ACADEMIC REGULATIONS (R-20)

COURSE STRUCTURE
AND
DETAILED SYLLABI

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

(For the Batches Admitted From the Academic Year 2020-2021)

COMPUTER SCIENCE AND ENGINEERING

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)

R.V.S. NAGAR, TIRUPATI ROAD, CHITTOOR- 517 127 (AP)-INDIA
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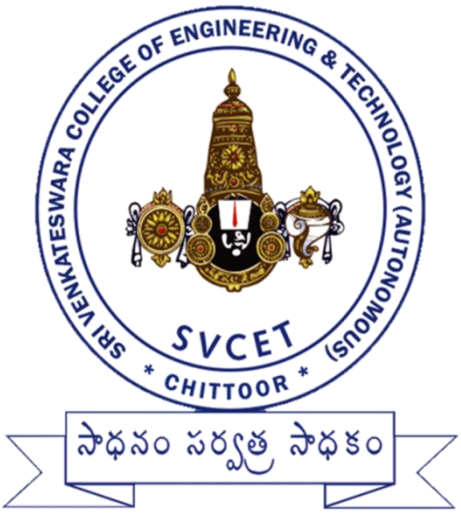
ACADEMIC REGULATIONS-R20,
COURSE STRUCTURE AND DETAILED SYLLABI

M.TECH REGULAR (Full-Time) TWO YEAR DEGREE PROGRAMME
(*FOR THE BATCHES ADMITTED FROM THE ACADEMIC YEAR 2020-21*)

MASTER OF TECHNOLOGY



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(AUTONOMOUS)
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SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY
(AUTONOMOUS)
(AFFILIATED TO JNTUA, ANANTAPUR)
ACADEMIC REGULATIONS – R20
MASTER OF TECHNOLOGY (M.TECH)
REGULAR (Full-Time) TWO YEAR POST GRADUATE DEGREE PROGRAMME
(For the batches admitted from the Academic Year 2020-2021)

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.

1.0 **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 2020-2021 onwards. Any reference to "College" in these rules and regulations stands for SVCET.

2.0 **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.

3.0 **Admission:** Admission into the first year of two year M.Tech degree programme is based on the eligibility conditions detailed below.

4.0 **Eligibility:**
Admission to the above programme shall be made subject to the eligibility, qualifications and specialization prescribed by the competent authority for each programme, from time to time. Admissions shall be made either on the basis of merit rank obtained by the qualified candidates at an Entrance Test conducted by the University or on the basis of GATE / PGECET score, subject to reservations and policies prescribed by the Government from time to time.

4.1 **Admission Procedure:**
As per the existing stipulations of AP State Council for Higher Education (APSCHE), Government of Andhra Pradesh, admissions are made into the first year as follows:
a) Category –A seats are to be filled by Convenor through APPGECET / GATE score.
b) Category-B seats are to be filled by Management as per the norms stipulated by Government of A.P.

5.0 **Specializations:**

S. No.	Branch	Specialization
1	CE	Structural Engineering
2	EEE	PE&ED
3	ME	CAD/CAM
4	ECE	VLSI Design
5	CSE	Computer Science and Engineering
6	CSE	CSE(Data Science)

6.0 **Course Work:**
A Candidate after securing admission must pursue the M.Tech course of study for Four Semesters duration. Each semester shall have a minimum of 16 instructional weeks.
A candidate admitted to a programme should complete it within a period equal to twice the prescribed duration of the programme from the date of admission.

7.0 **Contact Periods:**
Depending on the complexity and volume of the course, the numbers of contact periods per week are assigned.

7.1 **Credit Courses:** Courses are to be registered by a student in a Semester to earn Credits. Credits shall be assigned to each Course in an L: T: P: C (Lecture Hours: Tutorial Hours: Practical Hours: Credits) structure, based on the following pattern.

7.2 **Theory Courses:** One hour Lecture (L) per Week in a Semester = 01 Credit.

7.3 **Practical Courses:** One Practical hour (P) per Week in a Semester = 0.5 Credit.

7.4 **Audit Courses (AC) = NOCREDITS** are awarded

7.5 **Mini Project:** For Mini Project, where formal contact periods are not specified, credits are assigned based on the complexity of the work to be carried out.

7.6 **Dissertation Work:** For Dissertation Work, where formal contact periods are not specified, credits are assigned based on the complexity of the work to be carried out.

7.7 The Two year curriculum of Post Graduate Degree Program M. Tech shall have total of 68 credits.

8.0 **Choice Based Credit System (CBCS):**

8.1 Choice Based Credit System (CBCS) is introduced in line with UGC guidelines in order to promote:

- Student centered learning
- Students to learn courses of their choice

A Student has a choice of registering for courses comprising basic science, program core and professional elective.

9.0 **Evaluation:**

The performance of the candidate in each semester shall be evaluated subject wise, with a maximum of 100 marks for Theory and 100 marks for practical's, on the basis of Internal Evaluation and End Semester Examination.

For the theory subjects, 60% of the marks will be for the External End Examination. While 40% of the marks will be for Internal Evaluation. Internal marks for midterm examinations shall be arrived at by considering the marks secured by the student in both the midterm examinations with 80% weightage to the better midterm exam and 20% to the other. First midterm examinations will be conducted in the middle of the Semester (first two units) and second midterm examinations immediately after the completion of instruction (last three units) with four questions with internal choice, either or type, are to be answered in 2 hours, evaluated for 40 marks.

For semester end examination five questions shall be given for a maximum of 60 marks with one question from each unit with internal choice i.e. either or type. All questions carry equal marks.

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 (25 marks) and practical test at the end of the semester (15 marks).

For Mini Project there will be an internal evaluation for 100 marks. A candidate has to secure a minimum of 50% to be declared successful. The assessment will be made by a board consisting of HOD, Mini Project supervisor and one senior faculty of the department.

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.

In case the candidate does not secure the minimum academic requirement in any of the subjects, he has to reappear for the Semester Examination either supplementary or regular in that subject, or repeat the subject when next offered or do any other specified subject as may be required.

In case of audit course, students will be able to register for courses outside the prescribed range of Credits for audit only, when interested to supplement their knowledge / skills; any student who wishes

to pursue audit course can register for the same with the concerned teacher and attend to the classes regularly. No examination will be conducted; no grade will be given for the audit courses. However such of those students who have registered and got the requisite attendance of 75% in the audit course, it will be mentioned in their grade sheet.

10.0 Dissertation Work:

10.1 Registration of Dissertation work

A candidate shall register for the dissertation work at the beginning of the second year, only after satisfying the attendance requirement of all the courses up to II Semester. The duration of the dissertation work is for two semesters.

10.2 The candidate has to submit, in consultation with the supervisor, the title, objective and plan of action of dissertation work to the Department Evaluation Committee (DEC) for its approval. Only after obtaining the approval from DEC, the student can initiate the dissertation work.

11.0 Evaluation of Dissertation Work

11.1 The Department Evaluation Committee (DEC) consisting of HOD, Supervisor and one internal senior faculty member shall monitor the progress of the project work. The DEC is constituted by the Principal on the recommendation of the Head of the Department.

11.2 Dissertation work Phase – I is to be completed in the III Semester. The student has to identify the topic of the project work, collect relevant literature, preliminary data, implementation tools/methodologies etc., and perform a critical study and analysis of the problem identify and submit a report.

(i) Internal Evaluation: The internal evaluation of dissertation work phase – I shall be made by the DEC on the basis of two project reviews on the topic of the project. Each review shall be conducted for a maximum of 40 marks. For a total of 40 marks, 80% of better one of the two and 20% of the other one are added and finalized.

(ii) Semester-End Evaluation: The Semester end dissertation work phase – I Viva-Voce examination shall be conducted for 60 marks, by the HOD, concerned supervisor and a senior faculty member recommended by the HOD and appointed by the Principal.

11.**3** The student shall continue to undertake the dissertation work phase – II during the IV Semester by conducting practical investigations, implementation, analysis of results, validation and report writing. The student shall submit a dissertation report at the end of the semester after approval of the DEC.

(i) Internal Evaluation: The internal evaluation of dissertation work phase – II shall be made by the DEC on the basis of two project reviews on the progress, presentation and quality of work. Each review shall be conducted for a maximum of 120 marks. For a total of 120 marks, 80% of better one of the two and 20% of the other one are added and finalized.

(ii) Semester-End Evaluation: A candidate shall be allowed to submit the dissertation on the recommendations of the DEC. Three copies of the Dissertation certified in the prescribed format by the concerned Supervisor and HOD shall be submitted to the department. The Department shall submit a panel of three experts for a maximum of 05 students to the principal for appointment of the external examiner. The Viva-voce examination shall be conducted by the board consisting of the Supervisor, Head of the Department and the external examiner nominated by the principal. The board shall jointly award the marks for 180.

11.4 A candidate shall be deemed to have secured the minimum academic requirement of project work if he secures a minimum of 40% marks in the viva-voce examination and a minimum aggregate of 50% of the total marks in the end viva-voce examination and the internal assessment marks taken together. If he fails to get the minimum academic requirement he has to appear for the viva-voce examination again to get the minimum marks. The viva voce examination may be conducted once in two months for all the candidates who have submitted thesis during that period.

12.0 Eligibility to appear for the Semester-End Examination (SEE)

12.1 A student shall be eligible to appear for semester-end examinations if he acquires a minimum of 75% of attendance in aggregate of all the courses in a semester.

12.2 Condonation of shortage of attendance in aggregate up to 10% (65% and above and below75%) in each semester may be granted by the College Academic Council.

12.3 Shortage of Attendance below 65% in aggregate shall **in no case be condoned**.

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

12.5 A student shall not be promoted to the next semester unless he satisfies the attendance requirements of the current semester, as applicable. The student may seek readmission for the semester when offered next. He will not be allowed to register for the courses of the semester while he is in detention. A student detained due to shortage of attendance, will have to repeat that semester when offered next.

12.6 A stipulated fee shall be payable to the College towards condonation of shortage of attendance.

12.7 The attendance in Student Development Activities shall be considered for finalization of aggregate attendance.

12.8 For the calculation of a student attendance in any semester, the total number of classes conducted shall be counted as scheduled in the class-work time table.

13.0 Conduct of Semester End Examination and Evaluation

13.1 Semester end examination shall be conducted by the Controller of Examination (COE) by inviting 50% Question Papers from the External and 50% Question papers from the Internal Subject Experts. Principal will decide the External and Internal subject experts.

13.2 The answer papers of semester end examination should be evaluated externally / internally.

13.3 Marks for components evaluated internally by the faculty shall be submitted to the Controller of Examinations one week before the commencement of the End examinations. The marks for the internal evaluation components shall be added to the external evaluation marks secured in the Semester-end examinations, to arrive at the total marks for any course in that semester.

13.4 Performance in all the subjects is tabulated program-wise and will be scrutinized by the office of the Controller of Examinations. Total marks obtained in each subject are converted into letter grades. Finally subject-wise marks and grades details, subject-wise and branch-wise pass percentages are calculated through software.

14.0 Results Committee

14.1 Results Committee comprising of Principal, Controller of Examinations, Additional Controller of Examinations (Confidential) and 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.

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

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

15.0 Personal Verification / Recounting / Revaluation / Final Valuation

15.1 **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.

15.2 **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.

15.3 **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.

16.0 **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.

17.0 **Re-Registration for improvement of Internal Marks**

17.1 Following are the conditions for Re-Registration of Theory Courses for improvement of Internal Marks:

17.2 The student should have completed all the course work and obtained examinations results from I to III semesters.

17.3 If the student has failed in the examination due to internal evaluation marks secured being less than 50%, he shall be given one chance for a maximum of 3 theory courses for improvement of internal evaluation marks.

17.4 The candidate has to register for the chosen courses and fulfill the academic requirements (i.e. a student has to attend the classes regularly and appear for the mid-examinations and satisfy the attendance requirements to become eligible for appearing at the semester-end examinations).

17.5 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, payable at Chittoor along with the requisition through the concerned Head of the Department.

17.6 A student availing the benefit for Improvement of Internal evaluation marks, the internal evaluation marks as well as the semester-end examinations marks secured in the previous attempt(s) for the re-registered courses stands cancelled.

18.0 **Academic Requirements for completion of Post Graduate Degree Program M.Tech:**
The following academic requirements have to be satisfied in addition to the attendance requirements for completion of Post Graduate Degree Program M.Tech.
For students admitted into Post Graduate Degree Program M.Tech for the Academic Year 2020-21:

18.1 A student shall be deemed to have satisfied the minimum academic requirements for each theory, laboratory course, and Internship and project work, if he secures not less than 40% of marks in the semester-end examination and a minimum of 50% of marks in the sum total of the internal evaluation and Semester-end examination taken together.
A student shall be deemed to have satisfied the minimum academic requirements of mini-project, if he secures not less than a minimum of 50% of marks.

18.2 A student shall register for all the **68** credits and earn all the **68** credits. Grade points obtained in all the 6**8** credits shall be considered for the calculation of the DIVISION based on CGPA.

18.3 A student who fails to earn **68** credits as indicated in the course structure within **four** academic years from the year of their admission shall forfeit his seat in M.Tech Program and his admission stands cancelled.

19.0 Grades, Semester Grade point Average, Cumulative Grade point Average:

19.1 **Grade System:** After all the components and sub-components of any subject (including laboratory subjects) are evaluated, the final total marks obtained will be converted to letter grades on a "10 point scale" described below.

% of Marks obtained	Grade	Grade Points (GP)
90 to 100	A+	10
80 to 89	A	9
70 to 79	B	8
60 to 69	C	7
50 to 59	D	6
Less than 50%in Sum of Internal & External (or) Less than 40% in External	F	0
Not Appeared	N	0

19.2 Computation of SGPA and CGPA

19.2.1 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.

$$\mathbf{SGPA = \Sigma\ (Ci \times Gi) / \Sigma\ Ci}$$

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

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

$$\mathbf{CGPA = \Sigma\ (Ci \times Si) / \Sigma\ Ci}$$

where 'Si' is the SGPA of the ith semester and Ci is the total number of credits in that semester

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

19.2.4 While computing the SGPA/CGPA, the subjects in which the student is awarded Zero grade points will also be included.

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

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

19.2.7 As per AICTE regulations, conversion of CGPA into equivalent percentage is as follows:

Equivalent Percentage to SGPA = (SGPA – 0.50) x 10
Equivalent Percentage to CGPA = (CGPA – 0.50) x 10

19.3 **Grade Sheet:** A grade sheet (Marks Memorandum) will be issued to each student Indicating his performance in all subjects registered in that semester indicating the GPA and CGPA. GPA and CGPA will be rounded off to the second place of decimal.

20.0 **Consolidated Grade Sheet:** After successful completion of the entire Program of study, a Consolidated Grade Sheet containing performance of all semesters will be issued as a final record. Duplicate Consolidated Grade Sheet will also be issued, if required, after payment of requisite fee.

21.0 **Award of Degree:** The Degree will be conferred and awarded by Jawaharlal Nehru Technological University Anantapur, Ananthapuramu on the recommendation of The Principal of SVCET (Autonomous). Student admitted in M.Tech 2Yrs programme shall register for all **68** credits and earn all the **68** credits. Marks obtained in all the **68** credits shall be considered for the award of the class based on CGPA.

21.1 **Eligibility:** A student shall be eligible for the award of M.Tech Degree if he fulfills all the following conditions:

- Registered and successfully completed all the components prescribed in the program of study for which he is admitted.
- Successfully acquired the minimum required credits as specified in the curriculum corresponding to the branch of study within the stipulated time.
- Obtained CGPA greater than or equal to 6.0 (Minimum requirement for declaring as passed.)

21.2 **Award of Class:** Declaration of Class is based on CGPA.

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

22.0 **With Holding of Results:**
If the candidate has not paid dues to the University / College or if any case of in-discipline is 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.

23.0 **Graduation Day:**
The institute shall have its own annual Graduation Day for the award of Provisional Certificates to students completing the prescribed academic requirements in each case, in consultation with the University and by following the provisions in the Statute. The college shall institute prizes and medals to meritorious students and award them annually at the Graduation Day. This will greatly encourage the students to strive for excellence in their academic work.

24.0 **Discipline:**
Every student is required to observe discipline and decorum both inside and outside the institute and not to indulge in any activity which will tend to bring down the honor of the institute. If a student indulges in malpractice in any of the theory / practical examination, continuous assessment examinations he shall be liable for punitive action as prescribed by the Institute from time to time.

25.0 **Grievance Redressal Committee:**
The institute shall form a Grievance Redressal Committee for each course in each department with the Course Teacher and the HOD as the members. This Committee shall solve all grievances related to the course under consideration.

26.0 **Transitory Regulations:**
Students who got detained for want of attendance (**or**) who have not fulfilled academic requirements

(**or**) who have failed after having undergone the Program in earlier regulations (**or**) who have discontinued and wish to continue the Program are eligible for admission into the unfinished semester from the date of commencement of class work with the same (**or**) equivalent courses as and when courses are offered and they will be in the academic regulations into which they are presently readmitted. A student has to satisfy all the eligibility requirements within the maximum stipulated period of **four years** for the award of M.C.A Degree.

27.0 Medium of Instruction:

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

28.0 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.

29.0 General Instructions:

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

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

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

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

v. The Principal 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 Principal.

vi. 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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FAILURE TO READ AND UNDERSTAND THE REGULATIONS IS NOT AN EXCUSE

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY
(AUTONOMOUS)

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:20
Next one letter	Type of program: A: B. Tech B: M. Tech C: M.B.A D: M.C.A
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:
20BST01
20BPE01
20BCM01
20BVL01
20BCS01
20BDS01

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 practicals and project work) already appeared and shall not be allowed to appear for examinations of the remaining subjects of that semester/year. The candidate is also debarred for 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 means or misconduct or has the tendency to disrupt the orderly conduct of the examination.	In case of students of the college, they shall be expelled from examination halls and cancellation of their performance in that subject and all other subjects the candidate (s) has (have) already appeared and shall not be permitted to appear for the remaining examinations of the subjects of that semester / year. 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.
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	Cancellation of the performance in that subject.

	writes to the examiner requesting him to award pass marks.	
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.

DEPARTMENT OF
COMPUTER SCIENCE AND ENGINEERING

VISION

- Evolve as center of Excellence in computer science and Engineering education with national and international reputation and adapt itself to the rapid advancements in the computer Science and Engineering Field.

MISSION

- To impart high quality professionals in undergraduate and postgraduate level with emphasis on basic principles of computer Science and Engineering and to foster leading edge research in the fast changing field.
- To inculcate professional behavior, strong ethical values, innovative research capabilities and leadership abilities in the young minds so as to work with a commitment to the progress of the nation.

DEPARTMENT OF
COMPUTER SCIENCE AND ENGINEERING

PROGRAMME EDUCATIONAL OBJECTIVES

- **PEO1:** To be able to solve wide range of computing related problems in order to cater to the needs of industry and society.
- **PEO2:** To exhibit analytical decision making and problem solving skills by applying research principles for handling dynamic real time challenges.
- **PEO3:** To be able to adapt to the evolving technical challenges and changing career opportunities. Learn to effectively communicate ideas in oral, written, or graphical form to promote collaboration other engineering teams in accordance with social standards and ethical practices.

PROGRAMME SPECIFIC OUTCOMES

- **PSO1:** Ability to take up higher studies, Research & Development and Entrepreneurships in the modern computing environment.
- **PSO2:** Analyze software products, processes in a systematic way by applying problem solving skills and employable in product oriented Industry.

DEPARTMENT OF
COMPUTER SCIENCE AND ENGINEERING

PROGRAM OUTCOMES

PO1 To obtain sound knowledge in the theory, principles and applications of compute systems.

PO2 Apply knowledge of mathematics and algorithms in the design and development of software systems.

PO3 Configure recent software tools, apply test conditions, and deploy and manage them on computer systems.

PO4 Perform experiments on different software packages either obtain from external parties or developed by themselves and analyze the experimental results.

PO5 Design and develop software projects given their specifications and within Performance and cost constraints.

PO6 Identify, formulate and solve software engineering problems and understand the software project management principles.

PO7 Ability to understand the computing needs of inter-disciplinary scientific and engineering disciplines and design and develop algorithms and techniques for achieving these.

PO8 Communicate effectively in oral, written and graphical form to extend Entrepreneurship and leadership skills.

PO9 Abilitytoextendthestateofartinsomeofthe areasofinterestandcreatenew knowledge.

PO10 An understanding of professional, legal, and ethical issues and responsibilities, formulate research problems and explore the current research being done.

PO11 To identify the shortcomings and examine the outcomes of one's action without depending on external feedback and implement the corrective measures subsequently to develop their career.

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	20BCS01	Advanced Data Structures And Algorithms	3	0	0	3	40	60	100
2	20BCS02	Cloud Computing	3	0	0	3	40	60	100
PROFESSIONAL ELECTIVE – I									
3	20BCS03	Inter-Networking with TCP/IP	3	0	0	3	40	60	100
	20BCS04	Soft Computing							
	20BCS05	Artificial Intelligence							
PROFESSIONAL ELECTIVE – II									
4	20BCS06	Wireless Sensor Networks	3	0	0	3	40	60	100
	20BCS07	Parallel Computing							
	20BCS08	Operating Systems							
5	20BMB21	Research Methodology	2	0	0	2	40	60	100
6	20BCS09	Computer Science Applications Lab-I	0	0	4	2	40	60	100
7	20BCS10	Computer Science Applications Lab-II	0	0	4	2	40	60	100
8	20BDS11	Audit Course – I: English for Research Paper Writing	2	0	0	-	-	-	-
TOTAL			**16**	**0**	**8**	**18**	**280**	**420**	**700**

M.TECH, II-SEMESTER

S.NO	SUBJECT CODE	SUBJECT	PERIODS			CREDITS	SCHEME OF EXAMINATION (MAXIMUM MARKS)		
			L	T	P		CIE	SEE	TOTAL
1	20BCS11	Big Data Analytics	3	0	0	3	40	60	100
2	20BCS12	Internet Of Things	3	0	0	3	40	60	100
PROFESSIONAL ELECTIVE – III									
3	20BCS13	Cryptography and Network Security	3	0	0	3	40	60	100
	20BCS14	Deep Learning							
	20BCS15	Advanced Databases							
PROFESSIONAL ELECTIVE – IV									
4	20BCS16	Ethical Hacking	3	0	0	3	40	60	100
	20BCS17	Block chain Technology							
	20BCS18	Pattern Recognition							
5	20BCS19	Mini Project	0	0	4	2	100	00	100
6	20BCS20	Computer Science Applications Lab-III	0	0	4	2	40	60	100
7	20BCS21	Computer Science Applications Lab-IV	0	0	4	2	40	60	100
8	20BDS23	Audit Course - II :Value Education	2	0	0	-	-	-	-
TOTAL			**14**	**0**	**12**	**18**	**340**	**360**	**700**

M.TECH, III SEMESTER

S.NO	SUBJECT CODE	SUBJECT	PERIODS			CREDITS	SCHEME OF EXAMINATION (MAXIMUM MARKS)		
			L	T	P		CIE	SEE	TOTAL
PROFESSIONAL ELECTIVE – V									
1	20BDS12	Optimization Techniques	3	0	0	3	40	60	100
	20BCS22	Semantic web and Social Networks							
	20BCS23	Software Architecture and Design Patterns							
PROFESSIONAL ELECTIVE – VI									
2	20BCS24	Mobile application Development	3	0	0	3	40	60	100
	20BCS25	Computer Vision							
	20BCS26	Smart Sensors and Internet of Things							
3	20BCS27	**DISSERTATION PHASE-I**	-	-	20	10	40	60	100
TOTAL			**6**	**0**	**20**	**16**	**120**	**180**	**300**

M.TECH, IV-SEMESTER

S.NO	SUBJECT CODE	SUBJECT	PERIODS			CREDITS	SCHEME OF EXAMINATION (MAXIMUM MARKS)		
			L	T	P		CIE	SEE	TOTAL
1	20BCS28	**DISSERTATION PHASE-II**	-	-	32	16	120	180	300
TOTAL						**16**	**120**	**180**	**300**

Sri Venkateswara College of Engineering and Technology
(Autonomous)

M.TECH- I Semester CSE

L	T	P	C
3	0	0	3

20BCS01 ADVANCED DATA STRUCTURES AND ALGORITHMS

Course Objectives:

The objectives of this course are to

1. Introduce various data structures for representation and manipulation of the data in the real world.
2. Understand and demonstrate the basic concept of an algorithm and its application in combinational mathematics.
3. Get familiar and understand the advanced notions in the design of algorithms.
4. Identify the basic properties of graphs and trees and mathematical modeling of simple applications.

UNIT I

Overview of Data Structures: Review of Arrays, Stacks, Queues, linked lists, Linked stacks and Linked queues, Applications, Efficiency of algorithms, Asymptotic Notations, Time complexity of an algorithm using O Notation, Average, Best, and Worst-case Complexities.

UNIT II

TreesandGraphs: Introduction,DefinitionandBasicterminologiesoftrees,binarytreesandbinarysearch trees, Representation of trees and Binary trees, Binary tree Traversals, Operations and applications of Binary search trees, AVL Trees and B trees, Graphs-basic concepts, representation and traversals.

UNIT III

Red – Black Trees, Splay Trees and Hash Tables

Red–Black Trees, Splay Trees and its applications. Hash Tables: Introduction, Hash Tables, Hash Functions and its applications.

Design of Algorithms:

General Method: Divide and Conquer, Binary Search, Finding Maximum and Minimum, Strassen's Matrix Multiplication, Greedy Method- General Method, Minimum Cost Spanning Trees, Single Source Shortest Path.

UNIT IV

Dynamic Programming:

General Method, All Pairs Shortest Path, Single Source Shortest Path, 0 / 1 Knapsack problem, Reliability Design, Traveling Sales Person's Problem.

UNIT V

Back Tracking and Branch – and – Bound

General Method, 8 – Queen's Problem, Graph Coloring. Branch – and – Bound: The Method, LC Search, Control Abstraction, Bounding, 0 / 1 Knapsack Problem.

Course Outcomes:

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

1. Distinguish between the applications data structures and the advanced ones.
2. Apply advanced data structures to solve the real world problems.
3. Understand the significance of advanced data structures.
4. Formulate and solve graph problems by using advanced data structures.

TEXT BOOKS:

1. G.A.V. Pai, "Data Structures and Algorithms", 2009,TMH.
2. Ellis Horowitz, Sartaj Sahni and Sanguthevar Rajasekaran Fundamentals of Computer Algorithms, 2nd edition, 2008, University Press.
3. Cormen, Leiserson, Rivest, stein, Introduction to algorithms", Prentice Hall of India,2006.

REFERENCE BOOKS:

1.D. Samanta "*Classic Data Structures*", 2005, PHI

2. Aho, Hopcraft, Ullman "*Design and Analysis of Computer Algorithms*", 1998, PEA.

3. E. Horowitz, S. Sahni and Rajasekharan, "F*undamentals of computer Algorithms",* 3rd Edition, Galgotia publishing pvt. Ltd,1999.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	**3**	**3**					**2**						**1**	**1**
CO2	**2**	**3**	**2**		**2**		**3**							**2**
CO3	**3**						**1**						**2**	
CO4	**3**	**3**			**2**	**2**								**2**

3- High mapping **2-Medium Mapping** **1- Low Mapping**

Sri Venkateswara College of Engineering and Technology
(Autonomous)

M.TECH- I Semester CSE

L	T	P	C
3	0	0	3

20BCS02 CLOUD COMPUTING

Course Objectives:

The objectives of this course are to

1. Understand the concept of cloud computing.
2. Appreciate the evolution of cloud from the existing technologies.
3. Have knowledge on the various issues in cloud computing.
4. Familiarize with the lead players in cloud.
5. Appreciate the emergence of cloud as the next generation computing paradigm.

UNIT I
INTRODUCTION

Introduction to Cloud Computing – Definition of Cloud – Roots of Cloud Computing –Layers and types of cloud-Desired Features of Cloud

Migrating into the cloud—Introduction – Broad approaches to Migrating into the Cloud- Seven steps into Migrating into the Cloud

UNIT II BUSINESS CASE FOR GOING TO THE CLOUD

Accessing Cloud-Platforms-Web Applications-Web API- Web Browsers

Business case-Cloud Computing Services—Business Benefits—Hardware and Infrastructure

UNIT III CLOUD ARCHITECTURE, SERVICES AND STORAGE

Layered Cloud Architecture Design – NIST Cloud Computing Reference Architecture – Public, Private and Hybrid Clouds – laaS – PaaS – SaaS – Architectural Design Challenges – Cloud Storage – Storage-as-a-Service – Advantages of Cloud Storage – Cloud Storage Providers – S3.

UNIT IV ARCHITECTURE FOR FEDERATED CLOUD

Introduction—A typical use case—Basic principles of cloud computing—A model for federated cloud computing—Security consideration

UNIT V GOVERENCE AND CASE STUDIES

Introduction—Basic concepts of organizational rediness—Drivers for change—Common change management model—change management maturity model—Organizational readiness and self Assessment

Legal issues in cloud computing- Introduction-Data Privacy and security issues-Cloud Contracting Models—Jurisdictional issues raised by Virtualisation and Data Location

Course Outcomes:

At the end of this course student will be able to:

1. Identify issues with current cloud computing architecture concerning IoT and Big Data
2. Identify problems, explain, analyze and evaluate various Cloud computing solutions
3. Attempt to generate new innovative ideas utilizing cloud computing
4. Apply cloud computing for real-time applications

TEXTBOOKS:

1. Rajkumar Buyya, James Broberg, Andrzej M. Goscinski - Cloud Computing Principles and Paradigms (Wiley Series on Parallel and Distributed Computing) (2011, Wiley) - libgen.lc (3)

REFERENCE BOOKS:

1. Toby Velte, Anthony Velte, Robert Elsenpeter - Cloud Computing, A Practical Approach (2009, McGraw-Hill Osborne Media) - libgen.lc

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	**2**	**3**	**3**											**2**
CO2				**3**									**1**	
CO3	**2**	**3**	**2**	**2**									**2**	
CO4		**2**	**3**		**3**		**2**							**2**

3- High mapping **2-Medium Mapping** **1- Low Mapping**

Sri Venkateswara College of Engineering and Technology
(Autonomous)

M.TECH- I Semester CSE

L	T	P	C
3	0	0	3

20BCS03 INTERNETWORKING WITH TCP/IP
(Professional Elective- I)

Course Objectives:

The objectives of this course are to

1. Understand the architecture of the Internet protocols as a layered model.
2. Describe the functions implemented by each protocol, the design of the protocol and the characteristics of typical implementations.
3. Analyze the relationships and dependencies between the protocols.

UNIT I

INTRODUCTION:

Introduction to internetworking, Overview of OSI Model TCP/IP protocol suite, Basics ofSwitching technologies and switches, Comparisons of different models, Gateways.

UNIT II

INTERNET PROTOCOL: Purpose of Internet Protocol, Internet datagram, Options, Checksum, ARP and RARP, Routing Methods: Routing Table and Routing module, ICMP, IGMP. IP Addresses: Introduction, Address classification, A sample internet with class full addressing, Subnetting, Super netting, Classless addressing, Security at the IP Layer, IPSec, IPv4 and IPv6 packet formats.

UNIT III

ROUTING PROTOCOLS: UNICAST ROUTING PROTOCOLS Interior and Exterior routing, RIP, OSPF, BGP, Multicasting: Introduction, Multicast Routing, Multicast Routing Protocols, Multicast Trees, DVMRP, MOSPF,CBT,PIM, MBONE.

UNIT IV

TRANSPORT CONTROL PROTOCOL: TCP operation, Segment, Sliding window, Silly window, Options, TCP state machine, Karn's Algorithm, Congestion control- Leaky bucket and Token bucket algorithms. UDP: User Datagram, UDP operations, Checksum calculation.

UNIT V

TCP/IP OVER ATM NETWORKS: ISDN and B-ISDN, ATM reference model, ATM Switch, Interconnection Network, Virtual circuit in ATM, Paths, Circuits and identifiers, ATM cell transport and adaptation layers, packet type and multiplexing, IP Address binding in an ATM Network, Logical Subnet

Concept and Connection Management.

Course Outcomes:

At the end of this course student will be able to:

1. Describe the architecture, design and behaviors of the internet and of the TCP/IP suite of protocols.
2. Describe the concepts and techniques that have been used to design and implement the TCP/IP Internet technology
3. Describe the issues that are driving the development of new protocols to broaden and enhance the operation of the Internet.

TEXT BOOKS:

1. Internetworking with TCP/IP by Comer (Vol. 1)(PHI Pub.)
2. TCP/IP Protocol suite by Behrouz A. Forouzan.(TMH Pub.)

REFERENCE BOOKS:

1. Computer Networking by James F. Kurose, Keith W. Ross (Pearson Education)
2. TCP/IP Illustrated By Wright and Stevens (Vol.2) (Pearson Education)
3. An Introduction to Computer Networks by Kenneth C. Mansfield Jr. James L. Antonakes (PHI)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	**3**												**1**	
CO2	**2**		**2**											**2**
CO3	**3**						**3**						**2**	**1**

3- High mapping **2-Medium Mapping** **1- Low Mapping**

Sri Venkateswara College of Engineering and Technology
(Autonomous)

M.TECH- I Semester CSE

L	T	P	C
3	0	0	3

20BCS04 **SOFT COMPUTING**
(Professional Elective- I)

Course Objectives:
The objectives of this course are to

1. Improve the concept of Soft computing of AI and Machine Learning
2. Be familiar with the design of neural networks, fuzzy logic and fuzzy systems
3. Understand the deepest learning of neural network concept
4. Learn mathematical background for optimized genetic Algorithm
5. Expose to neuro-fuzzy hybrid systems and its applications with Matlab and Python

UNIT I

INTRODUCTION TO SOFT COMPUTING AND NEURALNETWORKS:

Evolution of Computing: Soft Computing Constituents, From Conventional AI to Computational Intelligence: Machine Learning Basics

UNIT II

FUZZY LOGIC: Fuzzy Sets, Operations on Fuzzy Sets, Fuzzy Relations, Membership Functions: Fuzzy Rules and Fuzzy Reasoning, Fuzzy Inference Systems, Fuzzy Expert Systems, Fuzzy Decision Making.

UNIT III

NEURAL NETWORKS: Machine Learning Using Neural Network, Adaptive Networks, Feed forward Networks, Supervised Learning Neural Networks, Radial Basis Function Networks : Reinforcement Learning, Unsupervised Learning Neural Networks, Adaptive Resonance architectures, Advances in Neural networks

UNIT IV

GENETIC ALGORITHMS: Introduction to Genetic Algorithms (GA), Applications of GA in Machine Learning : Machine Learning Approach to Knowledge Acquisition.

UNIT V

Matlab/Python Lib: Introduction to Matlab/Python, Arrays and array operations, Functions and Files, Study of neural network toolbox and fuzzy logic toolbox, Simple implementation of Artificial Neural

Network and Fuzzy Logic

Course Outcomes:

After completion of course, students would be able to:

1. Apply various soft computing concepts for practical applications
2. Use fuzzy rules and reasoning to develop decision making and expert system
3. Choose and design suitable neural network for real time problems
4. Apply optimization techniques and genetic Algorithm
5. Review the various hybrid soft computing techniques and apply in real time problems

TEXT BOOK:

1.Abraham Silberschatz , Peter B. Galvin, Greg Gagne," *Operating System Concepts*," John Wiley and Sons**,** Eighth Edition, 2009.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1		**3**		**2**					**1**				**1**	
CO2	**2**	**3**		**2**					**2**					
CO3	**2**	**2**											**1**	**2**
CO4		**3**					**2**						**3**	
CO5		**3**					**3**							**3**

3- High mapping **2-Medium Mapping** **1- Low Mapping**

Sri Venkateswara College of Engineering and Technology
(Autonomous)

M.TECH- I Semester CSE

L	T	P	C
3	0	0	3

20BCS05 ARTIFICIAL INTELLIGENCE
(Professional Elective- I)

Course Objectives:

The objectives of this course are to

1. Understand the various characteristics of Intelligent agents
2. Learn the different search strategies in AI
3. Learn to represent knowledge in solving AI problems
4. Understand the different ways of knowledge Representation .
5. Know about uncertain knowledge of Learning and Reasoning.

UNIT I

Introduction to Artificial Intelligence, Problems, Problem Spaces and Search The AI Problems - The underlying assumption - What is an AI technique? - The levels of the model - Criteria of success - Some general REFERENCES - One final word and beyond - Defining the problem as a State space search - Production systems - Problem characteristics - Production system characteristics - Issues in the design of search programs

UNIT II

Problem Solving, Un-informed Search Strategies, Informed Search and Exploration

Uninformed search strategies - Avoiding repeated states - Informed (Heuristic) search strategies - Heuristic functions - Local search algorithms and optimization problems - Local search in continuous spaces - Backtracking search for CSPs

UNIT III

Knowledge and Reasoning

Logical agents – Knowledge based agents - The wumpus world – Logic - Propositional logic

a very simple logic - Reasoning patterns in propositional logic - Effective propositional inference - Agents based on propositional logic

UNIT IV

First-Order Logic, Inference in First-Order Logic, Knowledge Representation

Representation revisited - Syntax and semantic of first order logic - Using first order logic - Knowledge engineering in first order logic - Propositional vs. First order inference - Ontological engineering -

Categories and objects - Actions, Situations and Events - The internet shopping world - Reasoning systems for categories - Reasoning with default information - Truth maintenance systems

UNIT V

Uncertain Knowledge and Reasoning, and Learning

Uncertainty - Acting under uncertainty - Basic probability notation - The axioms of probability - Inference using full joint distributions – Independence - Baye's rule and its use - Learning from observations - Forms of learning - Inductive learning - Learning decision trees-Ensemble Learning - Why Learning Works: Computational learning theory - Knowledge in Learning - A logical formulation of learning - Knowledge inlearning.

Course Outcomes:

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

1. Apply the various characteristics of Intelligent agents
2. Solve the problem by using different search in AI
3. Implement to represent knowledge in solving AI problems
4. Design the different ways of Reasoning.
5. Gaining the uncertain knowledge of Learning and Reasoning.

TEXT BOOKS:

1."Artificial Intelligence A Modern Approach", 2/e, 2003, Stuart Russell and Peter Norvig, Pearson Education, New Delhi, India.

2."Artificial Intelligence", 3/e, 2004, Elaine Rich, Kevin Knight and Shiva Shankar B Nair, Tata McGraw Hill, Hyderabad, India.

REFERENCE BOOKS:

1."Artificial Intelligence Structures and Strategies for Complex Problem Solving", 5/e, 2005, George F. Luther, Pearson Education, New Delhi, India.

2."Introduction to Artificial Intelligence", 1/e, 1985, Eugene Charniak and Drew McDermott, Pearson Education, New Delhi, India.

3."Artificial Intelligence: The Basics", 1/e, 2012, Kevin Warwick, Wearset ltd, Boldon.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1		**3**											**2**	
CO2		**3**	**3**										**1**	**2**
CO3			**2**				**3**		**2**				**2**	**2**
CO4		**2**											**2**	
CO5	**2**												**3**	

3- High mapping **2-Medium Mapping** **1- Low Mapping**

Sri Venkateswara College of Engineering and Technology
(Autonomous)

M.TECH- I Semester CSE

L	T	P	C
3	0	0	3

20BCS06 **WIRELESS SENSOR NETWORKS**
(Professional Elective- II)

Course Objectives:

The objectives of this course are to

1. Gain the knowledge of basic of WSN and its Architecture
2. Acquire the simulation of NS-3
3. Describe about WSN and MAC protocol.
4. Study detail about security and routing protocol in MANET.

UNIT I

Introduction to Wireless Sensor Networks: Course Information, Introduction to Wireless Sensor Networks: Motivations, Applications, Performance metrics, History and Design factors Network Architecture: Traditional layered stack, Cross-layer designs, Sensor Network Architecture Hardware Platforms: Motes, Hardware parameters

UNIT II

Introduction to ns-3: Introduction to Network Simulator 3 (ns-3), Description of the ns-3 core module and simulation example.

UNIT III

Medium Access Control Protocol design: Fixed Access, Random Access, WSN protocols: synchronized, duty-cycled Introduction to Markov Chain: Discrete time Markov Chain definition, properties, classification and analysis MAC Protocol Analysis: Asynchronous duty-cycled. X-MAC Analysis(Markov Chain)

UNIT IV

Security: Possible attacks, countermeasures, SPINS, Static and dynamic key distribution

UNIT V

Routing protocols: Introduction, MANET protocols Routing protocols for WSN: Resource- aware routing, Data-centric, Geographic Routing, Broadcast, Multicast Opportunistic Routing Analysis: Analysis of opportunistic routing (Markov Chain) Advanced topics in wireless sensor networks.

Course Outcomes:

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

1. Understand the WSN application and its layered stacks
2. Implement the simulation of NS-3
3. Acquire the knowledge of Markov chain classification and analysis
4. Understand of various routing protocol and Advance in WSN.

TEXT BOOKS:

1. W. Dargie and C. Poellabauer, "Fundamentals of Wireless Sensor Networks –Theory and Practice", Wiley 2010
2. KazemSohraby, Daniel Minoli and TaiebZnati, "wireless sensor networks-Technology, Protocols, and Applications", Wiley Interscience2007
3. Takahiro Hara,Vladimir I. Zadorozhny, and Erik Buchmann, "Wireless Sensor Network Technologies for the Information Explosion Era", springer2010

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	**3**												**1**	
CO2		**2**	**3**										**3**	
CO3	**3**			**2**										**2**
CO4	**3**								**2**	**2**			**1**	**2**

3- High mapping **2-Medium Mapping** **1- Low Mapping**

Sri Venkateswara College of Engineering and Technology
(Autonomous)

M.TECH- I Semester CSE

L	T	P	C
3	0	0	3

20BCS07 **PARALELL COMPUTING**
(Professional Elective- II)

Course Objectives:

The objectives of this course are to
1. Increase GPU awareness.
2. Know GPU computing platforms

UNIT I

Introduction to Parallel Computing Thinking in Parallel, Parallelism Vs. Concurrency, Types and levels of parallelism, Different grains of parallelism, Introduction to parallelization and vectorization: Data dependencies, SIMD technology, Definition of thread and process, Parallel programming models, Decomposition methodologies for parallel program development, The message passing paradigm,load balancing issues for parallel programs,PRAM computational model, Flynn's Taxonomy,current issues in parallel processing, Parallel Processing speedup issues: including Amdahl's and Gustafason's Laws.

UNIT II

Motivation for Heterogeneous Computing, Introduction to heterogeneous architectures- GPU in particular Modern GPU architecture. Introduction to GPU computing (general purpose computation on GPU), GPU architecture case studies: NVIDIA Fermi Tesla C2050/Kepler K20, languages for parallel computing, including:MPI and OpenMP Parallel Programming

UNIT III

CUDA Architecture, CUDA programming model, execution model, thread organization: Concept of grid, block and thread, thread index generation, warp; memory model: Introduction to global, shared, local memories, usage of cache, texture cache, constant memory, memory banks and bank conflicts. CUDA structure, API and library (CUDPP, CUBALS, FFT etc.) details. CUDA example programs (Vector dot product, Matrix multiplication (with the usage of tiling and shared memory) etc.).

UNIT IV

Fundamentals of Shared Memory Programming, Basic OpenMP concepts, PARALLEL directive, data scoping rules, basic OpenMP constructs/directives/calls, examples, parallelizing an existing code using

OpenMP, More advanced OpenMP directives and functions, OpenMP performance issues

UNIT V

Problem solving using GPUs:-Single vs double precision, solving problems that involves Vectors, Matrices, Binomial coefficients, Bernstein coefficients and etc. Instructor will choose the problems from several domains with which students are already aware. Optimizations and Tools: Memory coalescing, Reduction operation using prefix sum example. Usage of shared memory optimally, Performance issues in algorithms deciding parallelization of a part of algorithm and selecting the highest parallelism, Need of profilers and analyzers, Introduction to CUDA Tools: Mem Check, Command line & Visual Profilers.

Course Outcomes:

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

1. Awareness of the GPU architecture and its programming.
2. Design parallel programs for GPU.
3. Design & develop OpenMP and CUDA programs.
4. Analyze and apply various parallel algorithms.

TEXT BOOKS:

1. William E. Perry, Effective *Methods for Software Testing,* Second Edition, Wiley India,2006.
2. Mordechai Ben-Menachem/Garry S. Marliss, Software*Quality*, BS *Publications,2014.*

REFERENCE BOOKS:

1. Gao,TsaoandWu,*TestingandQualityAssuranceforComponent-basedSoftwar*e,Artech House Publishers(August2003)
2. G. Gordon Schulmeyer, James I.McManus ,*Handbook of Software Quality Assurance*, Second Edition, International Thomson ComputerPress
3. William E.Lewis, Gunasekaran Veerapillai , *Software Testing and continuous Quality Improvement*, Second Edition, AuerbachPublications

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	**3**					**3**							**1**	
CO2	**2**					**1**								**1**
CO3	**3**			**2**									**2**	
CO4		**3**	**2**	**1**										**2**

3- High mapping **2-Medium Mapping** **1- Low Mapping**

Sri Venkateswara College of Engineering and Technology
(Autonomous)

M.TECH- I Semester CSE

L	T	P	C
3	0	0	3

20BCS08 **OPERATING SYSTEMS**
(Professional Elective- II)

Course Objectives:

The objectives of this course are to

1 Gain advanced knowledge in process management concepts including scheduling.
2 Understand how operating system manages resource sharing among the computer's users**.**
3 Develop solutions to problems related to synchronization to meet the needs of society and industry.
4 Use concepts such as semaphores, monitors, message-passing and other forms of synchronization among threads

UNITI

Operating System Introduction, Structures - Simple Batch, Multi programmed, time-shared, Personal Computer, Parallel, Distributed Systems, Real-Time Systems, System components, Operating-System services, System Calls, Virtual Machines, System Design and Implementation.

Process and CPU Scheduling - Process concepts and scheduling, Operation on processes, Cooperating Processes, Threads, and Interposes Communication Scheduling Criteria, Scheduling Algorithm, Multiple -Processor Scheduling, Real-Time Scheduling.

UNITII

Memory Management and Virtual Memory -Logical versus Physical Address Space, Swapping, Contiguous Allocation, Paging, Segmentation, Segmentation with Paging. Demand Paging, Performance of Demanding Paging, Page Replacement, Page Replacement Algorithm, Allocation of Frames, Thrashing.

File System Interface and Implementation - Access methods, Directory Structure, Protection, File System Structure, Allocation methods, Free-space Management, Directory Management, Directory Implementation, Efficiency and Performance.

UNITIII

Deadlocks - System Model, Dead locks Characterization, Methods for Handling Dead locks Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, and Recovery from Deadlock.

Process Management and Synchronization -The Critical Section Problem, Synchronization Hardware,

Semaphores, and Classical Problems of Synchronization, Critical Regions, Monitors.

UNITIV

Operating System Security Issues - Introduction to the topic of Security in Operating Systems, Principles of Information Security, Access Control Fundamentals, Generalized Security Architectures.

Introduction to Distributed systems - Goals of distributed system, hardware and software Concepts, design issues

Elementary introduction to the terminologies within Modern Oss - Parallel, Distributed, Embedded & Real Time, Mobile, Cloud and Other Operating System Models.

UNITV

Clock Synchronization, Logical Clocks, Mutual Exclusion, Global Positioning of Nodes, Data- Centric Consistency Models, Client-Centric Consistency Models, Consistency Protocols.
Introduction to Fault Tolerance, Process Resilience, Reliable Client-Server Communication, Reliable Group Communication, Distributed Commit, Recovery, Secure Channels, Access Control, Security Management

Case Study - Over View Of UNIX, LINUX, Windows NT, Android and IOS Operating systems

Course Outcomes:

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

1. Understand the concepts of operating system services.
2. Understand the concepts of concurrency and synchronization.
3. Acquire knowledge in file system implementation and storage structure.
4. Acquire knowledge in Remote Procedure Call and Group Communication

TEXT BOOKS:

1.Modern Operating Systems, Andrew S Tanenbaum 2nd edition Pearson/PHI
2.Operating System Principles- Abraham Silberchatz, Peter B. Galvin, Greg Gagne 7th Edition, John Wiley
3.Operating Systems, Dhamdhere, TMH
4.Distributed Operating System - Andrew. S. Tanenbaum, PHI.

REFERENCE BOOKS:

1. Andrew. S. Tanenbaum, "*Distributed Operating System*," New Delhi, PrenticeHall,1995.
2. William Stallings, "*Operating Systems – Internals and Design Principles*," New Delhi, Fifth Edition, Pearson Education,2008
3. Charles Crowley "*Operating Systems - A Design Approach,*" New Delhi, First Edition, TMH, 2009.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3												2	
CO2	3												1	2
CO3	3	2	3				1							2
CO4	2												3	

3- High mapping **2-Medium Mapping** **1- Low Mapping**

Sri Venkateswara College of Engineering and Technology
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M.TECH- I Semester CSE

L	T	P	C
2	0	0	2

20BMB21 RESEARCH METHODOLOGY

Course Objectives:

The objectives of this course are to

1. Introduce the students to concepts, objectives, and process of research.
2. Enable the students to formulate research problems and develop a coherent research design.
3. Introduce the students to instruments of data collection, tools for data analysis, and help them draw meaningful interpretations.
4. Enable the students to prepare research reports.

UNITI

Reaearch: Meaning, Objective, Motivation in Research, Types of Research, Research Approaches, Research Process; Validity and Reliability in Research; Research Design: Features of Good Design, Types of Research Design, and Basic Principles of Experimental Design

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UNITII

Sampling Design: Meaning ,Steps in Sampling Design, Characteristics of a Good Sample Design, Random Samples and Random Sampling Design; Measurement and Scaling Techniques: Errors in Measurement, Tests of Sound Measurement, Scaling and Scale Construction techniques, Forecasting Techniques, Time Series Analysis, Interpolation and Extrapolation.

UNITIII

Methods of Data Collection: Primary Data, Questionnaire and Interviews, Collection of Secondary Data, Cases and Schedules. Professional Attitude and Goals, Concept of Research Excellence, Ethics in Science and Engineering, Frauds in Science and Research.

UNIT-IV

Correlation and Regression Analysis, Method of Least Squares, Regression Vs. Correlation, Correlation Vs. Determination, Types of Correlation and Their Specific Applications; Statistical Interference: Tests of Hypothesis, Parametric Vs. Non-Parametric Tests, Procedure for Testing Hypothesis, Use Statistical Techniques for Testing Hypothesis, Sampling Distribution, Sampling T Chi-Square Test, Analysis of

Variance and Covariance, Multivariable Analysis

UNIT V

interpretation of Data and Report Writing, Layout of a Research Paper, Techniques o f Interpretation. Making Scientific Presentation at Conferences and Popular Lectures to Semi Technical Audience, Participating in Public Debates on Scientific Issues.

Course Outcomes:

After Completion of the course the student will be able to

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

1.Explain the concepts, objectives, and process of research (Understanding).

2. Formulate the research problem and develop a sufficiently coherent research design (Creating).

3. Identify the measuring and scaling procedure used in research (Applying).

4. Use statistical tools for descriptive and inferential analysis (Applying).

5. Outline the key elements of report writing (Remembering).

TEXT BOOKS:

1. Garg, C. K. (2019). Research Methodology: Methods And Techniques (4 ed.). New Delhi: New Age International Publisher.
2. Bhattacharyya, D. K. (2006). Research Methodology (2 ed.). New Delhi: Excel Books.
3. O.R. Krishnaswamy and D.Obul Reddy,(2009),Research Methodology and Statistical Analysis, Himalaya Publication,(2nd Edition)

MAPPING COs WITH POs:

COURSE OUTCOMES	**PROGRAM OUTCOMES**										
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**
CO1				2	3					1	
CO2				2	3					2	
CO3					3					2	
CO4				2	3					1	
CO5				2	2						
3- High Mapping	**2-Medium Mapping**			**1- Low Mapping**							

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M.TECH- I Semester CSE

L	T	P	C
0	0	4	2

20BCS09 COMPUTER SCIENCE APPLICATIONS LAB-I

Course Objectives:

The objectives of this course are to

1. Understand linear data structures and its operations
2. Elaborate the various searching methods of graph data structure
3. Understand heap and various tree structures like AVL, Red-black, B and Segment, problems such as line segment intersection, convex shell and Graph coloring
4. Practical experience with designing and implementing concepts of operating systems such as file systems and deadlock.
5.

List of Experiments

1. Design and implement the following using a singly linkedlist.

a) Stack ADT b) Queue ADT

2.Develop to implement the dequeue (double endedqueue) ADT using a doubly linked list and an array.

3.Develop a programs for the implementation of Write C++ programs that use non-recursive functions to traverse the given binarytree in

a)Preorder b) Inorder and c) Postorder

4. Develop a programs for implementing the following sorting methods

a) Merge sort b) Heapsort

5.Design a program to perform the following operations

a)Insertion intoan AVL-tree b) Deletion from an AVL- tree

6. Develop a program to implement 0/1 KNAPSACK PROBLEM using the following techniques

a)Dynamic Programming b) Branch and Bound

7. Design a program to implement 8-QUEEN'S PROBLEM by using backtracking technique.
8. Design a program to implement GRAPH COLORING algorithm
9. Implement a program to simulate the following file organization techniques a) Single level

directory b) Two level directory c) Hierarchical

10. Design and Implement the program for file manipulation for displays the file and directory in memory
11. Design a program to imitate the concept of Dining-Philosophers problem.
12. Design and develop a program to implement lazy buddy algorithm.
13. Use ECOS operating System to develop a program for controlling accessing to a pool of resources using mutexes and condition variables
14. Design and develop a program to realize the virus classification such as boot sector,file infector and macro virus
15. Design a program to emulate the Unix ls-l command.

Course Outcomes:

After Completion of the course the student will be able to

1. Develop program for linear and non-linear data structure such as stack, searching, sorting, tree operation and graph.
2. Develop programs for implementing classical problem for Synchronization.
3. Implement unix commands
4. Solve the problems for various system calls and its operations.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1		**3**	**3**										**2**	
CO2	**3**	**3**	**2**	**2**			**1**						**3**	
CO3		**3**	**2**	**2**										**2**
CO4		**3**											**2**	

3- High mapping **2-Medium Mapping** **1- Low Mapping**

Sri Venkateswara College of Engineering and Technology
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M.TECH- I Semester CSE	**L**	**T**	**P**	**C**
	0	**0**	**4**	**2**

20BCS10 COMPUTER SCIENCE APPLICATIONS LAB-II

Course Objectives:

The objectives of this course are to

1. Understand and appreciate cloud architecture.
2. Create and run virtual machine on open source cloud.
3. Implement Infrastructure, Storage as a service.
4. Understand the basic concepts of TCP/IP protocol suite, switches and gateways.
5. Implement the functions and design of each protocols.
6. Describe the relationship and dependencies between protocol.

LIST OF EXPERIMENTS

1. To study cloud architecture and cloud computing model
2. Installation and configuration of virtualization using KVM
3. To study and implementation of Infrastructure as a Service
4. To study and implementation of Storage as a Service
5. To study Cloud Security management.
6. Implementation of ARP and RARP protocol using java
7. Implementation of IGMP and ICMP protocol using java
8. Implementation of OSPF unicast routing protocol using java
9. Implementation of MOSPF multicast routing protocol using java
10. Implementation of sliding window protocol using java
11. Implementation of karn's algorithm using java

Course Outcomes:

After Completion of the course the student will be able to

1. To provide an overview of concepts of Cloud Computing
2. To understand security features, user management of Cloud
3. Tounderstand the basics concepts of various protocol and their importance
4. To analyze the services and features of unicast and multicast routing protocol
5. To analyze ATM reference model and virtual circuit in ATM protocols

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	**3**	**3**	**3**										**1**	
CO2		**2**	**2**	**3**										**1**
CO3		**3**	**3**	**2**	**2**				**2**	**1**			**2**	
CO4		**2**	**2**		**3**		**2**							**2**

3- High mapping **2-Medium Mapping** **1- Low Mapping**

Sri Venkateswara College of Engineering and Technology
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M.TECH- II Semester CSE

L	T	P	C
2	0	0	0

20BDS11 ENGLISH FOR RESEARCH PAPER WRITING

(AUDIT COURSE-1)

Course Objectives:

The objectives of this course are to

1. Understand that how to improve your writing skills and level of readability
2. Learn about what to write in each section
3. Understand the skills needed when writing a Title

UNIT I

Planning and Preparation, Word Order, Breaking up long sentences, Structuring Paragraphs and Sentences, Being Concise and Removing Redundancy, Avoiding Ambiguity and Vagueness

UNIT II

Clarifying Who Did What, Highlighting Your Findings, Hedging and Criticising, Paraphrasing and Plagiarism, Sections of a Paper, Abstracts.

Introduction

UNIT III

Review of the Literature, Methods, Results, Discussion, Conclusions, The Final Check.

UNIT IV

key skills are needed when writing a Title, key skills are needed when writing an Abstract, key skills are needed when writing an Introduction, skills needed when writing a Review of the Literature,

UNIT V

skills are needed when writing the Methods, skills needed when writing the Results, skills are needed when writing the Discussion, skills are needed when writing the Conclusion useful phrases, how to ensure paper is as good as it could possibly be the first- time submission

Course Outcomes:

After Completion of the course the student will be able to

1. Understand that how to improve your writing skills and level of readability
2. Learn about what to write in each section
3. Understand the skills needed when writing a Title
4. Ensure the good quality of paper at very first-time submission

TEXT BOOKS:

1. Goldbort R (2006) Writing for Science, Yale University Press (available on Google Books)
Model Curriculum of Engineering & Technology PG Courses [Volume-I][41]
2. Day R (2006) How to Write and Publish a Scientific Paper, Cambridge University Press
3. Highman N (1998), Handbook of Writing for the Mathematical Sciences, SIAM. Highman'sbook.
4. Adrian Wallwork, English for Writing Research Papers, Springer New York Dordrecht Heidelberg London, 2011

Sri Venkateswara College of Engineering and Technology
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M.TECH- II Semester CSE

L	T	P	C
3	0	0	3

20BCS11 BIG DATA ANALYTICS

Course Objectives:

The objectives of this course are to

1. Understand big data analytics and modern data analytics.
2. Understand data analysis and data mining streams.
3. Inculcate knowledge in Mining Frequent Item sets.
4. Understand Analytics using Statistical packages.

UNIT I

Introduction to Big Data:

Introduction to Big Data Platform Traits of Big data -Challenges of Conventional Systems – Preprocessing of data, Web Data –Evolution of Analytic Scalability -Analytic Processes and Tools - Analysis vs Reporting - Modern Data Analytic Tools -Statistical Concepts: Sampling Distributions -Re-Sampling - Statistical Inference -Prediction Error.

UNIT II

Data Analysis:

Regression Modeling -Multivariate Analysis -Bayesian Modeling -Inference and Bayesian Networks - Support Vector and Kernel Methods -Analysis of Time Series: Linear Systems Analysis -Nonlinear Dynamics -Rule Induction -Neural Networks: Learning and Generalization - Competitive Learning -Principal Component Analysis

UNIT III

Mining Data Streams:

Introduction To Streams Concepts –Stream Data Model and Architecture -Stream Computing - Sampling Data in a Stream –Filtering Streams –Counting Distinct Elements in a Stream – Estimating Moments –Counting Oneness in a Window –Decaying Window -Real time Analytics Platform(RTAP) Applications -Case studies -Real Time Sentiment Analysis, Stock Market Predictions.

UNIT IV

Frequent Item sets And Clustering:

Mining Frequent Item sets -Market Based Model – Apriori Algorithm –Handling Large data Sets in Main Memory –Limited Pass Algorithm –Counting Frequent Item sets in a stream –Clustering Techniques –Hierarchical –K-Means –Clustering High Dimensional Data –CLIQUE And PROCLUS

–Frequent Pattern based Clustering Methods –Clustering in Non-Euclidean Space –Clustering for Streams and Parallelism.

UNIT V

Frameworks and Visualization:

MapReduce–Hadoop,Hive,MapR–Sharding–NoSQLDatabases-S3-HadoopDistributedFile Systems–Visualizations-VisualDataAnalysisTechniques-InteractionTechniques;Systems and Analytics Applications -Analytics using Statistical packages-Approaches to modeling in Analytics

–correlation,regression,decisiontrees,classification,association-Spark Tool- Introduction to Apache spark,pypsark

Course Outcomes:

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

1. Acquire knowledge in big data platform and data analytic tools.
2. Acquire knowledge in Streams Concepts –Stream Data Model and Architecture.
3. Get knowledge in Handling Large data Sets in Main Memory.
4. Understand emerging trends and technologies-Industry challenges and. application of Analytics.

TEXT BOOKS:

1. Michael Berthold, David J. Hand, "*Intelligent Data Analysis",* Springer, 2007.
2. Anand Rajaraman and Jeffrey David Ullman, *"Mining of Massive Datasets*", Cambridge University Press, 2012.

REFERENCE BOOKS:

1. Tom White " *Hadoop: The Definitive Guide*" Third Edition, O'reilly Media, 2012.
2. Bill Franks, "*Taming the Big Data Tidal Wave: Finding Opportunities in Huge Data Streams with Advanced Analytics*", John Wiley & sons, 2012.
3. Glenn J. Myatt, *"Making Sense of Data",* John Wiley & Sons,2007
4. Jiawei Han, Micheline Kamber "*Data Mining Concepts and Techniques*", Second Edition, Elsevier, Reprinted2008.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	**3**		**2**											**2**
CO2	**3**												**1**	
CO3	**3**													**2**
CO4	**3**						**2**			**1**			**3**	

3- High mapping **2-Medium Mapping** **1- Low Mapping**

Sri Venkateswara College of Engineering and Technology
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M.TECH- II Semester CSE

L	T	P	C
3	0	0	3

20BCS12 INTERNET OF THINGS

Course Objectives:

The objectives of this course are to

1. Vision and induction to Internet of things
2. Understand Internet of things market perspective
3. Data and knowledge management and use of devices in IoT
4. Understand the state of art, IoT architecture

UNITI

INTRODUCTION AND CONCEPTS: Introduction to Internet of Things , Physical Design of IoT, Logical Design of IoT – IoT Enabling Technologies – IoT levels & Deployment Templates.

Domain Specific IoTs: Introduction – Home Automation – Cities , Environment – Energy – Retail, Logistics – Agriculture , Industry, Health & Lifestyle.

UNITII

IOT AND M2M: Introduction – M2M, Difference between IoT and M2M, SDN and NFV for IoT, IoT System management with NETCONF,YANG , Need for IoT Systems Management –Simple network Management protocol(SNMP) – Network operator requirements, NETCONF,YANG, IOT systems management with NETCONF,YANG – NETOPEER.

UNITIII

DEVELOPING INTERNET OF THINGS: IoT Platforms Design Methodology , Introduction, IoT Design Methodology, Case Study on IoT System for Weather Monitoring – Motivation for Using Python –Iot Systems, logical Design using Python, installing Python,Python Data Types &Data Structures, Control flow, functions, Modules, Packages, File Handling, Data/Time Operations, Classes,Python Packages of Interest for IoT.

UNITIV

IOT PHYSICAL DEVICES & ENDPOINT: What is an IOT devices,Exemplary Devices: Raspberry Pi,About the Board, Linux on Raspberry Pi,Raspberry Pi Interfaces,Programming Raspberry Pi with Python– Other IoT Devices.

UNITV

IOT PHYSICAL SERVERS & CLOUD OFFERINGS: Introduction to Cloud Storage Models & Communication APIs, WAMP, AutoBahn for IoT, Xively Cloud for IoT, Python Web Application Framework, Django, Designing a Restful Web API, Amazon Web services for IoT, SkyNet IoT Messaging Platform.

Course Outcomes:

At the end of the course, the students would be able to
1. Understand the vision of IoT from the global context.
2. Determine the market perspective of IoT
3. Use of devices ,gateways and data management in IoT
4. Designing the state of Architecture for IoT

TEXT BOOKS:

1. Arshdeep Bahga,Vijay K.Madisetti",Internet of Things", A HANDS,ON,APPROACH,Universities Press,2014

REFERENCE BOOKS :

1. Adrian Mcewen,Hakin Cassimally,"Designing The Internet of Things",EILEY Publications,2015
2. Jan Holler, Vlasios Tsiatsis, Catherine Mulligan, Stefan Avesand, David Boyle, Stamatis Karnouskos,"From Machine-to-Machine to the Internet of Things",Academic Press ,2014

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	**3**												**1**	
CO2		**3**	**2**	**2**										
CO3		**3**	**3**											**2**
CO4		**2**					**3**						**2**	

3- High mapping **2-Medium Mapping** **1- Low Mapping**

Sri Venkateswara College of Engineering and Technology
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M.TECH- II Semester CSE

L	T	P	C
3	0	0	3

20BCS13 CRYPTOGRAPHY AND NETWORK SECURITY
(Professional Elective- III)

Course Objectives:

The objectives of this course are to

1. Understand Cryptography Theories, Algorithms and Systems.
2. Understand necessary Approaches and Techniques to build protection mechanisms in order to secure computer networks.
3. Describe about standards of Digital signature and protocol structure.
4. Acquire the knowledge of various security.

UNIT I

Introduction and Modern Techniques

Attacks - Services and mechanisms - Security attacks - Security services - A Model for network security - Classical encryption techniques - Symmetric cipher model – Substitution techniques – Transposition techniques – Rotor machines – Steganography.

Modern Techniques: Simplified DES - Block cipher principles - Data Encryption Standard - Strength of DES - Differential and linear cryptanalysis - Block Cipher Design Principles

UNIT II

Conventional Encryption and Public Key Cryptography and Hash and Mac Algorithms

Confidentiality Using Symmetric Encryption: Placement of encryption function - Traffic confidentiality - Key distribution - Random Number Generation-**Public Key Cryptography:** Principles - RSA Algorithm - Key management - Diffie- Hellman key exchange-**Hash and Mac Algorithms:** Secure hash algorithm – Whirlpool – HMAC - CMAC

UNIT III

Digital signatures, Authentication protocols and Authentication Applications

Digital signatures - Authentication protocols - Digital signature standard -**Authentication Applications:** Kerberos - X.509 Authentication service – Public key infrastructure

UNIT IV

Electronic Mail Security and IP Security

Electronic Mail Security -Pretty Good Privacy - S/MIME -IP Security: Overview - Architecture – Authentication header - Encapsulating security Payload - Combining security associations - Key management

UNIT V

Web Security and Intruders

Web Security Considerations - Secure socket layer and transport layer security - Secure Electronic Transaction - **Intruders:** Intruders - Intrusion detection - Password management – Firewalls - Firewall design principles - Trusted systems

Course Outcomes:

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

1. Apply various classical encryption techniques for real time application
2. Compare various Cryptographic Techniques
3. Design Secure applications
4. Inject secure coding in the developed applications

TEXT BOOKS:

1. "Cryptography and Network Security", 4/e, 2006, William Stallings , Pearson Education, New Delhi ,India.
2. "Network Security Essentials (Applications and Standards)", 3/e, 2007, William Stallings, Pearson Education, New Delhi, India.

REFERENCE BOOKS:

1. "Security in Computing", 4/e, 2009, Charles P. Pfleeger, Shari Lawrence Pfleeger, Deven Shah, Pearson Education, New Delhi, India.
2. "Principles and Practices of Information Security", 4/e, 2012, Michal E. Whitman and Herbert J. Mattord, Cengage Learning, New Delhi.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	**2**	**3**					**1**						**2**	
CO2	**3**												**2**	
CO3		**3**											**2**	
CO4			**2**	**1**							**1**			**3**

3- High mapping **2-Medium Mapping** **1- Low Mapping**

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M.TECH- II Semester CSE

L	T	P	C
3	0	0	3

20BCS14 **DEEP LEARNING**
(Professional Elective- III)

Course Objectives:

The objectives of this course are to

1. Understand complexity of Deep Learning algorithms and their limitations understand modern notions in data analysis oriented computing;
2. Be capable of confidently applying common Deep Learning algorithms in practice and implementing their own;
3. Be capable of performing distributed computations;
4. Be capable of performing experiments in Deep Learning using real-world data.

UNIT I

Introduction to TensorFlow: Computational Graph, Key highlights, Creating a Graph, Regression example, Gradient Descent, Tensor Board, Modularity, Sharing Variables, Keras Perceptrons: What is a Perceptron, XOR Gate.

UNIT II

Activation Functions: Sigmoid, ReLU, Hyperbolic Fns, Softmax Artificial Neural Networks: Introduction, Perceptron Training Rule, Gradient Descent Rule.

UNIT III

Gradient Descent and Back propagation: Gradient Descent, Stochastic Gradient Descent, Back propagation, Some problems in ANN Optimization and Regularization: Overfitting and Capacity, Cross Validation, Feature Selection, Regularization, Hyper parameters.

UNIT IV

Introduction to Convolutional Neural Networks: Introduction to CNNs, Kernel filter, Principles behind CNNs, Multiple Filters, CNN applications.

Introduction to Recurrent Neural Networks: Introduction to RNNs, Unfolded RNNs,Seq2Seq RNNs, LSTM, RNN applications

UNIT V

Deep Learning applications: Image Processing, Natural Language Processing, Speech Recognition, Video Analytics.

Course Outcomes:

After Completion of the course the student will be able to

1. Understand the concepts of Tensor Flow, its main functions, operations and the execution pipeline.
2. Implement deep learning algorithms, understand neural networks and traverse the layers of data abstraction which will empower the student to understand data more precisely.
3. Learn topics such as Convolutional neural networks, recurrent neural networks, training deep networks and high-level interfaces
4. Build deep learning models in Tensor Flow and interpret the results
5. Understand the language and fundamental concepts of artificial neural networks Troubleshoot and improve deep learning models
6. Differentiate between machine learning, deep learning and artificial intelligence

TEXT BOOKS:

1. Goodfellow, I., Bengio,Y., and Courville, A., Deep Learning, MIT Press, 2016.

REFERENCE BOOKS:

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.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	**3**						**2**		**2**				**2**
CO2	**2**						**3**		**3**				
CO3	**3**						**2**		**2**				**1**
CO4	**2**						**2**		**3**				
CO5	**3**						**1**		**2**			**2**	
CO6	**3**						**1**		**2**				**3**

3- High mapping **2-Medium Mapping** **1- Low Mapping**

Sri Venkateswara College of Engineering and Technology
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M.TECH- II Semester CSE

L	T	P	C
3	0	0	3

20BCS15 **ADVANCED DATA BASES**
(Professional Elective- III)

Course Objectives:

The objectives of this course are to

1. Learn the modeling and design of databases.
2. Acquire knowledge on parallel and distributed databases and its applications.
3. Study the usage and applications of Object Oriented database
4. Learn how enterprise applications use databases technologies.

UNIT I

Object Based Databases: Overview - 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 II

XML: Motivation - Structure of XML data - XML Document schema - Querying and Transformation - Application Program Interface to XML - Storage of XML data - XML applications.

UNIT III

Query processing: Overview - Measures of Query Cost - Selection operating - sorting - Join operation - Other Operations - Evaluation of Expressions.

Query Optimization: Overview - Transformation of Relational Expressions - Estimating Statistics of Expressing Results - Choice of Evaluation plans - Materialized Views.

UNIT IV

Parallel Databases: Introduction - I/O Parallelism - Interquery Parallelism – Interquery Parallelism- Interoperation Parallelism - Query Optimization - Design of Parallel Systems.

Distributed Databases: Homogenous 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.

UNITV

Advanced Application development: PerformanceTuning - Performance Benchmarks - Other Issues in Application Development – Standardization.

Spatial and Temporal Data and Mobility: Motivation- Time in Databases - spatial and Geographical Data - Multimedia Databases - Mobility and Personal databases.

Course Outcomes:

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

1.Select the appropriate high performance database like parallel and distributed database

2.Represent the data using XML database for better interoperability

3.Represent the basics of new trends such as: XML in relational databases, spatial data, multimedia databases.

4.Design the process and optimize database transactions.

TEXT BOOKS:

1. Abraham Silbershatz, Henry F Korth, S Sudharshan, "Database System Concepts", McGrawHill International Edition, Sixth Edition,2010.
2. R.Elmasri, S.B.Navathe, Somayajulu, Gupta, "Fundamentals of Database Systems", Pearson Education, Fourth Edition, 2006.

REFERENCE BOOKS:

1. C.J.Date, A.Kannan and S.Swamynathan, "An Introduction to Database Systems", Eighth Edition, Pearson Education,2006.
2. Raghu Ramakrishnan, Johannes Gehrke, "Database Management Systems", McGraw Hill, Third Edition2004.
3. Thomas Cannolly and Carolyn Begg, "Database Systems, A Practical Approach to Design, Implementation and Management", Third Edition, Pearson Education,2007.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	**3**												**1**	
CO2	**3**	**3**	**2**											**2**
CO3	**2**	**3**	**3**											
CO4		**3**	**2**										**3**	

3- High mapping **2-Medium Mapping** **1- Low Mapping**

Sri Venkateswara College of Engineering and Technology
(Autonomous)

M.TECH- II Semester CSE

L	T	P	C
3	0	0	3

20BCS16 **ETHICAL HACKING**
(Professional Elective- IV)

Course Objectives:

The objectives of this course are to

1. Understand about network and computer attacks.
2. Understand Intrusion Detection, Policy Creation, Social Engineering, Buffer Overflows and different types of Attacks and their protection mechanisms.
3. Learn about ethical laws and tests.
4. Learn how to scan, test, hack and secure the systems.

UNITI

Ethical Hacking Overview: Introduction to Ethical Hacking, overview of TCP/IP,IP Addressing, Overview of numbering systems, Network and computer Attacks: malicious software(malware), viruses, macro viruses, worms, Trojan programs, spyware, adware, Protecting against malware attacks

UNIT II

Intruder attacks on networks and computers, Addressing Physical Security, Foot printing and social Engineering: using web tools for foot printing, conducting competitive Intelligence, using domain name system zone transfers, introduction to social engineering.

UNIT III

Introduction to port scanning, using port scanning tools, conducting ping sweeps, understanding scripting, **Enumeration:** Introduction to enumeration, enumerating windows operating systems, enumerating the NetWare operating systems

UNIT IV

Programming for security professionals: Introduction to computer programming, Anatomy of a C Program, Understanding HTML basics, Understanding Perl, understanding Object oriented programming concepts, Windows OS vulnerability, tools for identifying vulnerability in windows, Best practices for handling windows systems.

UNIT V

Hacking Wireless Networks: Understanding Wireless Technologies, Wireless Network Standards, Authentication, war driving, Wireless hacking.

Network Protection Systems: Understanding Routers, Firewalls, Intrusion Detection and Prevention System, Honey pots.

Course Outcomes:

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

1 Evaluate where information networks are most vulnerable.
2 Perform penetration tests into secure networks for evaluation purposes.
3 identifying tools for vulnerability in windows.
4 Develop an ongoing security strategy.

TEXT BOOKS:

1. Michael T. Simpson, Kent Backman, James E.Corley, "*HandsOn Ethical Hacking and Network Defence"*, Second Edition, CENGAGE Learning, 2010.

REFERENCE BOOKS:

1. Steven DeFino, Barry Kaufman, Nick Valenteen, "*Official Certified Ethical Hacker Review Guide"*, CENGAGE Learning,2009.
2. Patrick Engebretson, "*The Basics of Hacking and Penetration Testing: Ethical Hacking and Penetration Testing Made Easy*", Syngress Basics Series – Elsevier, August 4,2011.
3. Whitaker & Newman, "Penetration *Testing and Network Defence"*, Cisco Press, Indianapolis, IN, 2006.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	**3**	**2**	**2**										**1**	
CO2			**2**	**3**										**2**
CO3			**3**				**2**							
CO4		**3**			**3**								**3**	

3- High mapping **2-Medium Mapping** **1- Low Mapping**

Sri Venkateswara College of Engineering and Technology
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M.TECH- II Semester CSE

L	T	P	C
3	0	0	3

20BCS17 BLOCK CHAIN TECHNOLOGY
(Professional Elective- IV)

Course Objectives:

The objectives of this course are to

1. Introduce block chain technology.
2. Discuss about bit coin crypto currency system.
3. Impart knowledge about building and deploying block chain applications.
4. Facilitate learning of using block chain for applications other than crypto currency.
5. Explore platforms such as Ethereum, Hyper ledger Fabric to build applications on block chain.

UNIT I

BITCOIN AND CRYPTOCURRENCY: A basic crypto currency, Creation of coins, Payments and double spending, FORTH – the precursor for Bitcoin scripting, Bitcoin Scripts, Bitcoin P2P Network, Transaction in Bitcoin Network, Block Mining, Block propagation and block relay, Consensus introduction, Distributed consensus in open environments-Consensus in a Bitcoin network.

UNIT II

INTRODUCTION TO BLOCKCHAIN: Blockchain-Public Ledgers, Blockchain as Public Ledgers - Bitcoin, Blockchain 2.0, Smart Contracts, Block in a Blockchain, Transactions-Distributed Consensus, The Chain and the Longest Chain - Crypto currency to Blockchain 2.0 - Permissioned Model of Blockchain, Cryptographic -Hash Function, Properties of a hash function-Hash pointer and Merkle tree.

UNIT III

BITCOIN CONSENSUS: Bitcoin Consensus, Proof of Work (PoW)- Hashcash PoW , Bitcoin PoW, Attacks on PoW ,monopoly problem- Proof of Stake- Proof of Burn - Proof of Elapsed Time - Bitcoin Miner, Mining Difficulty, Mining Pool-Permissioned model and use cases, Design issues for Permissioned Blockchains, Execute contracts- Consensus models for Permissioned block chain-Distributed consensus in closed environment-Paxos.

UNIT IV

DISTRIBUTED CONSENSUS: RAFT Consensus-Byzantine general problem, Byzantine fault tolerant system-Agreement Protocol, Lamport-Shostak-Pease BFT Algorithm-BFT over Asynchronous systems, Practical Byzantine Fault Tolerance.

UNIT V

HYPER LEDGER FABRIC & ETHERUM: Architecture of Hyperledger fabric v1.1-Introduction to Hyperledger fabric v1.1, chain code- Ethereum: Ethereum network, EVM, Transaction fee, Mist Browser, Ether, Gas, Solidity, Smart contracts, Truffle-Design and issue Crypto currency, Mining, DApps, DAO.

BLOCKCHAIN APPLICATIONS: Internet of Things-Medical Record Management System-Blockchain in Government and Blockchain Security-Blockchain Use Cases –Finance.

Course Outcomes:

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

1. Understand emerging abstract models for Blockchain Technology.
2. Identify major research challenges and technical gaps existing between theory and practice in crypto currency domain.
3. Provide conceptual understanding of the function of Blockchain as a method of securing distributed ledgers, how consensus on their contents is achieved, and the new applications that they enable.
4. Apply hyper ledger Fabric and Etherum platform to implement the Block chain Application.

TEXT BOOKS:

1. Melanie Swan, “Blockchain: Blueprint for a New Economy”, O’Reilly, 2015.
2. Andreas Antonopoulos, “Mastering Bitcoin: Unlocking Digital Crypto currencies”, O’Reilly, 2014.

REFERENCE BOOKS:

1. Iran Bashir “Mastering Blockchain”, Second Edition Paperback, 2018.
2. Daniel Drescher, “Blockchain Basics”, First Edition, Apress, 2017.
3. Ritesh Modi, “Solidity Programming Essentials: A Beginner’s Guide to Build Smart Contracts for Ethereum and Blockchain”, Packt Publishing.
4. Mastering Blockchain: Deeper insights into decentralization, cryptography, Bitcoin, and popular Blockchain frameworks by Bashir, Imran,2017.
5. Arvind Narayanan, Joseph Bonneau, Edward Felten, Andrew Miller, and Steven Gold feder. Bitcoin and crypto currency technologies: a comprehensive introduction. Princeton University Press, 2016.
6. Joseph Bonneau et al, SoK: Research perspectives and challenges for Bitcoin and crypto currency, IEEE Symposium on security and Privacy, 2015.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	**3**												**2**	
CO2	**3**					**3**				**2**				**2**
CO3	**2**						**1**		**2**					
CO4	**2**	**3**	**2**										**1**	

3- High mapping **2-Medium Mapping** **1- Low Mapping**

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M.TECH- II Semester CSE

L	T	P	C
3	0	0	3

20BCS18 PATTERN RECOGNITION
(Professional Elective- IV)

Course Objectives:

The objectives of this course are to

1. Describe the basic concepts andmeasures for pattern
2. Explore different types of Selection and Extraction of pattern.
3. Understanding a broad range of models.
4. Able to understand various pattern classification .
5. Learn the detailed view of clustering techniques involved in patterns recognition

UNITI INTRODUCTION

Basic concepts- Definitions-Types of data for Pattern Recognition,-Structure of a typical pattern recognition system-Design cycle of Pattern Recognition- Learning and Adaptation-Mathematical foundations: Linear algebra – Probability theory – Expectation – Mean and Covariance – Normal distribution – Multivariate normal densities – Chi square test of hypothesis.

UNITII

FEATURES EXTRACTION : Principal Component Analysis (PCA), Kernel PCA

UNITIII MODELS

Parameterestimationmethods:Maximum-Likelihoodestimation–BayesianParameterestimation – Dimension reduction methods – Principal Component Analysis (PCA) – Fisher Linear discriminant analysis – Expectation – maximization (EM) – Hidden Markov Models (HMM) – Gaussian mixture models.

UNITIV PATTERN CLASSIFICATION

Pattern classification using Statistical classifiers - Bayes' classifier - Classification performance measures – Risk and error probabilities. Linear Discriminant Function, Mahalanobis Distance, K-NN Classifier, Fisher's LDA, Single Layer Perceptron, Multi-layer Perceptron, Training set, test set; standardization and normalization

UNITV CLUSTERING TECHNIQUES

Unsupervised Learning and Clustering: Criterion functions for clustering – Clustering Techniques: Iterative square – Error partitional clustering – K-Means – agglomerative hierarchical clustering – Cluster validation.

Course Outcomes:

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

1.Apply the mathematical foundations for recognition of patterns.

2. Acquire the knowledge of pattern selection and Extraction.

3.Identify the pattern Recognition models.

4.Gathered deep knowledge of various methods used in classifer

5 . Apply the clustering techniques in pattern Recognition in real time applications.

TEXT BOOKS:

1. Devi V.S.; Murty, M.N. (2011) Pattern Recognition: An Introduction, Universities Press, Hyderabad.
2. R.O.Duda, P.E.Hart and D.G.Stork, Pattern Classification, John Wiley, 2006.
3. Statistical pattern Recognition; K. Fukunaga; Academic Press, 2000.
4. S.Theodoridis and K.Koutroumbas, Pattern Recognition, 4th Ed., Academic Press, 2009.

REFERENCES

1. Bishop, Christopher M., "Pattern Recognition and Machine Learning", First Edition, Springer,2009.
2. S. Theodoridis, K. Koutroumbas, "Pattern Recognition", Fourth Edition, Academic Press, 2009.
3. Keinosuke Fukunaga, "Introduction to Statistical Pattern Recognition", Second Edition, Academic Press,2003.
4. Sergios Thedoridis, Konstantinos Koutroumbas, "Pattern Recognition", Fourth Edition, Academic Press,2009.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	**3**	**3**											**2**	
CO2	**3**	**3**	**1**											**1**
CO3		**2**			**3**						**3**		**2**	
CO4	**2**	**3**		**2**		**1**								**2**
CO5	**2**	**3**												

3- High mapping **2-Medium Mapping** **1- Low Mapping**

Sri Venkateswara College of Engineering and Technology
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M.TECH- II Semester CSE

L	T	P	C
0	0	4	2

(20BCS19) **MINI PROJECT**

Sri Venkateswara College of Engineering and Technology
(Autonomous)

M.TECH- II Semester CSE

L	T	P	C
0	0	4	2

20BCS20 COMPUTER SCIENCE APPLICATIONS LAB-III

Course Objectives:

The objectives of this course are to

1. A student will be familiar with Hadoop and its operating modes
2. Able to design map reduce programs
3. Understanding and installing pig Latin tools and familiar with their commands
4. To create fully functional pig Latin Scripts

LIST OF EXPERIMENTS

ADVANCEDDATABASELAB

DISTRIBUTED DATABASE:

1. Consider a distributed database for a bookstore with 4 sites called S1, S2, S3 and S4. Consider the following relations:
Books (ISBN, primary Author, topic, total Stock, price)
Book Store (store No, city, state, zip, inventory Value)
Stock (store No, ISBN, Qty)
Total Stock is the total number of books in stock and inventory Value is the total inventory value for the store in dollars.
Consider that Books are fragmented by price amounts into:
F1: Books: price up to $20
F2: Books: price from $20.01 to $50 F3:
Books: price from $50.01 to $100 F4:
Books: price $100.01 and above
Similarly, Book Stores are divided by ZIP codes into:
S1: Bookstore: Zip up to 25000 S2:
Bookstore: Zip 25001 to50000 S3:
Bookstore: Zip 50001to75000
S4: Bookstore: Zip 75001 to 99999 Task:
Write SQL query for the following
1. Insert and Display details in eachtable.
2. Find the total number of books in stock where price is between $15and$55.
3. Update the book price of book No=1234 from $45 to $55 at siteS3.
4. Find total number of book atsiteS2.

OBJECT ORIENTED DATABASE:

2. A University wants to track persons associated with them. A person can be an Employeeor Student. Employees are Faculty, Technicians and Project associates. Students are Full time students, Part time students and TeachingAssistants.
a) Design an Enhanced Entity Relationship (EER) Model for universitydatabase.
Write OQL for the following

i. Insert details in each object.
ii. Display the Employeedetails.
iii. Display StudentDetails.
iv. Modify persondetails.
v. Delete person details.

b) Extend the design by incorporating the following information. Students are registering for courses which are handled by instructor searchers (graduate students).Faculty are advisors to graduate students. Instructor researchers' class is a category with super class of faculty and graduate students. Faculty are having sponsored research projects with a grant supporting instruction researchers. Grants are sanctioned by different agencies. Faculty belongs to different departments. Department is chaired by a faculty. Implement for the Insertion and Display of details in eachclass.

PARALLEL DATABASE:

3. Consider the application for University Counseling for Engineering Colleges. The college, departmentandvacancydetailsaremaintainedin3sites.Studentsareallocatedcollegesinthese3 sites simultaneously. Implement this application using parallel database [State any assumptions you have made]

ACTIVE DATABASE:

4. Create triggers and assertions for Bank database handling deposits and loan and admission database handling seat allocation and vacancy position. Design the above relational database schema and implement the following triggers andassertions.

a. Whenadepositismadebyacustomer,createatriggerforupdatingcustomersaccount andbank account.
b. When a loan is issued to the customer, create a trigger for updating customer'sloan account and bankaccount.
c. Create assertion for bank database so that the total loan amount does not exceed the total balance in thebank.
d. When an admission is made, create a trigger for updating the seat allocation detailsand vacancyposition.

DEDUCTIVE DATABASE:

5. Construct a knowledge database for kinship domain (family relations) with facts. Extract the following relations using rules. Parent,Sibling,Brother,Sister,Child,Daughter,Son,Spouse,Wife,husband,Grandparent,Grandchild , Cousin, Aunt and Uncle.

WEKA TOOL:

6. Work with Weka tool classification and clustering algorithms using the given training data and test with the unknown sample. Also experiment with different scenarios and largedataset.

RID	Age	Income	Student	Credit rating	Class: buys_ computer
1	youth	high	no	Fair	no
2	youth	high	no	Excellent	no
3	middle-aged	high	no	Fair	yes
4	senior	medium	no	Fair	yes
5	senior	low	yes	Fair	yes
6	senior	low	yes	excellent	no
7	middle-aged	low	yes	excellent	yes
8	youth	medium	no	Fair	no
9	youth	low	yes	Fair	yes
10	senior	medium	yes	Fair	yes
11	Youth	medium	yes	excellent	yes
12	middle-aged	medium	no	excellent	yes
13	middle-aged	high	yes	Fair	yes

QUERY PROCESSING:

7. Implement Query Optimizer with Relational Algebraic expression construction and execution plan generation for choosing an efficient execution strategy for processing the given query. Also design employee database and test the algorithm with following samplequeries.

a) Select empid, empname from employee where experience>5
b) Find all managers working at LondonBranch

XML:

8. Design XML Schema for the given company database
   Department (deptName, deptNo, dept Manager SSN, dept Manager Start Date, Dept Location)
   Employee (empName, empSSN, empSex, empSalary, empBirthDate,empDeptNo, EmpSupervisorSSN, empAddress,empWorksOn)
   Project (projName, projNo, projLocation, projDeptNo, projWorker)
   a. Implement the following queries using XQueryandXPath
      i. Retrieve the department name, manager name, and manager salaryfor everydepartment'
      ii. Retrieve the employee name, supervisor name and employee salary for each employee who works in theResearchDepartment.
      iii. Retrieve the project name, controlling department name, numberof employees and total hours worked per week on the project for each project.
      iv. Retrieve the project name, controlling department name, numberof employees and total hours worked per week on the project for each project with more than one employee workingonit.
   b. Implement a storage structure for storing XML database and test with the aboveschema.

BIG DATA ANALYTICSLAB

9. Perform some tasks by using web based tools of Hadoopsystem.

10. Implement the following file management tasks inHadoop:
    - Adding file and directories
    - Creating file, Retrieving file and deleting files
11. Using Hive; create, insert, update, alter, delete, and drop thetables.
12. Write Pig Latin scripts using several functions to analyze yourdata.

Course Outcomes:

After Completion of the course the student will be able to

1.Create and work on object oriented databases and work with parallel database.
2.Work on weka tool for clustering and classification.
3.Represent the database using XML and work on it.
4. Students will be able to write file management program inHadoop.
5. Handle Hive commands and develop scripting language of PigLatin

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	**3**	**3**												
CO2		**3**												
CO3	**2**		**3**											
CO4		**3**												
CO5		**3**												

3-Highmapping **2-MediumMapping** **1- LowMapping**

Sri Venkateswara College of Engineering and Technology
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M.TECH- II Semester CSE

L	T	P	C
0	0	4	2

20BCS21 COMPUTER SCIENCE APPLICATIONS LAB-IV

Course Objectives:

The objectives of this course are to

1. Apply machine learning algorithms to solve problems
2. Implementation of various algorithms on different sets of data
3. Understand Arduino, Raspberry Pi compiler and Python language in Linux/Windows environment
4. Design & Development of IoT Application Using Raspberry Pi2 and ThingSpeak.

LIST OF EXPERIMENTS

1. Implement and demonstrate the FIND-S algorithm for finding the most specific hypothesis based on a given set of training data samples. Read the training data from a .CSV file.
2. For a given set of training data examples stored in a .CSV file, implement and demonstrate the Candidate-Elimination algorithm to output a description of the set of all hypotheses consistent with the training examples.
3. Construct a Bayesian network considering medical data. Use this model to demonstrate the diagnosis of heart patients using standard Heart Disease Data Set. You can use Java/Python ML library classes/API.
4. Implement the naïve Bayesian classifier for a sample training data set stored as a .CSV file. Compute the accuracy of the classifier, considering few test data sets.
5. Apply EM algorithm to cluster a set of data stored in a .CSV file. Use the same data set for clustering using *k*-Means algorithm. Compare the results of these two algorithms and comment on the quality of clustering. You can add Java/Python ML library classes/API in the program.
6. Implement *k*-Nearest Neighbour algorithm to classify the iris data set. Print both correct and wrong predictions. Java/Python ML library classes can be used for this problem.
7. Build an Artificial Neural Network by implementing the Backpropagation algorithm and test the same using appropriate data sets.
8. Study and implement the Temperature sensor to monitor temperature using Arduino
9. Familiarize with ThingSpeak and understand the procedure of creation of a Channel over ThingSpeak.
10. Understand the integrated procedure of creation, analysis, scheduling and visualization of a Channel.
11. Read Light Sensor data from ThingSpeak channel and store it into database through Raspberry pi2.
12. Setting up wireless access point using Raspberry Pi.

Course Outcomes:

After Completion of the course the student will be able to

1. Implement various algorithms to solve problems.
2. Design and implement various machine learning algorithms in a wide range of real- world applications.
3. Implement various IoT Applications using Raspberry Pi and ThingSpeak

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	**3**	**3**												
CO2		**3**												
CO3	**2**		**3**											

3- High mapping **2-Medium Mapping** **1- Low Mapping**

Sri Venkateswara College of Engineering and Technology
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M.TECH- II Semester CSE

L	T	P	C
2	0	0	0

20BDS23 VALUE EDUCATION
(AUDIT COURSE-II)

Course Objectives:

The objectives of this course are to
1.Understand value of education and self- development.
2. Imbibe good values in students.
3. Let the should know about the importance of character.

UNIT I

Values and self-development –Social values and individual, attitudes. Work ethics, Indian vision of humanism, Moral and non- moral valuation. Standards and principles, Value judgements

UNIT II

Importance of cultivation of values, Sense of duty. Devotion, Self-reliance. Confidence, Concentration. Truthfulness, Cleanliness, Honesty, Humanity. Power of faith, National Unity, Patriotism. Love for nature, Discipline.

UNITIII

Personality and Behavior Development - Soul and Scientific attitude., Positive Thinking. Integrity and discipline, Punctuality, Love and Kindness, Avoid fault Thinking, Free from anger, Dignity of labour.

UNITIV

Universal brotherhood and religious tolerance, True friendship, Happiness Vs suffering, love for truth, Aware of self-destructive habits, Association and Cooperation, Doing best for saving nature.

UNIT -V

Character and Competence –Holy books vs Blind faith, Self-management and Good health, Science of reincarnation, Equality, Nonviolence, Humility, Role of Women, All religions and same message, Mind your Mind, Self-control, Honesty, Studying effectively

Course Outcomes:

After Completion of the course the student will be able to

1. Familiar with the design process to develop visualization methods and visualization systems, and methods for their evaluation.
2. Preparation and processing of data, visual mapping and the visualization
3. Have an understanding of large-scale abstract data

TEXT BOOKS:

1. Ward, Grinstein Keim, Interactive Data Visualization: Foundations, Techniques, and Applications. Natick: A K Peters, Ltd.

Sri Venkateswara College of Engineering and Technology
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M.TECH- III Semester CSE

L	T	P	C
3	0	0	3

20BDS12 OPTIMIZATION TECHNIQUES

(Professional Elective- V)

Course Objectives:

The objectives of this course are to

1. Understand inventory model and business replacement problems.
2. Find best method for solving linear programming, Optimization of transport problems.
3. Find solution to convex programming problem, quadratic programming problem.

UNIT I

UNCONSTRAINED OPTIMIZATION: Optimizing Single-Variable Functions, conditions for Local Minimum and Maximum, Optimizing Multi-Variable Functions.

UNIT II

CONSTRAINED OPTIMIZATION: Optimizing Multivariable Functions with Equality Constraint: Direct Search Method, Lagrange Multipliers Method, Constrained Multivariable Optimization with inequality constrained: Kuhn-Tucker Necessary conditions, Kuhn – Tucker Sufficient Conditions.

UNIT III

OPTIMIZATION: Quasi-Newton Methods and line search, least squares optimization, Gauss-Newton, Levenberg- Marquartd, Extensions of LP to Mixed Integer Linear Programming (MILP), Non-Liner Programming, The Newton Algorithm, Non-Linear Least Squares, Sequential Quadratics Programming (SQP), Constrained Optimization, SQP Implementation, Multi-Objective Optimization, Branch and Bound Approaches, Genetic Algorithms and Genetic Programming, Singular Based Optimization, On-Line Real-Time Optimization, Optimization in Econometrics Approaches – Blue.

UNIT IV

OPTIMIZATION AND FUNCTIONS OF A COMPLEX VARIABLE AND NUMERICAL ANALYSIS: The Finite Difference Method for Poisson's Equation in two Dimensions and for the Transient Heat Equation, Eulers Method, The Modified Euler Method and the Runga-Kutta Method for Ordinary Differential Equations, Gaussian Quardative Tranzoidal Rule and Simpson's 1/3 and 3/8 Rules, the Newton Raphson in one and two Dimensions, Jacobi's Iteration Method.

UNIT V

OPTIMIZATION IN OPERATION RESEARCH: Dynamic Programming, Transportation – Linear Optimization Simplex and Hitchcock Algorithms, Algorithms, Minimax and Maximum Algorithm, Discrete Simulation, Integer Programming – Cutting Plane Methods, Separable Programming, Stochastic Programming, Goal Programming, Integer Linear Programming, Pure and Mixed Strategy in theory of

Games, Transshipment Problems, Heuristic Methods.

Course Outcomes:

After Completion of the course the student will be able to

1. Understand the overview of optimization techniques, concepts of design space, constraint surfaces and objective function.
2. Review differential calculus in finding the maxima and minima of functions of several variables.
3. Formulate real-life problems with linear programming.
4. Apply dynamic programming to optimize multi stage decision problems.

TEXT BOOKS:

1. Winston W L: (01-Jan-2008) Operations Research: Applications and Algorithms, Thomson Business Press.
2. Singiresu S. Rao, S. S. Rao(2009), Engineering Optimization: Theory and Practice, (4th edition, John Wiley & Sons.

REFERENCE BOOKS:

1. Williams H.P. (2013): Model Building in Mathematics Programming, (5th ed.), John Wiley.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	**3**												**2**	
CO2	**2**													**2**
CO3							**1**		**3**					
CO4							**2**		**3**		**2**		**2**	

3- High mapping **2-Medium Mapping** **1- Low Mapping**

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M.TECH- III Semester CSE

L	T	P	C
3	0	0	3

20BCS22 SEMANTIC WEB ANDSOCIAL NETWORKS
(Professional Elective- V)

Course Objectives:

The objectives of this course are to

1. Learn Web Intelligence, Knowledge Representation for the Semantic Web
2. Learn Ontology Engineering
3. Learn Semantic Web Applications, Services and Technology
4. Learn Social Network Analysis and Semantic Web

UNIT -I
Web Intelligence

Thinking and Intelligent Web Applications, The Information Age ,The World Wide Web, Limitations of Today's Web, The Next Generation Web, Machine Intelligence, Artificial Intelligence, Ontology, Inference engines, Software Agents, Berners-Lee www, Semantic Road Map, Logic on the semantic Web.

UNIT- II
Knowledge Representation for the Semantic Web

Ontologies and their role in the semantic web, Ontologies Languages for the Semantic Web – Resource Description Framework(RDF) / RDF Schema, Ontology Web Language(OWL), UML, XML/XML Schema.

UNIT-III
Ontology Engineering

Ontology Engineering, Constructing Ontology, Ontology Development Tools, Ontology Methods, Ontology Sharing and Merging, Ontology Libraries and Ontology Mapping, Logic, Rule and Inference Engines.

UNIT-IV
Semantic Web Applications, Services and Technology

Semantic Web applications and services, Semantic Search, e-learning, Semantic Bioinformatics, Knowledge Base ,XML Based Web Services, Creating an OWL-S Ontology for Web Services, Semantic Search Technology, Web Search Agents and Semantic Methods.

UNIT-V
Social Network Analysis and semantic web

What is social Networks analysis, development of the social networks analysis, Electronic Sources for Network Analysis – Electronic Discussion networks, Blogs and Online Communities, Web Based Networks. Building Semantic Web Applications with social network features.

Course Outcomes:

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

1. Analyze the Semantic Web architectures, Perform Ontology reasoning.
2. Apply Ontology programming using Jena API.
3. Develop Ontology using Protégé editor, Perform queries on Ontology.
4. Develop Semantic Web Applications

TEXT BOOKS

1. Berners Lee, Godel and Turing , "*Thinking on the Web*", Wiley ,2008.
2. Peter Mika, "*Social Networks and the Semantic Web*, Springer,2007.

REFERENCE BOOKS:

1. J.Davies, R.Studer, P.Warren, *Semantic Web Technologies, Trends and Research in Ontology Based Systems*,John Wiley &Sons,2006.
2. Liyang Lu Chapman ,*Semantic Web and Semantic Web Services* ,Hall/CRC Publishers,2007.
3. Heiner Stucken Schmidt, Frank Van Harmelen, *Information Sharing on the semantic Web*, SpringerPublications,2006.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	**3**												**1**	
CO2	**2**	**3**				**2**								**2**
CO3	**2**									**3**			**2**	
CO4	**2**												**1**	

3- High mapping **2-Medium Mapping** **1- Low Mapping**

Sri Venkateswara College of Engineering and Technology
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M.TECH- III Semester CSE

L	T	P	C
3	0	0	3

20BCS23 SOFTWARE ARCHITECTURE AND DESIGN PATTERNS

(Professional Elective- V)

Course Objectives:

The objectives of this course are to
1. Understand and be able to apply incremental/iterative development
2. Understand common design patterns
3. Be able to identify appropriate design patterns for various problems
4. Be able to refactor poorly designed program by using appropriate design patterns.

Unit I

Introduction: what is a design pattern? describing design patterns, the catalog of design pattern, organizing the catalog, how design patterns solve design problems, how to select a design pattern, how to use a design pattern. What is object-oriented development? , key concepts of object oriented design other related concepts, benefits and drawbacks of the paradigm .

UNIT II

Analysis a System: overview of the analysis phase, stage 1: gathering the requirements functional requirements specification, defining conceptual classes and relationships, using the knowledge of the domain. Design and Implementation, discussions and further reading.

UNITIII

Design Pattern Catalog: Structural patterns, Adapter, bridge, composite, decorator, facade, flyweight, proxy.

UNIT IV

Interactive systems and the MVC architecture: Introduction , The MVC architectural pattern, analyzing a simple drawing program , designing the system, designing of the subsystems, getting into implementation , implementing undo operation , drawing incomplete items, adding a new feature , pattern based solutions.

UNITV

Designing with Distributed Objects: Client server system, java remote method invocation, implementing an object oriented system on the web (discussions and further reading) a note on input and output, selection statements, loops arrays.

Course outcomes:

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

1. Design and implement codes with higher performance and lower complexity
2. Be aware of code qualities needed to keep code flexible
3. Experience core design principles and be able to assess the quality of a design with respect to these principles.
4. Capable of applying these principles in the design of object oriented systems.
5. Demonstrate an understanding of a range of design patterns.

Text Books:

1. Object-oriented analysis, design and implementation, brahma dathan, sarnath rammath,universities press,2013

2. Design patterns, erich gamma, Richard helan, Ralph johman , john vlissides ,PEARSON ublication,2013.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	**3**	**3**	**3**										**1**	
CO2		**2**	**2**	**1**										**1**
CO3		**3**		**2**	**2**				**2**	**1**			**2**	
CO4		**2**	**2**		**3**		**2**							**2**
CO5														

3- High mapping **2-Medium Mapping** **1- Low Mapping**

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M.TECH- III Semester CSE

L	T	P	C
3	0	0	3

20BCS24 MOBILE APPLICATION DEVELOPMENT

(Professional Elective- VI)

Course Objectives:

The objectives of this course are to

1. Facilitate students to understand android SDK
2. Help students to gain a basic understanding of Android application development
3. Inculcate working knowledge of Android Studio development tool

UNIT I

Introduction to Android: The Android Platform, Android SDK, Eclipse Installation, Android Installation, Building you First Android application, Understanding Anatomy of Android Application, Android Manifest file.

UNIT II

Android Application Design Essentials: Anatomy of an Android applications, Android terminologies, Application Context, Activities, Services, Intents, Receiving and Broadcasting Intents, Android Manifest File and its common settings, Using Intent Filter, Permissions.

UNIT III

Android User Interface Design Essentials: User Interface Screen elements, Designing User Interfaces with Layouts, Drawing and Working with Animation.

UNIT IV

Testing Android applications, Publishing Android application, Using Android preferences, Managing Application resources in a hierarchy, working with different types of resources.

UNITV

Using Common Android APIs: Using Android Data and Storage APIs, Managing data using Sqlite, Sharing Data between Applications with Content Providers, Using Android Networking APIs, Using Android Web APIs, Using Android Telephony APIs, Deploying Android Application to the World.

Course Outcomes:

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

1. Identify various concepts of mobile programming that make it unique from programming for other platforms,
2. Critique mobile applications on their design pros and cons,
3. Utilize rapid prototyping techniques to design and develop sophisticated mobile interfaces,
4. Program mobile applications for the Android operating system that use basic and advanced phone features.
5. Deploy applications to the Android marketplace for distribution.

TEXT BOOKS:

1. Lauren Darcey and Shane Conder, "Android Wireless Application Development", Pearson Education, 2nd ed. (2011)

REFERENCE BOOKS:

1. Reto Meier, "Professional Android 2 Application Development", Wiley India Pvt Ltd 2. R2. Mark L Murphy, "Beginning Android", Wiley India Pvt Ltd 3. R3. Android Application Development All in one for Dummies by Barry Burd, Edition:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1						1	2	3					1	
CO2	1		2			2								1
CO3		2		2	2				2	1			1	
CO4		2	2		3		2						1	2
CO5			1		2		2						2	2

3- High mapping 2-Medium Mapping 1- Low Mapping

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M.TECH- III Semester CSE

L	T	P	C
3	0	0	3

20BCS25 **COMPUTER VISION**
(Professional Elective- VI)

Course Objectives:

The objectives of this course are to

1. Review image processing techniques for computer vision
2. Illustrate shape and region analysis
3. Describe Hough Transform and its applications to detect lines, circles, ellipses
4. Discuss three-dimensional image analysis techniques
5. Discuss motion analysis
6. Explore some applications of computer vision algorithms.

UNIT I

The image, its representations and properties – image representations a few concepts, Image digitization, Digital image properties, Color images, Cameras : an overview. Mathematical and physical background – Linear integral transforms, Images as stochastic processes, Image formation physics.

UNIT II

Data structures for image analysis- levels of image data representation, traditional image data structures, and Hierarchical data structures. Image understanding-fitting via random sample consensus, point distribution model .

UNIT III

Segmentation II – Mean Shift Segmentation , Active contour models – snakes, Geometric deformable model – level sets and geodesic active contours, Fuzzy connectivity, Towards 3D graph – based image segmentation, Graph cut segmentation

UNIT IV

3 D Vision Geometry – 3 D Vision tasks, basics of projective geometry, A Single perspective camera, Scene reconstruction from multiple views, two camera stereopsis, Use of 3D vision Shape from X, Full 3D objects, 3D model-based vision, 2D view based representations of a 3D scene.

UNIT V

Motion Analysis- Different Motion Analysis methods, Optical flow, analysis based on correspondence of interest points, Detection of specific motion patterns, video tracking.

Course Outcomes:

After completing the course, students will able to

1. Describe different image representation, their mathematical representation and different their data structures used.
2. Classify different segmentation algorithm for given input .
3. Create a 3D object from given set of images .
4. Detect a moving object in video using the concept of motion analysis .
5. Recognize the object using the concept of computer vision.

TEXT BOOK :

1. Milan Sonka, Vaclav Hlavac, Roger Boyle, ”Digital Image Processing and Computer Vision” Cengage Learning, 1st Edition, 2008

REFERENCE BOOK:

1.Digital image processing, by Gonzales Woods 3rd Edition, Pearson Education 2) Fundamental of Digital Image Processing by Anil K. Jain, PHI Pub.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	**3**		**2**					**2**		**2**				**2**
CO2	**3**						**1**						**1**	
CO3	**3**			**1**					**2**					**2**
CO4	**3**						**2**			**1**			**3**	
CO5	**3**		**2**											**2**

3- High mapping **2-Medium Mapping** **1- Low Mapping**

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M.TECH- III Semester CSE

L	T	P	C
3	0	0	3

20BCS26 SMART SENSORS AND INTERNET OF THINGS
(Professional Elective- VI)

Course Objectives:

The objectives of this course are to

1. Get knowledge about the importance of environmental parameters measurement and monitoring
2. Explore the comprehensive fundamentals of Smart Sensors
3. Understand the concept of smart home with the integration of IoT services
4. The use of IoT sensors to be embedded into products to improve processes or the products themselves.

UNIT I

Environmental Parameters Measurement and Monitoring: Why measurement and monitoring are important, effects of adverse parameters for the living being for IOT

UNIT II

Sensors: Working Principles: Different types; Selection of Sensors for Practical Applications Introduction of Different Types of Sensors such as Capacitive, Resistive, Surface Acoustic Wave for Temperature, Pressure, Humidity, Toxic Gas etc

UNIT III

Important Characteristics of Sensors: Determination of the Characteristics Fractional order element: Constant Phase Impedance for sensing applications such as humidity, water quality, milk quality Impedance Spectroscopy: Equivalent circuit of Sensors and Modeling of Sensors Importance and Adoption of Smart Sensors

UNIT IV

Architecture of Smart Sensors: Important components, their features Fabrication of Sensor and Smart Sensor: Electrode fabrication: Screen printing, Photolithography, Electroplating Sensing film deposition: Physical and chemical Vapor, Anodization, Sol-gel

UNIT V

Interface Electronic Circuit for Smart Sensors and Challenges for Interfacing the Smart Sensor, Usefulness of Silicon Technology in Smart Sensor And Future scope of research in smart sensor

Course Outcomes

After completing the course, students will able to

1. Understand the vision of IoT from a global context.
2. Determine the Market perspective of IoT.
3. Use of Devices, Gateways and Data Management in IoT.
4. Application of IoT in Industrial and Commercial Building Automation and Real World
5. Building state of the art architecture in IoT.

TEXT BOOKS:

1. Yasuura, H., Kyung, C.-M., Liu, Y., Lin, Y.-L., Smart Sensors at the IoT Frontier,Springer International Publishing .

2. Kyung, C.-M., Yasuura, H., Liu, Y., Lin, Y.-L., Smart Sensors and Systems, Springer International Publishing

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	**3**						**2**		**2**				**2**
CO2	**2**						**3**		**3**				
CO3	**3**		**1**				**2**		**2**				**1**
CO4	**2**						**2**		**3**				
CO5	**3**						**1**		**2**			**2**	

3- High mapping **2-Medium Mapping** **1- Low Mapping**

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M.TECH- III Semester CSE

L	T	P	C
0	0	20	10

20BCS27 **DISSERTATION PHASE-I**

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M.TECH- IV Semester CSE)	L	T	P	C
	0	0	32	16

20BCS28 **DISSERTATION PHASE-II**