility for Admissions:

- 4.1 Admission to the M. Tech Program shall be made subject to the eligibility, qualification and specialization prescribed by the A.P. State Government/University from time to time.
4.2 Admissions shall be made either on the basis of the merit rank or Percentile obtained by the qualified student in the relevant qualifying GATE Examination/ the merit rank obtained by the qualified student in an entrance test conducted by A.P. State Government (APPGECET) for M.Tech. programmes/an entrance test conducted by University/on the basis of any other exams approved by the University, subject to reservations as laid down by the Govt. from time to time.

5. Programme related terms:

- 5.1 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.

Credit definition:

Table with 2 columns: Instruction type, Credit value. Rows: 1 Hr. Lecture (L) per week = 1 credit, 1 Hr. Tutorial (T) per week = 1 credit.



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1 Hr. Practical (P) per week | 0.5 credit

- 5.2 Academic Year: Two consecutive (one odd + one even) semesters constitute one academic year.
5.3 Choice Based Credit System (CBCS): The CBCS provides choice for students to select from the prescribed courses.

6. Programme Pattern:

- 6.1 Total duration of the of M.Tech. programme is two academic years
6.2 Each academic year of study is divided into two semesters.
6.3 Each Semester shall be of 22 weeks duration (inclusive of Examinations), with a minimum of 90 instructional days per semester.
6.4 The student shall not take more than four academic years to fulfill all the academic requirements for the award of M.Tech. degree from the date of commencement of first year first semester, failing which the student shall forfeit the seat in M.Tech. programme.
6.5 The medium of instruction of the programme (including examinations and project reports) will be in English only.
6.6 All subjects/courses offered for the M.Tech. degree programme are broadly classified as follows:

Table with 4 columns: S.No., Broad Course Classification, Course Category, and Description. It details various course types like Core Courses, Elective Courses, Research, and Audit Courses.

- 6.7 The college shall take measures to implement Virtual Labs (https://www.vlab.co.in) which provide remote access to labs in various disciplines of Engineering and will help student in learning basic and advanced concept through remote experimentation. Student shall be made to work on virtual lab experiments during the regular labs.
6.8 A faculty advisor/mentor shall be assigned to each specialization to advise students on the programme, its Course Structure and Curriculum, Choice of Courses, based on his competence, progress, pre-requisites and interest.
6.9 Preferably 25% course work for the theory courses in every semester shall be conducted in the blended mode of learning.



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7. Attendance Requirements:

- 7.1 A student shall be eligible to appear for the University external examinations if he/she acquires 75% of attendance in aggregate of all the courses.
- 7.2 Condonation of shortage of attendance in aggregate up to 10% (65% and above and below 75%) in each semester may be granted by the College Academic Committee.
- 7.3 Condonation of shortage of attendance shall be granted only on genuine and valid reasons on representation by the candidate with supporting evidence
- 7.4 Students whose shortage of attendance is not condoned in any semester are not eligible to take their end examination of that class.
- 7.5 A stipulated fee shall be payable towards condonation of shortage of attendance.
- 7.6 A student will not be promoted to the next semester unless he satisfies the attendance requirements of the present semester. They may seek re-admission into that semester when offered next.
- 7.7 If any candidate fulfils the attendance requirement in the present semester, he shall not be eligible for readmission into the same class.
- 7.8 If the learning is carried out in blended mode (both offline & online), then the total attendance of the student shall be calculated considering the offline and online attendance of the student.

8. Evaluation – Distribution and Weightage of Marks:

The performance of a student in each semester shall be evaluated subject - wise (irrespective of credits assigned), for a maximum of 100 marks for theory and 100marks for practical, based on Internal Evaluation and End Semester Examination.

- 8.1 There shall be five units in each of the theory subjects. For the theory subjects 60 marks will be for the End Examination and 40 marks will be for Internal Evaluation.
- 8.2 Two Internal Examinations shall be conducted for 30 marks each, one in the middle of the Semester and the other immediately after the completion of instruction. First mid examination shall be conducted for I & II units of the syllabus and second mid examination for III, IV & V units. Each mid exam shall be conducted for a total duration of 120 minutes with 3 questions (without choice) each question for 10 marks. Final Internal marks for a total of 30 marks shall be arrived at by considering the marks secured by the student in both the internal examinations with 80% weightage to the better internal exam and 20% to the other. There shall be two online examinations conducted during the respective mid examinations by the college for the remaining 10 marks with 20 objective questions.
- 8.3 The following pattern shall be followed in the End Examination:
 - i. Five questions shall be set from each of the five units with either/or type for 12 marks each.
 - ii. All the questions have to be answered compulsorily.
 - iii. Each question may consist of one, two or more bits.
- 8.4 For practical subjects, 60 marks shall be for the End Semester Examinations and 40 marks will be for internal evaluation based on the day-to-day performance. The internal evaluation based on the day-to-day work-10 marks, record- 10 marks and the remaining 20 marks to be awarded by conducting an internal laboratory test. The end examination shall be conducted by the examiners, with a breakup mark of Procedure-10, Experimentation-25, Results-10, Viva- voce-15
- 8.5 There shall be a **Technical Seminar** during I year II semester for internal evaluation of 100 marks. A student under the supervision of a faculty member, shall



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collect the literature on a topic and critically review the literature and submit it to the department in a report form and shall make an oral presentation before the Project Review Committee consisting of Head of the Department, supervisor/mentor and two other faculty members of the department. The student must secure a minimum of 50% of marks, to be declared successful. If he fails to obtain the minimum marks, he must reappear for the same as and when supplementary examinations are conducted. The Technical seminar shall be conducted anytime during the semester as per the convenience of the Project Review Committee and students. There shall be no external examination for Technical Seminar.

- 8.6 There shall be Mandatory **Audit courses** in I & II semesters for zero credits. There is no external examination for audit courses. However, attendance shall be considered while calculating aggregate attendance and student shall be declared to have passed the mandatory course only when he/she secures 50% or more in the internal examinations. In case, the student fails, a re- examination shall be conducted for failed candidates for 40 marks every six months/semester satisfying the conditions mentioned in item 1 & 2 of the regulations.
- 8.7 A candidate shall be deemed to have secured the minimum academic requirement in a subject if he secures a minimum of 40% of marks in the End Examination and a minimum aggregate of 50% of the total marks in the End Semester Examination and Internal Evaluation taken together.
- 8.8 In case the candidate does not secure the minimum academic requirement in any of the subjects he/she has to reappear for the Semester Examination either supplementary or regular in that subject or repeat the course when next offered or do any other specified subject as may be required.
- 8.9 The laboratory records and mid semester test papers shall be preserved for a minimum of 3 years in the respective institutions as per the University norms.

9. Credit Transfer Policy

As per University Grants Commission (Credit Framework for Online Learning Courses through SWAYAM) Regulation, 2016, the University shall allow up to a maximum of 40% of the total courses being offered in a particular Programme in a semester through the Online Learning courses through SWAYAM.

- 9.1 The University shall offer credit mobility for MOOCs and give the equivalent credit weightage to the students for the credits earned through online learning courses through SWAYAM platform.
- 9.2 The online learning courses available on the SWAYAM platform will be considered for credit transfer. SWAYAM course credits are as specified in the platform
- 9.3 Student registration for the MOOCs shall be only through the institution, it is mandatory for the student to share necessary information with the institution
- 9.4 The institution shall select the courses to be permitted for credit transfer through SWAYAM. However, while selecting courses in the online platform institution would essentially avoid the courses offered through the curriculum in the offline mode.
- 9.5 The institution shall notify at the beginning of semester the list of the online learning courses eligible for credit transfer in the forthcoming Semester.
- 9.6 The institution shall also ensure that the student has to complete the course and produce the course completion certificate as per the academic schedule given for the regular courses in that semester



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- 9.7 The institution shall designate a faculty member as a Mentor for each course to guide the students from registration till completion of the credit course.
- 9.8 The university shall ensure no overlap of SWAYAM MOOC exams with that of the university examination schedule. In case of delay in SWAYAM results, the university will re-issue the marks sheet for such students.
- 9.9 Student pursuing courses under MOOCs shall acquire the required credits only after successful completion of the course and submitting a certificate issued by the competent authority along with the percentage of marks and grades.
- 9.10 The institution shall submit the following to the examination section of the university:
- List of students who have passed MOOC courses in the current semester along with the certificates of completion.
 - Undertaking form filled by the students for credit transfer.
- 9.11 The university shall resolve any issues that may arise in the implementation of this policy from time to time and shall review its credit transfer policy in the light of periodic changes brought by UGC, SWAYAM, NPTEL and state government.

Note: Students shall also be permitted to register for MOOCs offered through online platforms other than SWAYAM NPTEL. In such cases, credit transfer shall be permitted only after seeking approval.

10. Re-registration for Improvement of Internal Evaluation Marks:

A candidate shall be given one chance to re-register for each subject provided the internal marks secured by a candidate are less than 50% and has failed in the end examination

- 10.1 The candidate should have completed the course work and obtained examinations results for I, II and III semesters.
- 10.2 The candidate should have passed all the subjects for which the Internal Evaluation marks secured are more than 50%.
- 10.3 Out of the subjects the candidate has failed in the examination due to Internal Evaluation marks secured being less than 50%, the candidate shall be given one chance for each Theory subject and for a maximum of three Theory subjects for Improvement of Internal evaluation marks.
- 10.4 The candidate has to re-register for the chosen subjects and fulfill the academic requirements.
- 10.5 For reregistration the candidates have to apply to the University through the college by paying the requisite fees and get approval from the University before the start of the semester in which re-registration is required
- 10.6 In the event of availing the Improvement of Internal evaluation marks, the internal evaluation marks as well as the End Examinations marks secured in the previous attempt(s) for the reregistered subjects stand cancelled.

11. Evaluation of Project/Dissertation Work:

The Project work shall be initiated at the beginning of the III Semester and the duration of the Project is of two semesters. Evaluation of Project work is for 300 marks with 200 marks for internal evaluation and 100 marks for external evaluation. Internal evaluation of the Project Work – I & Project work – II in III & IV semesters respectively shall be for 100 marks each. External evaluation of final Project work viva voce in IV semester shall be for 100 marks.

A Project Review Committee (PRC) shall be constituted with the Head of the Department



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as Chairperson, Project Supervisor and one faculty member of the department offering the M.Tech. programme.

- 11.1 A candidate is permitted to register for the Project Work in III Semester after satisfying the attendance requirement in all the subjects, both theory and laboratory (in I & II semesters).
- 11.2 A candidate is permitted to submit Project dissertation with the approval of PRC. The candidate has to pass all the theory, practical and other courses before submission of the Thesis.
- 11.4 Project work shall be carried out under the supervision of teacher in the parent department concerned.
- 11.5 A candidate shall be permitted to work on the project in an industry/research organization on the recommendation of the Head of the Department. In such cases, one of the teachers from the department concerned would be the internal guide and an expert from the industry/ research organization concerned shall act as co-supervisor/ external guide. It is mandatory for the candidate to make full disclosure of all data/results on which they wish to base their dissertation. They cannot claim confidentiality simply because it would come into conflict with the Industry's or R&D laboratory's own interests. A certificate from the external supervisor is to be included in the dissertation.
- 11.6 Continuous assessment of Project Work - I and Project Work – II in III & IV semesters respectively will be monitored by the PRC.
- 11.7 The candidate shall submit status report by giving seminars in three different phases (two in III semester and one in IV semester) during the project work period. These seminar reports must be approved by the PRC before submission of the Project Thesis.
- 11.8 After registration, a candidate must present in Project Work Review - I, in consultation with his Project Supervisor, the title, objective and plan of action of his Project work to the PRC for approval within four weeks from the commencement of III Semester. Only after obtaining the approval of the PRC can the student initiate the project work.
- 11.9 The Project Work Review - II in III semester carries internal marks of 100. Evaluation should be done by the PRC for 50 marks and the Supervisor will evaluate the work for the other 50 marks. The Supervisor and PRC will examine the Problem Definition, Objectives, Scope of Work, Literature Survey in the same domain and progress of the Project Work.
- 11.10 A candidate has to secure a minimum of 50% of marks to be declared successful in Project Work Review - II. Only after successful completion of Project Work Review – II, candidate shall be permitted for Project Work Review – III in IV Semester. The unsuccessful students in Project Work Review - II shall reappear for it as and when supplementary examinations are conducted.
- 11.11 The Project Work Review - III in IV semester carries 100 internal marks. Evaluation should be done by the PRC for 50 marks and the Supervisor will evaluate it for the other 50 marks. The PRC will examine the overall progress of the Project Work and decide whether or not eligible for final submission. A candidate has to secure a minimum of 50% of marks to be declared successful in Project Work Review - III. If he fails to obtain the required minimum marks, he has to reappear for Project Work Review - III after a month.
- 11.12 For the approval of PRC the candidate shall submit the draft copy of dissertation to the Head of the Department and make an oral presentation before the PRC.



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- 11.13 After approval from the PRC, the students are required to submit a report showing that the plagiarism is within 30%. The dissertation report will be accepted only when the plagiarism is within 30%, which shall be submitted along with the dissertation report.
- 11.14 Research paper related to the Project Work shall be published in conference proceedings/UGC recognized journal. A copy of the published research paper shall be attached to the dissertation.
- 11.15 After successful plagiarism check and publication of research paper, three copies of the dissertation certified by the supervisor and HOD shall be submitted to the College.
- 11.16 The dissertation shall be adjudicated by an external examiner selected by the University. For this, the Principal of the College shall submit a panel of three examiners as submitted by the supervisor concerned and department head for each student. However, the dissertation will be adjudicated by one examiner nominated by the University.
- 11.17 If the report of the examiner is not satisfactory, the candidate shall revise and resubmit the dissertation, in the time frame as decided by the PRC. If report of the examiner is unfavorable again, the thesis shall be summarily rejected. The candidate has to reregister for the project and complete the project within the stipulated time after taking the approval from the University
- 11.18 If the report of the examiner is satisfactory, the Head of the Department shall coordinate and make arrangements for the conduct of Project Viva voce exam.
- 11.19 The Project Viva voce examinations shall be conducted by a board consisting of the Supervisor, Head of the Department and the external examiner who has adjudicated the dissertation. For Dissertation Evaluation (Viva voce) in IV Sem. there are external marks of 100 and it is evaluated by external examiner. The candidate must secure a minimum of 50% marks in Viva voce exam.
- 11.20 If he fails to fulfill the requirements as specified, he will reappear for the Project Viva voce examination only after three months. In the reappeared examination also, if he fails to fulfill the requirements, he will not be eligible for the award of the degree.

12. Credits for Co-curricular Activities

The credits assigned for co-curricular activities shall be given by the principals of the colleges and the same shall be submitted to the University.

A Student shall earn 02 credits under the head of co-curricular activities, viz., attending Conference, Scientific Presentations and Other Scholarly Activities.

Following are the guidelines for awarding Credits for Co-curricular Activities

Name of the Activity	Maximum Credits / Activity
Participation in National Level Seminar/ Conference / Workshop /Training programs (related to the specialization of the student)	1
Participation in International Level Seminar / Conference / workshop/Training programs held outside India (related to the specialization of the student)	2
Academic Award/Research Award from State Level/National Agencies	1
Academic Award/Research Award from International Agencies	2
Research / Review Publication in National Journals (Indexed in Scopus / Web of Science)	1



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Table with 2 columns: Research / Review Publication in International Journals with Editorial board outside India (Indexed in Scopus / Web of Science) and 2

Note:

- i) Credit shall be awarded only for the first author. Certificate of attendance and participation in a Conference/Seminar is to be submitted for awarding credit.
ii) Certificate of attendance and participation in workshops and training programs (Internal or External) is to be submitted for awarding credit. The total duration should be at least one week.
iii) Participation in any activity shall be permitted only once for acquiring required credits under cocurricular activities

13. Grading:

As a measure of the student's performance, a 10-point Absolute Grading System using the following Letter Grades and corresponding percentage of marks shall be followed:

After each course is evaluated for 100 marks, the marks obtained in each course 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

Table with 3 columns: Range in which the marks in the subject fall, Grade, Grade points Assigned. Rows include ranges from >= 90 to < 50 and Absent, with corresponding grades (S, A, B, C, D, F, Ab) and points (10, 9, 8, 7, 6, 0, 0).

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 in the next supplementary examination.

- i) For noncredit audit courses, "Satisfactory" or "Unsatisfactory" shall be indicated instead of the letter grade and this will not be counted for the computation of SGPA/CGPA/Percentage.

Computation of Semester Grade Point Average (SGPA) and Cumulative Grade Point Average (CGPA):

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 = Σ (Ci × Gi) / Σ Ci

where, Ci is the number of credits of the ith subject and Gi is the grade point scored by the student in the ith course.

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



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$$CGPA = \frac{\sum (C_i \times S_i)}{\sum C_i}$$

where “S_i” is the SGPA of the ith semester and C_i is the total number of credits of ith semester.

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

14. Award of Class:

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

Class Awarded	Percentage of Marks to be secured
First Class with Distinction	≥70%
First Class	< 70% ≥ 60%
Pass Class	< 60% ≥ 50%

- 15. Exit Policy:** The student shall be permitted to exit with a PG Diploma based on his/her request to the university through the institution at the end of first year subject to passing all the courses in first year.

The University shall resolve any issues that may arise in the implementation of this policy from time to time and shall review the policy in the light of periodic changes brought by UGC, AICTE and State government.

16. Withholding of Results:

If the candidate has any case of in-discipline pending against him, the result of the candidate shall be withheld, and he will not be allowed/promoted into the next higher semester. The issue of degree is liable to be withheld in such cases.

17. Transitory Regulations

Discontinued, detained, or failed candidates are eligible for readmission as and when the semester is offered after fulfilment 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.

18. General:

- 18.1 The academic regulations should be read for purpose of any interpretation.
- 18.2 Disciplinary action for Malpractice/improper conduct in examinations is appended.
- 18.3 Where the words “he”, “him”, “his”, occur in the regulations, they include “she”,



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“her”, “hers”.

- 18.4 In the case of any doubt or ambiguity in the interpretation of the above rules, the decision of the Vice-Chancellor is final.
- 18.5 The University may change or amend the academic regulations 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 University.



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RULES FOR

DISCIPLINARY ACTION FOR MALPRACTICES / IMPROPER CONDUCT IN EXAMINATIONS

	Nature of Malpractices/Improper conduct	Punishment
	<i>If the candidate:</i>	
1.(a)	Possesses or keeps accessible in examination hall, any paper, note book, programmable calculators, Cell phones, pager, palm computers or any other form of material concerned with or related to the subject of the examination (theory or practical) in which he is appearing but has not made use of (material shall include any marks on the body of the candidate which can be used as an aid in the subject of the examination)	Expulsion from the examination hall and cancellation of the performance in that subject only.
(b)	Gives assistance or guidance or receives it from any other candidate orally or by any other body language methods or communicates through cell phones with any candidate or persons in or outside the exam hall in respect of any matter.	Expulsion from the examination hall and cancellation of the performance in that subject only of all the candidates involved. In case of an outsider, he will be handed over to the police and a case is registered against him.
2.	Has copied in the examination hall from any paper, book, programmable calculators, palm computers or any other form of material relevant to the subject of the examination (theory or practical) in which the candidate is appearing.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted to appear for the remaining examinations of the subjects of that semester/year. The Hall Ticket of the candidate is to be cancelled and sent to the University.
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 University 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 University examinations if his involvement is established. Otherwise, the candidate is debarred for two consecutive semesters from class work and all University 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 University 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 thereof inside or outside the examination hall.	Expulsion from the examination hall and cancellation of performance in that subject and all the other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all University 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 University for further action to award suitable punishment.	

1. Malpractices identified by squad or special invigilators
2. Punishments to the candidates as per the above guidelines.
3. Punishment for institutions: (if the squad reports that the college is also involved in encouraging malpractices)
4. A show cause notice shall be issued to the college.
5. Impose a suitable fine on the college.
6. Shifting the examination center from the college to another college for a specific period of not less than one year.

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 fulfil all the norms required for the award of Degree.



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SKUCET Curriculum
M.Tech Course Structure – R24
COMPUTER SCIENCE & ENGINEERING(CSE)

Semester – I					
Computer Science & Engineering (CSE)					
S.No	Course Code	Course Name	Category	L-T-P	Credits
1		Advanced Data Structures and Algorithms	PC	3-0-0	3
2		Advanced Computer Networks	PC	3-0-0	3
3		Program Elective Course -I Machine Learning Object Oriented Software Engineering Cyber Forensics	PE	3-0-0	3
4		Program Elective Course-II Data Science Cloud computing Information Security	PE	3-0-0	3
5		Advanced Data Structures and Algorithms Lab	PC	0-0-4	2
6		Advanced Computer Networks Lab	PC	0-0-4	2
7		Research Methodology and IPR	MC	2-0-0	2
8		Audit Course–I English for Research paper writing Disaster Management Sanskrit for Technical Knowledge	AC	2-0-0	0
TOTAL					18



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Computer Science & Engineering (CSE)					
Semester – II					
S.No	Course Code	Course Name	Category	L-T-P	Credits
1.		Advanced Operating Systems	PC	3-0-0	3
2.		Internet of Things	PC	3-0-0	3
3.		Program Elective Course– III Deep Learning Service Oriented Architecture Quantum Computing	PE	3-0-0	3
4.		Program Elective course-IV Data Visualization Techniques Distributed Systems Privacy Preserving Data Publishing	PE	3-0-0	3
5.		Advanced Operating Systems Lab	PC	0-0-4	2
6.		Internet of Things Lab	PC	0-0-4	2
7.		Technical seminar	MC	2-0-0	2
8.		Audit Course–II Pedagogy Studies Stress Management for Yoga Personality Development through Life Enlightenment Skills	AC	2-0-0	0
TOTAL					18



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Computer Science & Engineering (CSE)					
Semester – III					
S.No	Course Code	Course Name	Category	L-T-P	Credits
1.		Program Elective Course– V Software Defined Networks Reinforcement Learning Data Analytics	PE	3-0-0	3
2.		Open Elective Industrial Safety Business Analytics Optimization Techniques	OE	3-0-0	3
3.		Dissertation Phase–I	PR	0-0-20	10
4.		Co-curricular Activities			2
TOTAL					18

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Computer Science & Engineering(CSE)					
Semester – IV					
S.No	Course Code	Course Name	Category	L-T-P	Credits
1.		Dissertation Phase – II	PR	0-0-32	16
TOTAL					16



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Course Code	ADVANCED DATA STRUCTURES AND ALGORITHMS	L	T	P	C
		3	0	0	3
Semester		I			
Course Objectives:					
<ul style="list-style-type: none"> To understand concepts of dictionaries and hash tables. To implement lists and trees. To analyze usage of B trees, Splay trees and 2-3 trees. To understand the importance of text processing and computational Geometry. 					
Course Outcomes (CO): Student will be able to					
<ul style="list-style-type: none"> Understand the implementation of symbol table using hashing techniques Apply advanced abstract data type (ADT) and data structures in solving real world problem Effectively combine the fundamental data structures and algorithmic techniques in building a solution to a given problem Develop algorithms for text processing applications 					
UNIT - I					
Dictionaries : Definition, Dictionary Abstract Data Type, Implementation of Dictionaries, Hashing: Review of Hashing, Hash Function, Collision Resolution Techniques in Hashing, Separate Chaining, Open Addressing, Linear Probing, Quadratic Probing, Double Hashing, Rehashing, Extendible Hashing.					
UNIT - II					
Skip Lists : Need for Randomizing Data Structures and Algorithms, Search and Update Operations on Skip Lists, Probabilistic Analysis of Skip Lists, Deterministic Skip Lists, Trees: Binary Search Trees (BST), AVL Trees, Red Black Trees: Height of a Red Black Tree, Red Black Trees Bottom-Up Insertion, Top-Down Red Black Trees, Top-Down Deletion in Red Black Trees, Analysis of Operations.					
UNIT - III					
2-3 Trees , Advantage of 2-3 trees over Binary Search Trees, Search and Update Operations on 2-3 Trees, Analysis of Operations, B-Trees: Advantage of B- trees over BSTs, Height of B-Tree, Search and Update Operations on 2-3 Trees, Analysis of Operations, Splay Trees: Splaying, Search and Update Operations on Splay Trees, Amortized Analysis of Splaying.					
UNIT - IV					
Text Processing: Sting Operations, Brute-Force Pattern Matching, The Boyer-Moore Algorithm, The Knuth-Morris-Pratt Algorithm, Standard Tries, Compressed Tries, Suffix Tries, The Huffman Coding Algorithm, The Longest Common Subsequence Problem (LCS), Applying Dynamic Programming to the LCS Problem					
UNIT - V					
Computational Geometry: One Dimensional Range Searching, Two Dimensional Range Searching, Constructing a Priority Search Tree, Searching a Priority Search Tree, Priority Range Trees, Quadrees, k-D Trees.					
Textbooks:					
<ol style="list-style-type: none"> 1. Mark Allen Weiss, Data Structures and Algorithm Analysis in C++, second Edition, Pearson, 2004. 2. T.H. Cormen, C.E. Leiserson, R.L.Rivest, Introduction to Algorithms, Third Edition Prentice Hall, 2009 					
Reference books:					
<ol style="list-style-type: none"> 1. Michael T. Goodrich, Roberto Tamassia, Algorithm Design, First Edition, Wiley, 2006. 					



Course Code	ADVANCED COMPUTER NETWORKS	L	T	P	C
		3	0	0	3
Semester		I			
Course Objectives:					
The objective of this course is to build a solid foundation in computer networks concepts and design					
<ul style="list-style-type: none"> • To understand computer network architectures, protocols, and interfaces. • The OSI reference model and the Internet architecture network applications. • The course will expose students to the concepts of traditional as well as modern day computer networks - wireless and mobile, multimedia-based. • Students completing this course will understand the key concepts and practices employed in modern computer networking 					
Course Outcomes (CO): Student will be able to					
<ul style="list-style-type: none"> • Analyse computer network architectures and estimate quality of service • Design application-level protocols for emerging networks • Analyse TCP and UDP traffic in data networks • Design and analyse medium access methods, routing algorithms and IPv6 protocol for data networks • Analyze Data Center Networks and Optical Networks 					
UNIT - I					
Network Architecture, Performance: Bandwidth and Latency, High Speed Networks, Network-Centric View, Error Detection, Reliable Transmission, Ethernet and Multiple Access Networks, Overlay Networks: Routing Overlays, Peer-to-Peer Networks and Content Distribution Networks, Client-Server Networks, Delay-Tolerant Networks,					
UNIT - II					
Switching: Circuit-Switched Networks, Datagram Networks, Virtual-Circuit Networks, Message-Switched Networks, Asynchronous Transfer Mode: Evolution, Benefits, Concepts, Exploring Broadband Integrated Services Digital Network, Layer and Adaptation Layer, IPv4: Address Space, Notations, Classful, Classless, Network Address Translation, Datagram					
UNIT - III					
Fragmentation and Checksum IPv6 Addresses: Structure, Address Space, Packet Format and Extension Headers, ICMP, IGMP, ARP, RARP, Congestion Control and Resource Allocation: Problem, Issues, Queuing, TCP Congestion Control, Congestion-Avoidance Mechanisms and Quality of Service,					
UNIT - IV					
Internetworking: Intra-Domain and Inter-Domain Routings, Unicast Routing Protocols: RIP, OSPF and BGP, Multicast Routing Protocols: DVMRP, PIM-DM, PIM-SM, CBT, MSDP and MOSPF, Spanning Tree Algorithm, Optical Networking: SONET/SDH Standards, Traffic Engineering: Requirement, Traffic Sizing, Characteristics, Protocols, Time and Delay Considerations, Connectivity, Availability, Reliability and Maintainability and Throughput.					
UNIT - V					
Multimedia Over Internet: Transmission, IP Multicasting and VoIP, Domain Name System: Name Space, Domain Name Space, Distribution, Domains, Resolutions and Dynamic Domain Name System, SNMP, Security: IPsec, SSL/TLS, PGP and Firewalls, Datacenter Design and Interconnection Networks.					
Textbooks:					
<ol style="list-style-type: none"> 1. Larry L. Peterson and Bruce S. Davie, Computer Networks: A System Approach, Fifth Edition, Morgan Kaufmann, Elsevier, 2012. 2. Behrouz A. Forouzan, Data Communications and Networking, McGraw Hill, Fifth Edition, 2017. 					



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|---|
| <ol style="list-style-type: none">3. Chwan-Hwa (John) Wu, J. David Irwin, Introduction to Computer Networks and Cyber Security, CRC press, Taylor & Francis Group,20144. Andrew S. Tanenbaum, David J. Wetherall, Computer Networks, Pearson, 5th Edition, 2014. |
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Reference Books:

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| <ol style="list-style-type: none">1. Satish Jain Advanced Computer Networking: Concepts and Applications |
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Course Code	MACHINE LEARNING	L	T	P	C
		3	0	0	3
Semester		I			
Course Objectives:					
<ul style="list-style-type: none"> To understand various key paradigms for machine learning approaches. To familiarize with the mathematical and statistical techniques used in machine learning. To understand and differentiate among various machine learning techniques. 					
Course Outcomes (CO): Student will be able to					
<ul style="list-style-type: none"> To formulate a machine learning problem Select an appropriate pattern analysis tool for analysing data in a given feature space. Apply pattern recognition and machine learning techniques such as classification and feature selection to practical applications and detect patterns in the data. 					
UNIT - I					
Introduction: Definitions, Datasets for Machine Learning, Different Paradigms of Machine Learning, Data Normalization, Hypothesis Evaluation, VC-Dimensions and Distribution, Bias-Variance Tradeoff, Regression					
UNIT - II					
Bayes Decision Theory: Bayes decision rule, Minimum error rate classification, Normal density and discriminant functions. Parameter Estimation: Maximum Likelihood and Bayesian Parameter Estimation					
UNIT - III					
Discriminative Methods: Distance-based methods, Linear Discriminant Functions, Decision Tree, Random Decision Forest and Boosting Feature Selection and Dimensionality Reduction: PCA, LDA, ICA, SFFS, SBFS					
UNIT - IV					
Learning from unclassified data. Clustering. Hierarchical Agglomerative Clustering. k-means partitional clustering. Expectation maximization (EM) for soft clustering. Semi-supervised learning with EM using labelled and unlabelled data.					
UNIT - V					
Kernel Machines: Kernel Tricks, SVMs (primal and dual forms), K-SVR, K-PCA (6 Lectures) Artificial Neural Networks: MLP, Backprop, and RBF-Net					
Textbooks:					
<ol style="list-style-type: none"> Shalev-Shwartz,S., Ben-David,S., (2014), Understanding Machine Learning: From Theory to Algorithms, Cambridge University Press R. O. Duda, P. E. Hart, D. G. Stork (2000), Pattern Classification, Wiley-Blackwell, 2nd Edition. 					
Reference Books:					
<ol style="list-style-type: none"> Machine Learning Methods in the Environmental Sciences, Neural Networks, William W Hsieh, Cambridge Univ Press. Richard o. Duda, Peter E. Hart and David G. Stork, pattern classification, John Wiley & Sons Inc.,2001 Chris Bishop, Neural Networks for Pattern Recognition, Oxford University Press, 1995 					



Course Code	OBJECT ORIENTED SOFTWARE ENGINEERING	L	T	P	C
		3	0	0	3
	Semester	I			
Course Objectives:					
<ul style="list-style-type: none"> To learn and understand various O-O concepts along with their applicability contexts. Given a problem, identify domain objects, their properties, and relationships among them. How to identify and model/represent domain constraints on the objects and (or) on their relationships To learn various modelling techniques to model different perspectives of object-oriented software design (UML) 					
Course Outcomes (CO): Student will be able to					
<ul style="list-style-type: none"> Discuss about software development process models Identify the contemporary issues and discuss about coding standards Recognize the knowledge about testing methods and comparison of various testing techniques. Use the concept and standards of quality and getting knowledge about software quality assurance group. 					
UNIT - I					
Introduction to Software Engineering - Software Development process models – Agile Development - Project & Process - Project management - Process& Project metrics - Object Oriented concepts, Principles & Methodologies.					
UNIT - II					
Software Requirements Specification, Software prototyping - Software project planning - Scope - Resources - Software Estimation - Empirical Estimation Models – Planning - Risk Management - Software Project Scheduling - Object Oriented Estimation & Scheduling.					
UNIT - III					
Analysis Modelling - Data Modelling - Functional Modelling& Information Flow - BehaviouralModelling-Structured Analysis - Object Oriented Analysis - Domain Analysis-Object oriented Analysis process - Object Relationship Model - Object Behaviour Model, Design modelling with UML.					
UNIT - IV					
Design Concepts & Principles - Design Process - Design Concepts - Modular Design - Design Effective Modularity - Introduction to Software Architecture - Data Design - Transform Mapping - Transaction Mapping - Object Oriented Design - System design process- Object design process - Design Patterns.					
UNIT - V					
Top - Down, Bottom-Up, object oriented product Implementation & Integration. Software Testing methods-White Box, Basis Path-Control Structure - Black Box - Unit Testing - Integration testing - Validation & System testing - Testing Tools – Software Maintenance &Reengineering.					
Textbooks:					
<ol style="list-style-type: none"> Fairley R, “Software Engineering Concepts”, second edition, Tata McGraw Hill,NewDelhi, 2003. Jalote P, “An Integrated Approach to Software Engineering”, third edition, NarosaPublishers, New Delhi, 2013. 					
Reference Books:					
<ol style="list-style-type: none"> Grady Booch, James Rumbaugh, Ivar Jacobson - "the Unified Modeling Language User Guide" - Addison Wesley, 1999. Ali Bahrami, “Object Oriented Systems Development” 1st Edition, The McGraw-Hill Company, 1999 					



Course Code	CYBER FORENSICS			L	T	P	C
				3	0	0	3
	Semester			I			
Course Objectives:							
<ul style="list-style-type: none"> A brief explanation of the objective is to provide digital evidences which are obtained from digital media. In order to understand the objectives of computer forensics, first of all, people have to recognize the different roles computer plays in a certain crime. According to a snippet from the United States Security Service, the functions computer has in different kinds of crimes 							
Course Outcomes(CO):							
<ul style="list-style-type: none"> Students will understand the usage of computers in forensic, and how to use various forensic tools for a wide variety of investigations. It gives an opportunity to students to continue their zeal in research in computer forensic 							
UNIT - I							
Introduction of Cybercrime: Types, The Internet spawns crime, Worms versus viruses, Computers' roles in crimes, Introduction to digital forensics, Introduction to Incident - Incident Response Methodology – Steps - Activities in Initial Response, Phase after detection of an incident.							
UNIT - II							
Initial Response and forensic duplication, Initial Response & Volatile Data Collection from Windows system -Initial Response & Volatile Data Collection from Unix system – Forensic Duplication: Forensic duplication: Forensic Duplicates as Admissible Evidence, Forensic Duplication Tool Requirements, Creating a Forensic. Duplicate/Qualified Forensic Duplicate of a Hard Drive							
UNIT - III							
Forensics analysis and validation: Determining what data to collect and analyze, validating forensic data, addressing data-hiding techniques, performing remote acquisitions Network Forensics: Network forensics overview, performing live acquisitions, developing standard procedures for network forensics, using network tools, examining the honeynet project.							
UNIT - IV							
Current Forensic tools: evaluating computer forensic tool needs, computer forensics software tools, computer forensics hardware tools, validating and testing forensics software E-Mail Investigations: Exploring the role of e-mail in investigation, exploring the roles of the client and server in e-mail, investigating e-mail crimes and violations, understanding e-mail servers, using specialized e-mail forensic tools.Cell phone and mobile device forensics: Understanding mobile device forensics, understanding acquisition procedures for cell phones and mobile devices.							
UNIT - V							
Working with Windows and DOS Systems: understanding file systems, exploring Microsoft File Structures, Examining NTFS disks, Understanding whole disk encryption, windows registry, Microsoft startup tasks, MS-DOS startup tasks, virtual machines.							
Textbooks:							
<ol style="list-style-type: none"> Kevin Mandia, Chris Prosis, “Incident Response and computer forensics”, Tata McGraw Hill, 2006. R18 B.Tech. CSE Syllabus JNTU HYDERABAD 152 Computer Forensics, Computer Crime Investigation by John R. Vacca, Firewall Media, New Delhi. Computer Forensics and Investigations by Nelson, Phillips Enfinger, Steuart, CENGAGE Learning 							



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ReferenceBooks:

1. Real Digital Forensics by Keith J. Jones, Richard Bejtich, Curtis W. Rose, Addison- Wesley Pearson Education
2. Forensic Compiling, A Tractitioneris Guide by Tony Sammes and Brian Jenkinson, Springer International edition



Course Code	DATA SCIENCE	L	T	P	C
		3	0	0	3
	Semester	I			
Course Objectives:					
<ul style="list-style-type: none"> • Provide you with the knowledge and expertise to become a proficient data scientist. • Demonstrate an understanding of statistics and machine learning concepts that are vital for data science; • Produce Python code to statistically analyse a dataset; • Critically evaluate data visualizations based on their design and use for communicating stories from data; 					
Course Outcomes (CO): Student will be able to					
<ul style="list-style-type: none"> • Explain how data is collected, managed and stored for data science; • Understand the key concepts in data science, including their real-world applications and the toolkit used by data scientists; • Implement data collection and management scripts using MongoDB 					
UNIT - I					
Introduction to core concepts and technologies: Introduction, Terminology, data science process, data science toolkit, Types of data, Example applications.					
UNIT - II					
Data collection and management: Introduction, Sources of data, Data collection and APIs, Exploring and fixing data, Data storage and management, Using multiple data sources					
UNIT - III					
Data analysis: Introduction, Terminology and concepts, Introduction to statistics, Central tendencies and distributions, Variance ,Distribution properties and arithmetic, Samples/CLT, Basic machine learning algorithms, Linear regression, SVM, Naive Bayes					
UNIT - IV					
Data visualization: Introduction, Types of data visualisation, Data for visualisation: Data types, Data encodings, Retinal variables, Mapping variables to encodings, Visual encodings					
UNIT - V					
Applications of Data Science, Technologies for visualisation, Bokeh (Python) Recent trends in various data collection and analysis techniques, various visualization techniques, application development methods of used in data science					
Textbooks:					
<ol style="list-style-type: none"> 1. Cathy O’Neil and Rachel Schutt. Doing Data Science, Straight Talk From The Frontline. O’Reilly. 2. Jure Leskovek, AnandRajaraman and Jeffrey Ullman. Mining of Massive Datasets. v2.1, Cambridge University Press 					
Reference Books:					
<ol style="list-style-type: none"> 1. Kevin P. Murphy. Machine Learning: A Probabilistic Perspective. MIT Press, 2013. 2. Foster Provost and Tom Fawcett. Data Science for Business: What You Need to Know about Data Mining and Data-analytic Thinking. O’Reilly, 2013. 3. Trevor Hastie, Robert Tibshirani and Jerome Friedman. Elements of Statistical Learning, Second Edition. Springer, 2009. 4. Avrim Blum, John Hopcroft and RavindranKannan. Foundations of Data Science.2018. 5. Mohammed J. Zaki and Wagner Miera Jr. Data Mining and Analysis: Fundamental Concepts and Algorithms. Cambridge University Press, 2014. 6. Jiawei Han, MichelineKamber and Jian Pei. Data Mining: Concepts and Techniques, Third Edition. Morgan Kaufmann, 2011. 					



Course Code	CLOUD COMPUTING	L	T	P	C
		3	0	0	3
	Semester	I			
Course Objectives:					
<ul style="list-style-type: none"> Understand the concept of design patterns and their importance. Comprehend the behavioral knowledge of the problem and solutions. Relate creational, structural, and behavioral design patterns. Apply suitable design patterns to refine basic designs for a given context. 					
Course Outcomes (CO):					
<ul style="list-style-type: none"> Identify the appropriate design patterns to solve object-oriented design problems. Develop design solutions using creational patterns. Apply structural patterns to solve design problems. Construct design solutions by using behavioral patterns. 					
UNIT - I					
<p>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.</p> <p>The Evolution of Cloud Computing: Hardware Evolution, Internet Software Evolution, Server Virtualization</p>					
UNIT - II					
<p>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</p> <p>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.</p>					
UNIT - III					
<p>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</p>					
UNIT - IV					
<p>Common Standards in Cloud Computing: The open cloud consortium- The distributed management task force - standards for application developers - standards for messaging - standards for security</p>					
UNIT - V					
<p>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</p>					
Textbooks:					
<ol style="list-style-type: none"> 1) Cloud Computing implementation, management and security by John W. Ruttinghouse, James F. Ransome. CRC Press, Taylor & Francis group, 2010. 2) Cloud Computing a practical approach by Anthony T. velte, Toby J. velte Robert Elsenpeter. Tata Mc Graw Hill edition, 2010 					
ReferenceBooks:					
<ol style="list-style-type: none"> 1) Cloud Application Architectures by George Reese. Oreilly publishers 2) Cloud computing and SOA convergence in your enterprise, by David S. Linthicum, Addison- Wesley 					



Course Code	INFORMATION SECURITY	L	T	P	C
		3	0	0	3
Semester		I			
Course Objectives:					
<ul style="list-style-type: none"> To understand basics of Cryptography and Network Security. To be able to secure a message over insecure channel by various means. To learn about how to maintain the Confidentiality, Integrity and Availability of a Data To understand various protocols for network security to protect against the threats in the networks. 					
Course Outcomes (CO): Student will be able to					
<ul style="list-style-type: none"> Provide security of the data over the network. Do research in the emerging areas of cryptography and network security. Implement various networking protocols. Protect any network from the threats in the world 					
UNIT - I					
Security Attacks (Interruption, Interception, Modification and Fabrication), Security Services (Confidentiality, Authentication, Integrity, Non-repudiation, access Control and Availability) and Mechanisms, A model for Internetwork security, Internet Standards and RFCs, Buffer overflow & format string vulnerabilities, TCP session hijacking, ARP attacks, route table modification, UDP hijacking, and man-in-the-middle attacks.					
UNIT - II					
Conventional Encryption Principles, Conventional encryption algorithms, cipher block modes of operation, location of encryption devices, key distribution Approaches of Message Authentication, Secure Hash Functions and HMAC.					
UNIT - III					
Public key cryptography principles, public key cryptography algorithms, digital signatures, digital Certificates, Certificate Authority and key management Kerberos, X.509 Directory Authentication Service.					
UNIT - IV					
Email privacy: Pretty Good Privacy (PGP) and S/MIME.IP Security Overview, IP Security Architecture, Authentication Header, Encapsulating Security Payload, Combining Security Associations and Key Management.					
UNIT - V					
Web Security Requirements, Secure Socket Layer (SSL) and Transport Layer Security (TLS), Secure Electronic Transaction (SET).Basic concepts of SNMP, SNMPv1 Community facility and SNMPv3. Intruders, Viruses and related threats.					
Textbooks:					
<ol style="list-style-type: none"> 1. Network Security Essentials (Applications and Standards) by William Stallings Pearson Education. 2. Hack Proofing your network by Ryan Russell, Dan Kaminsky, Rain Forest Puppy, Joe Grand, David Ahmad, Hal Flynn IdoDubrawsky, Steve W.Manzuik and Ryan Permech, wileyDreamtech, 3. Cryptography and network Security, Third edition, Stallings, PHI/Pearson 					
Reference Books:					
<ol style="list-style-type: none"> 1. Network Security and Cryptography, Bernard Menezes ,Cengage Learning. 2. Cryptography and Security, C.K. Shymala, N. Harini and Dr. T.R. Padmanabhan, Wiley-India. 3. Applied Cryptography, Bruce Schiener, 2nd edition, John Wiley & Sons. 4. Cryptography and Network Security, AtulKahate, TMH. 5. Introduction to Cryptography, Buchmann, Springer. 6. Number Theory in the Spirit of Ramanujan, Bruce C.Berndt, University Press 7. Introduction to Analytic Number Theory, Tom M.Apostol, University Press 					



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Course Code	ADVANCED DATA STRUCTURES AND ALGORITHMS LAB	L	T	P	C
			0	0	4
		Semester I			
Course Objectives:					
<ul style="list-style-type: none">• Implement linear and non linear data structures.• Analyze various algorithms based on their time complexity.• Choose appropriate data structure and algorithm design method for a specific application.• Identify suitable data structure to solve various computing problems.					
Course Outcomes (CO):					
<ul style="list-style-type: none">• Implement divide and conquer techniques to solve a given problem.• Implement hashing techniques like linear probing, quadratic probing, random probing and double hashing/rehashing.• Perform Stack operations to convert infix expression into post fix expression and evaluate the post fix expression.• Differentiate graph traversal techniques Like Depth First Search, Breadth First Search. Identify shortest path to other vertices using various algorithms.					
List of Experiments:					
<ul style="list-style-type: none">• To implement functions of Dictionary using Hashing (division method, Multiplication method, Universal hashing).• To perform various operations i.e., insertions and deletions on AVL trees.• To perform various operations i.e., insertions and deletions on 2-3 trees.• To implement operations on binary heap.• To implement operations on graphs• To implement Depth First Search for a graph non-recursively.• To implement Breadth First Search for a graph non-recursively.• To implement Prim’s algorithm to generate a min-cost spanning tree.• To implement Krushkal’s algorithm to generate a min-cost spanning tree.• To implement Dijkstra’s algorithm to find shortest path in the graph.					



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Course Code	ADVANCED COMPUTER NETWORKS LAB	L	T	P	C
		0	0	4	2
	Semester	I			
Course Objectives:					
<ul style="list-style-type: none">Aims to provide advanced background on relevant computer networking topics to have a comprehensive and deep knowledge in computer networks					
Course Outcomes (CO):					
Develop programs for client-server applications Perform packet sniffing and analyze packets in network traffic. Implement error detecting and correcting codes Implement network security algorithms					
List of Experiments:					
<ol style="list-style-type: none">Implementation of client server programs for different network applicationsStudy and analysis of the network using Wireshark network protocol analyserImplementation of topology generation for network simulationImplementation of queuing managementImplementation of MAC-layer protocolsImplementation of routing protocolsImplementation of transport-layer protocolsImplementation of network security mechanisms					



Course Code	RESEARCH METHODOLOGY AND IPR	L	T	P	C
		2	0	0	2
Semester		I			
Course Objectives:					
<ul style="list-style-type: none"> Identify an appropriate research problem in their interesting domain. Understand ethical issues understand the Preparation of a research project thesis report. Understand the Preparation of a research project thesis report Understand the law of patent and copyrights. Understand the Adequate knowledge on IPR 					
Course Outcomes (CO): Student will be able to					
<ul style="list-style-type: none"> Analyze research related information Follow research ethics Understand that today's world is controlled by Computer, Information Technology, but tomorrow world will be ruled by ideas, concept, and creativity. Understanding that when IPR would take such important place in growth of individuals & nation, it is needless to emphasis the need of information about Intellectual Property Right to be promoted among students in general & engineering in particular. Understand that IPR protection provides an incentive to inventors for further research work and investment in R & D, which leads to creation of new and better products, and in turn brings about, economic growth and social benefits. 					
UNIT - I					
Meaning of research problem, Sources of research problem, Criteria Characteristics of a good research problem, Errors in selecting a research problem, scope, and objectives of research problem. Approaches of investigation of solutions for research problem, data collection, analysis, interpretation, Necessary instrumentations					
UNIT - II					
Effective literature studies approaches, analysis Plagiarism, Research ethics, Effective technical writing, how to write report, Paper Developing a Research Proposal, Format of research proposal, a presentation and assessment by a review committee.					
UNIT - III					
Nature of Intellectual Property: Patents, Designs, Trade and Copyright. Process of Patenting and Development: technological research, innovation, patenting, development. International Scenario: International cooperation on Intellectual Property. Procedure for grants of patents, Patenting under PCT.					
UNIT - IV					
Patent Rights: Scope of Patent Rights. Licensing and transfer of technology. Patent information and databases. Geographical Indications.					
UNIT - V					
New Developments in IPR: Administration of Patent System. New developments in IPR; IPR of Biological Systems, Computer Software etc. Traditional knowledge Case Studies, IPR and IITs.					
Textbooks:					
<ol style="list-style-type: none"> Stuart Melville and Wayne Goddard, "Research methodology: an introduction for science & engineering students" Wayne Goddard and Stuart Melville, "Research Methodology: An Introduction" 					
Reference Books:					
<ol style="list-style-type: none"> Ranjit Kumar, 2nd Edition, "Research Methodology: A Step by Step Guide for beginners" Halbert, "Resisting Intellectual Property", Taylor & Francis Ltd ,2007. Mayall, "Industrial Design", McGraw Hill, 1992. Niebel, "Product Design", McGraw Hill, 1974. 					



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5. Asimov, "Introduction to Design", Prentice Hall, 1962.
6. Robert P. Merges, Peter S. Menell, Mark A. Lemley, " Intellectual Property in New Technological Age", 2016.



Course Code	ADVANCED OPERATING SYSTEMS	L	T	P	C
		3	0	0	3
	Semester	II			
Course Objectives:					
<ul style="list-style-type: none"> To be able to read and understand sample open source programs and header files. System calls which explore networking and security Applications.. To acquire the knowledge in the implementation of interprocess communication. 					
Course Outcomes (CO): Student will be able to					
<ul style="list-style-type: none"> To explain the functionality of a large software system by reading its source. To revise any algorithm present in a system. Inter process communication mechanism Android mobiles inner process system 					
UNIT - I					
Basic Operating System Concepts - Overview of Unix File System - Files - Links - Types - Inodes -Access Rights - System Calls - Overview of Unix Kernels -Model - Implementation - Reentrant Kernels - Address Space - Synchronization - Interprocess Communication - Process Management - Memory Management - Device Drivers.					
UNIT - II					
Processes, Lightweight Processes, and Threads - Process Descriptor - State - Identifying a Process - Relationships among processes - Organization - Resource Limits - Creating Processes - System Calls - Kernel Threads - Destroying Processes -Termination - Removal.					
UNIT - III					
The Virtual File System (VFS) - Role - File Model -System Calls - Data Structures - Super Block, Inode, File, dentry Objects - dentry Cache - Files Associated with a Process - Filesystem Types - Special Files systems – Filesystem Type Registration – Filesystem Handling - Namespaces - Mounting – Unmounting - Implementation of VFS System Calls.					
UNIT - IV					
Windows Operating system - versions, Concepts and tools, Windows internals, System Architecture, Requirements and design goals, Operating system model, Architecture overview. Key system components. System mechanisms - Trap dispatching, object manager, Synchronization, System worker threads, Windows global flags, Local procedural calls, Kernelevent tracing.					
UNIT - V					
what is android, basic building blocks – activities, services, broadcast receivers & content, ui components- views & notifications, components for communication -intents & intent filters, android api levels launching emulator editing emulator settings emulator shortcuts log cat usage, Applications of Android.					
Textbooks:					
<ol style="list-style-type: none"> Daniel P. Bovet and Marco Cesati, "Understanding the Linux Kernel", 3rd Edition, O'Reilly Publications, 2005. Harold Abelson, Gerald Jay Sussman and Julie Sussman, —Structure and Interpretation of Computer Programs, Second Edition, Universities Press, 2013. 					
Reference Books:					
<ol style="list-style-type: none"> Mark E. Russinovich and David A. Solomon, Microsoft Windows Internals, 4th Edition, Microsoft Press, 2004. 					



Course Code	INTERNET OF THINGS				L	T	P	C
		3	0	0	3			
Semester					II			
Course Objectives:								
Introduce the fundamental concepts of IoT and physical computing <ul style="list-style-type: none"> • Expose the student to a variety of embedded boards and IoT Platforms • Create a basic understanding of the communication protocols in IoT communications. • Familiarize the student with application program interfaces for IoT. • Enable students to create simple IoT applications. 								
Course Outcomes (CO): Student will be able to								
<ul style="list-style-type: none"> • Choose the sensors and actuators for an IoT application • Select protocols for a specific IoT application • Utilize the cloud platform and APIs for IoT applications • Experiment with embedded boards for creating IoT prototypes • Design a solution for a given IoT application • Establish a startup 								
UNIT - I								
Overview of IoT: The Internet of Things: An Overview, The Flavor of the Internet of Things, The “Internet” of “Things”, The Technology of the Internet of Things, Enchanted Objects, Who is Making the Internet of Things? Design Principles for Connected Devices: Calm and Ambient Technology, Privacy, Web Thinking for Connected Devices, Affordances. Prototyping: Sketching, Familiarity, Costs Vs Ease of Prototyping, Prototypes and Production, Open source Vs Close source, Tapping into the community.								
UNIT - II								
Embedded Devices: Electronics, Embedded Computing Basics, Arduino, Raspberry Pi, Mobile phones and tablets, Plug Computing: Always-on Internet of Things								
UNIT - III								
Communication in the IoT: Internet Communications: An Overview, IP Addresses, MAC Addresses, TCP and UDP Ports, Application Layer Protocols Prototyping Online Components: Getting Started with an API, Writing a New API, Real-Time Reactions, Other Protocols Protocol								
UNIT - IV								
Business Models: A short history of business models, The business model canvas, Who is the business model for, Models, Funding an Internet of Things startup, Lean Startups. Manufacturing: What are you producing, Designing kits, Designing printed circuit boards.								
UNIT - V								
Manufacturing continued: Manufacturing printed circuit boards, Mass-producing the case and other fixtures, Certification, Costs, Scaling up software. Ethics: Characterizing the Internet of Things, Privacy, Control, Environment, Solutions								
Textbooks:								
1. Adrian McEwen, Hakim Cassimally - Designing the Internet of Things, Wiley Publications, 2012								
Reference Books:								
1. Haider Raad Fundamentals of IoT and Wearable Technology Design, Wiley Publications 2020. 2. Kashish Ara Shakil, Samiya Khan, Internet of Things (IoT) Concepts and Applications, Springer Publications 2020.								



Course Code	DEEP LEARNING				L	T	P	C
		3	0	0	3			
	Semester				II			
Course Objectives:								
<ul style="list-style-type: none"> To present the mathematical, statistical and computational challenges of building neural networks. To teach the concepts of deep learning. To introduce dimensionality reduction techniques. To enable the students to know deep learning techniques to support real-time applications. To explain the case studies of deep learning techniques. 								
Course Outcomes (CO): Student will be able to								
<ul style="list-style-type: none"> Identify the deep learning algorithms which are more appropriate for various types of learning tasks in various domains. Implement deep learning algorithms and solve real-world problems. 								
UNIT - I								
Introduction: Introduction to machine learning- Linear models (SVMs and Perceptron's, logistic regression)- Intro to Neural Nets: What a shallow network computes- Training a network: loss functions, back propagation and stochastic gradient descent- Neural networks as universal function approximates.								
UNIT - II								
Deep Networks: History of Deep Learning- A Probabilistic Theory of Deep Learning- Back propagation and regularization, batch normalization- VC Dimension and Neural Nets-Deep Vs Shallow Networks Convolutional Networks - Generative Adversarial Networks (GAN), Semi-supervised Learning .								
UNIT - III								
Dimensionality Reduction: Linear (PCA, LDA) and manifolds, metric learning - Auto encoders and dimensionality reduction in networks - Introduction to Convnet - Architectures – AlexNet, VGG, Inception, ResNet - Training a Convnet: weights initialization, batch normalization, hyper parameter optimization.								
UNIT - IV								
Optimization and Generalization: Optimization in deep learning– Non-convex optimization for deep networks- Stochastic Optimization Generalization in neural networks- Spatial Transformer Networks- Recurrent networks, LSTM - Recurrent Neural Network Language Models- Word-Level RNNs & Deep Reinforcement Learning - Computational & Artificial Neuroscience.								
UNIT - V								
Case Study and Applications: Image net- Detection-Audio Wave Net-Natural Language Processing Word2Vec - Joint Detection Bioinformatics- Face Recognition- Scene Understanding- Gathering Image Captions.								
Textbooks:								
1. "Deep Learning", Ian Goodfellow, YoshuaBengio , Aaron Courville, MIT Press 2016.								
Reference Books:								
1. "Neural Networks and Deep Learning A Text Book", Charu C Aggarwal, Springer International Publishing AG, Part of Springer Nature 2018.								



Course Code	SERVICE ORIENTED ARCHITECTURE	L	T	P	C
		3	0	0	3
	Semester	II			

Course Objectives:

- Understand SOA and evolution of SOA.
- Understand web services and primitive, contemporary SOA.
- Understand various service layers.
- Understand service-oriented analysis and design based on guidelines.

Course Outcomes (CO): Student will be able to

- Comprehend the need for SOA and its systematic evolution
- Apply SOA technologies to enterprise domain
- Design and analyse various SOA patterns and techniques
- Compare and evaluate best strategies and practices of SOA

UNIT - I

Introducing SOA: Fundamental SOA, Common Characteristics of Contemporary SOA, Common Tangible Benefits of SOA, Common Pitfalls of Adopting SOA.
The Evolution of SOA: An SOA Timeline, The Continuing Evolution of SOA, The Roots of SOA.

UNIT - II

Web Services and Primitive SOA: The Web Services Frame Work, Services, Service Descriptions, Messaging. Web Services and Contemporary SOA (Part I-Activity management and Composition): Message Exchange Patterns, Service Activity, Coordination, Atomic Transactions, Orchestration, and Choreography. Web Services and Contemporary SOA (Part-II-Advanced Messaging, Metadata and Security): Addressing, Reliable Messaging, Correlation, Policies, Metadata exchange, Security.

UNIT - III

Principles of Service-Oriented: Service–Orientation and the Enterprise, Anatomy of SOA, Common Principles of Service–Orientation, Interrelation between Principles of Service- Orientation, Service Orientation and Object Orientation, Native Web Services Support for Principles of Service-Oriented.
Service Layers: Service-Oriented and Contemporary SOA, Service Layer abstraction, Application Service Layer, Business Service Layer, Orchestration Service Layer, Agnostic Services, Service Layer Configuration Scenarios.

UNIT - IV

SOA Delivery Strategies: SOA Delivery Lifecycle Phases, The Top-Down Strategy, The Bottom-up Strategy, The Agile Strategy.
Service Oriented Analysis (Part I-Introduction): Introduction to Service Oriented Analysis, Benefits of a Business Centric SOA, Deriving Business Services.
Service Oriented Analysis (Part-II-Service Modelling): Service Modelling, Service Modelling Guidelines, Classifying Service Model Logic, Contrasting Service Modelling Approaches.
Service Oriented Design (Part I-Introduction): Introduction to Service-Oriented Design, WSDL Related XML Schema Language Basics, WSDL Language Basics, Service Interface Design Tools.
Service Oriented Design (Part II-SOA Composition Guidelines): SOA Composing Steps, Considerations for Choosing Service Layers, Considerations for Positioning Core SOA Standards, Considerations for Choosing SOA Extensions.

UNIT - V

Service Oriented Design (Part III- Service Design): Service Design Overview, Entity- Centric Business Service Design, Application Service Design, Task-Centric Business Service Design, Service Design Guidelines.
Service Oriented Design (Part IV-Business Process Design): WS-BPEL Language Basics, WS- Coordination Overview, Service Oriented Business Process Design.

Textbooks:

1.Service-Oriented Architecture-Concepts, Technology, and Design, Thomas Erl, Pearson Education, 2006.

2.Understanding SOA with Web Services, Eric Newcomer, Greg Lomow, Pearson Education, 2005.

Reference Books:



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1. Thomas Erl; Service Oriented Architecture Concepts Technology & Design, Pearson Education Limited; 2015, ISBN-13: 9788131714904.
- 2 Guido Schmutz, Peter Welkenbach, Daniel Liebhart; Service Oriented Architecture An Integration Blueprint; Shroff Publishers & Distributors; 2010, ISBN-13: 9789350231081



Course Code	COMPUTER VISION (Common to M.Tech CSE, AI & ML)	L	T	P	C
		3	0	0	3
	Semester	II			
Course Objectives:					
<ul style="list-style-type: none"> • Be familiar with both the theoretical and practical aspects of computing with images. • Have described the foundation of image formation, measurement, and analysis. • Understand the geometric relationships between 2D images and the 3D world. • Grasp the principles of state-of-the-art deep neural networks 					
Course Outcomes (CO): Student will be able to					
<ul style="list-style-type: none"> • Develop the practical skills necessary to build computer vision applications. • To have gained exposure to object and scene recognition and categorization from images 					
UNIT - I					
Overview, computer imaging systems, lenses, Image formation and sensing, Image analysis, pre-processing and Binary image analysis					
UNIT - II					
Edge detection, Edge detection performance, Hough transform, corner detection					
UNIT - III					
Segmentation, Morphological filtering, Fourier transform					
UNIT - IV					
Feature extraction, shape, histogram, colour, spectral, texture, using CVIPtools, Feature analysis, feature vectors, distance /similarity measures, data pre-processing					
UNIT - V					
Pattern Analysis: Clustering: K-Means, K-Medoids, Mixture of Gaussians, Classification: Discriminant Function, Supervised, Un-supervised, Semi supervised Classifiers: Bayes, KNN, ANN models; Dimensionality Reduction: PCA, LDA, ICA, and Non-parametric methods					
Textbooks:					
1. Computer Vision: Algorithms and Applications by Richard Szeliski.					
Reference Books:					
1. Deep Learning, by Goodfellow, Bengio, and Courville. 2. Dictionary of Computer Vision and Image Processing, by Fisher et al.					



Course Code	DATA VISUALIZATION TECHNIQUES	L	T	P	C
		3	0	0	3
Semester		II			
Course Objectives:					
<ul style="list-style-type: none"> To develop skills to both design and critique visualizations. To introduce visual perception and core skills for visual analysis. To understand visualization for time-series analysis. To understand visualization for ranking analysis. To understand visualization for deviation analysis.. 					
Course Outcomes (CO): Student will be able to					
<ul style="list-style-type: none"> Explain principles of visual perception Apply core skills for visual analysis Apply visualization techniques for various data analysis tasks Design information dashboard 					
UNIT - I					
Information visualization – effective data analysis – traits of meaningful data – visual perception – making abstract data visible – building blocks of information visualization – analytical interaction – analytical navigation – optimal quantitative scales – reference lines and regions – trellises and crosstabs – multiple concurrent views – focus and context – details on demand – over-plotting reduction – analytical patterns – pattern examples.					
UNIT - II					
Distribution analysis – describing distributions – distribution patterns – distribution displays – distribution analysis best practices – correlation analysis – describing correlations – correlation patterns – correlation displays – correlation analysis techniques and best practices – multivariate analysis – multivariate patterns – multivariate displays – multivariate analysis techniques and best practices.					
UNIT - III					
Information dashboard – Introduction– dashboard design issues and assessment of needs – Considerations for designing dashboard-visual perception – Achieving eloquence.					
UNIT - IV					
Advantages of Graphics _Library of Graphs – Designing Bullet Graphs – Designing Sparklines – Dashboard Display Media –Critical Design Practices – Putting it all together- Unveiling the dashboard.					
UNIT - V					
Plotting Geospatial Data: Introduction to Geoplotlib, Design Principles of Geoplotlib, Geospatial Visualizations, Plotting Geospatial Data on a Map Web-Based Visualizations: Concepts of Bokeh, Interfaces-Plotting and Model Interfaces, Output, Bokeh Server, Presentation, Integrating – HTML Document and Bokeh Applications					
Textbooks:					
<ol style="list-style-type: none"> Ben Fry, "Visualizing data: Exploring and explaining data with the processing environment", O'Reilly, 2008. Mario Dobler, Tim Grobmann, "Data Visualization with Python", O'Reilly, First Edition, 2019 					
Reference Books:					
<ol style="list-style-type: none"> Stephen Few, "Information dashboard design: Displaying data for at-a-glance monitoring", second edition, Analytics Press, 2013. 					



Course Code	DISTRIBUTED SYSTEMS			L	T	P	C
				3	0	0	3
Semester				II			
Course Objectives:							
To introduce the fundamental concepts and issues of managing large volume of shared data in a parallel and distributed environment, and to provide insight into related research problems							
Course Outcomes (CO): Student will be able to							
<ul style="list-style-type: none"> • Design trends in distributed systems. • Apply network virtualization. • Apply remote method invocation and objects 							
UNIT - I							
Distributed data processing: What is a DDBS; Advantages and disadvantages of DDBS; Problem areas; Overview of database and computer network concepts DISTRIBUTED DATABASE MANAGEMENT SYSTEM ARCHITECTURE Transparencies in a distributed DBMS; Distributed DBMS architecture; Global directory issues							
UNIT - II							
DISTRIBUTED DATABASE DESIGN Alternative design strategies; Distributed design issues; Fragmentation; Data Allocation SEMANTICS DATA CONTROL View management; Data security; Semantic Integrity Control QUERY PROCESSING ISSUES Objectives of query processing; Characterization of query processors; Layers of query processing; Query decomposition; Localization of distributed data							
UNIT - III							
Factors governing query optimization; Centralized query optimization; Ordering of fragment queries; Distributed query optimization algorithms TRANSACTION MANAGEMENT The transaction concept; Goals of transaction management; Characteristics of transactions; Taxonomy of transaction models CONCURRENCY CONTROL Concurrency control in centralized database systems; Concurrency control in DDBSs; Distributed concurrency control algorithms; Deadlock management							
UNIT - IV							
Reliability issues in DDBSs; Types of failures; Reliability techniques; Commit protocols; Recovery protocols							
UNIT - V							
PARALLEL DATABASE SYSTEMS Parallel architectures; parallel query processing and optimization; load balancing ADVANCED TOPICS Mobile Databases, Distributed Object Management, Multi-databases							
Textbooks:							
1. Principles of Distributed Database Systems, M.T. Ozsu and P. Valduriez, Prentice-Hall, 1991.							
Reference Books:							
1. Distributed Database Systems, D. Bell and J. Grimson, Addison-Wesley, 1992.							



Course Code	PRIVACY PRESERVING DATA PUBLISHING	L	T	P	C
		3	0	0	3
	Semester	II			
Course Objectives:					
<ul style="list-style-type: none"> Will be able to decide, given an application, if it should be formulated as a data privacy problem. If yes, the students will be able to formally define the problem and state what properties can be guaranteed by applying differential privacy. Will have understanding of how (and why) randomness (or uncertainty) provides privacy protection. Will be able to analyse real-world privacy problems, identify which privacy-preserving methods are appropriate, and implement the private algorithms in code. Will be able to evaluate and compare privacy-preserving algorithms. 					
Course Outcomes (CO): Student will be able to					
<ul style="list-style-type: none"> Apply anonymization methods for sensitive data protection Apply state-of-art techniques for data privacy protection Design privacy preserving algorithms for real-world applications Identify security and privacy issues in OLAP systems Apply information metrics for Maximizing the preservation of information in the anonymization process 					
UNIT - I					
Fundamentals of defining privacy and developing efficient algorithms for enforcing privacy, challenges in developing privacy preserving algorithms in real-world applications, privacy issues, privacy models,					
UNIT - II					
Anonymization operations, information metrics, Anonymization methods for the transaction data, trajectory data, social networks data, and textual data, Collaborative Anonymization,					
UNIT - III					
Access control of outsourced data, Use of Fragmentation and Encryption to Protect Data Privacy, Security and Privacy in OLAP systems.					
UNIT - IV					
Extended Data publishing Scenarios, Anonymization for Data Mining, publishing social science data,					
UNIT - V					
Continuous user activity monitoring (like in search logs, location traces, energy monitoring), social networks, recommendation engines and targeted advertising.					
Textbooks:					
1. Benjamin C.M. Fung, Ke Wang, Ada Wai-Chee Fu and Philip S. Yu, Introduction to PrivacyPreserving Data Publishing: Concepts and Techniques, 1st Edition, Chapman & Hall/CRC, 2010.					
Reference Books:					
1. Bee-Chung Chen, Daniel Kifer, AshwinMachanavajjhala, Kristen LeFevre Privacy-Preserving Data Publishing ,Now Publishers Inc, 2009.					



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Course Code	ADVANCED OPERATING SYSTEMS LAB	L	T	P	C
		0	0	4	2
	Semester	II			
Course Objectives:					
<ul style="list-style-type: none">To study Linux memory management data structures and algorithms.To acquire the knowledge in the implementation of interprocess communication.To understand how program execution happens in Linux.					
Course Outcomes (CO):					
<ul style="list-style-type: none">To revise any algorithm present in a system.To design a new algorithm to replace an existing one.To appropriately modify and use the data structures of the linux kernel for a different software system					
List of Experiments:					
<ol style="list-style-type: none">Write programs using the following system calls of UNIX operating system: 40 fork, exec, getpid, exit, wait, close, stat, opendir, readdirWrite programs using the I/O system calls of UNIX operating system (open, read, write, etc)Write C programs to simulate UNIX commands like ls, grep, etc.Given the list of processes, their CPU burst times and arrival times, display/print the Gantt chart for FCFS and SJF. For each of the scheduling policies, compute and print the average waiting time and average turnaround time. (2 sessions)Given the list of processes, their CPU burst times and arrival times, display/print the Gantt chart for Priority and Round robin. For each of the scheduling policies, compute and print the average waiting time and average turnaround time. (2 sessions)Developing Application using Inter Process communication (using shared memory, pipes or message queues)Implement the Producer – Consumer problem using semaphores (using UNIX system calls).					



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Course Code	INTERNET OF THINGS LAB	L	T	P	C
		0	0	4	2
Semester		II			
Course Objectives:					
<ul style="list-style-type: none">The main objective IOT applications is to know the different real time sensors used to measure the different electrical parameters and to control the different devices from anywhere through IOT.					
Course Outcomes (CO):					
<ul style="list-style-type: none">The students will be thorough about the technology behind the IoT and associated technologiesThe students will be able to use the IoT technologies in practical domains of societyThe students will be able to gain knowledge about the state of the art methodologies in IoT application domains.					
List of Experiments:					
<ol style="list-style-type: none">Exercise on Eclipse IoT Project.Experiments on few Eclipse IoT Projects.Any Experiment on architecture of Iot Toolkit.Exercise on smart object API Gateway service reference implementation in IoTToolkit.Experiment on HTTP-to-CoAP semantic mapping Proxy in IoT Toolkit.Experiment on Gate way as a service deployment in IoT Toolkit.Experiment on application framework and embedded software agents for IoT Toolkit					



Course Code	SOFTWARE DEFINED NETWORKS	L	T	P	C
		3	0	0	3
Semester		III			
Course Objectives:					
<ul style="list-style-type: none"> This course introduces about software defined networking, an emerging paradigm in computer networking that allows a logically centralized software program to control the behavior of an entire network. 					
Course Outcomes (CO): Student will be able to					
<ul style="list-style-type: none"> Differentiate between traditional networks and software defined networks and understand the key benefits and use cases of SDN. Interpret the SDN data plane devices and OpenFlow Protocols Implement the operation of SDN control plane with different controllers Apply techniques that enable applications to control the underlying network using SDN Evaluate Network Functions Virtualization components and their roles in SDN 					
UNIT - I		Lecture Hrs:			
Evolving network requirements-The SDN Approach: Requirements, SDN Architecture, Characteristics of Software-Defined Networking, SDN and NFV-Related Standards: Standards-Developing Organizations, Industry Consortia, Open Development Initiatives.					
UNIT - II		Lecture Hrs:			
SDN data plane: Data plane Functions, Data plane protocols, Open flow logical network Device: Flow table Structure, Flow Table Pipeline, The Use of Multiple Tables, Group Table- Open Flow Protocol.					
UNIT - III		Lecture Hrs:			
SDN Control Plane Architecture: Control Plane Functions, Southbound Interface, Northbound Interface, Routing, ITU-T Model- OpenDaylight-REST- Cooperation and Coordination Among Controllers					
UNIT - IV		Lecture Hrs:			
SDN Application Plane Architecture: Northbound Interface, Network Applications, User Interface- Network Services Abstraction Layer: Abstractions in SDN, Frenetic- Traffic Engineering Measurement and Monitoring Security- Data CentreNetworking- Mobility and Wireless.					
UNIT - V		Lecture Hrs:			
Background and Motivation for NFV- Virtual Machines- NFV Concepts: Simple Example of the Use of NFV, NFV Principles, High-Level NFV Framework, NFV Benefits and Requirements- NFV Reference Architecture: NFV Management and Orchestration					
Textbooks:					
<ol style="list-style-type: none"> Paul Goransson Chuck Black Timothy Culver: Software Defined Networks: A Comprehensive Approach, Morgan Kaufmann, 2016. Ken Gray Thomas Nadeau: Network Function Virtualization, Morgan Kaufmann, 2016. 					
Reference Books:					
<ol style="list-style-type: none"> Larry Peterson , Carmelo Cascone , Bruce Davie: Software-Defined Networks: A Systems Approach, Systems Approach, 2021 					



Course Code	REINFORCEMENT LEARNING	L	T	P	C
		3	0	0	3
	Semester	III			
Course Objectives:					
<ul style="list-style-type: none"> Reinforcement Learning is a subfield of Machine Learning, but is also a general-purpose formalism for automated decision-making and AI. This course introduces you to statistical learning techniques where an agent explicitly takes actions and interacts with the world. 					
Course Outcomes (CO): Student will be able to					
<ul style="list-style-type: none"> Formulate Reinforcement Learning problems Apply various Tabular Solution Methods to Markov Reward Process Problems Apply various Iterative Solution methods to Markov Decision Process Problems Comprehend Function approximation methods 					
UNIT - I		Lecture Hrs:			
Introduction: Introduction to Reinforcement Learning (RL) – Difference between RL and Supervised Learning, RL and Unsupervised Learning. Elements of RL, Markov property, Markov chains, Markov reward process (MRP).					
UNIT - II		Lecture Hrs:			
Evaluative Feedback - Multi-Arm Bandit Problem: An n-Armed Bandit Problem, Exploration vs Exploitation principles, Action value methods, Incremental Implementation, tracking a non-stationary problem, optimistic initial values, upper-confidence-bound action selection, Gradient Bandits. Introduction to and proof of Bellman equations for MRPs					
UNIT - III		Lecture Hrs:			
Introduction to Markov decision process (MDP), state and action value functions, Bellman expectation equations, optimality of value functions and policies, Bellman optimality equations. Dynamic Programming (DP): Overview of dynamic programming for MDP, principle of optimality, Policy Evaluation, Policy Improvement, policy iteration, value iteration, asynchronous DP , Generalized Policy Iteration.					
UNIT - IV		Lecture Hrs:			
Monte Carlo Methods for Prediction and Control: Overview of Monte Carlo methods for model free RL, Monte Carlo Prediction, Monte Carlo estimation of action values, Monto Carlo Control, On policy and off policy learning, Importance sampling, Temporal Difference Methods: TD Prediction, Optimality of TD(0), TD Control methods - SARSA, Q-Learning and their variants.					
UNIT - V		Lecture Hrs:			
Eligibility traces: n-Step TD Prediction, Forward and Backward view of TD(λ), Equivalence of forward and backward view, Sarsa(λ),, Watkins’s Q(λ), Off policy eligibility traces using importance of sampling. Function Approximation Methods: Value prediction with function approximation, gradient descent methods, Linear methods, control with function approximation.					
Textbooks:					
<ol style="list-style-type: none"> Richard S. Sutton and Andrew G. Barto, Reinforcement Learning: An Introduction", 2nd Edition, The MIT Press. CsabaSzepesvari – Algorithms for Reinforcement Learning – Morgan & Claypool, 2010. 					
Reference Books:					
<ol style="list-style-type: none"> Reinforcement Learning By Richard S. (University Of Alberta) Sutton,Andrew G. (Co-Director Autonomous Learning Laboratory) Barto 					



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Course Code	DATA ANALYTICS (Common to M.Tech CSE, SE)	L	T	P	C
2		3	0	0	3
Semester		III			
Course Objectives:					
<ul style="list-style-type: none"> To explore the fundamental concepts of data analytics. To learn the principles and methods of statistical analysis Discover interesting patterns, analyze supervised and unsupervised models and estimate the accuracy of the algorithms. To understand the various search methods and visualization techniques. 					
Course Outcomes (CO): Student will be able to					
<ul style="list-style-type: none"> Understand the ideas of statistical approaches to learning Understand the significance of exploratory data analysis (EDA) in data science and apply basic tools (plots, graphs, summary statistics) to perform EDA Apply basic machine learning algorithms (Linear Regression, k-Nearest Neighbors (k-NN), k-means, Naive Bayes) for predictive modeling. Explore the merits of Naive Bayes technique Recognize the characteristics of machine learning techniques that are useful to solve real-world problems 					
UNIT - I		Lecture Hrs:			
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, Life cycle of Data Science, Different phases.					
UNIT - II		Lecture Hrs:			
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 Neighbours (k-NN), k-means.					
UNIT - III		Lecture Hrs:			
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, Feature Generation and Feature Selection (Extracting Meaning From Data), Motivating application: user (customer) retention,					
UNIT - IV		Lecture Hrs:			
Feature Generation (brainstorming, role of domain expertise, and place for imagination), Feature Selection algorithms: Filters; Wrappers; Decision Trees; Random Forests, 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.					
UNIT - V		Lecture Hrs:			
Data Visualization: Basic principles, ideas and tools for data visualization, Case study on industry projects, Exercise: create your own visualization of a complex dataset, Data Science and Ethical Issues: Discussions on privacy, security, ethics, A look back at Data Science, Next-generation data scientists.					
Textbooks:					
<ol style="list-style-type: none"> Cathy O'Neil and Rachel Schutt. Doing Data Science, Straight Talk From The Frontline. O'Reilly, 2014. Jure Leskovek, AnandRajaraman and Jerey Ullman. Mining of Massive Datasets, Cambridge University Press, 2014. 					
Reference Books:					
<ol style="list-style-type: none"> Kevin P. Murphy. Machine Learning: A Probabilistic Perspective. MIT Press, 2013. Foster Provost and Tom Fawcett. Data Science for Business: What You Need to Know about Data Mining and Data-analytic Thinking. O'Reilly, 2013. Trevor Hastie, Robert Tibshirani and Jerome Friedman. Elements of Statistical Learning, Second Edition. Springer, 2009. 					



AUDIT COURSE-I



**Sri Krishnadevaraya University College of Engineering & Technology
Ananthapuramu-515003(A.P) India
Computer Science & Engineering**

Course Code	ENGLISH FOR RESEARCH PAPER WRITING	L	T	P	C
		2	0	0	0
Semester		I			
Course Objectives: This course will enable students:					
<ul style="list-style-type: none"> • Understand the essentials of writing skills and their level of readability • Learn about what to write in each section • Ensure qualitative presentation with linguistic accuracy 					
Course Outcomes (CO): Student will be able to					
<ul style="list-style-type: none"> • Understand the significance of writing skills and the level of readability • Analyze and write title, abstract, different sections in research paper • Develop the skills needed while writing a research paper 					
UNIT - I		10			
I Overview of a Research Paper- Planning and Preparation- Word Order- Useful Phrases - Breaking up Long Sentences-Structuring Paragraphs and Sentences-Being Concise and Removing Redundancy -Avoiding Ambiguity					
UNIT - II		10			
Essential Components of a Research Paper- Abstracts- Building Hypothesis-Research Problem - Highlight Findings- Hedging and Criticizing, Paraphrasing and Plagiarism, Cauterization					
UNIT - III		10			
Introducing Review of the Literature – Methodology - Analysis of the Data-Findings - Discussion- Conclusions-Recommendations.					
UNIT - IV		9			
Key skills needed for writing a Title, Abstract, and Introduction					
UNIT - V		9			
Appropriate language to formulate Methodology, incorporate Results, put forth Arguments and draw Conclusions					
Suggested Reading					
<ol style="list-style-type: none"> 1. Goldbort R (2006) Writing for Science, Yale University Press (available on Google Books) Model Curriculum of Engineering & Technology PG Courses [Volume-I] 2. Day R (2006) How to Write and Publish a Scientific Paper, Cambridge University Press 3. Highman N (1998), Handbook of Writing for the Mathematical Sciences, SIAM. Highman'sbook 4. Adrian Wallwork , English for Writing Research Papers, Springer New York Dordrecht Heidelberg London, 2011 					



**Sri Krishnadevaraya University College of Engineering & Technology
Ananthapuramu-515003(A.P) India
Computer Science & Engineering**

Course Code	DISASTER MANAGEMENT	L	T	P	C
			2	0	0
Semester		I			
Course Objectives: This course will enable students:					
<ul style="list-style-type: none"> Learn to demonstrate critical understanding of key concepts in disaster risk reduction and humanitarian response. Critically evaluate disaster risk reduction and humanitarian response policy and practice from Multiple perspectives. Develop an understanding of standards of humanitarian response and practical relevance in specific types of disasters and conflict situations Critically understand the strengths and weaknesses of disaster management approaches, planning and programming in different countries, particularly their home country or the countries they work in 					
UNIT - I					
<p>Introduction: Disaster: Definition, Factors and Significance; Difference Between Hazard and Disaster; Natural and Manmade Disasters: Difference, Nature, Types and Magnitude.</p> <p>Disaster Prone Areas in India: Study of Seismic Zones; Areas Prone to Floods and Droughts, Landslides and Avalanches; Areas Prone to Cyclonic and Coastal Hazards with Special Reference to Tsunami; Post- Disaster Diseases and Epidemics</p>					
UNIT - II					
<p>Repercussions of Disasters and Hazards: Economic Damage, Loss of Human and Animal Life, Destruction of Ecosystem. Natural Disasters: Earthquakes, Volcanisms, Cyclones, Tsunamis, Floods, Droughts and Famines, Landslides and Avalanches, Man-made disaster: Nuclear Reactor Meltdown, Industrial Accidents, Oil Slicks and Spills, Outbreaks of Disease and Epidemics, War and Conflicts.</p>					
UNIT - III					
<p>Disaster Preparedness and Management: Preparedness: Monitoring of Phenomena Triggering Disaster Hazard; Evaluation of Risk: Application of Remote Sensing, Data from Meteorological and Other Agencies, Media Reports: Governmental and Community Preparedness.</p>					
UNIT - IV					
<p>Risk Assessment Disaster Risk: Concept and Elements, Disaster Risk Reduction, Global and National Disaster Risk Situation. Techniques of Risk Assessment, Global Co-Operation in Risk Assessment and Warning, People's Participation in Risk Assessment. Strategies for Survival.</p>					
UNIT - V					
<p>Disaster Mitigation: Meaning, Concept and Strategies of Disaster Mitigation, Emerging Trends in Mitigation. Structural Mitigation and Non-Structural Mitigation, Programs of Disaster Mitigation in India.</p>					
Suggested Reading					
<ol style="list-style-type: none"> R.Nishith, Singh AK, "Disaster Management in India: Perspectives, issues and strategies "New Royal book 					



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Computer Science & Engineering

Company..Sahni,PardeepEt.Al.(Eds.),"DisasterMitigationExperiencesAndReflections",PrenticeHall OfIndia, New Delhi.

3. GoelS.L., Disaster Administration And Management Text and Case Studies",Deep & Deep Publication Pvt. Ltd., New Delhi



Sri Krishnadevaraya University College of Engineering & Technology
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Computer Science & Engineering

Course Code	SANSKRIT FOR TECHNICAL KNOWLEDGE	L	T	P	C
		2	0	0	0
Semester		I			
Course Objectives: This course will enable students:					
<ul style="list-style-type: none">• To get a working knowledge in illustrious Sanskrit, the scientific language in the world• Learning of Sanskrit to improve brain functioning• Learning of Sanskrit to develop the logic in mathematics, science & other subjects enhancing the memory power• The engineering scholars equipped with Sanskrit will be able to explore the huge• Knowledge from ancient literature					
Course Outcomes (CO): Student will be able to					
<ul style="list-style-type: none">• Understanding basic Sanskrit language• Ancient Sanskrit literature about science & technology can be understood• Being a logical language will help to develop logic in students					
UNIT - I					
Alphabets in Sanskrit,					
UNIT - II					
Past/Present/Future Tense, Simple Sentences					
UNIT - III					
Order, Introduction of roots					
UNIT - IV					
Technical information about Sanskrit Literature					
UNIT - V					
Technical concepts of Engineering-Electrical, Mechanical, Architecture, Mathematics					
Suggested Reading					
1. "Abhyaspustakam" –Dr.Vishwas, Sanskrit-Bharti Publication, New Delhi 2. "Teach Yourself Sanskrit" Prathama Deeksha- VempatiKutumbshastri, RashtriyaSanskrit Sansthanam, New Delhi Publication 3. "India's Glorious ScientificTradition" Suresh Soni, Ocean books (P) Ltd.,New Delhi					



AUDIT COURSE-II



**Sri Krishnadevaraya University College of Engineering & Technology
Ananthapuramu-515003(A.P) India
Computer Science & Engineering**

Course Code	PEDAGOGY STUDIES		L	T	P	C
			2	0	0	0
Semester			II			
Course Objectives: This course will enable students:						
<ul style="list-style-type: none"> Review existing evidence on their view topic to inform programme design and policy making undertaken by the DfID, other agencies and researchers. Identify critical evidence gaps to guide the development. 						
Course Outcomes (CO): Student will be able to						
Students will be able to understand: <ul style="list-style-type: none"> What pedagogical practices are being used by teachers informal and informal classrooms in developing countries? What is the evidence on the effectiveness of these pedagogical practices, in what conditions, and with what population of learners? How can teacher education (curriculum and practicum) and the school curriculum and guidance materials best support effective pedagogy? 						
UNIT - I						
Introduction and Methodology: Aims and rationale, Policy background, Conceptual frame work and terminology Theories of learning, Curriculum, Teacher education. Conceptual framework, Research questions. Overview of methodology and searching.						
UNIT - II						
Thematic overview: Pedagogical practices are being used by teachers in formal and informal classrooms in developing countries. Curriculum, Teacher education.						
UNIT - III						
Evidence on the effectiveness of pedagogical practices, Methodology for the in-depth stage: quality assessment of included studies. How can teacher education (curriculum and practicum) and the school curriculum and guidance materials best support effective pedagogy? Theory of change. Strength and nature of the body of evidence for effective pedagogical practices. Pedagogic theory and pedagogical approaches. Teachers' attitudes and beliefs and Pedagogic strategies.						
UNIT - IV						
Professional development: alignment with classroom practices and follow-up support, Peer support, Support from the head teacher and the community. Curriculum and assessment, Barriers to learning limited resources and large class sizes						
UNIT - V						
Research gaps and future directions: Research design, Contexts, Pedagogy, Teacher education, Curriculum and assessment, Dissemination and research impact.						
Suggested Reading						
<ol style="list-style-type: none"> Ackers J, Hardman F (2001) Classroom interaction in Kenyan primary schools, Compare, 31 (2): 245-261. Agrawal M (2004) Curricular reform in schools: The importance of evaluation, Journal of Curriculum Studies, 36 (3): 361-379. 						



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4. AkyeamongK(2003) Teacher training in Ghana - does it count? Multi-site teacher educationresearch project (MUSTER) country report 1. London: DFID.
5. Akyeamong K, LussierK, PryorJ, Westbrook J (2013) Improving teaching and learning of basicmaths and reading in Africa: Does teacher preparation count? International Journal Educational Development, 33 (3): 272–282.
6. Alexander RJ(2001) Culture and pedagogy: International comparisons in primary education. Oxford and Boston: Blackwell.
- Chavan M (2003)Read India: A mass scale, rapid, 'learning to read' campaign.
7. www.pratham.org/images/resource%20working%20paper%202.pdf.



**Sri Krishnadevaraya University College of Engineering & Technology
Ananthapuramu-515003(A.P) India
Computer Science & Engineering**

Course Code	STRESS MANAGEMENT BY YOGA	L	T	P	C
			2	0	0
Semester		II			
Course Objectives: This course will enable students:					
<ul style="list-style-type: none"> • To achieve overall health of body and mind • To overcome stress 					
Course Outcomes (CO): Student will be able to					
<ul style="list-style-type: none"> • Develop healthy mind in a healthy body thus improving social health also • Improve efficiency 					
UNIT - I					
Definitions of Eight parts of yog. (Ashtanga)					
UNIT - II					
Yam and Niyam.					
UNIT - III					
Do`s and Don`t`s in life. i) Ahinsa,satya,astheya,bramhacharyaand aparigrahaaii)Shaucha,santosh,tapa,swadhyay,ishwarpranidhan					
UNIT - IV					
Asan and Pranayam					
UNIT - V					
i)Various yoga poses and their benefits formind & body ii) Regularization of breathing techniques and its effects-Types of pranayam					
Suggested Reading					
1. ‘Yogic Asanas for Group Tarining-Part-I’: Janardan Swami Yogabhyasi Mandal, Nagpur 2. “Rajayogaor conquering the Internal Nature” by Swami Vivekananda, AdvaitaAshrama (Publication Department), Kolkata					



**Sri Krishnadevaraya University College of Engineering & Technology
Ananthapuramu-515003(A.P) India
Computer Science & Engineering**

Course Code	PERSONALITY DEVELOPMENT THROUGH LIFE ENLIGHTENMENT SKILLS	L	T	P	C
		2	0	0	0
Semester		II			
Course Objectives: This course will enable students:					
<ul style="list-style-type: none"> • To learn to achieve the highest goal happily • To become a person with stable mind, pleasing personality and determination • To awaken wisdom in students 					
Course Outcomes (CO): Student will be able to					
<ul style="list-style-type: none"> • Study of Shrimad-Bhagwad-Geeta will help the student in developing his personality and achieve the highest goal in life • The person who has studied Geeta will lead the nation and mankind to peace and prosperity • Study of Neeti shatakam will help in developing versatile personality of students 					
UNIT - I					
Neeti satakam- Holistic development of personality Verses-19,20,21,22(wisdom) Verses-29,31,32(pride & heroism) Verses-26,28,63,65(virtue)					
UNIT - II					
Neeti satakam- Holistic development of personality Verses-52,53,59(dont's) Verses-71,73,75,78(do's)					
UNIT - III					
Approach to day-to-day work and duties. Shrimad Bhagwad Geeta: Chapter2-Verses41,47,48, Chapter3-Verses13,21,27,35,Chapter6-Verses5,13,17,23,35,Chapter18-Verses45,46,48.					
UNIT - IV					
Statements of basic knowledge. Shrimad Bhagwad Geeta: Chapter2-Verses 56,62,68Chapter12 -Verses13,14,15,16,17,18 Personality of Role model. Shrimad Bhagwad Geeta:					
UNIT - V					
Chapter2-Verses 17, Chapter3-Verses36,37,42,Chapter4-Verses18,38,39 Chapter18- Verses37,38,63					
Suggested Reading					
<ol style="list-style-type: none"> 1. "Srimad Bhagavad Gita" by Swami Swarupananda Advaita Ashram (Publication Department), Kolkata 2. Bhartrihari's Three Satakam (Niti-sringar-vairagya) by P.Gopinath, Rashtriya Sanskrit Sansthanam, New Delhi. 					



OPEN ELECTIVE



Sri Krishnadevaraya University College of Engineering & Technology
Ananthapuramu-515003(A.P) India
Computer Science & Engineering

Course Code	INDUSTRIAL SAFETY			L	T	P	C
				3	0	0	3
Semester				III			
Course Objectives:							
<ul style="list-style-type: none"> To know about Industrial safety programs and toxicology, Industrial laws, regulations and source models To understand about fire and explosion, preventive methods, relief and its sizing methods To analyze industrial hazards and its risk assessment. 							
Course Outcomes (CO): Student will be able to							
<ul style="list-style-type: none"> To list out important legislations related to health, Safety and Environment. To list out requirements mentioned in factories act for the prevention of accidents. To understand the health and welfare provisions given in factories act. 							
UNIT - I							
Industrial safety: Accident, causes, types, results and control, mechanical and electrical hazards, types, causes and preventive steps/procedure, describe salient points of factories act 1948 for health and safety, wash rooms, drinking water layouts, light, cleanliness, fire, guarding, pressure vessels, etc, Safety color codes. Fire prevention and firefighting, equipment and methods.							
UNIT - II							
Fundamentals of maintenance engineering: Definition and aim of maintenance engineering, Primary and secondary functions and responsibility of maintenance department, Types of maintenance, Types and applications of tools used for maintenance, Maintenance cost & its relationship with replacement economy, Service life of equipment.							
UNIT - III							
Wear and Corrosion and their prevention: Wear- types, causes, effects, wear reduction methods, lubricants- types and applications, Lubrication methods, general sketch, working and applications, i. Screw down grease cup, ii. Pressure grease gun, iii. Splash lubrication, iv. Gravity lubrication, v. Wick feed lubrication vi. Side feed lubrication, vii. Ring lubrication, Definition, principle and factors affecting the corrosion. Types of corrosion, corrosion prevention methods.							
UNIT - IV							
Fault tracing: Fault tracing-concept and importance, decision tree concept, need and applications, sequence of fault finding activities, show as decision tree, draw decision tree for problems in machine tools, hydraulic, pneumatic, automotive, thermal and electrical equipment's like, I. Any one machine tool, ii. Pump iii. Air compressor, iv. Internal combustion engine, v. Boiler, vi. Electrical motors, Types of faults in machine tools and their general causes.							
UNIT - V							
Periodic and preventive maintenance: Periodic inspection-concept and need, degreasing, cleaning and repairing schemes, overhauling of mechanical components, overhauling of electrical motor, common troubles and remedies of electric motor, repair complexities and its use, definition, need, steps and advantages of preventive maintenance. Steps/procedure for periodic and preventive maintenance of: I. Machine tools, ii. Pumps, iii. Air compressors, iv. Diesel generating (DG) sets, Program and schedule of preventive maintenance of mechanical and electrical equipment, advantages of preventive maintenance. Repair cycle concept and importance							
Textbooks:							
<ol style="list-style-type: none"> Maintenance Engineering Handbook, Higgins & Morrow, Da Information Services. Maintenance Engineering, H. P. Garg, S. Chand and Company. 							
Reference Books:							
<ol style="list-style-type: none"> Pump-hydraulic Compressors, Audels, Mcgrew Hill Publication. Foundation Engineering Handbook, Winterkorn, Hans, Chapman & Hall London. 							



**Sri Krishnadevaraya University College of Engineering & Technology
Ananthapuramu-515003(A.P) India
Computer Science & Engineering**

Course Code	BUSINESS ANALYTICS			
	L	T	P	C
	3	0	0	3
Semester				III
Course Objectives:				
<ul style="list-style-type: none"> The main objective of this course is to give the student a comprehensive understanding of business analytics methods. 				
Course Outcomes (CO): Student will be able to				
<ul style="list-style-type: none"> Students will demonstrate knowledge of data analytics. Students will demonstrate the ability of think critically in making decisions based on data and deep analytics. Students will demonstrate the ability to use technical skills in predicative and prescriptive modeling to support business decision-making. Students will demonstrate the ability to translate data into clear, actionable insights. 				
UNIT - I				
Business Analysis: Overview of Business Analysis, Overview of Requirements, Role of the Business Analyst. Stakeholders: the project team, management, and the front line, Handling Stakeholder Conflicts.				
UNIT - II				
Life Cycles: Systems Development Life Cycles, Project Life Cycles, Product Life Cycles, Requirement Life Cycles.				
UNIT - III				
Forming Requirements: Overview of Requirements, Attributes of Good Requirements, Types of Requirements, Requirement Sources, Gathering Requirements from Stakeholders, Common Requirements Documents. Transforming Requirements: Stakeholder Needs Analysis, Decomposition Analysis, Additive/Subtractive Analysis, Gap Analysis, Notations (UML & BPMN), Flowcharts, Swim Lane Flowcharts, Entity-Relationship Diagrams, State-Transition Diagrams, Data Flow Diagrams, Use Case Modeling, Business Process Modeling				
UNIT - IV				
Finalizing Requirements: Presenting Requirements, Socializing Requirements and Gaining Acceptance, Prioritizing Requirements. Managing Requirements Assets: Change Control, Requirements Tools				
UNIT - V				
Recent Trands in: Embedded and colleborative business intelligence, Visual data recovery, Data Storytelling and Data Journalism.				
Textbooks:				
<ol style="list-style-type: none"> Business Analysis by James Cadle et al. Project Management: The Managerial Process by Erik Larson and, Clifford Gray 				
Reference Books:				
<ol style="list-style-type: none"> Business analytics Principles, Concepts, and Applications by Marc J. Schniederjans, Dara G. Schniederjans, Christopher M. Starkey, Pearson FT Press. Business Analytics by James Evans, persons Education. 				



**Sri Krishnadevaraya University College of Engineering & Technology
Ananthapuramu-515003(A.P) India
Electronics and Communication Engineering**

Course Code	WASTE TO ENERGY	L	T	P	C
		3	0	0	3
Semester		III			
Course Objectives:					
<ul style="list-style-type: none"> • Introduce and explain energy from waste, classification and devices to convert waste to energy. • To impart knowledge on biomass pyrolysis, gasification, combustion and conversion process. • To educate on biogas properties, bio energy system, biomass resources and their classification and biomass energy programme in India. 					
Course Outcomes (CO): Student will be able to					
<ul style="list-style-type: none"> • To know about overview of Energy to waste and classification of waste. • To acquire knowledge on biomass pyrolysis, gasification, combustion and conversion process in detail. • To gain knowledge on properties of biogas, biomass resources and programmes to convert waste to energy in India. 					
UNIT - I					
Introduction to Energy from Waste: Classification of waste as fuel – Agro based, Forest residue, Industrial waste - MSW – Conversion devices – Incinerators, gasifiers, digestors					
UNIT - II					
Biomass Pyrolysis: Pyrolysis – Types, slow fast – Manufacture of charcoal – Methods - Yields and application – Manufacture of pyrolytic oils and gases, yields and applications.					
UNIT - III					
Biomass Gasification: Gasifiers – Fixed bed system – Downdraft and updraft gasifiers – Fluidized bed gasifiers – Design, construction and operation – Gasifier burner arrangement for thermal heating – Gasifier engine arrangement and electrical power – Equilibrium and kinetic consideration in gasifier operation					
UNIT - IV					
Biomass Combustion: Biomass stoves – Improved chullahs, types, some exotic designs, Fixed bed combustors, Types, inclined grate combustors, Fluidized bed combustors, Design, construction and operation - Operation of all the above biomass combustors.					
UNIT - V					
Biogas: Properties of biogas (Calorific value and composition) - Biogas plant technology and status - Bio energy system - Design and constructional features - Biomass resources and their classification - Biomass conversion processes - Thermo chemical conversion - Direct combustion - biomass gasification - pyrolysis and liquefaction - biochemical conversion - anaerobic digestion - Types of biogas Plants – Applications - Alcohol production from biomass - Bio diesel production - Urban waste to energy conversion - Biomass energy programme in India.					
Textbooks:					
<ol style="list-style-type: none"> 1. Non-Conventional Energy, Desai, Ashok V., Wiley Eastern Ltd., 2018 2. Biogas Technology - A Practical Hand Book - Khandelwal, K. C. and Mahdi, S. S., TMH, 2017 					
Reference Books:					
<ol style="list-style-type: none"> 1. Food, Feed and Fuel from Biomass, Challal, D. S., IBH Publishing Co. Pvt. Ltd., 1991. 2. Biomass Conversion and Technology, C. Y. WereKo-Brobby and E. B. Hagan, John Wiley 					