ACADEMIC REGULATIONS(R-25)
COURSE STRUCTURE AND DETAILED SYLLABI

M.Tech Regular (Full Time) Two Year Degree Programme

(For the Batches Admitted From the Academic Year 2025-2026)

Department of Computer Science and Engineering

SRI VENKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY (AUTONOMOUS)

Accredited by NBA, New Delhi, Accredited by NAAC, Bengaluru |Affiliated to JNTUA, Ananthapuramu, Recognized by UGC under 12(B) & 2(F) | Approved by AICTE, New Delhi)

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SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY
(AUTONOMOUS)
(AFFILIATED TO JNTUA, ANANTAPUR)

ACADEMIC REGULATIONS – R25

MASTER OF TECHNOLOGY (M. TECH)

REGULAR (Full-Time) TWO YEAR POST GRADUATE DEGREE PROGRAMME

(Effective for the students admitted into I year from the Academic Year 2025-26 and onwards)

Sri Venkateswara College of Engineering and Technology (Autonomous), 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.

The Jawaharlal Nehru Technological University Anantapur, Ananthapuramu shall confer M.Tech Post Graduate degree to candidates who are admitted to the Master of Technology Program and fulfill all the requirements for the award of the degree.

1. **Applicability** :
   All the rules specified herein, approved by the Academic Council, shall be in the force and applicable to the students admitted from the Academic Year 2025-2026 onwards. Any reference to "College" in these rules and regulations stands for SVCET.

2. **Extent**: All the rules and regulations, specified hereinafter shall be read as a whole for the purpose of interpretation. As and when a doubt arises, the interpretation of the Chairman, Academic Council shall be final and ratified by the Academic Council in the forthcoming meeting. As per the requirements of statutory bodies, Principal, Sri Venkateswara College of Engineering College shall be the Chairman, Academic Council.

3. **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:
   - **3.1** Pursues a course of study for not less than two academic years and not more than four academic years.
   - **3.2** Registers for 75 credits and secures all 75 credits.

4 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.

5 **Programme of Study:**
The following M. Tech. Specializations are offered at present in different branches of Engineering and Technology in the institution:

Sl. No.	Discipline	Name of the Specialization	Code
01	Civil Engineering	Structural Engineering	20
02	Electrical and	Power Electronics & Electrical	54

	Electronics Engineering	Drives	
03	Mechanical Engineering	CAD / CAM	04
04	Electronics and Communication Engineering	VLSI Design	57
05	Computer Science and Engineering	Computer Science & Engineering	58
06		Data Science	32

and any other specializations as approved by AICTE/University from time to time.

6 Eligibility for Admissions:

6.1 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.

6.2 Admissions shall be made either on the basis of either 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.

7 Programme related terms:

7.1 ***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:

1 Hr. Lecture (L) per week	1 credit
1 Hr. Tutorial (T) per week	1 credit
1 Hr. Practical (P) per week	0.5 credit

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

7.3 Choice Based Credit System (CBCS): The CBCS provides choice for students to select from the prescribed courses.

8 Programme Pattern:

8.1 Total duration of the of M. Tech. programme is two academic years

8.2 Each academic year of study is divided into two semesters.

8.3 Each Semester shall be of 22 weeks duration (inclusive of Examinations), with a minimum of 90 instructional days per semester.

8.4 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.

8.5 The medium of instruction of the programme (including examinations and

project reports) will be in English only.

8.6 All subjects/courses offered for the M. Tech. degree programme are broadly classified as follows:

S. No.	Broad Course Classification	Course Category	Description
1.	Core Courses	Foundational & Professional Core Courses (PC)	Includes subjects related to the parent discipline / department / branch of Engineering
2.	Elective Courses	Professional Elective Courses (PE)	Includes elective subjects related to the parent discipline/ department/ branch of Engineering
		Open Elective Courses (OE)	Elective subjects which include inter-disciplinary subjects or subjects in an area outside the parent discipline which are of importance in the context of special skill development
3.	Research	Research methodology & IPR	To understand importance and process of creation of patents through research
		Technical Seminar	Ensures preparedness of students to undertake major projects / Dissertation, based on core contents related to specialization
		Cocurricular Activities	Attending conferences, scientific presentations and other scholarly activities
		Dissertation	M. Tech. Project or Major Project
4.	Audit Courses	Mandatory noncredit courses	Covering subjects of developing desired attitude among the learners is on the line of initiatives such as Unnat Bharat Abhiyan, Yoga, Value education etc.

8.7 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.

8.8 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.

8.9 Preferably 25% course work for the theory courses in every semester shall be conducted in the blended mode of learning.

9 Attendance Requirements:

9.1 A student shall be eligible to appear for the external examinations if he/she acquires i) a minimum of 50% attendance in each course and ii) 75% of attendance in aggregate of all the courses.

9.2 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.

9.3 Condonation of shortage of attendance shall be granted only on genuine and valid reasons on representation by the candidate with supporting evidence

9.4 Students whose shortage of attendance is not condoned in any semester are not eligible to take their end examination of that class.

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

9.6 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.

9.7 If any candidate fulfils the attendance requirement in the present semester, he shall not be eligible for readmission into the same class.

9.8 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.

10 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 100 marks forpractical, based on Internal Evaluation and End Semester Examination.

10.1 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.

10.2 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 an online examination (TWO) conducted during the respective mid examinations by the college for the remaining 10 marks with 20 objective questions.

10.3 The following pattern shall be followed in the End Examination:

- **10.3.1** Five questions shall be set from each of the five units with either/or type for 12 marks each.
- **10.3.2** All the questions have to be answered compulsorily.
- **10.3.3** Each question may consist of one, two or more bits.

10.4 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.

10.5 There shall be a Comprehensive Viva-Voce in I year – II sem for 2 credits. The Comprehensive Viva-Voce will be conducted by the committee consisting of Head of the Department and two senior faculty members of the department nominated by the Principal as recommended by the chairman, BOS. The Comprehensive Viva – Voce is aimed to assess the students understanding in various subjects he studies during the M. Tech I year course of study. The Comprehensive Viva – Voce shall be evaluated for 100 marks by the committee. There are no internal marks for the Comprehensive Viva – Voce. A student shall acquire 2 credits assigned to the Comprehensive Viva – Voce only when he secures 40% or more marks. In case, if a student fails in Comprehensive Viva – voce, he shall reappear as and when I/II supplementary examinations are conducted.

10.6 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.

10.7 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.

10.8 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.

10.9 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 and shall be produced to the Committees of the University as and when the same are asked for.

10.10 Industry internship with a minimum of eight weeks duration, done at the end of second semester. The internship can be done by the students at local industries, Govt. Organizations, construction agencies, Industries, Hydel and thermal power projects and also in software MNCs. Evaluation of the industry internship shall be through the departmental committee. A student will be required to submit industry internship report to the concerned department and appear for an oral presentation before the departmental committee. The report and the oral presentation shall carry

40% and 60% weightages respectively. A student shall acquire 2 credits assigned to the industry internship only when he secures 40% or more marks. In case, if a student fails in industry internship, he shall reappear as and when II/III supplementary examinations are conducted.

11 Credit Transfer Policy

As per University Grants Commission (Credit Framework for Online Learning Courses through SWAYAM) Regulation, 2016, the Institution 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.

11.1 The Institution 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.

11.2 The online learning courses available on the SWAYAM platform will be considered for credit transfer. SWAYAM course credits are as specified in the platform

11.3 Student registration for the MOOCs shall be only through the institution, it is mandatory for the student to share necessary information with the institution

11.4 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.

11.5 The institution shall notify at the beginning of semester the list of the online learning courses eligible for credit transfer in the forthcoming Semester.

11.6 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

11.7 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.

11.8 The Institution shall ensure no overlap of SWAYAM MOOC exams with that of the Internal / External examination schedule. In case of delay in SWAYAM results, the Institution will re-issue the marks sheet for such students.

11.9 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.

11.10 The departments shall submit the following to the examination section of the Institution:

a) List of students who have passed MOOC courses in the current semester along with the certificates of completion.
b) Undertaking form filled by the students for credit transfer.

11.11 The Institution 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 of the Head of the Institution at least three months prior to the commencement of the semester.

12 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

12.1 The candidate should have completed the course work and obtained examinations results for **I, II and III** semesters.

12.2 The candidate should have passed all the subjects for which the Internal Evaluation marks secured are more than 50%.

12.3 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.

12.4 The candidate has to re-register for the chosen subjects and fulfill the academic requirements.

12.5 For reregistration the candidates have to submit the applications to the Head of the Institution through the Head of the Department by paying the requisite fees (For each course, the candidate has to pay a fee equivalent to one third of the semester tuition fee and the amount is to be remitted in the form of D.D./ Challan in favour of the Principal, Sri Venkateswara College of Engineering & Technology) and get approval from the Head of the Institution before the start of the semester in which re-registration is required.

12.6 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.

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

13.1 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).

13.2 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.

13.3 Project work shall be carried out under the supervision of teacher in the parent department concerned.

13.4 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.

13.5 Continuous assessment of Project Work - I and Project Work – II in III & IV semesters respectively will be monitored by the PRC.

13.6 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.

13.7 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.

13.8 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.

13.9 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.

13.10 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.

13.11 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.

13.12 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.

13.13 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.

13.14 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.

13.15 The dissertation shall be adjudicated by an external examiner selected by the Head of the Institution. For this, the supervisor concerned and department head for each student shall submit a panel of three examiners to the Principal. However, the dissertation will be adjudicated by one examiner nominated by the Head of the Institution.

13.16 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 Head of the Institution

13.17 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.

13.18 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 has to secure a minimum of 50% marks in Viva voce exam.

13.19 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.

14 Credits for Co-curricular Activities

The credits assigned for co-curricular activities shall be given by the Head of the Department and the same shall be submitted to the Examination section through Head of the Institution.

A Student shall earn 01 credit 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)	1
Academic Award/Research Award from State Level/National Agencies	1
Academic Award/Research Award from International Agencies	1
Research / Review Publication in National Journals (Indexed in Scopus / Web of Science)	1
Research / Review Publication in International Journals with Editorial board outside India (Indexed in Scopus / Web of Science)	1

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

15. Results Committee

Results Committee comprising of Principal, Controller of Examinations, Additional Controller of Examinations, One Senior Professor nominated by the Principal, and the University Nominee will oversee the details of marks, grades, and pass percentages of all the subjects and branch-wise pass percentages.

Office of the Controller of Examinations will generate student-wise result sheets and the same will be published through the college website.

Student-wise Grade Sheets are generated and issued to the students.

16 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

Range in which the marks in the subject fall	Grade	Grade points Assigned

≥ 90	S (Superior)	10
≥ 80 < 90	A (Excellent)	9
≥ 70 < 80	B (Very Good)	8
≥ 60 < 70	C (Good)	7
≥ 50 < 60	D (Pass)	6
< 50	F (Fail)	0
Absent	Ab (Absent)	0

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

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

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

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.,

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

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

17. Personal Verification / Revaluation / Final Valuation

17.1 Personal Verification of Answer Scripts:

Candidates appear in a particular semester end examinations may appeal for verification of their answer script(s) for arithmetic correction in totaling of marks and any omission / deletion in evaluation within 7 days from the date of declaration of results at the office of the Controller of Examinations on the prescribed proforma and by paying the prescribed fee per answer script.

It is clarified that personal verification of answer script shall not tantamount to revaluation of answer script. This is only a process of reverification by the candidate. Any mistake / deficiency with regard to arithmetic correction in totaling of marks and any omission / deletion in evaluation if found, the institution will correct the same.

17.2 Recounting / Revaluation:
Students shall be permitted for request for recounting/revaluation of the Semester-End examination answer scripts within a stipulated period after payment of prescribed fee. After recounting or revaluation, records are updated with changes if any and the student will be issued a revised grade sheet. If there are no changes, the same will be intimated to the students.

17.3 Final Valuation:
Students shall be permitted for request for final valuation of the Semester–End Examination answer scripts within a stipulated period after the publication of the revaluation results by paying the necessary fee. The final valuation shall be carried out by an expert not less than Associate Professor as per the scheme of valuation supplied by the examination branch in the presence of the student, Controller of Examinations and Principal. However students are not permitted to discuss / argue with the examiner. If the increase in marks after final valuation is equal to or more than 15% of the previous valuation marks, the marks obtained after final valuation shall be treated as final. If the variation of marks after final valuation is less than 15% of the previous valuation marks, then the earlier valuation marks shall be treated as the final marks.

17.4 Supplementary Examinations: In addition to the regular semester-end examinations conducted, the College may also schedule and conduct supplementary examinations for all the courses of other semesters when feasible for the benefit of students. Such of the candidates writing supplementary examinations may have to write more than one examination per day.

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

Class Awarded	Cumulative Grade Point Average
First Class with Distinction	≥7.75
First Class	≥6.75 and<7.75
Second Class	≥6.0 and <6.75

19. Exit Policy: The student shall be permitted to exit with a PG Diploma based on his/her request to the Head of the Institution through the respective Head of the Department at the end of first year subject to passing all the courses in first year.

The Head of the Institution 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, Affiliating University and State government.

20. 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.

20. 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.

21. Medium of Instruction:

The Medium of Instruction is English for all courses, laboratories, Internal and External examinations, Seminar Presentation and Project Reports.

22. Mode of Learning:

Preferably 50% course work for the theory courses in every semester shall be conducted in the blended mode of learning. If the blended learning is carried out in online mode, then the total attendance of the student shall be calculated considering the offline and online attendance of the student.

23. General Instructions:

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

23.2 Disciplinary action for Malpractice/improper conduct in examinations is appended.

23.3 There shall be no places transfer within the constituent colleges and affiliated colleges of Jawaharlal Nehru Technological University Anantapur.

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

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

23.6 The University / Institution 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 / Institution.

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

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Identification of Courses

M. Tech

Each course shall be uniquely identified by an alphanumeric code of width 7 characters as given below.

No. of Digits	Description
First two digits	Year of regulations Ex:25
Next one letter	Type of program: A: B. Tech B: M. Tech C: M.B.A D: M.C.A E: BBA F: BCA
Next two letters	Code of program: ST: Structural Engineering, P.E: Power Electronics & Electric Drives, CM: CAD/CAM, VL: VLSI, CS: Computer Science and Engineering, DS: Data Science
Last two digits	Indicate serial numbers: ≥ 01

Ex:
25BST01
25BPE01
25BCM01
25BVL01
25BCS01
25BDS01
25BMB01
25BHS01

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY
(AUTONOMOUS)
(AFFILIATED TO JNTUA, ANANTHAPURAMU)
RULES FOR DISCIPLINARY ACTION FOR MALPRACTICE / IMPROPER CONDUCT IN EXAMINATIONS

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

		forfeits the seat. The performance of the original candidate who has been impersonated, shall be cancelled in all the subjects of the examination (including practical's and project work) already appeared and shall not be allowed to appear for examinations of the remaining subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all University examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat. If the impostor is an outsider, he will be handed over to the police and a case is registered against him.
8.	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 or 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	In case of students of the college, they shall be expelled from examination halls and cancellation of their performance in that subject and all other subjects the candidate (s) has (have) already appeared and shall not be permitted to appear for the remaining examinations of the subjects of that semester / year. The candidates also are debarred and forfeit their seats. In case of outsiders, they will be handed over to the police and a police case is registered against them.

	means or misconduct or has the tendency to disrupt the orderly conduct of the examination.	
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.	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.
11.	Copying detected on the basis of internal evidence, such as, during valuation or during special scrutiny.	Cancellation of the performance in that subject and all other subjects the candidate has appeared including practical examinations and project work of that semester/year examinations.
12.	If any malpractice is detected which is not covered in the above clauses 1 to 11 shall be reported to the Examination committee for further action to award suitable punishment.	

Malpractices identified by squad or special invigilators

1. Punishments to the candidates as per the above guidelines.

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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SRI VENKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY

(AUTONOMOUS)
R.V.S. NAGAR, CHITTOOR - 517127, A.P.

COURSE STRUCTURE AND SCHEME OF EXAMINATION FOR M.TECH-COMPUTER SCIENCE AND ENGINEERING

M.TECH, I-SEMESTER

S.NO	SUBJECT CODE	SUBJECT	PERIODS			CREDITS	SCHEME OF EXAMINATION (MAXIMUM MARKS)		
			L	T	P		CIE	SEE	TOTAL
1	25BCS01	Advanced Data Structures and Algorithms	3	0	0	3	40	60	100
2	25BCS02	Distributed Operating Systems	3	0	0	3	40	60	100
PROGRAM ELECTIVE COURSE - I									
3	25BCS03	Advanced Computer Architecture	3	0	0	3	40	60	100
	25BCS04	Enterprise Cloud Concepts							
	25BCS05	Applied Machine Learning							
PROGRAM ELECTIVE COURSE - II									
4	25BCS06	Natural Language Processing	3	0	0	3	40	60	100
	25BCS07	Smart Sensor Networks & IOT							
	25BCS08	Computing for Data Analytics							
5	25BCS09	Advanced Data Structures and Algorithms Lab	0	0	4	2	40	60	100
6	25BCS10	Distributed operating Systems Lab	0	0	4	2	40	60	100
MANDATORY COURSE									
7	25BMB01	Research Methodology and IPR	2	0	0	2	40	60	100
8	25BCS11	Full Stack Development Using MERN	0	1	2	2	40	60	100
AUDIT COURSE									
9	25BHS04	English for Research paper writing	2	0	0	-	-	-	-
	25BST11	Disaster Management							
	25BHS03	Essennce of Indian Traditional Knowleldge							
TOTAL			**16**	**1**	**10**	**20**	**320**	**480**	**800**

M.TECH, II-SEMESTER

S.NO	SUBJECT CODE	SUBJECT	PERIODS			CREDITS	SCHEME OF EXAMINATION (MAXIMUM MARKS)		
			L	T	P		CIE	SEE	TOTAL
1	25BCS12	Advances in Software Engineering	3	0	0	3	40	60	100
2	25BCS13	Advanced Databases	3	0	0	3	40	60	100
PROGRAM ELECTIVE COURSE-– III									
3	25BCS14	Block Chain Technology	3	0	0	3	40	60	100
	25BCS15	Advanced Computer Networks							
	25BCS16	Deep Learning and Applications							
PROGRAM ELECTIVE COURSE – IV									
4	25BCS17	Generative AI	3	0	0	3	40	60	100
	25BCS18	Digital Forensics							
	25BCS19	Robotic Process Automation							
5	25BCS20	Advance in Software Engineering Lab	0	0	4	2	40	60	100
6	25BCS21	Advanced Databases Lab	0	0	4	2	40	60	100
7	25BCS22	Quantum Technologies and Applications	2	0	0	2	40	60	100
8	25BCS23	Comprehensive Vivia Voce	0	0	0	2	0	100	100
AUDIT COURSE – II									
9	25BMB02	Pedagogy Studies	2	0	0				
	25BHS06	Stress Management for Yoga							
	25BHS07	Personality Development through Life Enlightenment Skills							
TOTAL			**16**	**0**	**8**	**20**	**280**	**520**	**800**

M.TECH, III SEMESTERS

S.NO	SUBJECT CODE	SUBJECT	PERIODS			CREDITS	SCHEME OF EXAMINATION (MAXIMUM MARKS)		
			L	T	P		CIE	SEE	TOTAL
PROGRAM ELECTIVE COURSE – V									
1	25BCS24	Software Defined Networks	3	0	0	3	40	60	100
	25BDS25	Reinforcement Learning							
	25BDS26	Data Science							
OPEN ELECTIVE									
2	25BCM29	Industrial Safety	3	0	0	3	40	60	100
	25BMB03	Business Analytics							
	25BCS27	Optimization Techniques							
3	25BCS28	DISSERTATION PHASE-I	-	-	20	10	40	60	100
4	25BCS29	Industry Internship	0	0	0	2	0	100	100
5	25BCS30	Co-curricular Activities	0	0	0	1	0	100	100
TOTAL			**6**	**0**	**20**	**19**	**120**	**380**	**500**

M.TECH, IV-SEMESTER

S.NO	SUBJECT CODE	SUBJECT	PERIODS			CREDITS	SCHEME OF EXAMINATION (MAXIMUM MARKS)		
			L	T	P		CIE	SEE	TOTAL
1	25BCS31	DISSERTATION PHASE-II	-	-	32	16	120	180	300
TOTAL						16	120	180	300

SRI VENKATESWARA COLLEGE OF ENGINEERING &TECHNOLOGY (AUTONOMOUS)

I M.Tech-I Semester (CSE)

25BCS01	ADVANCED DATA STRUCTURES AND ALGORITHMS	L	T	P	C
		3	0	0	3

Course Outcomes:

After completing this course, students will be able to:

1. Implement and manipulate linear data structures like singly/doubly linked lists, circular lists, stacks, and queues using dynamic memory allocation.
2. Apply and analyze searching and sorting algorithms including linear, binary search, bubble, selection, insertion, quick, and merge sort.
3. Design and implement dictionaries and hashing techniques to efficiently store and retrieve data.
4. Construct and operate on trees and priority queues, performing insertion, deletion, and traversal operations.
5. Compare and implement balanced search trees (AVL, Red-Black, Splay, B-Trees) for optimized data access and storage.

UNIT I: Introduction
Introduction to Data Structures, Singly Linked Lists, Doubly Linked Lists, Circular Lists-Algorithms. Stacks and Queues: Algorithm Implementation using Linked Lists.

UNIT II: Searching and Sorting:
Linear and Binary Search Methods, Sorting: -Basic sorting techniques, Radix Sort, Bucket Sort, Shell Sort Trees- Binary trees, Properties, Representation and Traversals, Expression Trees (Infix, prefix, postfix). Graphs-Basic Concepts, Storage structures and Traversals.

UNIT III: :Dictionaries and Hashing
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 IV: Priority queues
Definition, ADT, Realizing a Priority Queue Using Heaps, Definition, Insertion, Deletion .Search Trees- Binary Search Trees, Definition, ADT, Implementation, Operations-Searching, Insertion, Deletion.

UNIT V: Search Trees-
AVL Trees, Definition, Height of AVL Tree, Operations-, Insertion, Deletion and Searching, Introduction to Red-Black and Splay Trees, B-Trees, Height of B-Tree, Insertion, Deletion and Searching, Comparison of Search Trees, Analyzing complexity of trees..

Text Books:
1. Data Structures: A Pseudo Code Approach, 2/e, Richard F.Gilberg, Behrouz A. Forouzon and Cengage
2. Data Structures, Algorithms and Applications in java, 2/e, SartajSahni, University Press

Reference Books:
1. Data Structures and Algorithm Analysis, 2/e, Mark Allen Weiss, Pearson.
2. Data Structures and Algorithms, 3/e, Adam Drozdek, Cengage
3. C and Data Structures: A Snap Shot Oriented Treatise Using Live Engineering Examples, N.B.Venkateswarulu, E.V.Prasad and S Chand & Co.

SRI VENKATESWARA COLLEGE OF ENGINEERING &TECHNOLOGY (AUTONOMOUS)

I M.Tech-I Semester (CSE)

25BCS02	DISTRIBUTED OPERATING SYSTEMS	L	T	P	C
		3	0	0	3

Course Outcomes: At the end of the course, the student will be able to
CO1: Explain the architectures, limitations, and synchronization mechanisms (logical clocks, mutual exclusion) in distributed systems.
CO2: Analyze distributed deadlock detection methods, agreement protocols, and distributed resource management techniques.
CO3: Apply concepts of distributed shared memory, scheduling, and fault-tolerance techniques for reliable system design.
CO4: Evaluate models of protection, access control, and cryptographic algorithms for ensuring data security in distributed systems.
CO5: Compare multiprocessor and database operating systems, and analyze concurrency control algorithms for distributed databases.

UNIT – I

Architectures of Distributed Systems, System Architecture types, issues in distributed operating systems, communication networks, communication primitives. Theoretical Foundations, inherent limitations of a distributed system, lamp ports logical clocks, vector clocks, casual ordering of messages, global state, cutsofadistributed computation, termination detection.

UNIT – II

Distributed Mutual Exclusion: The Classification of Mutual Exclusion Algorithms, Non-Token – Based Algorithms: Lamport's Algorithm, The Ricart-Agrawala Algorithm, Maekawa's Algorithm, Token-Based Algorithms: Suzuki-Kasami's Broadcast Algorithm, Singhal'sHeurisric Algorithm, Raymond's Heuristic Algorithm.

UNIT – III

Distributed Deadlock Detection: Preliminaries, Deadlock Handling Strategies in Distributed Systems, Issues in Deadlock Detection and Resolution, Control Organizations for Distributed Deadlock Detection, Centralized- Deadlock – Detection Algorithms, Distributed Deadlock Detection Algorithms, Hierarchical Deadlock Detection Algorithms

UNIT – IV

Multiprocessor System Architectures: Introduction, Motivation for multiprocessor Systems, Basic Multiprocessor System Architectures Multi Processor Operating Systems: Introduction, Structures of Multiprocessor Operating Systems, Operating Design Issues, Threads, Process Synchronization, Processor Scheduling. Distributed File Systems: Architecture, Mechanisms for Building Distributed File Systems, Design Issues

UNIT – V

Distributed Scheduling: Issues in Load Distributing, Components of a Load Distributed Algorithm, Stability, Load Distributing Algorithms, Requirements for Load Distributing, Task Migration, Issues

in task Migration Distributed Shared Memory: Architecture and Motivation, Algorithms for Implementing DSM, Memory Coherence, Coherence Protocols, Design Issues

TEXT BOOKS

1.Advancedconceptsinoperatingsystems:Distributed,Databaseandmultiprocessoroperating systems",MukeshSinghal, Niranjan andG.Shivaratri,TMH, 2001

2. Andrew S. Tanenbaum, Maarten Van Steen, *Distributed Systems: Principles and Paradigms*, Pearson Education, 2nd Edition, 2006.

REFERENCES

1. **Andrew S. Tanenbaum, Maarten Van Steen**, *Distributed Systems: Principles and Paradigms*, Pearson Education, 2nd Edition, 2006.
2. **Silberschatz, Galvin, Gagne**, *Operating System Concepts*, Wiley, 9th Edition, 2018.
3. **M. Mitzenmacher, E. Upfal**, *Probability and Computing: Randomized Algorithms and Probabilistic Analysis*, Cambridge University Press, 2005.
4. **Alan Tucker**, *Applied Combinatorics*, John Wiley & Sons, 5th Edition, 2007.
5. **Nancy A. Lynch**, *Distributed Algorithms*, Morgan Kaufmann, 1996.
6. **George Coulouris, Jean Dollimore, Tim Kindberg, Gordon Blair**, *Distributed Systems: Concepts and Design*, Pearson, 5th Edition, 2011.

SRI VENKATESWARA COLLEGE OF ENGINEERING &TECHNOLOGY (AUTONOMOUS)

I M.Tech-I Semester (CSE)

25BCS03	ADVANCED COMPUTER ARCHITECTURE (Program Elective I)	L	T	P	C
		3	0	0	3

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

1. Analyze various parallel computer models, program partitioning techniques, and system interconnect architectures to evaluate conditions for parallelism.
2. Apply performance metrics and scalability analysis to assess parallel processing applications using advanced processor and memory technologies.
3. Design and differentiate linear, non-linear, instruction, and arithmetic pipelines to enhance execution performance in modern processors.
4. Examine multiprocessor and multicomputer architectures, cache coherence protocols, and synchronization mechanisms for scalable system design.
5. Evaluate vector and SIMD processing principles through case studies like CM-5 to identify their effectiveness in solving computationally intensive applications.

UNIT I: Micro Processors

Theory of Parallelism, Parallel computer models, The State of Computing, Multiprocessors and Multi computers, Multi vector and SIMD Computers, PRAM and VLSI models, Architectural development tracks, Program and network properties, Conditions of parallelism, Program partitioning and Scheduling, Program flow Mechanisms, System interconnect Architectures.

UNIT II: Parallel Processing

Principles of Scalable performance, Performance metrics and measures, Parallel Processing applications, Speed up performance laws, Scalability Analysis and Approaches, Hardware Technologies, Processes and Memory Hierarchy, Advanced Processor Technology, Superscalar and Vector Processors

UNIT III: Pipeline Processors

Shared-Memory Organizations, Sequential and weak consistency models, Pipelining and superscalar techniques, Linear Pipeline Processors, Non-Linear Pipeline Processors, Instruction Pipeline design, Arithmetic pipeline design, superscalar pipeline design.

UNIT IV: Architecture of Microprocessors

Parallel and Scalable Architectures, Multiprocessors and Multi computers, Multiprocessor system interconnects, cache coherence and synchronization mechanism, Three Generations of Multi computers, Message-passing Mechanisms, Multi vector and SIMD computers.

UNIT V: Applications

Vector Processing Principles, Multi vector Multiprocessors, Compound Vector processing, SIMD computer Organizations, The connection machine CM-5.

Text Books:

1. Advanced Computer Architecture, Kai Hwang, 2nd Edition, Tata McGraw Hill Publishers.

Reference Books:

1. Computer Architecture, J.L. Hennessy and D.A. Patterson, 4th Edition, ELSEVIER.
2. Advanced Computer Architectures, S.G.Shiva, Special Indian edition, CRC, Taylor &Francis.
3. Introduction to High Performance Computing for Scientists and Engineers, G. Hager and G.Wellein, CRC Press, Taylor & Francis Group.
4. Advanced Computer Architecture, D. Sima, T. Fountain, P. Kacsuk, Pearson education.
5. Computer Architecture, B. Parhami, Oxford Univ. Press.

SRI VENKATESWARA COLLEGE OF ENGINEERING &TECHNOLOGY (AUTONOMOUS)

I M. Tech-I Semester (CSE)

25BCS04	ENTERPRISE CLOUD CONCEPTS (Program Elective I)	L	T	P	C
		3	0	0	3

Course Outcomes:

1. Understand importance of cloud architecture
2. Illustrating the fundamental concepts of cloud security
3. Analyze various cloud computing mechanisms
4. Understanding the architecture and working of cloud computing.

Unit - I

Understanding Cloud Computing: Origins and influences, Basic Concepts and Terminology, Goals and Benefits, Risksand Challenges. Fundamental Concepts and Models: Roles and Boundaries, Cloud Characteristics, Cloud DeliveryModels, Cloud Deployment Models.

Unit - II

Cloud-Enabling Technology: Broadband Networks and Internet Architecture, Data Center Technology, VirtualizationTechnology CLOUD COMPUTING MECHANISMS: Cloud Infrastructure Mechanisms: Logical Network Perimeter,Virtual Server, Cloud Storage Device, Cloud Usage Monitor, Resource Replication

Unit - III

Cloud Management Mechanisms: Remote Administration System, Resource Management System, SLA ManagementSystem, Billing Management System, Case Study ExampleCloud Computing Architecture

Fundamental Cloud Architectures: Workload Distribution Architecture, Resource Pooling Architecture, DynamicScalability Architecture, Elastic Resource Capacity Architecture, Service Load Balancing Architecture, Cloud BurstingArchitecture, Elastic Disk Provisioning Architecture, Redundant Storage Architecture, Case Study Example

Unit - IV

Cloud-Enabled Smart Enterprises Introduction, Revisiting the Enterprise Journey, Service-Oriented Enterprises, CloudEnterprises, Smart Enterprises, The Enabling Mechanisms of Smart Enterprises Cloud-Inspired EnterpriseTransformations Introduction, The Cloud Scheme for Enterprise Success, Elucidating the Evolving Cloud Idea,Implications of the Cloud on Enterprise Strategy, Establishing a Cloud-Incorporated Business Strategy

UNIT-V

Transitioning to Cloud-Centric Enterprises The Tuning Methodology, Contract Management in the Cloud Cloud-Instigated IT Transformations Introduction, Explaining Cloud Infrastructures, A Briefing on Next-Generation Services,Service Infrastructures, Cloud Infrastructures, Cloud Infrastructure Solutions, Clouds for Business Continuity, TheRelevance of Private Clouds, The Emergence of Enterprise Clouds

TEXT BOOKS:

1. Erl Thomas, Puttini Ricardo, Mahmood Zaigham, Cloud Computing: Concepts, Technology & Architecture 1st Edition,
2. Pethuru Raj, Cloud Enterprise Architecture, CRC Press

REFERENCE:

1. James Bond, The Enterprise Cloud, O'Reilly Media, Inc.

SRI VENKATESWARA COLLEGE OF ENGINEERING &TECHNOLOGY
(AUTONOMOUS)

I M. Tech-I Semester (CSE)

25BCS05	APPLIED MACHINE LEARNING (Program Elective I)	L	T	P	C
		3	0	0	3

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

1. Understand the fundamental concepts of machine learning
2. Apply linear, distance based, and decision tree based models
3. Analyze probabilistic, neural network models
4. Design a suitable machine learning model for a given scenario

UNIT I:
Introduction to Machine Learning: Introduction. Different types of learning, Examples of Machine Learning Applications Supervised Learning: Learning a Class from Examples, Probably Approximately Correct Learning, Learning multiple classes, Model selection and generalization Regression: Linear regression, Multiple Linear regression, Logistic Regression.

UNIT-II:
The ingredients of machine learning: Tasks, Models, Features Binary classification and related tasks: Classification, Assessing classification performance, Visualizing classification performance Beyond binary classification: Multi-class classification, Regression, Unsupervised and descriptive learning

UNIT-III:
Decision Tree learning – Introduction, Decision tree representation, Appropriate problems for decision tree learning, The basic decision tree learning algorithm, Inductive bias in decision tree, Issues in decision tree learning. Linear models: The least-squares method, Multivariate linear regression, The perceptron, Support vector machines, Soft margin SVM, Going beyond linearity with kernel methods.

UNIT –IV:
Distance Based Models: Introduction, Neighbours and exemplars, Nearest Neighbours classification, K-Means algorithms, Clustering around medoids Probabilistic Models: Using Naïve Bayes Model for classification, Expectation Maximization, Gaussian Mixture models

UNIT –V:
Artificial Neural Networks: Introduction, Neural network representation, appropriate problems for neural network learning, Multilayer networks and the back propagation, Advanced topics in Artificial Neural Networks Reinforcement Learning: Introduction, Learning tasks, Q-learning

Text Books:
1. Machine Learning: The art and Science of algorithms that make sense of data, Peter Flach, Cambridge University Press, 2012
2. Tom M. Mitchell, Machine Learning, India Edition 2013, McGraw Hill Education

References:

1. AurélienGéron, Hands-On Machine Learning with Scikit-Learn, Keras, and Tensor Flow: Concepts, Tools, and Techniques to Build Intelligent Systems 2nd Edition
2. Stephen Marsland, “Machine Learning – An Algorithmic Perspective”, Second Edition, Chapman and Hall/CRC Machine Learning and Pattern Recognition Series, 2014
3. EthemAlpaydın, Introduction to machine learning, second edition, MIT press.
4. T. Hastie, R. Tibshirani and J. Friedman, “Elements of Statistical Learning”, Springer Series, 2nd edition

SRI VENKATESWARA COLLEGE OF ENGINEERING &TECHNOLOGY
(AUTONOMOUS)

I M. Tech-I Semester (CSE)

25BCS06	NATURAL LANGUAGE PROCESSING (Program Elective-II)	L	T	P	C
		3	0	0	3

Course Outcomes:
After completing this course, students will be able to

1. **Understand linguistic foundations** of English syntax and various levels of language analysis for Natural Language Processing.
2. **Apply parsing techniques** such as top-down, bottom-up, ATNs, and feature-based systems for grammatical analysis of natural language.
3. **Analyse different grammar formalisms and parsing approaches** to handle language phenomena like movement, ambiguity, and human preferences in parsing.
4. **Construct semantic representations** using logical forms, thematic roles, and speech acts, and apply n-gram and statistical models for language modeling.
5. **Evaluate and compare machine translation approaches** and demonstrate understanding of systems like Anusaraka for multilingual language processing.
6. **Implement and analyze multilingual information retrieval systems**, applying appropriate pre-processing, evaluation metrics, and tools for cross-lingual retrieval.

UNIT-I:
The Study of Language, Applications of NLP, Evaluating Language Understanding Systems, Different Levels of Language Analysis, Representations and Understanding, Organization of Natural language Understanding Systems, Linguistic Background: An outline of English Syntax.

UNIT-II:
Grammars and Parsing- Top-Down and Bottom-Up Parsers, Transition Network Grammars, Feature Systems and Augmented Grammars, Morphological Analysis and the Lexicon, Parsing with Features, Augmented Transition Networks, Bayes Rule, Shannon game, Entropy and Cross Entropy.

UNIT-III:
Grammars for Natural Language, Movement Phenomenon in Language, Handling questions in Context Free Grammars, Hold Mechanisms in ATNs, Gap Threading, Human Preferences in Parsing, Shift Reduce Parsers, Deterministic Parsers.

UNIT-IV:
Semantic Interpretation: Semantic & Logical form, Word senses & ambiguity, The basic logical form language, encoding ambiguity in the logical Form, Verbs & States in logical form, Thematic roles, Speech acts &embedded sentences, Defining semantics structure model theory.
Language Modelling: Introduction, n-Gram Models, Language model Evaluation, Parameter Estimation, Language Model Adaption, Types of Language Models, Language-Specific Modelling Problems, Multilingual and Cross lingual Language Modelling.

UNIT-V:

Machine Translation Survey: Introduction, Problems of Machine Translation, Is Machine Translation Possible, Brief History, Possible Approaches, Current Status. Anusaraka or Language Accessor: Background, Cutting the Gordian Knot, The Problem, Structure of Anusaraka System, User Interface, Linguistic Area, Giving up Agreement in Anusarsaka Output, Language Bridges.

Multilingual Information Retrieval: Introduction, Document Pre-processing, Monolingual Information Retrieval, CLIR, MLIR, Evaluation in Information Retrieval, Tools, Software and Resources.

Textbooks:

1. James Allen, Natural Language Understanding, 2nd Edition, 2003, Pearson Education.
2. Multilingual Natural Language Processing Applications: From Theory To Practice-Daniel M.Bikel and ImedZitouni, Pearson Publications.
3. Natural Language Processing, Apaninian perspective, AksharBharathi, Vineetchaitanya, Prentice–Hall of India.

Reference Books:

1. Charniack, Eugene, Statistical Language Learning, MIT Press, 1993.
2. Jurafsky,Dan and Martin, James, Speech and Language Processing, 2nd Edition, Prentice Hall, 2008.
3. Manning, Christopher and Henrich, Schutze, Foundations of Statistical Natural Language Processing, MIT Press, 1999.

SRI VENKATESWARA COLLEGE OF ENGINEERING &TECHNOLOGY
(AUTONOMOUS)

I M. Tech-I Semester (CSE)

25BCS07	SMART SENSOR NETWORKS & IOT (Program Elective-II)	L	T	P	C
		3	0	0	3

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

1. Explain the fundamental concepts, applications, and research areas of IoT across various domains.
2. AnalyzeIoT reference architectures, functional and deployment views, and real-world design constraints including hardware, technical, and operational limitations.
3. Demonstrate practical knowledge of IoT devices, programming, operating systems, communication protocols, network security, and database management.
4. Apply IoT principles to industrial automation and enterprise integration using frameworks such as SOCRADES and IMC-AESOP.
5. Evaluate case studies in commercial building automation and emerging IoT trends, including edge/fog computing, predictive maintenance, and digital twin technologies.

UNIT I:
Introduction and Applications: smart transportation, smart cities, smart living, smart energy, smart health, and smart learning. Examples of research areas include for instance: Self-Adaptive Systems, Cyber Physical Systems, Systems of Systems, Software Architectures and Connectors, Software Interoperability, Big Data and Big Data Mining, Privacy and Security IoT Reference Architecture Introduction, Functional View, Information View, Deployment and Operational View, Other Relevant architectural views.

UNIT II:
Real-World Design Constraints- Introduction, Technical Design constraints, hardware, Data representation and visualization, Interaction and remote control.

UNIT III:
IOT Physical Devices & Endpoints: What is an IOT Device, Exemplary Device Board, Linux on Raspberry, Interface and Programming & IOT Device. Hardware Platforms and Energy Consumption, Operating Systems, Time Synchronization, Positioning and Localization, Medium Access Control, Topology and Coverage Control, Routing**:** Transport Protocols, Network Security, Middleware, Databases

UNIT IV:
Industrial Automation-Service-oriented architecture-based device integration, SOCRADES: realizing the enterprise integrated Web of Things, IMC-AESOP: from the Web of Things to the Cloud of Things, Commercial Building Automation-Introduction,

UNIT V:
Case study: phase one-commercial building automation today.
Case study: phase two commercial building automation in the future. Recent trends in sensor network and IOT architecture, Automation in Industrial aspect of IOT.

Text Books:

1. Mandler, B., Barja, J., MitreCampista, M.E., Cagáová, D., Chaouchi, H., Zeadally, S., Badra, M., Giordano, S., Fazio, M., Somov, A., Vieriu, R.-L., Internet of Things. IoT Infrastructures, Springer International Publication
2. Internet of Things: A Hands-On Approach Paperback – 2015, by ArsheepBahga (Author), Vijay Madisetti (Author)
3. IoT Fundamentals: Networking Technologies, Protocols and Use Cases for the Internet of Things by Pearson Paperback – 16 Aug 2017 ,by Hanes David (Author), Salgueiro Gonzalo (Author), Grossetete Patrick (Author), Barton Rob (Author).

SRI VENKATESWARA COLLEGE OF ENGINEERING &TECHNOLOGY
(AUTONOMOUS)

I M.Tech-I Semester (CSE)

25BCS08	**COMPUTING FOR DATA ANALYTICS (Program Elective-II)**	**L**	**T**	**P**	**C**
		3	**0**	**0**	**3**

Course Outcomes:
After completing this course, students will be able to:

1. Understand the data analytics lifecycle and identify the roles and responsibilities of data scientists in business analytics projects.
2. Apply statistical techniques such as measures of central tendency, variation, skewness, and kurtosis for data summarization and interpretation.
3. Analyze probability distributions (binomial, Poisson, normal, exponential, gamma, etc.) and apply them in modelling uncertain events.
4. Perform hypothesis testing and predictive analytics using t-tests, chi-square tests, regression, correlation, and multiple correlation methods.
5. Design forecasting models (moving average, exponential smoothing, seasonal trends) and conduct design of experiments (ANOVA, Latin square, factorial design) for analytical problem solving.

UNIT – I DATA ANALYTICS LIFE CYCLE
Introduction to Big data Business Analytics - State of the practice in analytics role of data scientists - Key roles for successful analytic project - Main phases of life cycle - Developing core deliverables for stakeholders.

UNIT – II STATISTICS
Sampling Techniques - Data classification, Tabulation, Frequency and Graphic representation - Measures of central value - Arithmetic mean, Geometric mean, Harmonic mean, Mode, Median, Quartiles, Deciles, Percentile - Measures of variation – Range, IQR, Quartile deviation, Mean deviation, standard deviation, coefficient variance, skewness, Moments & Kurtosis.

UNIT – III PROBABILITY AND HYPOTHESIS TESTING
Random variable, distributions, joint probability function, marginal density function. Random vectors - Some special probability distribution - Binomial, Poison, Geometric, uniform, exponential, normal, gamma and Erlang - Normal distribution.

UNIT – IV PREDICTIVE ANALYTICS
Sampling distribution – Estimation - point, confidence - Test of significance, 1& 2 tailed test, uses of t-distribution, F-distribution, $\chi 2$ distribution - Predictive modeling and Analysis - Regression Analysis, Correlation analysis, Rank correlation coefficient, Multiple correlation.

UNIT – V TIME SERIES FORECASTING AND DESIGN OF EXPERIMENTS
Forecasting Models for Time series : MA, SES, TS with trend, season - Design of Experiments, one way classification, two way classification, ANOVA, Latin square, Factorial Design.

Text Books:
1. Chris Eaton, Dirk Deroos, Tom Deutsch et al., ―Understanding Big Data, Mc Graw Hill, 2012.
2. Alberto Cordoba, ―Understanding the Predictive Analytics Lifecycle, Wiley, 2014.
3. Eric Siegel, Thomas H. Davenport, ―Predictive Analytics: The Power to Predict Who Will Click, Buy, Lie, or Die, Wiley, 2013.

Reference Books:

1. James R Evans,―Business Analytics – Methods, Models and Decisions, Pearson 2013.
2. R. N. Prasad, Seema Acharya, ―Fundamentals of Business Analytics, Wiley, 2015.
3. S M Ross, ―Introduction to Probability and Statistics for Engineers and Scientists‖, Academic Foundation, 2011.
4. David Hand, HeikiMannila, Padhria Smyth, ―Principles of Data Mining, PHI 2013.
5. Spyros Makridakis, Steven C Wheelwright, Rob J Hyndman, ―Forecasting methods and applications Wiley 2013(Reprint).
6. David Hand, HeikkiMannila, Padhraic Smyth, ―Principles of Data mining, PHI 2013.

SRI VENKATESWARA COLLEGE OF ENGINEERING &TECHNOLOGY (AUTONOMOUS)

I M. Tech-I Semester (CSE)

25BCS09	ADVANCED DATA STRUCTURES AND ALGORITHMS LAB	L	T	P	C
		0	0	4	2

Course Outcomes:

After completing these experiments, students will be able to:

1. Implement linear data structures such as single, double, and circular linked lists to perform insertion, deletion, searching, and traversal operations.
2. Apply stack and queue concepts using linked lists to solve real-world computational problems such as expression evaluation and infix-to-postfix conversion.
3. Develop and test tree-based and Graph-based data structures including Binary Search Trees, AVL Trees, and B-Trees using recursive and iterative approaches, Graph traversals.
4. Implement and compare searching and sorting techniques to analyze their performance and efficiency.
5. Apply hashing techniques for efficient dictionary implementation and collision resolution.
6. Analyze and evaluate the performance of different data structures to select appropriate techniques for given computational problems.

Experiment 1:

Write a program to perform various operations on single linked list

Experiment 2:

Write a program for the following

a) Reverse a linked list

b) Sort the data in a linked list

c) Remove duplicates

d) Merge two linked lists

Experiment 3: Write a program to perform various operations on doubly linked list.

Experiment 4: Write a program to perform various operations on circular linked list.

Experiment 5: Write a program for performing various operations on stack using linked list.

Experiment 6: Write a program for performing various operations on queue using linked list.

Experiment 7: Write a program for the following using stack

a) Infix to postfix conversion.

b) Expression evaluation.

Experiment 8: Write a program to implement various operations on Binary Search Tree Using Recursive and Non-Recursive methods.

Experiment 9: Write a program to implement the following for a graph. a) BFS b) DFS

Experiment 10: Write a program to implement various Sorting Techniques

Experiment 11: Write a program to implement various Searching Techniques

Experiment 12: Write a program to implement various operations on AVL trees.

Experiment 13: Write a program to perform the following operations:

a) Insertion into a B-tree

b) Searching in a B-tree

Experiment 15: Write a program to implement all the functions of Dictionary (ADT) using Hashing.

References:

1. Ellis Horowitz, SartajSahni, and SanguthevarRajasekaran – *Fundamentals of Computer Algorithms*, Universities Press, 2008.
2. Mark Allen Weiss – *Data Structures and Algorithm Analysis in C++ / Java*, Pearson Education, 4th Edition, 2013.
3. Seymour Lipschutz – *Data Structures with C*, Schaum's Outline Series, McGraw Hill, 2011.
4. Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, and Clifford Stein –*Introduction to Algorithms*, MIT Press, 3rd Edition, 2009.

SRI VENKATESWARA COLLEGE OF ENGINEERING &TECHNOLOGY
(AUTONOMOUS)

I M. Tech-I Semester (CSE)

25BCS10	DISTRIBUTED OPERATING SYSTEMS LAB	L	T	P	C
		0	0	4	2

Course Outcomes:
After completing this lab, students will be able to:

1. Implement and analyze synchronization mechanisms in distributed environments.
2. Develop and evaluate distributed deadlock detection techniques.
3. Design and implement distributed shared memory models and scheduling algorithms.
4. Apply security and cryptographic techniques to distributed systems.
5. Implement concurrency control algorithms in database operating systems.
6. Gain hands-on experience in developing efficient multiprocessor operating system components.

List of Experiments:

Unit I: Architectures & Synchronization

1. Implementation of Lamport's Logical Clocks – Simulate logical clock updates in a distributed system.
2. Vector Clocks and Causal Ordering – Implement vector clocks and analyze message ordering.
3. Distributed Mutual Exclusion Algorithms – Implement Ricart-Agrawala and Maekawa's mutual exclusion algorithms.

Unit II: Deadlock Detection & Resource Management

4. Simulation of Distributed Deadlock Detection Algorithms – Implement centralized and distributed deadlock detection techniques.
5. Hierarchical Deadlock Detection – Implement a hierarchical approach to detecting deadlocks in a distributed system.

Unit III: Shared Memory, Scheduling & Fault Tolerance

6. Implementation of Load Balancing Algorithms – Compare load balancing techniques (static and dynamic).
7. Task Migration Mechanism – Implement and analyze task migration in a distributed system.

Unit IV: Security & Cryptography

8. Access Matrix Model Implementation – Simulate access control using an access matrix.
9. Implementation of Data Encryption Standard (DES) Algorithm – Encrypt and decrypt messages using DES.
10. Public Key Cryptography using RSA – Implement RSA encryption and authentication mechanisms.

Unit V: Multiprocessor & Database OS

11. Process Synchronization in Multiprocessor Systems – Implement and analyze thread synchronization.
12. Concurrency Control using Lock-Based Algorithms – Implement two-phase locking protocol.
13. Timestamp-Based Concurrency Control – Develop a timestamp-based concurrency control mechanism.
14. Optimistic Concurrency Control Algorithm – Implement an optimistic concurrency control protocol.

References:

1. MukeshSinghal and Niranjan G. Shivaratri – *Advanced Concepts in Operating Systems: Distributed, Database, and Multiprocessor Operating Systems*, McGraw Hill, 2001.
2. Andrew S. Tanenbaum and Maarten Van Steen – *Distributed Systems: Principles and Paradigms*, Pearson Education, 2nd Edition, 2007.

3. George Coulouris, Jean Dollimore, Tim Kindberg, and Gordon Blair –*Distributed Systems: Concepts and Design*, Pearson Education, 5th Edition, 2012.
4. Pradeep K. Sinha – *Distributed Operating Systems: Concepts and Design*, PHI Learning, 2008.

SRI VENKATESWARA COLLEGE OF ENGINEERING &TECHNOLOGY (AUTONOMOUS)

I M. Tech-I Semester (CSE)

25BMB01	RESEARCH METHODOLOGY AND INTELLECTUAL PROPERTY RIGHTS	L	T	P	C
		2	0	0	2

Course Outcomes:

1. Recall key concepts and terminology related to research design, data collection, and intellectual property rights.
2. Explain the importance of research design and data analysis in research studies, and describe the concept of intellectual property rights.
3. Design a research study, including data collection and analysis methods, and apply intellectual property rights principles to protect research findings.
4. Analyze research studies to identify strengths and limitations, and evaluate the effectiveness of data collection and analysis methods.
5. Assess the impact of intellectual property rights on research and innovation, and evaluate the effectiveness of research designs and methods.
6. Develop a comprehensive research plan, including a detailed research design, data collection and analysis methods, and a plan for protecting intellectual property.

UNIT - I FUNDAMENTALS OF RESEARCH METHODOLOGY

Overview of research process and design - Types of Research - Approaches to Research (Qualitative vs Quantitative) - Observation studies, Experiments and Surveys - Use of Secondary and exploratory data to answer the research question - Importance of Reasoning in Research and Research ethics - Documentation Styles (APA/IEEE etc.) - Plagiarism and its consequences

UNIT - II DATA COLLECTION AND SOURCES

Importance of Data Collection - Types of Data - Data Collection Methods - Data Sources - primary, secondary and Big Data sources - Data Quality & Ethics - Tools and Technology for Data Collection

UNIT - III DATA ANALYSIS AND REPORTING

Overview of Multivariate analysis - Experimental research, cause-effect relationship, and development of hypotheses- Measurement systems analysis, error propagation, and validity of experiments - Guidelines for writing abstracts, introductions, methodologies, results, and discussions - Writing Research Papers & proposals

UNIT - IV UNDERSTANDING INTELLECTUAL PROPERTY RIGHTS

Intellectual Property – The concept of IPR, Evolution and development of concept of IPR, IPR development process, Trade secrets, utility Models, IPR & Bio diversity, Role of WIPO and WTO in IPR establishments, Right of Property, Common rules of IPR practices, Types and Features of IPR Agreement, Trademark, Functions of UNESCO in IPR maintenance.

UNIT - V PATENTS

Patents – objectives and benefits of patent, Concept, features of patent, Inventive step, Specification - Types of patent application, process E-filling, Examination of patent, Grant of patent, Revocation, Equitable Assignments, Licenses, Licensing of related patents, patent agents, Registration of patent agents

Text books:

1.Stuart Melville and Wayne Goddard, Research Methodology: An introduction for Science & Engineering students, Juta and Company Ltd, 2004

2.Catherine J. Holland, Intellectual property: Patents, Trademarks, Copyrights, Trade Secrets, Entrepreneur Press, 2007.

References:

1. Cooper Donald R, Schindler Pamela S and Sharma JK, “Business Research Methods”, Tata McGraw Hill Education 11e (2012).
2. Ranjit Kumar , Research Methodology: A Step-by-Step Guide for Beginners. . David Hunt, Long Nguyen, Matthew Rodgers, “Patent searching: tools & techniques”, Wiley, 2007.
3. Deborah E. Bouchoux , Intellectual Property: The Law of Trademarks, Copyrights, Patents, and Trade Secrets, 6th Edition, Cengage 2024.
4. Wayne C. Booth, Gregory G. Colomb, Joseph M. Williams, The Craft of Research, 5th Edition, University of Chicago Press, 2024
5. The Institute of Company Secretaries of India, Statutory body under an Act of parliament, “Professional Programme Intellectual Property Rights, Law and practice”, September 2013.
6. Peter Elbow, Writing With Power, Oxford University Press, 1998.
Online Resources (Free & Authentic)

SRI VENKATESWARA COLLEGE OF ENGINEERING &TECHNOLOGY (AUTONOMOUS)

I M. Tech-I Semester (CSE)

25BCS11	FULL STACK DEVELOPMENT USING MERN (Skill Enhancement Course)	L	T	P	C
		0	1	2	2

Course Outcomes:
After completing the course, the students will be able to:
1. Apply fundamental web technologies (HTML, CSS, JavaScript, ES6) to design responsive web pages.
2.Develop server-side applications using Node.js and Express.js with REST API integration.
3.Perform database operations using MySQL and MongoDB and integrate them with backend services.
4. Design and implement dynamic, component-based user interfaces using ReactJS.
5. Develop and deploy full-stack applications by combining frontend, backend, and database skills.
6. Demonstrate problem-solving, debugging, and version control skills in web development projects.

Module 1: Web Development Fundamentals
Fundamentals of Web Design, Webpage and Website, Web application HTML Typography, Images, Tables, Lists, Hyperlinks etc. CSS Syntax and usage, CSS Selectors, CSS on body, CSS on Text, CSS on Links, CSS on Tables, CSS on Lists, CSS on Forms, CSS on Images, CSS on DIV, W3.CSS Framework

List of Experiments :
- **HTML & CSS Basics** – Create a personal portfolio webpage using HTML (headings, lists, tables, hyperlinks, forms) and style it with CSS selectors.
- **Responsive Layout** – Develop a responsive webpage using DIV, CSS box model, and W3.CSS framework.
- **Styled Components** – Design a webpage for a college event with images, tables, and styled navigation menu using CSS.

Module 2: JavaScript and ECMA Script 6
JavaScript Fundamentals - Grammar and types, Control flow and error handling - Loops, Function - Objects, Arrays, Promises - ES6 Let and const, Template literals - Arrow Function, Default parameter, Async Await

List of Experiments :
- **JavaScript Fundamentals** – Build a simple calculator app using functions, loops, and control flow.
- **Array & Object Manipulation** – Write a program using ES6 features (let/const, arrow functions, template literals) to manage student records.
- **Async Programming** – Create a webpage that fetches and displays random user data from a public API using Promises and Async/Await.

Module 3: Node.js
overview, Node.js - basics and setup - Node.js console, Node.js command utilities - Node.js modules, concepts - Node.js events, database access - Node.js with Express.js, Express.js Request/Response - Express.js Get, Express.js Post - Express.js Routing, Express.js Cookies - Express.js File Upload, Middleware - Express.js Scaffolding, Template

List of Experiments:
- Node.js Basics – Write a Node.js script to create a local server and display “Hello World” in the browser.

- Express.js Routing – Build a REST API with Express.js that handles GET and POST requests for a student information system.
- File Handling – Develop a Node.js application to upload, read, and display a text/JSON file using Express middleware.

Module 4: MySQL and MongoDB

MySQL Concepts - Create, Read, Update, Delete Operation - SQL and NoSQL concepts - Create and manage MongoDB - Migration of data into MongoDB - MongoDB with NodeJS - Services offered by MongoDB

List of Experiments :

- MySQL CRUD – Create a MySQL database for employee records and perform Create, Read, Update, Delete (CRUD) operations.
- MongoDB CRUD with Node.js – Build a Node.js application that connects to MongoDB and manages student data.
- Migration Project – Write a script to migrate data from MySQL to MongoDB and display it through a Node.js API.

Module 5: React JS

ReactJS introduction and overview - ReactJS installation and environment setup - Introducing JSX, Rendering Elements - Components and Props - State and Lifecycle - Handling Events - Conditional Rendering - Lists and Keys, Forms - Lifting State Up

List of Experiments :

- React Components – Build a React app to display a list of courses using functional components and props.
- State & Events – Create a counter and a form component in React using useState and event handling.
- Conditional Rendering & Lists – Develop a React to-do list application with add/delete functionality and conditional rendering of completed tasks.

Textbooks

1. **Alex Banks, Eve Porcello** – *Learning React: Modern Patterns for Developing React Apps*, O'Reilly.
2. **StoyanStefanov** – *React Up & Running: Building Web Applications*, O'Reilly.
3. **Mario Casciaro, Luciano Mammino** – *Node.js Design Patterns*, Packt.
4. **Seyed M.M. Iravani** – *Learning Web Design: A Beginner's Guide to HTML, CSS, JavaScript, and Web Graphics*, O'Reilly.

References:

1. **Robin Wieruch** – *The Road to React*, Leanpub.
2. **Carl Rippon** – *React 18 Design Patterns and Best Practices*, Packt.
3. **KirupaChinnathambi** – *Learning React: A Hands-On Guide to Building Web Applications*, Addison-Wesley.
4. **Ethan Brown** – *Web Development with Node and Express: Leveraging the JavaScript Stack*, O'Reilly.
5. **Kristina Chodorow** – *MongoDB: The Definitive Guide*, O'Reilly.
6. **Ben Forta** – *SQL in 10 Minutes, Sams Teach Yourself*, Sams Publishing.

SRI VENKATESWARA COLLEGE OF ENGINEERING &TECHNOLOGY (AUTONOMOUS)

I M. Tech-I Semester (CSE)

25BHS04	ENGLISH FOR RESEARCH PAPER WRITING (Audit Course-I)	L	T	P	C
		2	0	0	0

Course Outcomes (CO):

Student will be able to

1. Recall the key language aspects and structural elements of academic writing in research papers.
2. Explain the importance of clarity, precision, and objectivity in research writing.
3. Apply critical reading strategies and advanced grammar skills to analyze and write research papers.
4. Analyze research articles and identify the strengths and limitations of different methodologies.
5. Evaluate research papers to check for plagiarism, structure, clarity, and language accuracy.
6. Evaluate the effectiveness of different language and technology tools in research writing, including AI-assisted tools and plagiarism detection software.
7. Develop a well-structured research paper that effectively communicates complex ideas.

UNIT – IFUNDAMENTALS OF ACADEMIC ENGLISH

Academic English. MAP (Message-Audience-Purpose). Language Proficiency for Writing. Key Language Aspects. Clarity and Precision. Objectivity. Formal Tone. Integrating References. Word order. Sentences and Paragraphs. Link Words for Cohesion. Avoiding Redundancy / Repetition. Breaking up long sentences. Structuring Paragraphs. Paraphrasing Skills – Framing Title and Sub-headings

UNIT –IIREADING SKILLS FOR RESEARCHERS

Reading Academic Texts. Critical Reading Strategies. Skimming and Scanning. Primary Research Article vs. Review Article. Reading an Abstract. Analyzing Research Articles. Identifying Arguments. Classifying Methodologies. Evaluating Findings. Making Notes

UNIT – IIIGRAMMAR REFINEMENT FOR RESEARCH WRITING

Advanced Punctuation Usage. Grammar for Clarity. Complex Sentence Structures. Active- Passive Voice. Subject-Verb Agreement. Proper Use of Modifiers. Avoiding Ambiguous Pronoun References. Verb Tense Consistency. Conditional Sentences

UNIT –IVMASTERY IN REFINING WRITTEN CONTENT/EDITING SKILLS

Effective Revisions. Restructuring Paragraph. Editing vs Proofreading, Editing for Clarity and Coherence. Rectifying Sentence Structure Issues. Proofreading for Grammatical Precision – Spellings. Tips for Correspondence with Editors. Critical and Creative Phases of Writing

UNIT – VTECHNOLOGY AND LANGUAGE FOR RESEARCH

Digital Literacy and Critical Evaluation of Online Content. Technology and Role of AI in Research Writing – Assistance in Generating Citations and References. Plagiarism and Ethical Considerations – Tools and Awareness – Fair Practices

Text Books:

1.Bailey. S. Academic Writing: A Handbook for International Students. London and New York: Routledge,2015.
2. Adrian Wallwork, English for Writing Research Papers, Springer New York Dordrecht Heidelberg London, 2011.

References:

1. Craswell, G. Writing for Academic Success, Sage Publications, 2004.

2. Peter Elbow, Writing With Power, E-book, Oxford University Press, 2007
3. Oshima, A. & Hogue, A. Writing Academic English, Addison-Wesley, New York, 2005
4. Swales, J. & C. Feak, Academic Writing for Graduate Students: Essential Skills and Tasks. Michigan University Press, 2012.
5.Goldbort R.Writing for Science, Yale University Press (available on Google Books), 2006
6. Day R.How to Write and Publish a Scientific Paper, Cambridge University Press, 2006

SRI VENKATESWARA COLLEGE OF ENGINEERING &TECHNOLOGY
(AUTONOMOUS)

I M. Tech-I Semester (CSE)

25BST11	DISASTER MANAGEMENT (Audit Course-I)	L	T	P	C
		2	0	0	0

Course Outcomes:
On successful completion, students will be able to:
1. Define and distinguish between hazards and disasters, and explain their types, nature, and impacts.
2. Identify and map disaster-prone areas in India and understand the epidemiological consequences of disasters.
3. Assess the economic, social, and ecological repercussions of major natural and man-made disasters.
4. Demonstrate knowledge of disaster preparedness tools such as remote sensing, meteorological data, risk evaluation, and community awareness.
5. Apply risk assessment methods and propose disaster risk reduction strategies at local, national, and global levels.
6. Formulate and evaluate structural and non-structural disaster mitigation strategies, with emphasis on Indian programs and emerging trends.

UNIT –IINTRODUCTION
Disaster. Definition, Factors and Significance. Difference Between Hazard and Disaster. Natural and Man-made Disasters. Difference, Nature, Types and Magnitude -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.

UNIT – IIREPERCUSSIONS OF DISASTERS AND HAZARDS
Economic Damage. Loss of Human and Animal Life. Destruction of Ecosystem. Natural Disasters. Earthquakes, Volcanism, Cyclones, Tsunamis, Floods, Droughts and Famines, Landslides and Avalanches, Man-made disaster. Nuclear Reactor Meltdown. Industrial Accidents. Oil Slick sand Spills. Outbreaks of Disease and Epidemics War and Conflicts

UNIT – IIIDISASTER PREPAREDNESS AND MANAGEMENT
Preparedness. Monitoring of Phenomena. Triggering a Disaster Hazard. Evaluation of Risk-Application of Remote Sensing. Data from Meteorological and Other Agencies. Media Reports-Governmental and Community Preparedness

UNIT – IVRISK 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

UNIT - VDISASTER MITIGATION
Meaning, Concept and Strategies of Disaster Mitigation. EmergingTrends in Mitigation. Structural Mitigation and Non- Structural Mitigation. Programs of Disaster Mitigation in India

Text books:
1.Gupta, H. K. Disaster Management. Universities Press, 2003
2.Singh, R. B. Natural Hazards and Disaster Management. Rawat Publications, 2006.

Reference Books:

1.Coppola, D. P. (2020). Introduction to International Disaster Management (4th ed.). Elsevier.
2.Shaw, R., & Izumi, T. (2022). Science and Technology in Disaster Risk Reduction in Asia. Springer.
3.Wisner, B., Gaillard, J. C., & Kelman, I. (2021). Handbook of Hazards and Disaster Risk Reduction and Management (2nd ed.). Routledge.
4.Saini, V. K. (2021). Disaster Management in India: Policy, Issues and Perspectives. Sage India.
5.Kelman, I. Disaster by Choice: How Our Actions Turn Natural Hazards into Catastrophes, Oxford University Press, 2022
6.Sahni, P. & Dhameja, A. Disaster Mitigation: Experiences and Reflections. Prentice Hall of India, 2004.

SRI VENKATESWARA COLLEGE OF ENGINEERING &TECHNOLOGY
(AUTONOMOUS)

I M. Tech-I Semester (CSE)

25BHS03	ESSENCE OF INDIAN TRADITIONAL KNOWLEDGE (Audit Course-I)	L	T	P	C
		2	0	0	0

COURSE OUTCOMES:
At the end of the course, students will be able to
1. Define and explain the concept of traditional knowledge, its nature, characteristics, and scope
2. Understand the need for protecting traditional knowledge and its significance in the global economy
3. Explain the legal framework and policies related to traditional knowledge protection
4. Apply traditional knowledge in different sectors, such as engineering, medicine, agriculture, and biotechnology
5. Analyze the importance of traditional knowledge in various contexts, including its historical impact and social change
6. Analyze the relationship between traditional knowledge and intellectual property rights, including patents and non-IPR mechanisms

UNIT-I
Introduction to traditional knowledge. Definition, Nature and characteristics, scope and importance. Kinds of traditional knowledge. Physical and social contexts in which traditional knowledge develop. Historical impact of social change on traditional knowledge systems. Indigenous Knowledge (IK) – Characteristics. traditional knowledge vis-à-vis indigenous knowledge -Traditional knowledge Vs western knowledge, traditional knowledge vis-à-vis formal knowledge

UNIT-II
Protection of traditional knowledge- Need for protecting traditional knowledge. Significance of TK Protection. Value of TK in global economy. Role of Government to harness TK.

UNIT-III
Legal frame work and TK. A)The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006. Plant Varieties Protection and Farmer's Rights Act, 2001 (PPVFR Act) – B)The Biological Diversity Act 2002 and Rules 2004. the protection of traditional knowledge bill, 2016. Geographical Indicators Act 2003.

UNIT-IV
Traditional knowledge and Intellectual property. Systems of traditional knowledge protection. Legal concepts for the protection of traditional knowledge. Certain non-IPR mechanisms of traditional knowledge protection. Patents and traditional knowledge. Strategies to increase protection of traditional knowledge -Global legal FORA for increasing protection of Indian Traditional Knowledge.

UNIT-V
Traditional knowledge in different sectors. Traditional knowledge and Engineering. Traditional medicine system. TK and Biotechnology. TK in Agriculture. Traditional societies depend on it for their food and healthcare needs. Importance of conservation and sustainable development of environment. Management of biodiversity, Food security of the country and protection of TK

Text Books:
1. Mahadevan, B., Bhat Vinayak Rajat, Nagendra Pavana R.N. *Introduction to Indian Knowledge System: Concepts and Applications*, PHI Learning Pvt.Ltd. Delhi, 2022.

2.Basanta Kumar Mohanta and Vipin Kumar Singh,*Traditional Knowledge System and Technology in India*,PratibhaPrakashan 2012.

References:

1. Pride of India: A Glimpse into India's Scientific Heritage, Samskrita Bharati, New Delhi.
2. Kak, S.C. "On Astronomy in Ancient India", Indian Journal of History of Science, 22(3), 1987
3. Subbarayappa, B.V. and Sarma, K.V. *Indian Astronomy: A Source Book*, Nehru Centre, Mumbai, 1985.
4. Bag, A.K. *History of Technology in India*, Vol. I, Indian National Science Academy, New Delhi, 1997.
5. Acarya, P.K. *Indian Architecture*, MunshiramManoharlal Publishers, New Delhi, 1996.
6. Banerjea, P. *Public Administration in Ancient India*, Macmillan, London, 1961.
7. Kapoor Kapil, Singh Avadhesh,*Indian Knowledge Systems Vol – I & II,* Indian Institute of Advanced Study, Shimla, H.P., 2022

SRI VENKATESWARA COLLEGE OF ENGINEERING &TECHNOLOGY (AUTONOMOUS)

I M. Tech-II Semester (CSE)

		L	T	P	C
25BCS12	**ADVANCES IN SOFTWARE ENGINEERING**	**3**	**0**	**0**	**3**

Course Outcomes (COs):

1. Demonstrate understanding of advanced software process models and project management practices.
2. Apply requirement engineering and advanced modeling techniques to software system design.
3. Develop robust designs using object-oriented, component-based, and aspect-oriented approaches.
4. Evaluate software quality through systematic testing, reviews, and maintenance strategies.
5. Analyze emerging research challenges and apply metrics, configuration management, and agile practices in modern software engineering.

UNIT I: SOFTWARE PROCESS AND PROJECT MANAGEMENT

Software Engineering – A Layered Technology, Process Models: Waterfall, Incremental, Evolutionary, Spiral, Agile Development, Unified Process Framework.

Software Project Management Concepts: Estimation, Scheduling, Risk Analysis, Process Improvement and Capability Maturity (CMMI, ISO Standards).

UNIT II: REQUIREMENTS ENGINEERING AND MODELING

Requirement Engineering Tasks: Inception, Elicitation, Elaboration, Negotiation, Specification, Validation.

System Modeling with UML, Scenario-based, Flow-oriented, Behavioral and Class-based modelling, Design Concepts and Principles, Architectural Design – Styles and Patterns

UNIT III: ADVANCED DESIGN AND DEVELOPMENT CONCEPTS

Component-level Design, Object-Oriented Design using UML, Design Patterns and Frameworks, Aspect-Oriented Software Engineering, Reuse-oriented Software Engineering.

UNIT IV: SOFTWARE QUALITY, TESTING AND MAINTENANCE

Quality Concepts and Quality Assurance, Software Reviews, Formal Technical Reviews, Software Testing Strategies: Unit, Integration, System, Regression Testing, Black-box and White-box Testing, Software Maintenance and Reengineering.

UNIT V: ADVANCED TOPICS AND EMERGING TRENDS

Software Configuration Management (SCM) and Version Control, Software Reliability and Safety Engineering, Agile Software Development and DevOps, Software Metrics and Measurement.

Emerging Areas: AI in Software Engineering, Cloud-based SE, Secure Software Development.

Text Books :

1. Software Engineering A Practitioner's Approach, Roger S. Pressman, 9th Edition McGrawHill International Edition.
2. Fundamentals of Software Engineering, Rajib Mall, Fifth Edition, PHI.

References :

1. Software Engineering, Ian Sommerville, Tenth Edition, Pearson education.
2. Software Engineering : A Primer, Waman S Jawadekar, Tata McGraw-Hill, 2008
3. Software Engineering, A Precise Approach, Pankaj Jalote, Wiley India,2010.
4. Software Engineering, Principles and Practices, Deepak Jain, Oxford University Press.

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I M. Tech-II Semester (CSE)

		L	T	P	C
25BCS13	**ADVANCED DATABASES**	**3**	**0**	**0**	**3**

Course Outcomes (COs):

1. Understand Database system Architectures and parallel databases
2. Analyze transactions, Concurrency Control in Distributed Databases
3. Understand the importance of Data Warehousing and Mining
4. Illustrate concepts of object based databases

Unit I

Database System Architectures Centralized and Client –Server Architectures, Server System Architectures, Parallel Systems, Distributed Systems, Network Types Parallel Databases: Introduction, I/O Parallelism, Interquery Parallelism, Intra Query Parallelism, Intraoperation Parallelism, Interoperation Parallelism, Query Optimization, Design of Parallel Systems, Parallelism on Multicore Processors

Unit II

Distributed Databases Homogeneous and Heterogeneous Databases, Distributed Data Storage, Distributed Transactions, Commit Protocols, Concurrency Control in Distributed Databases, Availability, Distributed Query Processing, Heterogeneous Distributed Databases, Cloud-Based Databases, Directory Systems

Unit III

Data Warehousing and Mining Decision-Support Systems, Data Warehousing, Data Mining, Classification, Association Rules, Other Types of Associations, Clustering, Other Forms of Data Mining

Unit IV

Object-Based Databases Introduction, Complex Data Types, Structured Types and Inheritance in SQL, Table Inheritance, Array and Multiset Types in SQL, Object-Identity and Reference Types in SQL, Implementing O-R Features, Persistent Programming Languages, Object-Relational Mapping, Object-Oriented versus Object-Relational.

Unit V

Motivation, Structure of XML Data, XML Document Schema, Querying and Transformation, Application Program Interfaces to XML, Storage of XML Data, XML Applications

Applications Advanced database models and applications: Active Database Concepts and Triggers, Temporal database concepts, Spatial database concepts, Multimedia database concepts, Deductive databases

TEXT BOOKS:

1. Abraham Silberschatz, Henry F. Korth, S. Sudarshan Database System Concepts, Sixth Edition
2. RamezElmasri, Shamkant B. Navathe, Database systems- Models, Languages, Design and Application Programming

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I M. Tech-II Semester (CSE)

25BCS14	BLOCK CHAIN TECHNOLOGY (Program Elective -III)	L	T	P	C
		3	0	0	3

Course Outcomes:
1. Understanding concepts behind crypto currency
2. Applications of smart contracts in decentralized application development
3. Understand frameworks related to public, private and hybrid blockchain
4. Create blockchain for different application case studies

UNIT-I
Fundamentals of Blockchain: Introduction, Origin of Blockchain, Blockchain Solution, Components of Blockchain, Block in a Blockchain, The Technology and the Future. Blockchain Types and Consensus Mechanism: Introduction, Decentralization and Distribution, Types of Blockchain, Consensus Protocol. Cryptocurrency – Bitcoin, Altcoin and Token: Introduction, Bitcoin and the Cryptocurrency, Cryptocurrency Basics, Types of Cryptocurrencies, Cryptocurrency Usage.

UNIT-II
Public Blockchain System: Introduction, Public Blockchain, Popular Public Blockchains, The Bitcoin Blockchain, Ethereum Blockchain. Smart Contracts: Introduction, Smart Contract, Characteristics of a Smart Contract, Types of Smart Contracts, Types of Oracles, Smart Contracts in Ethereum, Smart Contracts in Industry.

UNIT-III
Private Blockchain System: Introduction, Key Characteristics of Private Blockchain, Why We Need Private Blockchain, Private Blockchain Examples, Private Blockchain and Open Source, E- commerce Site Example, Various Commands (Instructions) in E-commerce Blockchain, Smart Contract in Private Environment, State Machine, Different Algorithms of Permissioned Blockchain, Byzantine Fault, Multichain.
Consortium Blockchain: Introduction, Key Characteristics of Consortium Blockchain, Why We Need Consortium Blockchain, Hyperledger Platform, Overview of Ripple, Overview of Corda. Initial Coin Offering: Introduction, Blockchain Fundraising Methods, Launching an ICO, Investing in an ICO, Pros and Cons of Initial Coin Offering, Successful Initial Coin Offerings, Evolution of ICO, ICO Platforms.

UNIT-IV
Security in Blockchain: Introduction, Security Aspects in Bitcoin, Security and Privacy Challenges of Blockchain in General, Performance and Scalability, Identity Management and Authentication, Regulatory Compliance and Assurance, Safeguarding Blockchain Smart Contract (DApp), Security Aspects in Hyperledger Fabric.
Applications of Blockchain: Introduction, Blockchain in Banking and Finance, Blockchain in Education, Blockchain in Energy, Blockchain in Healthcare, Blockchain in Real-estate, Blockchain In Supply Chain, The Blockchain and IoT. Limitations and Challenges of Blockchain.

UNIT-V
Blockchain Case Studies: Case Study 1 – Retail, Case Study 2 – Banking and Financial Services, Case Study 3 – Healthcare, Case Study 4 – Energy and Utilities.
Blockchain Platform using Python: Introduction, Learn How to Use Python Online Editor, Basic Programming Using Python, Python Packages for Blockchain.

Blockchain platform using Hyperledger Fabric: Introduction, Components of Hyperledger Fabric Network, Chain codes from Developer.ibm.com, Blockchain Application Using Fabric Java SDK.

Text Books:

1. “Blockchain Technology”, Chandramouli Subramanian, Asha A.George, Abhilasj K A and MeenaKarthikeyan , Universities Press.

Reference Books:

1. Michael Juntao Yuan, Building Blockchain Apps, Pearson, India.
2. Blockchain Blueprint for Economy, Melanie Swan, SPD O'reilly.
3. Blockchain for Business, Jai Singh Arun, Jerry Cuomo, Nitin Gaur, Pearson.

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I M. Tech-II Semester (CSE)

		L	T	P	C
25BCS15	**Advanced Computer Networks (Program Elective -III)**	**3**	**0**	**0**	**3**

Course Outcomes:
1. Understanding of holistic approach to computer networking
2. Ability to understand the computer network protocols and their applications
3. Ability to design simulation concepts related to packet forwarding in networks.

UNIT – I
Data-link protocols: Ethernet, Token Ring and Wireless (802.11). Wireless Networks and Mobile IP: Infrastructure of Wireless Networks, Wireless LAN Technologies, IEEE 802.11 Wireless Standard, Cellular Networks, Mobile IP, Wireless Mesh Networks (WMNs), Multiple access schemes Routing and Internetworking: Network–Layer Routing, Least-Cost-Path algorithms, Non-Least-Cost-Path algorithms, Intra-domain Routing Protocols, Inter-domain Routing Protocols, Congestion Control at Network Layer.

UNIT - II
Transport and Application Layer Protocols: Client-Server and Peer-To-Peer Application Communication, Protocols on the transport layer, reliable communication. Routing packets through a LAN and WAN. Transport Layer, Transmission Control Protocol (TCP), User Datagram Protocol (UDP), Mobile Transport Protocols, TCP Congestion Control. Principles of Network Applications.

UNIT- III
The Web and HTTP, File Transfer: FTP, Electronic Mail in the Internet, Domain Name System (DNS), P2P File Sharing, Socket Programming with TCP and UDP, building a Simple Web Server Creating simulated networks and passing packets through them using different routing techniques. Installing and using network monitoring tools.

UNIT - IV
Wireless and Mobile Networks: Introduction, Wireless links and Network Characteristics - CDMA, Wifi: 802.11 Wireless LANS, Cellular internet access, Mobility management: Principles

UNIT - V
Multimedia networking: Multimedia networking applications, streaming stored video, Voice-over-IP, Protocols for real-time conversational applications.

TEXT BOOKS:
1. Computer Networking: A Top-Down Approach, James F. Kuros and Keith W. Ross, Pearson, 6th Edition, 2012.
2. Computer Networks and Internets, Duglas E. Comer, 6th Edition, Pearson.

REFERENCES:
1. A Practical Guide to Advanced Networking, Jeffrey S. Beasley and PiyasatNilkaew, Pearson, 3rd Edition, 2012
2. Computer Networks, Andrew S. Tanenbaum, David J. Wetherall, Prentice Hall.

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I M. Tech-II Semester (CSE)

		L	T	P	C
25BCS16	**DEEP LEARNING AND APPLICATIONS (PROGRAM ELECTIVE -III)**	**3**	**0**	**0**	**3**

Course Outcomes:

1. Implement deep learning algorithms, understand neural networks and traverse the layers of data 2. Learn topics such as convolutional neural networks, recurrent neural networks, training deep networks and high-level interfaces
3. Understand applications of Deep Learning to Computer Vision
4. Understand and analyze Applications of Deep Learning to NLP

UNIT - I

Introduction: Feed forward Neural networks, Gradient descent and the back propagation algorithm, Unit saturation, the vanishing gradient problem, and ways to mitigate it. RelU Heuristics for avoiding bad local minima, Heuristics for faster training, Nestors accelerated gradient descent, Regularization, Dropout

UNIT - II

Convolutional Neural Networks: Architectures, convolution/pooling layers, Recurrent Neural Networks: LSTM, GRU, Encoder Decoder architectures. Deep Unsupervised Learning: Auto encoders, Variational Auto-encoders, Adversarial Generative Networks, Auto-encoder and DBM Attention and memory models, Dynamic Memory Models

UNIT - III

Applications of Deep Learning to Computer Vision: Image segmentation, object detection, automatic image captioning, Image generation with Generative adversarial networks, video to text with LSTM models, Attention Models for computer vision tasks

UNIT -IV

Applications of Deep Learning to NLP: Introduction to NLP and Vector Space Model of Semantics, Word Vector Representations: Continuous Skip-Gram Model, Continuous Bag-of-Words model (CBOW), Glove, Evaluations and Applications in word similarity.

UNIT -V

Analogy reasoning: Named Entity Recognition, Opinion Mining using Recurrent Neural Networks: Parsing and Sentiment Analysis using Recursive Neural Networks: Sentence Classification using Convolutional Neural Networks, Dialogue Generation with LSTMs

Text Books:

1. Deep Learning by Ian Goodfellow, YoshuaBengio and Aaron Courville, MIT Press.
2. The Elements of Statistical Learning by T. Hastie, R. Tibshirani, and J. Friedman, Springer.
3. Probabilistic Graphical Models. Koller, and N. Friedman, MIT Press.

References:

1. Bishop, C, M., Pattern Recognition and Machine Learning, Springer, 2006.
2. Yegnanarayana, B., Artificial Neural Networks PHI Learning Pvt. Ltd, 2009.
3. Golub, G.,H., and Van Loan, C.,F., Matrix Computations, JHU Press,2013.
4. Satish Kumar, Neural Networks: A Classroom Approach, Tata McGraw-Hill Education, 2004.

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I M. Tech-II Semester (CSE)

25BCS17	**GENERATIVE AI (PROGRAM ELECTIVE - IV)**	**L**	**T**	**P**	**C**
		3	**0**	**0**	**3**

Course Outcomes:

1. Demonstrate knowledge of AI foundations, generative models, and advanced neural architectures.
2. Apply generative AI techniques to create solutions for text, image, video, and multimodal tasks.
3. Design, fine-tune, and optimize Large Language Models for specific applications.
4. Evaluate ethical, social, and legal implications of Generative AI deployments and propose mitigation strategies.

UNIT 1 - Foundations of AI and Generative Models

Introduction and historical evolution to Artificial Intelligence (AI), Machine Learning (ML), Natural Language Processing (NLP)and Deep Learning (DL), Structure of Artificial Neural Networks (ANNs), Mathematical and computational foundations of generative modeling, Overview of generative models and their applications across various domains; Importance of Generative AI in modern applications, Transfer learning and in advancing Generative AI

UNIT 2 - Advanced Neural Architectures for Generative AI

VariationalAutoencoders (VAEs): principles and applications, Generative Adversarial Networks (GANs): architecture and working principles; Transformer architecture and attention mechanisms (in detail); Long Short-Term Memory Networks (LSTMs) and the limitations of traditional RNNs/LSTMs, Advanced Transformer architectures and techniques, Pre-training and transfer learning strategies for generative models.

UNIT 3 - Large Language Models and Prompt Engineering

Overview of Large Language Models (LLMs), GPT architecture, variants, and working principles, Pretraining and fine-tuning GPT models for applications (e.g., chatbots, text generation), Case study: GPT-based customer support chatbot, BERT architecture, pre-training objectives, and fine-tuning, Prompt Engineering: Designing effective prompts, controlling model behavior, and improving output quality, Fine-tuning language models for creative writing and chatbot development.

UNIT 4 - Multi-Agent Systems and Generative AI Applications

Introduction to Multi-Agent Systems (MAS),Types of agents: reactive, deliberative, hybrid, and learning agents, Multi-agent collaboration and orchestration for generative tasks, Use cases: autonomous research assistants, cooperative creative generation, distributed problem-solving, Frameworks and tools: AutoGen, CrewAI, Hugging GPT for LLM-powered multi-agent systems, Generative AI applications: Art, Creativity, Image/Video generation, Music composition, Healthcare, Finance, Real-world case studies and deployment challenges

UNIT 5 – Frameworks

Multimodal Applications, and Ethics Long Chain framework Components and LLM application development, Retrieval-Augmented Generation (RAG), Embeddings, Indexing networks, and Vector databases, Generative AI across modalities: Text, Code, Image, and Video generation, Image and Video generation using GANs and VAEs, Multimodal Generative AI: integration and training strategies, Ethical considerations: bias, fairness, trust, and responsible AI deployment, Social and legal implications of Generative AI, Risk mitigation strategies and real-world ethical case studies

Text Books:

1. AltafRehmani, Generative AI for Everyone: Understanding the Essentials and Applications of This Breakthrough Technology.
2. Charu C. Aggarwal, Neural Networks and Deep Learning: A Textbook. Joseph Babcock, Raghav Bali, Generative AI with Python and TensorFlow 2, 2024.

Reference Books:

1. Josh Kalin, Generative Adversarial Networks Cookbook.
2. Jesse Sprinter, Generative AI in Software Development: Beyond the Limitations of Traditional Coding, 2024.

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I M. Tech-II Semester (CSE)

25BCS18	**DIGITAL FORENSICS (PROGRAM ELECTIVE - IV)**	**L**	**T**	**P**	**C**
		3	**0**	**0**	**3**

Course Outcomes:
On completion of the course the student should be able to
1. Understand relevant legislation and codes of ethics.
2. Computer forensics and digital detective and various processes, policies and procedures.
3. E-discovery, guidelines and standards, E-evidence, tools and environment.
4. Email and web forensics and network forensics.

UNIT - I
Digital Forensics Science: Forensics science, computer forensics, and digital forensics. Computer Crime: Criminalistics as it relates to the investigative process, analysis of cyber criminalistics area, holistic approach to cyber-forensics

UNIT - II
Cyber Crime Scene Analysis: Discuss the various court orders etc., methods to search and seizure electronic evidence, retrieved and un-retrieved communications, Discuss the importance of understanding what court documents would be required for a criminal investigation.

UNIT - III
Evidence Management & Presentation: Create and manage shared folders using operating system, importance of the forensic mindset, define the workload of law enforcement, explain what the normal case would look like, define who should be notified of a crime, parts of gathering evidence, Define and apply probable cause.

UNIT - IV
Computer Forensics: Prepare a case, begin an investigation, understand computer forensics workstations and software, conduct an investigation, complete a case, Critique a case, Network Forensics: open-source security tools for network forensic analysis, requirements for preservation of network data.

UNIT - V
Mobile Forensics: mobile forensics techniques, mobile forensics tools. Legal Aspects of Digital Forensics: IT Act 2000, amendment of IT Act 2008. Recent trends in mobile forensic technique and methods to search and seizure electronic evidence

Text Books:
1. John Sammons, The Basics of Digital Forensics, Elsevier
2. John Vacca, Computer Forensics: Computer Crime Scene Investigation, Laxmi Publications

References:
1. William Oettinger, Learn Computer Forensics: A beginner's guide to searching, analyzing, and securing digital evidence, Packt Publishing; 1st edition (30 April 2020), ISBN : 1838648178.
2. Thomas J. Holt, Adam M. Bossler, Kathryn C. Seigfried-Spellar, Cybercrime and Digital Forensics: An Introduction, Routledge.

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I M. Tech-II Semester (CSE)

25BCS19	**ROBOTIC PROCESS AUTOMATION (PROGRAMELECTIVE - IV)**	**L**	**T**	**P**	**C**
		3	**0**	**0**	**3**

Course Outcomes:

1. Describe RPA, where it can be applied and how it's implemented.
2. Identify and understand Web Control Room and Client Introduction
3. Understand how to handle various devices and the workload
4. Understand Bot creators, Web recorders and task editors

UNIT I

Introduction to Robotic Process Automation & Bot Creation Introduction to RPA and Use cases – Automation Anywhere Enterprise Platform – Advanced features and capabilities – Ways to create Bots

UNIT II

Web Control Room and Client Introduction - Features Panel - Dashboard (Home, Bots, Devices, Audit, Workload, Insights) - Features Panel – Activity (View Tasks in Progress and Scheduled Tasks) - Bots (View Bots Uploaded and Credentials)

UNIT III

Devices (View Development and Runtime Clients and Device Pools) - Workload (Queues and SLA Calculator) - Audit Log (View Activities Logged which are associated with Web CR) - Administration (Configure Settings, Users, Roles, License and Migration) - Demo of Exposed API's – Conclusion – Client introduction and Conclusion.

UNIT IV

Bot Creator Introduction – Recorders – Smart Recorders – Web Recorders – Screen Recorders - Task Editor – Variables - Command Library – Loop Command – Excel Command – Database Command - String Operation Command - XML Command

UNIT V

Terminal Emulator Command - PDF Integration Command - FTP Command - PGP Command - Object Cloning Command - Error Handling Command - Manage Windows Control Command - Workflow Designer - Report Designer

Text Books:

1. Learning Robotic Process Automation: Create Software robots and automate business processes with the leading RPA tool - UiPath: Create Software robots. with the leading RPA tool – UiPath Kindle Edition.

References:

1. Robotic Process Automation A Complete Guide - 2020 Edition Kindle Edition.

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I M. Tech-II Semester (CSE)

25BCS20	**ADVANCES IN SOFTWARE ENGINEERING LAB**	**L**	**T**	**P**	**C**
		0	**0**	**4**	**2**

Course Outcomes:

1. Apply various software process models and project management techniques (estimation, scheduling, risk management) to plan and manage software development effectively.
2. Perform requirements elicitation, documentation, and system modeling using UML to capture, analyze, and validate software requirements.
3. Design software systems using object-oriented principles, design patterns, and component-based approaches for modularity, reusability, and maintainability.
4. Implement software testing strategies, maintenance techniques, and reengineering practices to ensure software quality, reliability, and evolution.
5. Utilize modern software engineering tools and practices such as version control, DevOps pipelines, software metrics, and AI-based analysis to enhance development efficiency and quality assurance.

Experiment 1: Comparative Study of Process Models
Implement a simple project using **Waterfall** and **Incremental models**; compare effort, defects, and time taken.

Experiment 2: Agile Development Simulation
Develop a small software system using **Scrum methodology** with sprints, product backlog, sprint backlog, and daily scrums.

Experiment 3: Project Estimation and Scheduling
Perform **Function Point Analysis (FPA)** or **Use Case Points (UCP)** to estimate size and effort, then prepare a Gantt chart and PERT chart.

Experiment 4: Risk Analysis in Software Projects
Conduct risk identification, qualitative/quantitative assessment, and develop a **risk mitigation plan** for a given case study.

Experiment 5: Requirement Elicitation and SRS Document
Conduct requirement gathering for a mini-project and prepare a **Software Requirement Specification (SRS)** document.

Experiment 6: UML Modelling (Scenario-based & Structural)
Create **Use Case diagrams, Activity diagrams, and Sequence diagrams** for a given problem domain.

Experiment 7: UML Modelling (Class &Behavioural)
Create **Class diagrams, State machine diagrams, and Component diagrams** to represent system architecture.

Experiment 8: Object-Oriented Design Using UML
Design a software module using **OO principles** (encapsulation, inheritance, polymorphism) and illustrate with UML diagrams.

Experiment 9: Design Patterns Implementation
Implement **at least three design patterns** (e.g., Singleton, Factory, Observer) in Java/Python.

Experiment 10: Reuse-Oriented Software Engineering
Use existing **open-source libraries/frameworks** to develop a component-based application (e.g., web app using Django/Flask).

Experiment 11: Black-box and White-box Testing
Perform **equivalence partitioning and boundary value analysis** (black-box) and **basis path testing** (white-box) for a given program.

Experiment 12: Software Maintenance and Reengineering
Take an **existing open-source project** (small module), analyze it, and perform **refactoring/reengineering** for improvement.

Experiment 13: Version Control and DevOps Pipeline
Use **Git & GitHub/GitLab** for version control and demonstrate **CI/CD pipeline** setup with Jenkins/GitHub Actions.

Experiment 14: Software Metrics and AI in SE
Compute **software metrics** (complexity, coupling, cohesion) for a given project and explore an **AI tool** (e.g., GitHub Copilot, SonarQube) for software quality analysis.

Text Books :
1. Software Engineering A Practitioner's Approach, Roger S. Pressman, 9th Edition McGrawHill International Edition.
2. Fundamentals of Software Engineering, Rajib Mall, Fifth Edition, PHI.

Reference Books :
1. Software Engineering, Ian Sommerville, Tenth Edition, Pearson education.
2. Software Engineering : A Primer, Waman S Jawadekar, Tata McGraw-Hill, 2008
3. Software Engineering, A Precise Approach, Pankaj Jalote, Wiley India,2010.
4. Software Engineering, Principles and Practices, Deepak Jain, Oxford University Press.

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I M. Tech-II Semester (CSE)

25BCS21	**ADVANCED DATABASES LAB**	**L**	**T**	**P**	**C**
		0	**0**	**4**	**2**

Course Outcomes:

1. Understand Database system Architectures and parallel databases
2. Analyze transactions, Concurrency Control in Distributed Databases
3. Understand the importance of Data Warehousing and Mining
4. Illustrate concepts of object based databases

List of Experiments

1. Write a program to implement RDBMS - Cursors, Triggers
2. Write a Program to implement Range Partitioning sort.
3. Write a program to implement parallel hash join
4. Write a program to implement parallel nested join loop
5. Write a program to implement parallelize duplicate elimination by partitioning the tuples
6. Perform data fragmentation of distributed data(Horizontal, Vertical, Hybrid fragmentation)
7. Implement deadlock detection in distributed databases
8. Implement Semi Join algorithm.
9. DataCube Implementation - Aggregation
10. Perform data Integration - Extraction, Transformation, Loading
11. Implement any one classifier
12. Implement vector space models for Text corpus
13. Demonstrate type inheritance, table inheritance in object based databases
14. Write queries in XQueries on DTD
15. Write queries in SQL/XML to convert University data - XML Schema

TEXT BOOKS:

1. Abraham Silberschatz, Henry F. Korth, S. Sudarshan Database System Concepts, Sixth Edition
2. RamezElmasri, Shamkant B. Navathe, Database systems- Models, Languages, Design and Application Programming.

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I M. Tech-II Semester (CSE)

		L	T	P	C
25BCS22	**QUANTUM TECHNOLOGIES AND APPLICATIONS**	**2**	**0**	**0**	**2**

Course Outcomes (CO):

C01: Explain core quantum principles in a non-mathematical manner.
C02: Compare classical and quantum information systems.
CO3: Identify theoretical issues in building quantum computers.
C04: Discuss quantum communication and computing concepts.
CO5: Recognize applications, industry trends, and career paths in quantum technology.

Unit 1: Introduction to Quantum Theory and Technologies

The transition from classical to quantum physics, Fundamental principles explained conceptually: Superposition, Entanglement, Uncertainty Principle, Wave-particle duality, Classical vs Quantum mechanics – theoretical comparison,Quantum states and measurement: nature of observation,Overview of quantum systems: electrons, photons, atoms,The concept of quantization: discrete energy levels,Why quantum? Strategic, scientific, and technological significance,A snapshot of quantum technologies: Computing, Communication, and Sensing,National and global quantum missions: India's Quantum Mission, EU, USA, China

Unit 2: Theoretical Structure of Quantum Information Systems

What is a qubit? Conceptual understanding using spin and polarization, Comparison: classical bits vs quantum bits, Quantum systems: trapped ions, superconducting circuits, photons (non-engineering view),Quantum coherence and decoherence – intuitive explanation, Theoretical concepts: Hilbert spaces, quantum states, operators – only interpreted in abstract,The role of entanglement and non-locality in systems, Quantum information vs classical information: principles and differences,Philosophical implications: randomness, determinism, and observer role

Unit 3: Building a Quantum Computer – Theoretical Challenges and Requirements

What is required to build a quantum computer (conceptual overview)?,Fragility of quantum systems: decoherence, noise, and control, Conditions for a functional quantum system: Isolation, Error management, Scalability, Stability, Theoretical barriers:

Why maintaining entanglement is difficult,Error correction as a theoretical necessity, Quantum hardware platforms (brief conceptual comparison),Superconducting circuits, Trapped ions, Photonics, Visionvs reality: what's working and what remains elusive,The role of quantum software in managing theoretical complexities

Unit 4: Quantum Communication and Computing – Theoretical Perspective

Quantum vs Classical Information, Basics of Quantum Communication, Quantum Key Distribution (QKD),Role of Entanglement in Communication,The Idea of the Quantum Internet – Secure Global Networking,Introduction to Quantum Computing,Quantum Parallelism (Many States at Once),Classical vs Quantum Gates, Challenges: Decoherence and Error Correction,Real-World Importance and Future Potential

Unit 5: Applications, Use Cases, and the Quantum Future

Real-world application domains: Healthcare (drug discovery),Material science, Logistics and optimization, Quantum sensing and precision timing, Industrial case studies: IBM, Google, Microsoft, PsiQuantum,Ethical, societal, and policy considerations, Challenges to adoption: cost, skills, standardization,Emerging careers in quantum: roles, skillsets, and preparation pathways,Educational and research landscape – India's opportunity in the global quantum race

Textbooks**:**

1. Michael A. Nielsen, Isaac L. Chuang, *Quantum Computation and Quantum Information*, Cambridge University Press, 10th Anniversary Edition, 2010.
2. Eleanor Rieffel and Wolfgang Polak, *Quantum Computing: A Gentle Introduction*, MIT Press, 2011.
3. Chris Bernhardt, *Quantum Computing for Everyone*, MIT Press, 2019.

Reference Books**:**

1. David McMahon, *Quantum Computing Explained*, Wiley, 2008.
2. Phillip Kaye, Raymond Laflamme, Michele Mosca, *An Introduction to Quantum Computing*, Oxford University Press, 2007.
3. Scott Aaronson, *Quantum Computing Since Democritus*, Cambridge University Press, 2013.
4. **Alastair I.M. Rae**, *Quantum Physics: A Beginner's Guide*, Oneworld Publications, Revised Edition, 2005.
5. **Eleanor G. Rieffel, Wolfgang H. Polak**, *Quantum Computing: A Gentle Introduction*, MIT Press, 2011.
6. **Leonard Susskind, Art Friedman**, *Quantum Mechanics: The Theoretical Minimum*, Basic Books, 2014.
7. **Bruce Rosenblum, Fred Kuttner**, *Quantum Enigma: Physics Encounters Consciousness*, Oxford University Press, 2nd Edition, 2011.
8. **GiulianoBenenti, GiulioCasati, GiulianoStrini**, *Principles of Quantum Computation and Information, Volume I: Basic Concepts*, World Scientific Publishing, 2004.
9. **K.B. Whaley et al.**, *Quantum Technologies and Industrial Applications: European Roadmap and Strategy Document*, Quantum Flagship, European Commission, 2020.
10. **Department of Science & Technology (DST), Government of India**, *National Mission on Quantum Technologies & Applications – Official Reports and Whitepapers*, MeitY/DST Publications, 2020 onward.

Online Learning Resources**:**

- IBM Quantum Experience and Qiskit Tutorials
- Coursera – Quantum Mechanics and Quantum Computation by UC Berkeley
- edX – The Quantum Internet and Quantum Computers
- YouTube – Quantum Computing for the Determined by Michael Nielsen
- Qiskit Textbook – IBM Quantum

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I M. Tech-II Semester (CSE)

25BCS23	**COMPREHENSIVE VIVA VOCE**	**L**	**T**	**P**	**C**
		0	**0**	**0**	**2**

Course Outcomes:

SRI VENKATESWARA COLLEGE OF ENGINEERING &TECHNOLOGY (AUTONOMOUS)

II M. Tech-III Semester (CSE)

		L	T	P	C
25BMB02	**PEDAGOGY STUDIES**	**2**	**0**	**0**	**0**

Course Outcomes (CO): After completion of the course, the student will be able to

CO1. Understand the conceptual framework, policy context, and methodological foundations of research in pedagogy and teacher education.

CO2. Analyze pedagogical practices in formal and informal learning environments in developing countries, with emphasis on curriculum and teacher education.

CO3. Evaluate the effectiveness of pedagogical strategies and teacher education programs based on empirical evidence and theoretical models.

CO4. Examine the role of professional development, peer and community support, and classroom alignment in enhancing teaching practices and student learning outcomes.

CO5. Identify research gaps and propose future directions in pedagogy, curriculum, teacher training, and assessment practices to inform educational improvement.

UNIT-I

Introduction and Methodology: Aims and rationale, Policy back ground, Conceptual frame work and terminology Theories oflearning,Curriculum,Teachereducation.Conceptualframework,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 theeffectivenessofpedagogicalpractices,Methodologyforthein-depth stage:quality assessment of included studies. How can teacher education (curriculumandpracticum) andthescho 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 teacherandthecommunity.Curriculumandassessment,Barrierstolearning:limitedresourcesand large class.

UNIT-V

Researchgapsandfuturedirections:Researchdesign,Contexts,Pedagogy,Teachereducation, Curriculum and assessment, Dissemination and research impact.

References:

1. Ackers J,Hardman F (2001) Classroom interaction in Kenyan primary schools, Compare,31 (2): 245-261.
2. Agrawal M (2004) Curricular reform in schools: The importance of evaluation, Journal ofCurriculum Studies, 36 (3): 361-379.

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

SRI VENKATESWARA COLLEGE OF ENGINEERING &TECHNOLOGY
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II M. Tech-III Semester (CSE)

		L	T	P	C
25BHS06	**STRESS MANAGEMENT FOR YOGA**	**2**	**0**	**0**	**0**

Course Outcomes (CO): After completion of the course, the student will be able to

CO1. Explain the eight limbs (Ashtanga) of yoga and their significance in leading a balanced life.

CO2. Describe the principles of Yam and Niyam and their role in ethical living and personal discipline.

CO3. Apply moral values such as ahimsa, satya, and santosh in daily life for self-regulation and personal growth.

CO4. Demonstrate proficiency in basic asanas and pranayama techniques for physical and mental well-being.

CO5. Evaluate the benefits of various yoga poses and breathing techniques, and their impact on mind-body wellness.

UNIT-I

Definitions of Eight parts of yoga.(Ashtanga).

UNIT-II

Yam and Niyam.

UNIT-III

Do`sand Don't'sin life.

i) Ahinsa,satya,astheya,bramhacharyaand aparigrahaii) Shaucha,santosh,tapa,swadhyay,ishwarpranidhan.

UNIT-IV

Asan and Pranayam.

UNIT-V

i) Variousyoga posesand theirbenefitsformind &body

ii) Regularizationofbreathingtechniques and its effects-Types ofpranayam.

References:

1. Yogic Asanas forGroupTraining-Part-I": Janardan SwamiYogabhyasiMandal, Nagpur.
2. "Rajayogaor conquering the Internal Nature" by Swami Vivekananda, AdvaitaAshrama (Publication Department), Kolkata.

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II M. Tech-III Semester (CSE)

25BHS07	PERSONALITY DEVELOPMENT THROUGH LIFE ENLIGHTENMENT SKILLS	L	T	P	C
		2	0	0	0

Course Outcomes (CO): After completion of the course, the student will be able to

CO1. Interpret key verses from Neetisatakam that emphasize wisdom, virtue, pride, and heroism for holistic personality development.
CO2. Differentiate between ethical do's and don'ts based on selected Neetisatakam verses to cultivate moral behavior and disciplined living.
CO3. Apply teachings from the Bhagavad Gita to effectively approach daily duties and responsibilities with clarity and dedication.
CO4. Analyze Gita's philosophical insights to understand human behavior, emotional stability, and the characteristics of a role model.
CO5. Evaluate foundational knowledge from selected Gita verses to build mental resilience, ethical judgment, and spiritual insight.

UNIT-I

Neetisatakam-Holisticdevelopmentofpersonality
Verses-19,20,21,22(wisdom)
Verses-29,31,32(pride&heroism)
Verses-26,28,63,65(virtue)

UNIT-II

Neetisatakam- 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.
ShrimadBhagwadGeeta: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.
ShrimadBhagwadGeeta:Chapter2-Verses 56,62,68
Chapter12 -Verses13,14,15,16,17,18
Personality of Rolemodel.

UNIT-V

Shrimad Bhagwad Geeta: Chapter2-Verses 17,
Chapter3-Verses36,37,42, Chapter4-Verses18,38,39
Chapter18– Verses37,38,63.

References:

1. SrimadBhagavadGita"bySwamiSwarupanandaAdvaitaAshram(PublicationDepartment), Kolkata.
2. Bhartrihari'sThree Satakam (Niti-sringar-vairagya) by P.Gopinath, RashtriyaSanskrit Sansthanam, New Delh

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II M. Tech-III Semester (CSE)

25BCS24	**SOFTWARE DEFINED NETWORKS (PROGRAM ELECTIVE – V)**	**L**	**T**	**P**	**C**
		3	**0**	**0**	**3**

Course Outcomes:

- Analyze the implications of SDN for research and innovation data centers.
- Brief the OpenFlow basics and optical transport protocols.
- Develop the tunneling and path technologies for real world data center.
- Implementation of the access control for the campus and traffic engineering for service providers. Simulation and testing of SDN in open-source cloud software.
- Implementation of switch and controller in SDN applications

UNIT-I

Introduction: Evolution of Switches and Control Planes, SDN Implications for Research and Innovation, Data Center Innovation, Data Center Needs. The Evolution of Networking Technology, Forerunners of SDN, Legacy Mechanisms Evolve Toward SDN, Software Defined Networking Is Born,Sustaining SDN Interoperability, Open Source Contributions, Network Virtualization

UNIT-II

Fundamental Characteristics of SDN, SDN Operation, SDN Devices, SDN Controller, SDN Applications, Alternate SDN Method. The OpenFlow Specification, OpenFlow Overview, OpenFlow 1.0 and OpenFlow Basics, OpenFlow 1.0 to 1.5, Improving OpenFlow Interoperability, Optical Transport Protocol Extensions, OpenFlow Limitations.

UNIT-III

Alternative Definitions of SDN: Potential Drawbacks of Open SDN, SDN via APIs, SDN via Hypervisor-Based Overlays, SDN via Opening Up the Device, Network Functions Virtualization and Alternatives Overlap and Ranking.

UNIT-IV

SDN in the Data Center: Data Center Demands, Tunnelling Technologies for the Data Center, Path Technologies in the Data Center, Ethernet Fabrics in the Data Center, SDN Use Cases in the Data Center, Comparison of Open SDN, Overlays, and APIs, Real-World Data Center Implementations

UNIT-V

SDN Applications: Application Types, A Brief History of SDN Controllers, Using Floodlight for Training Purposes, A Simple Reactive Java Application, Controller Considerations, Network Device Considerations,12.9. Creating Network Virtualization Tunnels, Offloading Flows in the Data Center, Access Control for the Campus, Traffic Engineering for Service Providers

Text Books:

1. Software Defined Networks: A Comprehensive Approach by Paul Goransson and Chuck Black, Morgan Kaufmann Publications, 2014 .

Reference :

1. SDN - Software Defined Networks by Thomas D. Nadeau & Ken Gray, O'Reilly, 2013
2. Software Defined Networking with OpenFlowBySiamakAzodolmolky, Packt Publishing, 2013

SRI VENKATESWARA COLLEGE OF ENGINEERING &TECHNOLOGY (AUTONOMOUS)

II M. Tech-III Semester (CSE)

25BCS25	**REINFORCEMENT LEARNING (PROGRAM ELECTIVE – V)**	**L**	**T**	**P**	**C**
		3	**0**	**0**	**3**

Course Outcomes

1. Understand basics of RL
2. Understand RL Framework and Markov Decision Process
3. Analyzingning through the use of Dynamic Programming and Monte Carlo
4. Understand TD(0) algorithm, TD(λ) algorithm

Unit I

Basics of probability and linear algebra, Definition of a stochastic multi-armed bandit, Definition of regret, Achieving sublinear regret, UCB algorithm, KL-UCB, Thompson Sampling.

Unit II

Markov Decision Problem, policy, and value function, Reward models (infinite discounted, total, finite horizon, and average), Episodic & continuing tasks, Bellman's optimality operator, and Value iteration & policy iteration

Unit III

The Reinforcement Learning problem, prediction and control problems, Model-based algorithm, Monte Carlo methods for prediction, and Online implementation of Monte Carlo policy evaluation

Unit IV

Bootstrapping; TD(0) algorithm; Convergence of Monte Carlo and batch TD(0) algorithms; Model-free control: Q-learning, Sarsa, Expected Sarsa.

Unit V

n-step returns; TD(λ) algorithm; Need for generalization in practice; Linear function approximation and geometric view; Linear TD(λ). Tile coding; Control with function approximation; Policy search; Policy gradient methods; Experience replay; Fitted Q Iteration; Case studies.

TEXT BOOKS:

1. "Reinforcement learning: An introduction," First Edition, Sutton, Richard S., and Andrew G. Barto, MIT press 2020
2. "Statistical reinforcement learning: modern machine learning approaches," First Edition, Sugiyama, Masashi. CRC Press 2015

REFERENCES:

1. "Bandit algorithms," First Edition, Lattimore, T. and C. Szepesvári. Cambridge University Press. 2020
2. "Reinforcement Learning Algorithms: Analysis and Applications," Boris Belousov, Hany Abdulsamad, Pascal Klink, Simone Parisi, and Jan Peters First Edition, Springer 2021
3. Alexander Zai and Brandon Brown "Deep Reinforcement Learning in Action," First Edition, Manning Publications 2020

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II M. Tech-III Semester (CSE)

25BCS26	**DATA SCIENCE (PROGRAM ELECTIVE – V)**	**L**	**T**	**P**	**C**
		3	**0**	**0**	**3**

Course Objectives:
● To understand about Data Science
● To understand big data, to learn the analytics of Big Data how data is stored and processed in Hadoop
● To learn about Machine Learning Algorithms
● To learn model evaluation and how data is analyzed using R features .

UNIT I
Introduction to Data, Data Science, Data Process: Introduction to Data Science and data science process – Evolution of Data Science – Data Science Roles – Stages in a Data Science Project – Applications of Data Science in various fields ,data science profile , Types of Digital data: Classification of Digital Data, Introduction to Big Data: What is big data, Evolution of Big Data, Traditional Business Intelligence vs Big Data, Coexistence of Big Data and Data Warehouse.
UNIT II
Data Collection and Data Preprocessing: Processing data with hadoop, interfacing with hadoop ecosystem. Hadoop: Features of Hadoop, Key advantages of hadoop, versions of hadoop, overview of hadoop ecosystem, Hadoop distributions. Why hadoop? RDBMS vs Hadoop, Distribution computing challenges, History of hadoop, Hadoop overview,HDFS NoSQL: Where it is used? What is it? Types of NoSQL Databases, Why NoSQL? Advantages of NoSQL, What we miss with NoSQL? Use of NoSQL in industry,SQL vs NoSQL.
UNIT III
Exploratory Data Analytics: Descriptive Statistics – Mean, Standard Deviation, dispersion, Skewness and Kurtosis , statistical-interference-Correlation Statistics – ANOVA.
UNIT IV
Algorithms/Model Development: Basic machine learning algorithms, Simple and Multiple Regression – naivebayes, k-.means ,KNN ,decision tree, random forest, LDA ,Prediction and Decision Making, Evaluation Metrics – Cross Validation – Overfitting.
UNIT V
Data Visualization: using R, What is R? Why use R for analytics? How to run R? First R example, functions a short programming example, some important R data structures, vectors, matrices, lists, R programming structures, Charts, pie –charst, Barchart, boxplots, scatterplots ,linechart, Histograms, scatterplots ,Box plot.
TEXT BOOKS:
1. BIG DATA and ANALYTICS, Seema Acharya, SubhashiniChellappan, Wiley Publications. 2. Cathy O'Neil and Rachel Schutt , "Doing Data Science", O'Reilly, 2015.

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II M. Tech-III Semester (CSE)

		L	T	P	C
25BCM29	**INDUSTRIAL SAFETY**	**3**	**0**	**0**	**3**

CO1: Tolistoutimportantlegislationsrelatedtohealth,SafetyandEnvironment.
CO2: Tolistoutrequirementsmentionedinfactoriesactfor thepreventionofaccidents.
CO3: Tounderstandthehealthandwelfareprovisionsgiveninfactories act.

UNIT - I

Industrial safety: Accident, causes, types, results and control, mechanical and electrical hazards, types, causes and preventivesteps/procedure, describesalient 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 applicationsoftoolsusedfor maintenance, Maintenancecost&itsrelationwithreplacement economy, Service lifeofequipment.

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.Pressuregreasegun,iii.Splashlubrication,iv.Gravitylubrication,v.Wickfeedlubricationvi.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.Electricalmotors,Typesoffaultsinmachine tools andtheirgeneralcauses.

UNIT - V

Periodicandpreventive maintenance:Periodic inspection-conceptandneed, degreasing, cleaningandrepairing schemes, overhauling of mechanical components, overhauling of electrical motor, common troubles and remedies ofelectric motor,repair complexities anditsuse, definition, need, steps andadvantages ofpreventive maintenance. Steps/procedure for periodic and preventive maintenance of: I. Machine tools, ii. Pumps, iii. Air compressors,iv.Dieselgenerating(DG)sets,Programandscheduleofpreventivemaintenanceofmechanical andelectricalequipment,advantagesofpreventivemaintenance.Repaircycleconceptandimportance

Textbooks:

1. MaintenanceEngineeringHandbook,Higgins&Morrow,DaInformationServices.
2. MaintenanceEngineering,H.P.Garg,S.ChandandCompany.

ReferenceBooks:

1. Pump-hydraulicCompressors,Audels,McgrewHillPublication.
2. FoundationEngineeringHandbook,Winterkorn,Hans,Chapman&HallLondon.

Course Outcomes:

SRI VENKATESWARA COLLEGE OF ENGINEERING &TECHNOLOGY (AUTONOMOUS)

II M. Tech-III Semester (CSE)

25BMB03	BUSINESSANALYTICS	L	T	P	C
		3	0	0	3

CO1: Studentswilldemonstrateknowledgeof dataanalytics.
CO2: Studentswilldemonstratetheabilityofthinkcriticallyinmakingdecisionsbasedon data and deep analytics.
CO3: Students willdemonstratetheabilitytousetechnicalskills inpredicativeand prescriptive modeling to support business decision-making.
CO4: Studentswilldemonstratetheabilitytotranslatedataintoclear,actionableinsights.

UNIT-I

Business Analysis:OverviewofBusinessAnalysis,OverviewofRequirements,RoleoftheBusiness 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 LifeCycles.

UNIT- III

FormingRequirements:OverviewofRequirements, AttributesofGoodRequirements, TypesofRequirements, Requirement Sources, Gathering Requirements from Stakeholders, Common Requirements Documents. TransformingRequirements:StakeholderNeedsAnalysis,DecompositionAnalysis,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

FinalizingRequirements:PresentingRequirements,SocializingRequirementsandGainingAcceptance, Prioritizing Requirements. Managing Requirements Assets: Change Control, Requirements Tools

UNIT- V

RecentTrandsin:Embeddedandcolleborativebusinessintelligence,Visualdatarecovery,DataStorytelling andDataJournalism.

Textbooks:

1. BusinessAnalysisbyJamesCadleetal.
2. ProjectManagement:TheManagerialProcessbyErikLarsonand,CliffordGray

ReferenceBooks:

1. BusinessanalyticsPrinciples,Concepts,andApplicationsbyMarcJ.Schniederjans,DaraG. Schniederjans, Christopher M. Starkey, Pearson FT Press.
2. BusinessAnalyticsbyJamesEvans,personsEducation.

Course Outcomes:

SRI VENKATESWARA COLLEGE OF ENGINEERING &TECHNOLOGY (AUTONOMOUS)

II M. Tech-III Semester (CSE)

25BCS27	OPTIMIZATIONTECHNIQUES	L	T	P	C
		3	0	0	3

Course Outcomes:

CO1: ExplainthefundamentalknowledgeofLinear ProgrammingandDynamic Programming problems.
CO2: Useclassicaloptimizationtechniquesandnumericalmethodsofoptimization.
CO3: Describethebasicsofdifferentevolutionaryalgorithms.
CO4: Enumerate fundamentals of Integer programming technique and apply different techniquestosolvevariousoptimizationproblemsarisingfromengineeringareas

UNIT - I

LINERPROGRAMMING(L.P):
RevisedSimplexMethod,DuelsimplexMethod,SensitivityAnalysis DYNAMIC PROGRAMMING (D.P):
Multistagedecisionprocesses.Conceptsofsuboptimization,RecursiveRelation-calculusmethod,tabular method, LP as a case of D.P.

UNIT - II

CLASSICALOPTIMIZATIONTECHNIQUES:
Singlevariableoptimization without constraints, Multivariableoptimizationwithout constraints, multivariable optimization with constraints – method of Lagrange multipliers, Kuhn-Tucker conditions.
NUMERICALMETHODSFOROPTIMIZATION:
NelderMead'sSimplexsearchmethod,Gradientofafunction,Steepestdescent method,Newton'smethod

UNIT - III

MODERNMETHODSOFOPTIMIZATION:
GENETICALGORITHM(GA):
Differencesandsimilaritiesbetweenconventionalandevolutionaryalgorithms,workingprinciple,Genetic Operators- reproduction, crossover, mutation
GENETICPROGRAMMING(GP):
Principlesofgeneticprogramming,terminalsets,functionalsets,differencesbetweenGA&GP,Random population generation. Fuzzy Systems: Fuzzy set Theory, Optimization of Fuzzy systems

UNIT - IV

INTEGERPROGRAMMING:
GraphicalRepresentation,Gomory'sCuttingPlaneMethod,Balas'AlgorithmforZero–OneProgramming, Branch-and-Bound Method

UNIT - V

APPLICATIONSOFOPTIMIZATIONINDESIGNANDMANUFACTURINGSYSTEMS:
Formulation of model- optimization of path synthesis of a four-bar mechanism, minimizationof weight of a cantilever beam, general optimization model of a machining process, optimization of arc welding parameters, and general procedure in optimizing machiningoperations sequence.

Textbooks:

1.EngineeringOptimization(4thEdition)byS.S.Rao,NewAgeInternational,

ReferenceBooks:

1. OptimizationforEngineeringDesignbyKalyanmoyDeb,PHIPublishers
2. GeneticalgorithmsinSearch,Optimization,andMachinelearning–D.E.Goldberg, Addison-Wesley Publishers
3. OperationsResearchbyHillarandLiberman,TMHPublishers
4. Optimaldesign–JasbirArora,McGrawHill(International)Publisher

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25BCS28	DISSERTATION PHASE-I	L	T	P	C
		0	0	20	10

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II M. Tech-III Semester (CSE)

		L	T	P	C
25BCS29	**INDUSTRY INTERNSHIP**	**0**	**0**	**0**	**2**

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		L	T	P	C
25BCS30	**Co-curricular Activities**	**0**	**0**	**0**	**1**

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II M. Tech-IV Semester (CSE)

		L	T	P	C
25BCS31	**DISSERTATION PHASE-II**	**0**	**0**	**32**	**16**