

**ACADEMIC REGULATIONS
COURSE STRUCTURE
AND
DETAILED SYLLABI
For
MASTER OF TECHNOLOGY
in
COMPUTER SCIENCE**
(For the batches admitted from 2016-2017)
CHOICE BASED CREDIT SYSTEM



**DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
SREE VIDYANIKETHAN ENGINEERING COLLEGE**

(AUTONOMOUS)

**(Affiliated to JNTUA Ananthapuramu, Approved by AICTE
Programs Accredited by NBA; NAAC with 'A' grade)
Sree Sainath Nagar, A.Rangampet, Near Tirupati - 517 102 A.P**

VISION

To be one of the Nation's premier Engineering Colleges by achieving the highest order of excellence in Teaching and Research.

MISSION

- To foster intellectual curiosity, pursuit and dissemination of knowledge.
- To explore students' potential through academic freedom and integrity.
- To promote technical mastery and nurture skilled professionals to face competition in ever increasing complex world.

QUALITY POLICY

Sree Vidyanikethan Engineering College strives to establish a system of Quality Assurance to continuously address, monitor and evaluate the quality of education offered to students, thus promoting effective teaching processes for the benefit of students and making the College a Centre of Excellence for Engineering and Technological studies.



SREE VIDYANIKETHAN ENGINEERING COLLEGE (AUTONOMOUS)
SREE SAINATH NAGAR, A. RANGAMPET – 517102

Department of Computer Science and Engineering

Department of Computer Science and Engineering

VISION:

To become a centre of excellence in Computer Science and Engineering by imparting high quality education through teaching, training and research

MISSION:

1. The department of Computer Science and Engineering is established to provide undergraduate and graduate education in the field of Computer Science and Engineering to students with diverse background in foundations of software and hardware through a broad curriculum and strongly focused on developing advanced knowledge to become future leaders.
2. Create knowledge of advanced concepts, innovative technologies and develop research aptitude for contributing to the needs of industry and society.
3. Develop professional and soft skills for improved knowledge and employability of students.
4. Encourage students to engage in life-long learning to create awareness of the contemporary developments in computer science and engineering to become outstanding professionals.
5. Develop attitude for ethical and social responsibilities in professional practice at regional, National and International levels.

Program Educational Objectives

Within few years of graduation, M.Tech (CS) program graduates will be:

1. Enrolled in advanced studies in the domain of Computer Networks, Database Systems, Data Mining, Software engineering and Interdisciplinary areas.
2. Employed in academia, software development, Government and Research organizations or would have established start up companies.
3. Demonstrating effective communication and leadership skills in professional practice with ethical code, gain knowledge of contemporary and global issues and strive for continuous learning.

Program Outcomes (POs):

After successful completion of M.Tech (CS) program, graduates will be able to:

1. Acquire in-depth knowledge of specific discipline or professional area, including wider and global perspective, with an ability to discriminate, evaluate, analyze and synthesize

- existing and new knowledge, and integration of the same for enhancement of knowledge (**Scholarship of Knowledge**).
2. Analyze complex engineering problems critically; apply independent judgment for synthesizing information to make intellectual and/or creative advances for conducting research in a wider theoretical, practical and policy context (**critical Thinking**).
 3. Think laterally and originally, conceptualize and solve engineering problems, evaluate a wide range of potential solutions for those problems and arrive at feasible, optimal solutions after considering public health and safety, cultural, societal and environmental factors in the core areas of expertise (**Problem Solving**).
 4. Extract information pertinent to unfamiliar problems through literature survey and experiments, apply appropriate research methodologies, techniques and tools, design, conduct experiments, analyze and interpret data, demonstrate higher order skill and view things in a broader perspective, contribute individually/in group(s) to the development of scientific/technological knowledge in one or more domains of engineering (**Research Skill**).
 5. Create, select, learn and apply appropriate techniques, resources, and modern engineering and IT tools, including prediction and modelling, to complex engineering activities with an understanding of the limitations (**Usage of modern tools**).
 6. Possess knowledge and understanding of group dynamics, recognize opportunities and contribute positively to collaborative-multidisciplinary scientific research, demonstrate a capacity for self-management and teamwork, decision-making based on open-mindedness, objectivity and rational analysis in order to achieve common goals and further the learning of themselves as well as others (**Collaborative and Multidisciplinary work**).
 7. Demonstrate knowledge and understanding of engineering and management principles and apply the same to one's own work, as a member and leader in a team, manage projects efficiently in respective disciplines and multidisciplinary environments after consideration of economical and financial factors (**Project Management and Finance**).
 8. Communicate with the engineering community, and with society at large, regarding complex engineering activities confidently and effectively, such as, being able to comprehend and write effective reports and design documentation by adhering to appropriate standards, make effective presentations, and give and receive clear instructions (**communication**).

9. Recognize the need for, and have the preparation and ability to engage in life-long learning independently, with a high level of enthusiasm and commitment to improve knowledge and competence continuously (**Lifelong Learning**).
10. Acquire professional and intellectual integrity, professional code of conduct, ethics of research and scholarship, consideration of the impact of research outcomes on professional practices and an understanding of responsibility to contribute to the community for sustainable development of society (**Ethical Practices and Social Responsibility**).
11. Observe and examine critically the outcomes of one's actions and make corrective measures subsequently, and learn from mistakes without depending on external feedback (**Independent and Reflective Learning**).

Program Specific Outcomes (PSOs):

After successful completion of the program, graduates of M.Tech (CS) will:

1. Demonstrate advanced knowledge in data structures, Computer Networks, Computer Architecture, Database Systems, Operating Systems, Software Engineering, cloud computing and Big data. (PO1)
2. Analyze and Develop solutions for complex problems in computer science domain (PO2,PO3)
3. Design, implement, test and evaluate computer software and systems using modern techniques and tools (PO5)
4. Apply advanced knowledge to identify research challenges, and contribute individually or in teams to the development of Computer science domain (PO4,PO6)

**ACADEMIC REGULATIONS
CHOICE BASED CREDIT SYSTEM**

M. Tech. Regular Two Year Degree Program

(for the batches admitted from the academic year 2016–17)

For pursuing Two year degree program of study in Master of Technology (M.Tech) offered by Sree Vidyanikethan Engineering College under Autonomous status and herein after referred to as SVEC (Autonomous):

- 1. Applicability:** All the rules specified herein, approved by the Academic Council, shall be in force and applicable to students admitted from the academic year 2016-2017 onwards. Any reference to "College" in these rules and regulations stands for SVEC (Autonomous).
- 2. Extent:** All the rules and regulations, specified hereinafter shall be read as a whole for the purpose of interpretation and as and when a doubt arises, the interpretation of the Chairman, Academic Council is final. It shall be ratified by Academic Council in the forth coming meeting. As per the requirements of statutory bodies, Principal, SVEC (Autonomous) shall be the Chairman, Academic Council.
- 3. Admission :**
 - 3.1. Admission into the Two Year M. Tech. Degree Program of study in Engineering:**
 - 3.1.1. Eligibility:**
 - A candidate seeking admission into the two year M. Tech Degree Program should have
 - (i) Passed B.Tech / B.E or equivalent Program recognized by JNTUA, Anantapuramu, for admission as per the guidelines of Andhra Pradesh State Council of Higher Education (APSCHE).
 - (ii) A minimum percentage of marks in the qualifying degree as prescribed by the AICTE / UGC or Government at the time of admission.
 - (iii) Rank / score secured in the PGCET / GATE examination conducted by APSCHE/ MHRD for allotment of a seat by the convener PGCET, for admission.
 - 3.1.2. Admission Procedure:**

Admissions are made into the two year M.Tech. Degree Program as per the stipulations of APSCHE, Government of Andhra Pradesh:

 - (a) By the Convener, PGCET (for Category–A Seats)
 - (b) By the Management (for Category–B Seats).

4. Programs of study offered leading to the award of M.Tech. Degree and Eligibility:

Following are the two year postgraduate degree Programs of study offered in various branches at in SVEC (Autonomous) leading to the award of M.Tech. degree and eligibility to get admission into the Programs:

Name of the specialization	Offered by the Department	Name of the Degree / Branch eligible for Admission
Electrical Power Systems	EEE	BE/ B.Tech / AMIE in Electrical & Electronics Engineering / Electrical Engineering or equivalent
Digital Electronics and Communication Systems	ECE	BE / B.Tech in ECE / AMIE in ECE, AMIE (Electronics & Telecommunication Engineering) / AMIETE (Electronics & Telematics Engineering)/ Electronics & Computer Engineering/ Electronics/ Electronics & Telematics or equivalent
Communication Systems		
VLSI		
Computer Science	CSE	BE / B.Tech / AMIE in ECE, / EEE / CSE / Electronics & Computer Engineering / ETE / IT / CSIT / Electronics and Control Engineering / Instrumentation Engineering / Instrumentation Technology / EIE / Electronics Engineering / Bio-Medical Engineering / AMIETE (Electronics & Telematics Engineering)/ Electronics or equivalent
Computer Networks and Information Security		
Software Engineering		

5. Duration of the Program:

5.1 Minimum Duration: The program will extend over a period of two years leading to the Degree of Master of Technology (M.Tech) of the JNTUA, Ananthapuramu. The two academic years will be divided into four semesters with two semesters per year. In first year, each semester shall normally consist of 22 weeks (≥90 working days) having – ‘Continuous Internal Evaluation (CIE)’ and ‘Semester End Examination (SEE)’. In second year, each semester shall consist of 18 weeks and the entire year is for project work. Choice Based Credit System (CBCS) and Credit Based Semester System

(CBSS) as suggested by UGC, and Curriculum/ Course Structure as suggested by AICTE are followed.

5.2 Maximum Duration: The student shall complete all the passing requirements of the M.Tech degree program within a maximum duration of 4 years including Gap year, this duration reckoned from the commencement of the semester to which the student was first admitted to the program.

I SEMESTER (22 weeks)	INSTRUCTION PERIOD: I Spell : 7 Weeks II Spell : 9 Weeks	16 Weeks
	Internal Examinations : I Mid : 1 week II Mid : 1 week	2 Weeks
	Preparation & Practical Examinations	2 Week
	External Examinations	2 Weeks
	Semester Break	2 Weeks
II SEMESTER (22 weeks)	INSTRUCTION PERIOD: I Spell : 7 Weeks II Spell : 9 Weeks	16 weeks
	Internal Examinations : I Mid : 1 week II Mid : 1 week	2 Weeks
	Preparation & Practical Examinations	2 Week
	External Examinations	2 Weeks
	Summer Vacation	4 Weeks
III SEMESTER	Project Work Phase – I	19 Weeks
IV SEMESTER	Project Work Phase – II	19 Weeks
	Project Work Viva-Voce examinations	2 Weeks

6. Course Structure: Each Program of study shall consist of:

- Professional core courses:
The list of professional core courses are chosen as per the suggestions of the experts, to impart knowledge and skills needed in the concerned specialization of study.
- Professional elective courses:
Professional elective courses shall be offered to the students to diversify their spectrum of knowledge and skills. The elective courses can be chosen based on the interest of the student to broaden his individual knowledge and skills.
- Audit Courses: Audit courses shall be offered to the students to diversify their knowledge.

Contact periods: Depending on the complexity and volume of the course the number of contact periods per week shall be assigned.

7. **Credit System:** All Courses are to be registered by a student in a Semester to earn Credits. Credits are assigned based on the following norms given in Table 1.

Table 1

Course	Periods/Week	Credits
Theory	01	01
Practical	04	02
Seminar	--	02
Project Work Phase-I	--	--
Project Work Phase-II	--	28

- i. As a norm, for the theory courses, **one credit** for one contact period per week is assigned.
- ii. As a norm, for practical courses **two credits** will be assigned for four contact periods per week.
- iii. For courses like Project/Seminar, where formal contact periods are not specified, credits are assigned based on the complexity of the work to be carried out.
- iv. There are no credits for audit courses.

Other student activities like NCC, NSS, Sports, Study Tour, Guest Lecture etc. will not carry Credits.

The two year curriculum of any M. Tech Degree Program of study shall have total of **86** credits (28 credits in I Semester, 30 credits in II Semester and 28 credits in IV Semester).

8. **Choice Based Credit System (CBCS):**

Choice Based Credit System (CBCS) is introduced based on UGC guidelines in order to promote:

- Student centered learning
 - Cafeteria approach
 - Students to learn courses of their choice
 - Learning at their own pace
 - Interdisciplinary learning
- A student is introduced to "Choice Based Credit System (CBCS)"
 - The total credits for the Program is 86.
 - A student has choice of registering for credits from the theory courses offered in the program ensuring the total credits in a semester are between 24 and 34.
 - In I Semester, the student has the option of registering for one additional theory course from the latter semester or dropping one existing theory course from the current

semester within the course structure of the program. In II Semester also, the student has the option of registering for one additional theory course from the previous semester if dropped earlier within the course structure of the program. However the maximum number of credits the student can register in a particular semester cannot exceed 33 credits.

- Grade points, based on percentage of marks awarded for each course will form the basis for calculation of SGPA (Semester Grade Point Average) and CGPA (Cumulative Grade Point Average).
- All the registered credits will be considered for the calculation of final CGPA.

9. Course Enrollment and Registration

9.1 Each student, on admission shall be assigned to a Faculty Advisor (Mentor) who shall advise and counsel the student about the details of the academic program and the choice of courses considering the student's academic background and career objectives.

9.2 The enrollment of courses in I Semester will commence on the day of admission. If the student wishes, the student may drop or add courses (vide clause 8) within **three** days before commencement of I semester class work and complete the registration process. The student shall enroll for the courses with the help of the student's Faculty Advisor (Mentor). The enrollment of courses in II Semester will commence 10 days prior to the last instructional day of the I semester and complete the registration process for all the remaining theory courses as per program course structure, duly authorized by the Chairman, Board of studies of concern department.

9.3 If any student fails to register the courses in a semester, he shall undergo the courses as per the program structure.

9.4 After registering for a course, a student shall attend the classes, satisfy the attendance requirements, earn Continuous Assessment marks and appear for the Semester-end Examinations.

9.5 No elective course shall be offered by a Department unless a minimum of 8 students register for the course.

10. Massive Open Online Course (MOOC)

A Massive Open Online Course (MOOC) is an online course aimed at unlimited participation and open access via the web. MOOC is a model for delivering learning content online to any person who takes a course, with no limit on attendance.

- A student shall undergo a "Massive Open Online Course (MOOC)" for award of the degree besides other requirements.
- A student is offered this Online Course at the beginning of his II Semester of study and the course has to be completed by

the end of III Semester. If the student fails to complete the course by the end of III Semester, it shall be treated as a backlog and needs to be completed before completion of the program for the award of the degree.

- The student shall confirm registration by enrolling the course within 10 days prior to the last instructional day of the I semester like other courses.
- The courses will be approved by the Chairman, Academic Council, SVEC based on the recommendations of the Chairman, Board of Studies of concerned program considering current needs.
- A student has a choice of registering for only one MOOC with the recommendation of Chairman, Board of studies of concerned program and duly approved by the Chairman, Academic Council, SVEC.
- The student shall undergo MOOC without disturbing the normal schedule of regular class work.
- One faculty member assigned by the Head of the Department shall be responsible for the periodic monitoring of the course implementation.
- No formal lectures need be delivered by the faculty member assigned to the students.
- If any student wants to change the MOOC course already registered, he will be given choice to register a new MOOC course in M. Tech. II / III Semester only, with the recommendation of Chairman, Board of studies of concerned program and duly approved by the Chairman, Academic Council, SVEC.
- Finally, the performance of the student in the course will be evaluated as stipulated by the course provider. A certificate will be issued on successful completion of the course by the course provider.
- The performance in the MOOC will not be considered for the calculation of SGPA and CGPA of the student.
- The MOOC course will be listed in the grade sheets of the student.

11. Break of Study from a Program (Gap Year)

11.1 A student is permitted to go on break of study for a maximum period of one year.

11.2 The student shall apply for break of study in advance, in any case, not later than the last date of the first assessment period in a semester. The application downloaded from website and duly filled by the student shall be submitted to the Head of the Department. In the case of start-up for incubation of idea only, the application for break of study shall be forwarded by the Head of the Department to the Principal, SVEC. A sub-

committee appointed by the principal shall give recommendations for approval.

- 11.3** The students permitted to rejoin the program after break of study shall be governed by the Curriculum and Regulations in force at the time of rejoining. The students rejoining in new regulations shall apply to the Principal, SVEC in the prescribed format through Head of the Department at the beginning of the readmitted semester itself for prescribing additional/equivalent courses, if any, from any semester of the regulations in-force, so as to bridge the curriculum in-force and the old curriculum.
- 11.4** The total period for completion of the program reckoned from the commencement of the I Semester to which the student was admitted shall not exceed the maximum period specified in clause 5.2 irrespective of the period of break of study in order that the student may be eligible for the award of the degree (vide clause 19).
- 11.5** If a student has not reported to the department after approved period of break of study without any intimation, the student is treated as detained in that semester. Such students are eligible for readmission for the semester when offered next.
- 12. Examination System:** All components in any Program of study shall be evaluated through internal evaluation and / or an external evaluation conducted as semester-end examination.

12.1. Distribution of Marks:

Sl. No.	Course	Marks	Examination and Evaluation	Scheme of examination
1.	Theory	60	Semester-end examination of 3 hours duration (External evaluation)	The examination question paper in theory courses shall be for a maximum of 60 marks. The question paper shall be of descriptive type with 5 questions, taken one from each unit of syllabus, having internal choice and all 5 questions shall be answered. All questions carry equal marks.
		40	Mid-term Examination of 2 hours duration	The question paper shall be of descriptive type with 5 essay type

Sl. No.	Course	Marks	Examination and Evaluation	Scheme of examination	
			(Internal evaluation).	<p>questions out of which 4 are to be answered and evaluated for 40 marks.</p> <p>Two mid-term examinations each for 40 marks are to be conducted. For a total of 40 marks, 75% of better one of the two and 25% of the other one are added and finalized.</p> <p>Mid-I: After first spell of instruction (I to II Units).</p> <p>Mid-II: After second spell of instruction (III to V Units).</p>	
2	Laboratory	50	Semester-end Lab Examination for 3 hours duration (External evaluation)	50 marks are allotted for laboratory examination during semester-end.	
		50	30	Day-to-Day evaluation for Performance in laboratory experiments and Record. (Internal evaluation).	<p>Two laboratory examinations, which includes Day-to-Day evaluation and Practical test, each for 50 marks are to be evaluated. For a total of 50 marks 75% of better one of the two and 25% of the other one are added and finalized.</p> <p>Laboratory examination-I: Shall be conducted just before I mid-term examinations.</p>
			20	Practical test (Internal evaluation).	

Sl. No.	Course	Marks	Examination and Evaluation		Scheme of examination
					Laboratory examination-II: Shall be conducted just before II mid-term examinations.
3	Audit Course	-	-		Audit course will be conducted as given in 12.2.1
4	Seminar	100	Semester-end Examination		100 marks are allotted for Seminar during semester-end evaluation by the Departmental Committee (DC) as given in 12.2.2.
5	Project Work	400	200	External evaluation	Semester-end Project Viva-Voce Examination by Committee as detailed in 12.2.3.
			200	Internal evaluation	Continuous evaluation by the DC as detailed in 12.2.3. In each of Phase-I and Phase-II, 75% marks of better one of the two oral presentations and 25% marks of the other one are added and internal marks finalized.

12.2

12.2.1.

Audit Course/ Seminar/Project Work Evaluation:

Audit Course: For audit course, attendance shall be maintained like in case of any regular course. Students may be encouraged to submit assignments and give presentations on the course topics. There won't be any examinations for audit courses. However, the courses shall be listed in the grade sheet of the student.

12.2.2.

Seminar: For the seminar, the student shall collect information through literature survey on a specialized topic and prepare a technical report, showing his understanding over the topic, and submit to the Department a week before presentation. The report and the presentation shall be evaluated at the end of the semester during the period of preparation and practicals

by the Departmental Committee (DC) consisting of two senior faculty members and concerned supervisor of the department. The DC is constituted by the Principal on the recommendations of the Head of the Department. The department shall have individual DCs for each M. Tech. Program with senior faculty members and the supervisor specialized in the program.

12.2.3.

12.2.3.1.

Project Work:

Student shall register for the Project work with the approval of DC in the III Semester and continue the work in the IV Semester too. The DC shall monitor the progress of the project work. In III Semester, Phase-I of the Project Work has to be completed. A Student has to identify the topic of work, collect relevant Literature, preliminary data, implementation tools/ methodologies etc., and perform a critical study and analysis of the problem identified. He shall submit status report in two different phases in addition to oral presentation before the DC for evaluation and award of internal marks. At the end of Phase -I, the Viva-Voce examination shall be conducted as per the III Semester examinations schedule by a committee consisting of HOD, Supervisor and a senior faculty member specialized in the program other than the two senior faculty members of the DC. The senior faculty member will be nominated by the Chief Controller of the Examinations from the panel of three members submitted by the Department for all the students of the specialization. A candidate shall continue the Project Work in IV Semester (Phase - II) and submit a Project report at the end of Phase-II after approval of the DC. During Phase-II, the student shall submit status report in two different phases, in addition to oral presentation before the DC. The DC shall evaluate the project based on the progress, presentations and quality of work. A candidate shall be allowed to submit the dissertation only after passing all the courses from 1st to 3rd semesters and on recommendations of the DC. The Viva-Voce examination shall be conducted as per the IV Semester examinations schedule.

12.2.3.2

Three copies of the dissertation certified in the prescribed form by the concerned Supervisor and HOD shall be submitted to the Department. One copy is to be

submitted to the Chief Controller of Examinations, SVEC (Autonomous) and one copy to be sent to the examiner. The examiner shall be nominated by the Chief Controller of the Examinations from the panel of three examiners submitted by the Department for a maximum of 5 students at a time for adjudication.

12.2.3.3 If the report of the examiner is favourable, Viva-Voce examination shall be conducted by a board consisting of the concerned Supervisor, Head of the Department and the examiner who adjudicated the dissertation. The board shall jointly evaluate the candidates project work. If the report of the examiner is not favourable, the candidate should revise and resubmit the project report followed by Viva-Voce examination.

12.2.3.4 The candidates who fail in Viva-Voce examination shall have to re-appear the Viva-Voce examination after three months. Extension of time within the total permissible limit for completing the project is to be obtained from the Chairman, Academic Council, SVEC (Autonomous).

12.2.3.5 If a candidate desires to change the topic of the project already chosen, during Phase-II, he has to re-register for Project work with the approval of the DC and repeat Phases-I & II. Marks already earned in Phase-I stand cancelled.

12.2.3.6 If a candidate unable to complete the project work after Phase-II and desires to change the topic of the project already chosen, he has to re-register for Project work with the approval of the DC and repeat Phases-I & II. Marks already earned in Phase-I & II stand cancelled.

12.3. Eligibility to appear for the semester-end examination:

12.3.1 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.

12.3.2 Condonation of shortage of attendance in aggregate up to 10% (65% and above and below 75%) in each semester may be granted by the College Academic Committee.

12.3.3 Shortage of attendance below 65% in aggregate shall in no case be condoned.

12.3.4 Students whose shortage of attendance is not condoned in any semester shall not be eligible to take their semester-end examination and their registration shall stand cancelled.

- 12.3.5** A student shall not be promoted to the next semester unless he satisfies the attendance requirements of the 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.
- 12.3.6** A stipulated fee shall be payable to the college towards condonation of shortage of attendance.
- 12.4. Evaluation:** Following procedure governs the evaluation.
- 12.4.1.** Marks for components evaluated internally by the faculty should be submitted to the Controller of Examinations one week before the commencement of the semester-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 total marks for any course in that semester.
- 12.4.2.** Performance in all the courses is tabulated course-wise and shall be scrutinized by the Results Committee and moderation is applied if needed, and course-wise marks are finalized. Total marks obtained in each course are converted into letter grades.
- 12.4.3.** Student-wise tabulation shall be done and individual grade sheet shall be generated and issued.
- 12.5. Personal verification / Revaluation / Recounting:** Students shall be permitted for personal verification/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 shall be updated with changes if any and the student shall be issued a revised grade sheet. If there are no changes, the student shall be intimated the same through a notice.
- 12.6. Supplementary Examination:** 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.
- 13. Re-Registration for Improvement of Internal Marks:** Following are the conditions to avail the benefit of improvement of internal evaluation marks.

- 13.1** The candidate should have completed the course work and obtained examinations results for I and II semesters.
- 13.2** Out of the courses the candidate has failed in the examinations due to internal evaluation marks secured being less than 50%, the candidate shall be given one chance for a maximum of 3 theory courses for improvement of internal evaluation marks.
- 13.3** He should have passed all the remaining courses for which the internal evaluation marks secured more than or equal to 50%.
- 13.4** The candidate has to register for the chosen courses and fulfill the academic requirements.
- 13.5** 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 favor of the Principal, Sree Vidyanikethan Engineering College payable at Tirupati along with the requisition through the concerned Head of the Department.
- 13.6** In the event of availing the 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 stand cancelled.
- 14. Academic Requirements for completion of M.Tech Program of study:**
The following academic requirements have to be satisfied in addition to the attendance requirements for completion of M.Tech Program of study.
- 14.1** A student shall be deemed to have satisfied the minimum academic requirements for each theory, laboratory 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. For the seminar, he should secure not less than 50% of marks in the semester-end examination.
- 14.2** A student shall register for all the 86 credits and earn all the 86 credits. Marks obtained in the 86 credits shall be considered for the calculation of the DIVISION based on CGPA.
- 14.3** A student who fails to earn 86 credits as indicated in the curriculum within **four** academic years from the year of his admission shall forfeit his seat in M.Tech. Program and his admission stands cancelled.

15. 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 regular student has to satisfy all the eligibility requirements within the maximum stipulated period of **four years** for the award of M.Tech Degree.

16. Grades, Grade Point Average and Cumulative Grade Point Average:

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

Grades conversion and Grade points allotted

% of Marks obtained	Grade	Description of Grade	Grade Points (GP)
≥ 95	O	Outstanding	10
≥ 85 to < 95	S	Superior	9
≥ 75 to < 85	A	Excellent	8
≥ 65 to < 75	B	Very Good	7
≥ 55 to < 65	C	Good	6
≥ 50 to < 55	D	Pass	5
< 50	F	Fail	0
Not Appeared	N	Absent	0

Pass Marks: A student shall be declared to have passed theory course, laboratory course and project work if he secures minimum of 40% marks in Semester-end examination, and a minimum of 50% marks in the sum total of internal evaluation and Semester-end examination taken together. For the seminar, he shall be declared to have passed if he secures minimum of 50% of marks in the semester-end examinations. Otherwise he shall be awarded fail grade - **F** in such a course irrespective of internal marks. **F** is considered as a fail grade indicating that the student has to pass the semester-end examination in that course in future and obtain a grade other than **F** and **N** for passing the course.

16.2. Semester Grade Point Average (SGPA):

Semester Grade Point Average (SGPA) shall be calculated as given below on a "10 point scale" as an index of the student's performance at the end of each semester:

$$SGPA = \frac{\sum (C \times GP)}{\sum C}$$

where **C** denotes the credits assigned to the courses undertaken in that semester and **GP** denotes the grade points earned by the student in the respective courses.

Note: SGPA is calculated only for the candidates who passed all the courses in that semester.

16.3. Cumulative Grade Point Average (CGPA):

The CGPA for any student is awarded only when he completes the Program i.e., when the student passes in all the courses prescribed in the Program. The CGPA is computed on a 10 point scale as given below:

$$CGPA = \frac{\sum (C \times GP)}{\sum C}$$

where **C** denotes the credits assigned to courses undertaken up to the end of the Program and **GP** denotes the grade points earned by the student in the respective courses.

17. Grade Sheet: A grade sheet (Marks Memorandum) shall be issued to each student indicating his performance in all courses registered in that semester indicating the SGPA.

18. Transcripts: After successful completion of the entire Program of study, a transcript containing performance in all academic years shall be issued as a final record. Duplicate transcripts will also be issued, if required, after payment of requisite fee. Partial transcript will also be issued upto any point of study to a student on request.

19. Award of Degree: The Degree shall be conferred and awarded by Jawaharlal Nehru Technological University Anantapur, Ananthapuramu on the recommendations of the Chairman, Academic Council, SVEC (Autonomous).

19.1. 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 to which he is admitted.
- Successfully acquired the minimum required credits as specified in the curriculum corresponding to the Program of study within the stipulated time.

- Obtained CGPA greater than or equal to 5.0 (Minimum requirement for declaring as passed).
- Has no dues to the College, Hostel, Library etc. and to any other amenities provided by the College.
- No disciplinary action is pending against him.

19.2. Award of Division: Declaration of division is based on CGPA.

Awarding of Division

CGPA	Division
> = 7.0	First Class with Distinction
> = 6.0 and < 7.0	First Class
> = 5.0 and < 6.0	Second Class

- 20. Additional academic regulations:**
- 20.1** A student may appear for any number of supplementary examinations within the stipulated time to fulfill regulatory requirements for award of the degree.
- 20.2** In case of malpractice/improper conduct during the examinations, guidelines shall be followed as shown in the **Annexure-I**.
- 20.3** When a student is absent for any examination (Mid-term or Semester-end) he shall be awarded **zero** marks in that component (course) and grading will be done accordingly.
- 20.4** When a component is cancelled as a penalty, he shall be awarded zero marks in that component.
- 21. Withholding of Results:**
If the candidate has not paid dues to the College/University (or) if any case of indiscipline is pending against him, the result of the candidate shall be withheld and he will not be allowed/promoted to the next higher semester
- 22. Amendments to regulations:**
The Academic Council of SVEC (Autonomous) reserves the right to revise, amend, or change the Regulations, Scheme of Examinations, and / or Syllabi or any other policy relevant to the needs of the society or industrial requirements etc., with the recommendations of the concerned Board(s) of Studies.
- 23. General:**
The words such as "he", "him", "his" and "himself" shall be understood to include all students irrespective of gender connotation.
Note: *Failure to read and understand the regulations is not an excuse.*

Annexure-I
GUIDE LINES FOR DISCIPLINARY ACTION FOR MALPRACTICES /
IMPROPER CONDUCT IN EXAMINATIONS

Rule No.	Nature of Malpractices/ Improper conduct	Punishment
	<i>If the candidate:</i>	
1. (a)	Possesses or keeps accessible in examination hall, any paper, note book, programmable calculators, Cell phones, pager, palm computers or any other form of material concerned with or related to the course of the examination (theory or practical) in which he is appearing but has not made use of (material shall include any marks on the body of the candidate which can be used as an aid in the course of the examination)	Expulsion from the examination hall and cancellation of the performance in that course only.
(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 course 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 course of the examination (theory or practical) in which the candidate is appearing.	Expulsion from the examination hall and cancellation of the performance in that course and all other courses the candidate has already appeared including practical examinations and project work and shall not be permitted to appear for the remaining examinations of the courses of that Semester. The Hall Ticket of the candidate is to be cancelled.
3.	Impersonates any other candidate in connection with the examination.	The candidate who has impersonated shall be expelled from examination hall. The candidate is also debarred for four consecutive semesters from class work and all Semester-end examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat. The performance of the original candidate who has been impersonated, shall be cancelled in all the courses of the examination (including labs and project work) already appeared and shall not be allowed to appear for examinations of the remaining courses of that semester. The candidate is also debarred for four consecutive semesters from class work and all Semester-end examinations, if his involvement is established. Otherwise, The candidate is debarred for two consecutive semesters from class work and all Semester-end examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.

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

		candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the courses of that semester. The candidate is also debarred and forfeits the seat.
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Note: Whenever the performance of a student is cancelled in any course(s) due to Malpractice, he has to register for Semester-end Examinations in that course(s) consequently and has to fulfill all the norms required for the award of Degree.

SREE VIDYANIKETHAN ENGINEERING COLLEGE (Autonomous)
SREE SAINATH NAGAR, TIRUPATI - 517 102
SVEC16 - M. Tech (Computer Science)
I-Semester

Course Code	Course Title	Contact Periods per Week				Credits	Scheme of Examination Max. Marks		
		L	T	P	Total		Internal Marks	External Marks	Total Marks
16MT10501	Advanced Computer Networks	4	-	-	4	4	40	60	100
16MT10502	Advanced Database Management Systems	4	-	-	4	4	40	60	100
16MT10503	Advanced Operating Systems	4	-	-	4	4	40	60	100
16MT10504	Data Warehousing and Data Mining	4	-	-	4	4	40	60	100
16MT12502	Data Structures and Algorithms	4	-	-	4	4	40	60	100
	Professional Elective-1								
16MT10505	Computer Vision								
16MT10506	Information Retrieval Systems	4	-	-	4	4	40	60	100
16MT10507	Internet of Things								
16MT22504	Software Testing Techniques								
16MT10531	Database Management Systems & Data Warehousing and Data Mining Lab	-	-	4	4	2	50	50	100
16MT10532	Data Structures & Computer Networks Lab	-	-	4	4	2	50	50	100
Total:		24	-	8	32	28	340	460	800
16MT13808	Research Methodology (Audit Course)	-	2	-	2	-	-	-	-

II-Semester

Subject Code	Course Title	Contact Periods per Week				Credits	Scheme of Examination Max. Marks		
		L	T	P	Total		Internal Marks	External Marks	Total Marks
16MT20501	Advanced Computer Architecture	4	-	-	4	4	40	60	100
16MT20502	Big Data Analytics	4	-	-	4	4	40	60	100
16MT20503	Object Oriented Analysis and Design	4	-	-	4	4	40	60	100
16MT12501	Cloud Computing	4	-	-	4	4	40	60	100
16MT22505	Web Technologies	4	-	-	4	4	40	60	100
Professional Elective-2									
16MT20504	Embedded Systems	4	-	-	4	4	40	60	100
16MT20505	Information Security								
16MT20506	Mobile Computing								
16MT20507	Software Project Management								
16MT20531	Cloud Computing and Big Data Analytics Lab	-	-	4	4	2	50	50	100
16MT20532	Object Oriented Analysis and Design Lab	-	-	4	4	2	50	50	100
16MT20533	Seminar	-	-	-	-	2	--	100	100
Total:		24	-	8	32	30	340	560	900
16MT23810	Intellectual Property Rights (Audit Course)	-	2	-	2	-	-	-	-

III-Semester

S. No.	Course Code	Course Title	Contact Periods per Week				Credits	Scheme of Examination Max. Marks		
			L	T	P*	Total		Internal Marks	External Marks	Total Marks
1.	16MT3MOOC	MOOC	-	-	-	-	-	-	-	-
2.	16MT30531	Project Work – Phase I	-	-	-	-	8	50	50	100
Total:			-	-	-	-	8	50	50	100

*Fulltime Project Work

IV-Semester

S. No.	Course Code	Course Title	Contact Periods per Week				Credits	Scheme of Examination Max. Marks		
			L	T	P*	Total		Internal Marks	External Marks	Total Marks
1.	16MT40531	Project Work – Phase II	-	-	-	-	20	150	150	300
Total:			-	-	-	-	20	150	150	300
Grand Total:						86	880	1220	2100	

*Fulltime Project Work

SREE VIDYANIKETHAN ENGINEERING COLLEGE (Autonomous)
Department of Computer Science and Engineering
M. Tech. (CS) – I Semester
(16MT10501) ADVANCED COMPUTER NETWORKS
(Common to CS & CNIS)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	--	--	4

PRE-REQUISITES: A Course on "Computer Networks"

COURSE DESCRIPTION:

Computer Networks and Protocols, Data Link Layer, LAN and Network Routing; Transport Layer and Internet Protocols; Wireless and Optical Networks; MANETs and Wireless Sensor Networks

COURSE OUTCOMES:

After successful completion of this course, students will be able to:

- CO1.** Gain knowledge on principles of computers, network topologies, routing mechanisms.
- CO2.** Analyze the computer network with suitable network protocols and routing algorithms.
- CO3.** Formulate solutions for engineering problems pertaining to the advanced networking technologies.
- CO4.** Develop techniques for subnet masks and addresses to fulfill networking requirements.
- CO5.** Conduct Research to solve the problems related to Routing Algorithms in Networks.

DETAILED SYLLABUS:

UNIT I – REVIEW OF COMPUTER NETWORKS AND FOUNDATION OF NETWORKING PROTOCOLS (11 periods)

Review of Computer Networks and the Internet-The Network edge, The Network core, Access Networks and Physical Media, ISPs and Internet Backbones, Delay and Loss in Packet, Packet-Switched Networks. Foundations of Networking Protocols-5-layer TCP/IP Model, 7-Layer OSI Model, Internet Protocols and Addressing, Equal-Sized Packets Model: ATM.

UNIT II – DATA LINKS, TRANSMISSION AND ROUTING

(11 periods)

The Link Layer and Local Area Networks-Link Layer Introduction and Services, Error-Detection and Error-Correction Techniques, Multiple Access Protocols, Link Layer Addressing. Routing and Internet Working-Network Layer Routing, Least-Cost-Path Algorithms, Non-Least-Cost-Path algorithms, Intradomain Routing Protocols, Interdomain Routing Protocols

UNIT III – TRANSPORT LAYER PROTOCOLS AND NETWORK APPLICATIONS

(11 periods)

Transport and End-to-End Protocols-Transport Layer, Transmission Control Protocol (TCP), User Datagram Protocol (UDP), TCP Congestion Control.

Application Layer-Principles of Network Applications, the Web and HTTP, File Transfer: FTP, Electronic Mail in the Internet, Domain Name System (DNS).

UNIT IV – WIRELESS NETWORKS AND OPTICAL NETWORKS

(11 periods)

Wireless Networks and Mobile IP-Infrastructure of Wireless Networks, Wireless LAN Technologies, IEEE 802.11 Wireless Standards, Cellular Networks, Mobile IP, Wireless Mesh Networks (WMNs).

Optical Networks and WDM Systems-Overview of Optical Networks, Basic Optical Networking Devices, Large-Scale Optical Switches, Optical Routers

UNIT V – MANETS AND WIRELESS SENSOR NETWORKS

(11 periods)

Mobile Ad-Hoc Networks-Overview of Wireless Ad-Hoc Networks, Routing in Ad-Hoc Networks, Routing Protocols for Ad-Hoc Networks-DSDV, DSR, CGSR and AODV.

Wireless Sensor Networks-Sensor Networks and Protocol Structures, Communication Energy Model, Clustering Protocols, Routing Protocols

Total Periods: 55

TEXT BOOKS:

1. Nader F. Mir, "*Computer and Communication Networks*," Pearson Education, 2007.
2. F. Kurose, Keith W. Ross, "*Computer Networking: A Top-Down Approach Featuring the Internet*," 3rd, Pearson Education, 2007.

REFERENCE BOOKS:

1. Behrouz A. Forouzan, "*Data Communications and Networking*," 4 ed, Tata McGraw Hill, 2007
2. Andrew S. Tanenbaum, "*Computer Networks*," 4 ed, Pearson Education, New Delhi, 1997

SREE VIDYANIKETHAN ENGINEERING COLLEGE (Autonomous)

Department of Computer Science and Engineering

M. Tech. I Semester

(16MT10502) Advanced Database Management Systems

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	--	--	4

PRE-REQUISITES: A Course on "Database Management System".

COURSE DESCRIPTION:

Concepts of Database System and Architectures, Data modeling using ER-Model; SQL, Objects Relational Database and XML; Database Design and File Organizations; Query Processing, Concurrency and Recovery; Distributed DBMS Architecture and Design.

COURSE OUTCOMES:

After successful completion of this course the students will be able to:

CO1: Gain Advanced knowledge in

- Database System Concepts , Languages , Interfaces and Architectures
- Query Languages , Relational Databases and XML
- Database Design and File Organization.
- Query Processing and Recovery
- Distributed Database Architecture and Design

CO2: Analyze database management architecture and categorize languages and database objects.

CO3: Design a wide range of potential solutions for the database problems using ER-diagrams SQL, Normalization and XML.

CO4: Initiate Research to develop new Architectural models and Query processing using SQL in database Systems.

CO5: Apply appropriate modern techniques, resources and tools for the real world problems in databases.

DETAILED SYLLABUS:

UNIT I-Database System Concepts and Architectures, Data modeling using ER-Model (11 periods)

Database System Concepts and Architectures:

Architecture And Data Independence, Database Languages and Interfaces, Database System Environment, Centralized and Client/server Architectures for DBMS.

Data modeling using ER-Model:

Using High-Level Conceptual data Model for Database Design, A Sample Database Application, Entity Types, Entity Sets, Attributes, and Keys, Relationship Types, Relationship Sets, Roles, and Structural Constraints, Weak Entity Types, Refining the ER Design for the COMPANY Database, ER Diagrams, Naming Conventions, and Design Issues, Relationship Types of Degree Higher than Two, Relational Database Design using ER-to-Relational Model.

UNIT II: SQL, Objects Relational Database and XML (12 Periods)

SQL: Schema Definition, Constraints, Queries, Joins, Assertions, Triggers and Views

Object Relational Databases: Concepts for Object Databases, Standards, Languages and Design.

XML: Hierarchical data model, Documents, DTD, XML Schema, Documents and Databases, Querying.

UNIT III: Database Design and File Organizations (11 Periods)

Database Design: Functional Dependencies, Types of Normal Forms, properties of relational decompositions, Algorithms for Relational Database Design.

File Organizations: Introduction, Secondary Storage Devices, Buffering of Blocks, Placing File Records on Disk, Operations on Files, Files of Unordered Records, Files of Ordered Records, Hashing Techniques, Other Primary File Organizations, Parallelizing Disk Access Using RAID Technology, New Storage Systems.

UNIT IV: Query Processing, Concurrency and Recovery

(12 Periods)

Query Processing: Problem, Objectives, Characterization, Layers and Query Optimization and Query Optimization Algorithms: INGRES, System R, Distributed INGRES, R*, SDD-1 Algorithms

Concurrency Control: Transaction management types and properties, Algorithms, Deadlock Management.

Recovery: Concepts, Techniques Based on Deferred Update and Immediate Update, Shadow paging and ARIES Algorithm.

UNIT V: Distributed DBMS Architecture and Design (09 Periods)

Distributed DBMS Architecture: Architectural Models and Architectures

Distributed Database Design: Alternative Design Strategies, Distribution Design Issues, Fragmentation and Allocation

Total Periods: 55

TEXT BOOKS:

1. Ramez Elmasri & Shamkant B. Navathe, "Database Systems: Models, Languages, Design and Application Programming," 6 ed., Pearson Education, New Delhi , 2013.
2. M. Tamer Ozsu, Patrick Valduriez, "Principles of Distributed Database System," 2 ed., Pearson Education, New Delhi ,2006.

REFERENCE BOOKS:

1. Abraham Silberchatz, Henry F. Korth, S. Sudarsan, "Database System Concepts," 5 ed., McGraw-Hill, New York, 2006.
2. Thomas M. Connolly, Carolyn E. Begg, "Database Systems – A Practical Approach to Design, Implementation and Management," 3 ed., Pearson Education, New Delhi, 2003.

SREE VIDYANIKETHAN ENGINEERING COLLEGE (Autonomous)
Department of Computer Science and Engineering
M. Tech (CS) – I Semester

(16MT10503) Advanced Operating Systems

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	--	--	4

PRE-REQUISITES:

A Course on "Operating Systems"

COURSE DESCRIPTION

Process management and process scheduling; Concurrency, synchronization and deadlocks; Memory management, file system and secondary storage; I/O systems, protection and security; Introduction to Distributed Systems, Synchronization in Distributed Systems

COURSE OUTCOMES:

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

CO-1: Gain advanced knowledge in

- Process management concepts.
- Synchronization and Deadlocks
- Inter Process Communication.
- Group Communication.
- Remote Procedure Call.

CO-2: Analyze how operating system manages resources among the users.

CO-3: Formulate solutions for engineering problems pertaining to the advanced Operating Systems

CO-4: Design real time solutions for the problems related to CPU Scheduling, concurrency and Synchronization

CO-5: Apply the concepts of semaphores, monitors, message-passing and other forms of synchronization to maintain Concurrency.

DETAILED SYLLABUS:

UNIT I – INTRODUCTION TO OPERATING SYSTEMS, PROCESS MANAGEMENT AND PROCESS SCHEDULING

(12 periods)

Introduction: Operating system operations, Protection and Security, Distributed Systems, Special Purpose Systems, Open-Source Operating Systems, Operating System Services, System Calls.

Process Management: Process Concepts, Process State, Process Control Block, Operations on Processes, Inter Process Communication, Multithreaded programming.

Process Scheduling: Scheduling Criteria, Scheduling Algorithms, Multiple-Processor scheduling, thread scheduling

UNIT II – CONCURRENCY AND SYNCHRONIZATION, DEAD LOCKS

(12 periods)

Concurrency and Synchronization: Process Synchronization, Critical-Section Problem, Peterson's Solution, Synchronization Hardware,

Semaphores, Classic Problems of synchronization, Readers and Writers Problem, Dining Philosophers Problem, Monitors.

Deadlocks: System Model, Deadlock Characterization, Deadlock Prevention, Deadlock Detection and Avoidance, Recovery from Deadlock- Bankers Algorithm.

UNIT III – MEMORY MANAGEMENT, FILE SYSTEM

IMPLEMENTATION AND SECONDARY STORAGE STRUCTURE

(12 periods)

Memory Management: Swapping, Contiguous Memory Allocation, Paging, Segmentation, Virtual Memory, Demand Paging, Page Replacement Algorithms, Allocation of Frames, Thrashing.

File System Interface &Implementation: Concept of a File, Access Methods, Directory Structure, File Sharing, Protection.

Secondary Storage Structure: Overview of Mass-Storage Structure, Disk Structure, Disk Attachment, Disk scheduling algorithms

UNIT IV – I/O SYSTEMS, PROTECTION AND SECURITY

(11 periods)

I/O Systems: I/O systems, Hardware, Application I/O Interface, and Transforming I/O requests Hardware Operation.

Protection: Goals of Protection, Principles of Protection, Domain of Protection, Access Matrix, Implementation of Access Matrix, and Access control, Revocation of Access Rights.

Security: The Security Problem, Program Threats, System and Network Threats, Cryptography as a Security Tool, User Authentication.

UNIT V–DISTRIBUTED SYSTEMS, SYNCHRONIZATION IN DISTRIBUTED SYSTEMS

(08 periods)

Introduction to Distributed systems: Goals of distributed system- hardware and software concepts- design issues, the client server model- Remote Procedure Call and Group Communication.

Synchronization in distributed systems: Clock Synchronization- Election Algorithms- Bully Algorithm, Ring Algorithm

Total Periods: 55

TEXT BOOKS:

1. Abraham Silberschatz, Peter B. Galvin, Greg Gagne, " *Operating System Concepts,*" 7 ed., John Wiley and Sons, 2009
2. Andrew. S. Tanenbaum, " *Distributed Operating System,*" Prentice Hall, New Delhi 2010

REFERENCE BOOKS:

1. William Stallings, " *Operating Systems – Internals and Design Principles,*" 5 ed., Pearson Education, New Delhi, 2008
2. Andrew S Tanenbaum, " *Modern Operating Systems,*" 3 ed., Pearson Education, New Delhi, 2008
3. Charles Crowley " *Operating Systems - A Design Approach,*" 1 ed., TMH, New Delhi, 2009.

SREE VIDYANIKETHAN ENGINEERING COLLEGE (Autonomous)
Department of Computer Science and Engineering
M. Tech (CS) I Semester
(16MT10504) Data Warehousing and Data mining
(Common to CS & CNIS)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	0	--	4

PRE-REQUISITES: A Course on "Database Management System".

COURSE DESCRIPTION: Concepts of Data Warehousing and Data mining; Pre-processing techniques in Data Warehouses; Data cube computation and OLAP query processing; Data Mining process and System architecture; relationship with data warehouse and OLAP Systems; Data mining Techniques and Applications.

COURSE OUTCOMES:

After successful completion of this course, the student will be able to:

CO1: Gain knowledge in -

- Multidimensional data model and Data warehouse Architecture.
- Data mining algorithms.
- Association Rules, Classification and Prediction and Cluster Analysis.

CO2: Analyse data mining algorithms for complex industrial problems.

CO3: Solve engineering problems to get wide variety of solutions by applying data mining algorithms.

CO4: Ability to carry out research in Spatial Mining, Spatio Temporal Mining,
Text Mining Multimedia Mining and web Mining

CO5: Create and apply appropriate techniques & tools of data mining to solve real world problems.

DETAILED SYLLABUS:

UNIT I – INTRODUCTION TO DATA WAREHOUSE AND DATA MINING (10 periods)

Data Warehouse- A Multidimensional Data Model, Data Warehouse Architecture, Data Warehouse Implementation, From Data Warehouse to Data Mining.

Data Mining – Kinds of Data, Data Mining Functionalities, Primitives, Major Issues in Data Mining

UNIT II – DATA PREPROCESSING, MINING FREQUENT PATTERNS AND ASSOCIATIONS (10 periods)

Data Preprocessing- Descriptive Data Summarization, Data Cleaning, Data Integration and Transformation, Data Reduction.

Mining Frequent Patterns and Associations- Efficient and Scalable Frequent Item set Mining Methods, Mining various kinds of Association Rules, Constraint based association mining.

UNIT III – CLASSIFICATION AND PREDICTION (8 periods)

Issues regarding classification and prediction, classification by decision tree induction, Bayesian classification, Rule based classification, classification by Back propagation, Prediction, Accuracy and Error Measures.

UNIT IV – CLUSTER ANALYSIS (11 periods)

Cluster Analysis: Basic Concepts and Algorithms :Introduction to Cluster Analysis, different Types of Clustering, Different Types of Clusters, K-means, The Basic K-means Algorithm, K-means: Additional Issues, Bisecting Kmeans, K-means and Different Types of Clusters, Strengths and Weaknesses, K-means as an Optimization Problem, Agglomerative Hierarchical Clustering, Basic Agglomerative Hierarchical Clustering Algorithm, Specific Techniques, DBSCAN, Traditional Density: Center-Based Approach, The DBSCAN Algorithm, Strengths and Weaknesses.

UNIT V – MINING STREAM, TIME SERIES, SPATIAL DATA, MULTIMEDIA, TEXT AND WORLD WIDE WEB (9 periods)

Mining Data Streams, Mining Time Series Data, Multidimensional Analysis and Descriptive Mining of Complex Data Objects, Spatial Data Mining, Multimedia Data Mining, Text Mining, Mining the World Wide Web.

Total Periods: 48

TEXT BOOKS:

1. Jiawei Han and MichelineKamber, "*Data Mining: Concepts and Techniques*," 2 ed. , Elsevier, 2009
2. Pang-Ning Tan, Michael Steinbach, Vipin Kumar, "Introduction to Data Mining", Pearson Education, 2009.

REFERENCE BOOKS:

1. Margaret H Dunham, *Data Mining Introductory and Advanced Topics*," 2 ed., Pearson Education, 2006
2. Amitesh Sinha, "*Data Warehousing*," PHI Learning, 2007.

SREE VIDYANIKETHAN ENGINEERING COLLEGE (Autonomous)
Department of Computer Science and Engineering
M.Tech (CS) I-Semester
(16MT12502) DATA STRUCTURES AND ALGORITHMS
(Common to SE and CS)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	-	-	4

PREREQUISITES: A course on "Computer Programming".

COURSE DESCRIPTION:

Introduction to Data Structures and Algorithms; Searching and Sorting; Trees and Graphs; Divide and Conquer; Greedy method; Dynamic Programming, Back Tracking; Branch and Bound.

COURSE OUTCOMES:

After successful completion of this course, students will be able to:

1. Gain knowledge on:
 - Linear data structures including Stack, Queue and Linked Lists and Non-linear data structures like Trees and Graphs.
 - Divide and Conquer Method, Greedy Method, Dynamic Programming, Backtracking and Branch & Bound algorithms.
2. Analyze the efficiency of algorithms using space and time complexities.
3. Solve real world problems using algorithm design techniques.
4. Apply Dynamic programming techniques to provide software solutions.

DETAILED SYLLABUS:

UNIT-I: INTRODUCTION TO DATA STRUCTURES AND ALGORITHMS

(10 Periods)

Data Structures: Review of Data Structures - Stack, Queue, Circular Queue, Linked Lists, Applications, **Algorithm Analysis:** Efficiency of algorithms, Apriori Analysis, Asymptotic Notations, Polynomial vs Exponential Algorithms, Average, Best and Worst Case Complexities, Analyzing Recursive Algorithms.

UNIT-II: SEARCHING, SORTING AND TREES & GRAPHS

(10 Periods)

Searching and Sorting: Linear Search, Fibonacci Search, Counting Sort, Bucket Sort, Radix Sort, **Trees and Graphs:** Introduction to trees, representation of trees, binary trees, binary tree traversal techniques, Introduction to graphs, representation of graphs, graph traversal techniques.

UNIT-III: BINARY SEARCH TREES, AVL TREES, B- TREES AND HASH TABLES (10 Periods)

Binary Search Trees: Definition, Operations, Applications, AVL Trees: Definition, Operations, Applications, **Heaps:** Definition, Heap Implementation, Applications, **Hash Tables:** Definition, Hash Functions, Applications.

UNIT-IV: DIVIDE AND CONQUER & GREEDY METHODS (10 Periods)

Divide and Conquer: General Method, Binary Search, Finding Maximum and Minimum, Quick Sort, Merge sort, Strassen's Matrix Multiplication.

Greedy Method: General Method, Job sequencing with deadlines, Minimum Cost Spanning Tree and Single Source Shortest Path.

UNIT-V: DYNAMIC PROGRAMMING, BACK TRACKING & BRANCH AND BOUND (11 Periods)

Dynamic Programming: General Method, All Pairs Shortest Path, 0/1 Knapsack problem, Traveling Salesperson Problem, **Back Tracking:** General Method, 8 – Queen's Problem, Graph Coloring, **Branch and Bound:** General Method, LC Search, LIFO and FIFO branch and bound solutions of 0/1 Knapsack Problem.

[Total Periods: 50]

TEXT BOOKS:

1. G. A. V. Pai, "Data Structures and Algorithms: Concepts, Techniques and Applications," 1st Edition, Tata McGraw Hill, 2008.
2. Ellis Horowitz, Sartaj Sahni, and Sanguthevar Rajasekaran, "Fundamentals of Computer Algorithms," 2nd Edition, Universities Press (India) Pvt. Ltd, 2008.

REFERENCE BOOKS:

1. Richard Gileberg, Behrouz A. Forouzan, "Data Structures: A Pseudocode Approach with C," Second Edition, 2007.
2. Mark Allen Weiss, "Data Structures and Algorithm Analysis in C++," 3rd Edition, Pearson Education, 2007.
3. Sartaj Sahni, "Data structures, Algorithms and Applications in C++," 2nd Edition, Universities press (India) Pvt. Ltd., 2005.

SREE VIDYANIKETHAN ENGINEERING COLLEGE (Autonomous)
Department of Computer Science and Engineering
M. Tech (CS) – I Semester
(16MT10505) COMPUTER VISION
(Professional Elective-I)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	-	-	4

PRE-REQUISITES:

A Course on "Computer Graphics"

COURSE DESCRIPTION:

Concepts of Cameras, Measuring Light , Sources, Shadows and Shading; Linear filters, Edge detection; Segmentation by clustering, Segmentation by fitting a model; Finding templates using classifiers , Recognition by relations between Templates; Geometric camera models, Camera calibration.

COURSE OUTCOMES:

After successful completion of this course the students will be able to:

- CO -1:** Gain knowledge in image processing techniques.
- CO -2:** Analyze the applicability of various techniques such as Fourier Transforms, Normalized Correlation, Estimating Derivatives in filtering and edge detection to generate quality images.
- CO -3:** Solve complex image segmentation problems using clustering and fitting models.
- CO -4:** Conduct Research on geometric methods and tools for camera calibration.
- CO -5:** Apply building classifiers, voting and search techniques and Image Processing tools for finding templates for real world images.

DETAILED SYLLABUS:

UNIT-I: CAMERAS, SOURCES, SHADOWS AND SHADING

(10 Periods)

Cameras: Pinhole Cameras, Camera with Lenses, the Human Eye and Sensing. **Radiometry-Measuring Light:** Light in Space, Light at Surfaces and Important Special Cases.

Sources, Shadows and Shading: Qualitative Radiometry, Sources and their effects, Local Shading Models, Application: Photometric Stereo, Inter reflections: Global Shading Models.

UNIT-II: LINEAR FILTERS AND EDGE DETECTION (11 Periods)

Linear Filters: Linear Filters and Convolution, Shift Invariant Linear Systems, Spatial Frequency and Fourier Transforms, Sampling and Aliasing ,Filters as Templates, Techniques- Normalized Correlation and Finding Patterns, Scale and Image Pyramids.

Edge Detection: Noise, Estimating Derivatives, Detecting Edges, Texture: Representing Texture, Analysis using Oriented Pyramids.

Application: Synthesizing Textures for Rendering Shape for Texture for Planes.

UNIT-III: SEGMENTATION BY CLUSTERING AND FITTING A MODEL (11 Periods)

Segmentation by Clustering: Introduction to Segmentation, Human Vision: Grouping and Gestalt, Applications: Shot Boundary Detection and Background Subtraction, Image Segmentation by Clustering Pixels, Segmentation by Graph-Theoretic Clustering.

Segmentation by Fitting a Model: The Hough Transform, Fitting Lines, Fitting Curves, Fitting as Probabilistic Inference Problem, Robustness, Example: Using RANSAC to Fit Fundamental Matrices, Missing Data Problems, the EM Algorithm.

UNIT-IV:FINDING TEMPLATES USING CLASSIFIERS AND RECOGNITION BY RELATIONS BETWEEN TEMPLATES 13 Periods)

Finding Templates using Classifiers: Method for Building Classifiers, Building Classifiers from Class Histograms, Feature Selection, Neural Networks, the Support Vector Machine.

Recognition by relations between Templates: Finding Objects by Voting on Relations between Templates, Relational Reasoning Using Probabilistic Models and Search, Using Classifiers to Prune Search, Hidden Markov Models, Application: HMM and Sign Language Understanding, Finding People with HMM.

UNIT-V: GEOMETRIC CAMERA MODELS AND GEOMETRIC CAMERA CALIBRATION (10 Periods)

Geometric Camera Models: Elements of Analytical Euclidean Geometry, Camera Parameters and the Perspective Projection, Affine Cameras and Affine Projection Equations, **Geometric Camera Calibration:** Least-Squares Parameter Estimation, A Linear Approach to Camera Calibration, Taking Radial Distortion into Account, Analytical Photogrammetry, An Application: Mobile Robot Localization, **Introduction to image processing tools:** Adobe Photoshop, Macromedia Fireworks.

Total Periods: 55

TEXT BOOK:

1. David A. Forsyth and Jean Ponce: "*Computer Vision – A Modern Approach*," PHI Learning, 2009.

REFERENCE BOOKS:

1. G Sommer, "*Geometric Computing with Clifford Algebra*," 1 ed., Springer, New York, 2001
2. Milan Sonka, Vaclav Hlavac, Roger Boyle "*Digital Image Processing and Computer Vision*," 1 ed., Cengage Learning India Pvt. Ltd, New Delhi, 2008.
3. Jack, "*Computer Vision and Applications*," Concise Edition, Academy Press, 2000.

SREE VIDYANIKETHAN ENGINEERING COLLEGE (Autonomous)
Department of Computer Science and Engineering
M. Tech (CS) – I Semester
(16MT10506) INFORMATION RETRIEVAL SYSTEMS
(Professional Elective - I)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	--	--	4

PRE-REQUISITE:

A Course on "Database Management Systems"

COURSE DESCRIPTION:

Concepts of Information retrieval Systems; Indexing and data structures; indexing, Document and term clustering; user search techniques; Text search algorithms, information system Evaluation;

COURSE OUTCOMES:

After successful completion of this course, students will be able to:

CO-1 : Acquire knowledge in fundamental concepts of

- Information Retrieval System capabilities
- Data Structures
- Indexing and Search Algorithms

CO -2: Analyze concepts of Database, Data Warehouses of real time applications related to Document Store, Document data warehouses like space research , judicial, biomedical, scientific documents.

CO -3 : Solve complex search problems like ranking , weighted ,software text searches by implementing A* Search, Zipf and Information retrieval frame work

CO -4: Initiate research to identify and develop algorithms for indexing , clustering and searching.

CO -5: Create and apply online Information Retrieval Systems like search engines.

DETAILED SYLLABUS:

UNIT I: INTRODUCTION TO INFORMATION RETRIEVAL SYSTEM

(11 Periods)

Definition, Objectives, Functional Overview, Relationship to DBMS, Digital libraries and Data Warehouses.

Information Retrieval System Capabilities: Search, Browse.

UNIT II: INDEXING AND DATA STRUCTURES **(11 Periods)**

Objectives of Indexing, Indexing Process, Automatic Indexing.

Data Structures: Introduction to Data Structures, Stemming Algorithms, Inverted file structures, N-gram data structure, PAT data structure, Hypertext data structure.

UNIT III: AUTOMATIC INDEXING AND CLUSTERING (10 Periods)

Classes of automatic indexing, Statistical indexing, Natural language, Concept indexing. **Document and Term Clustering:** Introduction to Clustering, Thesaurus generation, Manual clustering, Automatic Term Clustering, Hierarchy of clusters.

UNIT IV: USER SEARCH TECHNIQUES (12 Periods)

Search statements and binding, Similarity measures and ranking, Relevance feedback, Selective dissemination of information search, weighted searches of Boolean systems.

UNIT V: TEXT SEARCH ALGORITHMS (11 Periods)

Introduction to Text Search Techniques, Software text search algorithms, Hardware text search systems.

Information System Evaluation: Introduction to Information System Evaluation, Measures used in system evaluation.

Total No. of periods: 55

TEXT BOOK:

1. Kowalski, Gerald, Mark T Maybury Kluwer, "*Information Storage and Retrieval Systems: Theory and Implementation*", Springer, Seventh Indian reprint 2 ed., 2013..

REFERENCE BOOKS:

1. Ricardo Baeza-Yates ,"*Modern Information Retrieval*" , Pearson Education, 2007
2. David A Grossman and Ophir Frieder, "*Information Retrieval: Algorithms and Heuristics*" , Springer International Edition ,2 ed., 2012.

SREE VIDYANIKETHAN ENGINEERING COLLEGE (Autonomous)
Department of Computer Science and Engineering
M. Tech (CS) – I Semester
(16MT10507)INTERNET OF THINGS
(Common to CS and CNIS)
(Professional Elective – 1)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	-	--	4

PRE-REQUISITES:

Courses on "Computer Networks" and "Java"

COURSE DESCRIPTION:

Domain Specific IoT's; M2M& System Management with Netconf-Yang; Developing Internet of Things Using Python; IoT Physical Devices & Case Studies Illustrating IoT Design

COURSE OUTCOMES:

After successful completion of this course, students will be able to:

CO1: Gain knowledge on

- o Building blocks of Internet of Things and characteristics.
- o Application areas of IoT
- o Concept of M2M (machine to machine) with necessary protocols

CO2: Analyze Domain specific IoT's, revolution of Internet in Mobile Devices.

CO3: Design and Develop Techniques for solutions to solve the problems in IoT using Python Scripting Language.

CO4: Conduct research on domain specific IoT's and IoT enabling Technologies.

CO5: Acquire knowledge to recognize the opportunities and contribute to collaborative-multidisciplinary Scientific Research.

DETAILED SYLLABUS:

UNIT I– INTRODUCTION & CONCEPTS (08 periods)

Introduction to Internet of Things –Definition and Characteristics of IoT, Physical Design of IoT – IoT Protocols, Logical Design of IOT, IOT Enabling Technologies, IoT Levels and Templates

UNIT II – DOMAIN SPECIFIC IOTS (09 periods)

Home Automation, Cities, Environment, Energy, Retail, Logistics, Agriculture, Industry, Health & Life Style

UNIT III – M2M & SYSTEM MANAGEMENT WITH NETCONF-YANG (11 periods)

IoT and M2M – M2M, Difference between IOT and M2M, difference between SDN and NFV for IoT, Software defined networks, network function virtualization, Need for IOT Systems Management, Simple Network Management Protocol, Limitations of SNMP, Network Operator Requirements.

Basics of IoT System Management with NETCOZF, YANG, YANG-NETCONF

**UNIT IV – DEVELOPING INTERNET OF THINGS USING PYTHON
(15 periods)**

Introduction, IOT Design Methodology, Installing Python, Language features of Python, Python Data Types & Data Structures, Control Flow, Functions, Modules, File Handling, Date/ Time Operations, Classes, Exception handling, Python Packages of Interest for IoT.

UNIT V – IOT PHYSICAL DEVICES & ENDPOINTS (12 periods)

What is an IOT Device, Exemplary Device, Board, Linux on Raspberry Pi, Interfaces, Programming and IOT Devices, Case Studies Illustrating IoT Design: Home Automation, Cities and Agriculture.

Total Periods: 55

TEXT BOOK:

1. Vijay Madiseti and Arshdeep Bahga, " *Internet of Things A Hands On Approach*", Universities Press, 2015.

REFERENCE BOOKS:

1. Adrian McEwen, " *Designing the Internet of Things*", Wiley Publishers, 2014.
2. Daniel Kellmerein, " *The Silent Intelligence: The Internet of Things*". 2013, DND Ventures LLC, 2013

SREE VIDYANIKETHAN ENGINEERING COLLEGE (Autonomous)
Department of Computer Science and Engineering
M.Tech (CS) – I Semester
(16MT22504) SOFTWARE TESTING TECHNIQUES

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	-	-	4

PREREQUISITES: A course on “Software Development Methodologies”.

COURSE DESCRIPTION: Basic concepts of Software Testing; Testing Techniques – Levels of Testing; Testing Process – Test Planning; Test Metrics and Reports; Software Test Automation.

COURSE OUTCOMES:

On successful completion of this course, the students will be able to:

1. Gain knowledge on the Software Testing types and Process for different programming environments.
2. Analyze and apply the appropriate testing techniques suitable for testing the software.
3. Perform testing by applying appropriate strategies for selecting test cases to meet requirements of the product.
4. Apply efficient modern software testing tools for automation.
5. Write test cases and perform defect reporting.

DETAILED SYLLABUS

UNIT-I: BASIC CONCEPTS OF SOFTWARE TESTING (12 Periods)

Fundamentals of software testing - software verification and validation – V test model: V model for software, testing during proposal stage, testing during requirements stage, testing during test-planning phase, test during design phase, VV model, critical roles and responsibilities.

UNIT-II: TESTING TECHNIQUES (12 Periods)

Levels of testing, Acceptance testing, Feature based testing, and Application based testing.

UNIT-III: TESTING PROCESS (11 Periods)

Test planning –test policy, contents, strategy, test plan, Quality plan, test plan template, guidelines, test administration and estimation, standards, building test data, test cases, scenarios, templates for test cases, test scripts, effective test cases, building test data, generation of test data, roles and responsibilities in testing life cycle, test process monitoring.

UNIT-IV: TEST METRICS AND REPORTS (10 Periods)

Testing related data, defect data, efficiency data, categories of test metrics, estimated, budgeted, approved and actual, resources, effectiveness in testing, defect density, defect leakage ratio, residual defect density, test team efficiency, test case efficiency, rework, MTBF/ MTRR, test reports, status reports, integration test reports, system test reports, final test reporting, test status report, Bench marking.

UNIT-V: SOFTWARE TEST AUTOMATION (10 Periods)

Test Automation: Scope of Automation, Design and Architecture of automation, Process Model for Automation, challenges in automation; Load Runner, Selenium, QTP, RFT and RQM.

[Total Periods: 54]

TEXT BOOKS:

1. M. G. Limaye, "*Software Testing: Principles and Techniques and Tools*," Tata McGraw Hill Education, 1st Edition, 2012.
2. Srinivasan Desikan and Gopaldaswamy Ramesh, "*Software Testing: Principles and Practices*", Pearson education, 2012

REFERENCE BOOKS:

1. Dr. K. V. K. K. Prasad, "*Software Testing Tools*," Dreamtech, 1st Edition, 2004.
2. Aditya P. Mathur, "*Foundations of Software Testing*", Pearson, 2008

SREE VIDYANIKETHAN ENGINEERING COLLEGE (Autonomous)
Department of Computer Science and Engineering
M. Tech (CS) I Semester
(16MT10531) DATABASE MANAGEMENT SYSTEMS & DATA
WAREHOUSING AND DATA MINING LAB

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
50	50	100	-	-	4	2

PRE-REQUISITES:

Courses on "Database Management Systems" and "Data Warehousing and Data Mining"

Course Description:

Hands on practice and implementation of data mining algorithms - Apriori, Fp-tree; Bayesian classification; Back propagation; k-means clustering; Bisecting k-means clustering in C++.

Designing and implement basic SQL Queries, PL/SQL and advanced concepts in PL/SQL such as Object creation structures; Triggers; Embedded SQL using Oracle Database Management System Package.

COURSE OUTCOMES:

After successful completion of this course, the student will be able to:

CO-1: Acquire Practical Knowledge on

- SQL Queries
- Triggers
- Data Mining Algorithms
- Classification , Prediction and Cluster Analysis

CO-2: Analyze Integrity Constraints on databases for validation and Data Mining algorithms

for solving real time applications

CO-3: Develop and Design solutions to complex problems related to frequent item sets, classification and clustering.

CO-4: Apply advanced knowledge to identify research challenges, and issues related to

databases and data mining.

CO-5: Use modern software tools and technologies for designing simple to complex

applications in databases and Data warehousing and data mining.

CO-6: Attitude for independent and continuous learning for improved knowledge with newer

versions of DBMS packages and data mining.

'ADBMS' LABORATORY EXERCISES:

1. Consider the following tables:

Employee(employee_name, street,city)

Works(employee_name, company_name,salary)

Company(company_name,city)

Manages(employee_name,manager-name)

Write the SQL Queries for the following:

- a. Find the names and cities of residence of all employees who work for First Bank Corporation.
 - b. Find the names, street address and cities of residence of all employees .
 - c. Find all employees in the database who do not work for First Bank Corporation
 - d. Find all employees in the database who earn more than each employee of small bank corporation.
 - e. Assume that the companies may be located in several cities. Find all companies located in every city in which small bank corporation is located.
 - f. Find the company that has the most employees find those companies whose employees earn a higher salary, on average, than the average salary at First Bank Corporation.
2. Write a PL/SQL block to do the following:
- a. Read a Number and reverse the given number.
 - b. Factorial of a given number using while, for and until loops
 - c. Check whether the given number is prime or not.
 - d. To calculate the sum of individual numbers.
3. a. Write a PL/SQL block that inserts a row and updates salary of an employee in employee table by using update_sal function which takes employee number as argument, calculates increment and returns increment based on the following criteria.

If salary \leq 3000 increment = 30% of salary

If salary $>$ 3000 and \leq 6000 increment = 20% of salary

Else increment = 10% of salary.

- b. Write a stored procedure, raise salary which accepts an employee number. It uses update_salfunction of previous program to get the salary increase amount and uses employee number to select the current salary from employee table. If employee number is not found or if the current salary is null, it should raise an exception. Otherwise, updates the salary.
4. Design and develop a suitable Student Database application by considering appropriate attributes. Couple of attributes to be maintained is the Attendance of a student in each subject for which he/she has enrolled and Internal Assessment Using TRIGGERS for the following:
- a) Whenever the attendance is updated, check if the attendance is less than 85%; if so, notify the Head of the Department concerned.
 - b) Whenever, the marks in an Internal Assessment Test are entered, check if the marks are less than 40%; if so, and notify the Head of the Department concerned.

5. Implement Database Objects and creation of object structures for complex relations.

6. Implement C program segment with embedded SQL.

'DATA WAREHOUSING AND DATA MINING' EXERCISES:

1. Implementation of multi dimensional data model using oracle warehouse builder/SQL Server.

'Weka' laboratory Exercises:

2. Demonstration of preprocessing on dataset student.arff

3. Demonstration of preprocessing on dataset labor.arff

4. Demonstration of Association rule process on dataset contactlenses.arff using apriori algorithm

5. Demonstration of Association rule process on dataset test.arff using apriori algorithm

6. Demonstration of classification rule process on dataset student.arff using j48 algorithm

7. Demonstration of classification rule process on dataset employee.arff using j48 algorithm

Implementation of data mining algorithms in C++:

8. Write a C++ program to implement Apriori algorithm and find the frequent item sets.

9. Write a C++ program to implement FP tree algorithm.

10. Write a C++ program to Implement Naïve Bayesian classification algorithm to classify the data.

11. Write a C++ program to Implement of Back propagation algorithm to classify the data.

12. Write a C++ program to Implement K-means clustering algorithm to cluster the data.

REFERENCE BOOKS:

1. Margaret H Dunham, *Data Mining Introductory and Advanced Topics*, 2 ed., Pearson Education, 2006.

2. Amitesh Sinha, *Data Warehousing*, PHI Learning, 2007.

SREE VIDYANIKETHAN ENGINEERING COLLEGE (Autonomous)
Department of Computer Science and Engineering
M. Tech. (CS) – I Semester
(16MT10532) DATA STRUCTURES AND COMPUTER NETWORKS LAB

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
50	50	100	--	--	4	2

PRE-REQUISITES:

Courses on "Advanced Computer Networks" and "Data Structures"

COURSE DESCRIPTION:

Hands on practical experience on implementing data link layer framing methods and routing algorithms;

Practical implementation of linked lists, stacks, queues, binary tree, binary search tree, AVL tree, B -tree, graphs, N-Queen's problem using C++.

COURSE OUTCOMES:

After successful completion of this course the students will be able to:

- CO-1.** Gain basic programming skills to implement
 - a. Framing mechanisms for data link layer,
 - b. Shortest path using Dijkstra's routing mechanism
 - c. Distance vector routing mechanism
- d. Linear and non-linear data structures, backtracking problems.
- CO-2.** Analyze data structures for various problem solving techniques and typical performance measures of network models.
- CO-3** Design, conceptualize and solve real world problems by providing the best solutions for data structures and networking models.
- CO-4:.** Use modern software tools and technologies for designing simple to complex applications in real world.
- CO-5:** Apply advanced knowledge to identify research challenges, and contribute individually or in teams to the development of network projects for real world problems.
- CO-6:** Develop effective professional and business communication in data structures and networks.
- CO-7:** Attitude for independent and continuous learning for improved knowledge with newer versions of object oriented software and new simulation models of protocols.

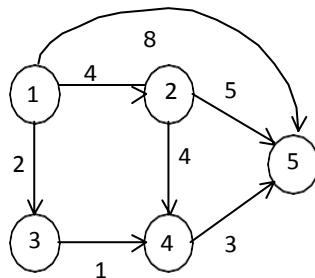
DETAILED SYLLABUS:

LIST OF EXERCISES IN COMPUTER NETWORKS

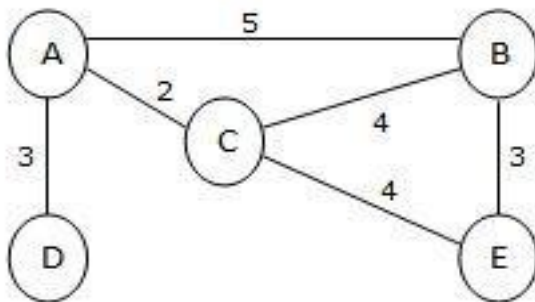
1. Implement the following data link layer framing methods
 - a. Character Count
 - b. Character Stuffing
 - c. Bit Stuffing
2. Design a program to compute checksum for the given frame 1101011011 using CRC-

12, CRC-16, CRC-CCIP. Display the actual bit string transmitted. Suppose any bit from is inverted during transmission. Show that this error is detected at the receivers end.

3. Implement Dijkstra's algorithm to compute the Shortest path through a graph.



4. Design a program to obtain routing table for each node using distance vector routing algorithm by considering the given subnet with weights indicating delay between nodes.



5. Write a program to simulates flow based routing

6. Simulate the Random Early Detection congestion control algorithm

LIST OF EXERCISES IN DATA STRUCTURES

1. Implementation of Stacks and Queue operations using linked list.
2. Perform the following operations on binary search tree:
 - a) Insertion b) Deletion c) Searching
3. Perform the following operations on AVL-tree:
 - a) Insertion b) Deletion
4. Implementing the following operations on B-Tree:
 - a) Insertion b) Searching c) Deletion
5. Implement the following using recursive and non-recursive traversals for binary tree:
 - a) Pre-order b) In-order c) Post-order
6. Implement the following functions of a dictionary using hashing:
 - a) Insertion b) Searching c) Deletion

7. Implement single source shortest path in a graph by using Bellman and Ford algorithm.

8. Implement N-queen's problem using Backtracking. The N Queen is the problem of

placing N chess queens on an N×N chessboard so that no two queens attack each other. The expected output is a binary matrix which has 1s for the blocks where queens are placed. For example following is the output matrix for above 4 queen problem's solution.

{0, 1, 0, 0}

{0, 0, 0, 1}

{1, 0, 0, 0}

{0, 0, 1, 0}

REFERENCE BOOKS:

1. G. A. V. Pai, "Data Structures and Algorithms: Concepts, Techniques and Applications," Mc Graw Hill, First Edition, 2008
2. Nader F. Mir, "Computer and Communication Networks," Pearson Education, 2007.
3. Behrouz A. Forouzan, "Data Communications and Networking," Tata McGraw Hill, Fourth Edition, 2007.
4. D. Samanta, "Classic Data Structures," PHI learning, 2005.

SREE VIDYANIKETHAN ENGINEERING COLLEGE (Autonomous)
Department of Computer Science and Engineering
M. Tech. I Semester
(16MT13808) RESEARCH METHODOLOGY
(Common to all M. Tech. Programs)
(Audit Course)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
-	-	-	-	2	-	-

PREREQUISITES: --

COURSE DESCRIPTION:

Overview of Research, research problem and design, various research designs, data collection methods, statistical methods for research, importance of research reports and its types.

COURSE OUTCOMES: After completion of the course, students should be able to:

1. Acquire in-depth knowledge on
 - a. Research design and conducting research
 - b. Various data collection methods
 - c. Statistical methods in research
 - d. Report writing techniques.
2. Analyze various research design issues for conducting research in core or allied areas
3. Formulate solutions for engineering problems by conducting research effectively in the core or allied areas
4. Carryout literature survey and apply research methodologies for the development of scientific/technological knowledge in one or more domains of engineering.
5. Select and Apply appropriate techniques and tools to complex engineering activities in their respective fields
6. Write effective research reports.
7. Develop attitude for lifelong learning to do research.
8. Develop professional code of conduct and ethics of research.

DETAILED SYLLABUS:

Unit-I: Introduction to Research Methodology (5 Periods)

Objectives and Motivation of Research, Types of Research, Research Approaches, Research Process, Criteria of good Research, Defining and Formulating the Research Problem, Problem Selection, Necessity of Defining the Problem, Techniques involved in Defining a Problem.

Unit-II: Research Problem Design and Data Collection Methods (7 Periods)

Features of Good Design, Research Design Concepts, Different Research Designs, Different Methods of Data Collection, Data preparation: Processing Operations, Types of Analysis.

Unit-III: Statistics in Research**(6 Periods)**

Review of Statistical Techniques - Mean, Median, Mode, Geometric and Harmonic Mean, Standard Deviation, Measure of Asymmetry, ANOVA, Regression analysis.

Unit-IV: Hypothesis Testing**(7 Periods)**

Normal Distribution, Properties of Normal Distribution, Basic Concepts of Testing of Hypothesis, Hypothesis Testing Procedure, Hypothesis Testing: t-Distribution, Chi-Square Test as a Test of Goodness of Fit.

Unit-V: Interpretation and Report Writing**(3 Periods)**

Interpretation – Techniques and Precautions, Report Writing – Significance, Stages, Layout, Types of reports, Precautions in Writing Reports.

[Total Periods: 28]**Text Book:**

- 1) C.R. Kothari, "Research Methodology: Methods and Techniques," New Age International Publishers, New Delhi, 2nd Revised Edition, 2004.

Reference Books:

- 1) Ranjit Kumar, "Research Methodology: A step-by-step guide for beginners," Sage South Asia, 3rd ed., 2011.
- 2) R. Panneerselvam, "Research Methodology," PHI learning Pvt. Ltd., 2009

SREE VIDYANIKETHAN ENGINEERING COLLEGE (Autonomous)
Department of Computer Science and Engineering
M.Tech (CS) II-Semester

(16MT20501) ADVANCED COMPUTER ARCHITECTURE

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	--	--	4

PREREQUISITES: A course on "Computer Organization".

COURSE DESCRIPTION

Quantitative design and analysis, memory hierarchy design; parallel computer models and network properties; pipelining, superscalar techniques, multiprocessors and multi computers; Multi-Vector, SIMD and Multi-Core computers

COURSE OUTCOMES:

After successful completion of this course, students will be able to:

- CO1. Acquire knowledge of:
 - Models and Computer Architectures.
 - Concepts of parallel computer models.
 - Scalable Architectures.
 - Pipelining, Superscalar processors, multiprocessors, SIMD and Multi core Computers.
- CO2. Analyze architectures of parallel computers, sub systems and their interconnection structures.
- CO3. Apply concepts and techniques of advanced computer architectures to solve engineering problems
- CO4. Conduct research in the area of parallel computer architecture development and warehouse scale computing.

DETAILED SYLLABUS:

UNIT-I: FUNDAMENTALS OF QUANTITATIVE DESIGN AND ANALYSIS, MEMORY HIERARCHY DESIGN (10 Periods)

Fundamentals of Quantitative Design and Analysis: Introduction, Classes of computers, Defining Computer Architecture, Trends in technology, Trends in power and energy in ICs, Trends in cost, Dependability, Quantitative Principles of Computer Design.

Memory Hierarchy Design: Introduction, Advanced optimizations of cache performance, Memory technology and optimizations

UNIT-II: PARALLEL COMPUTER MODELS AND NETWORKS PROPERTIES (10 Periods)

Parallel Computer Models: The state of computing, Multiprocessors and multi-computers, Multi vector and SIMD computers,

Program and Networks Properties: Conditions of Parallelism, Program partitioning and scheduling, Program flow mechanisms, System interconnect architectures.

Examples: Detection of Parallelism in a program using Bernstein's conditions.

UNIT-III: PRINCIPLES OF SCALABLE PERFORMANCE AND MEMORY (12 Periods)

Principles of Scalable Performance: Performance metrics and measures, Parallel Processing applications, Speedup performance laws.

Bus, Cache and Shared memory: Bus systems, Cache memory organizations, Shared memory organizations.

UNIT-IV: PIPELINING, MULTIPROCESSORS AND MULTI COMPUTERS (12 Periods)

Pipelining: Linear pipeline processors, nonlinear pipeline processors, Instruction pipeline design, Arithmetic pipeline design.

Multiprocessors and Multi-computers: Multiprocessor system interconnects; Cache Coherence and synchronization mechanisms.

UNIT-V: MULTIVECTOR AND SIMD COMPUTERS, MULTICORE COMPUTERS (10 Periods)

Multi-Vector and SIMD computers: Vector processing principles, Multi-vector multiprocessors, SIMD computer organizations, The Evolution of Dataflow computers Computer Architecture of Warehouse-Scale Computers

Multi-Core computers: Multi-core organization.

Example Architectures: Intel x86 Multi core Organization

[Total Periods: 54]

TEXT BOOKS:

1. Kai Hwang and Naresh Jotwani, "Advanced Computer Architecture," 2 ed., McGraw Hill, New Delhi ,2011.
2. John L. Hennessy and David A. Patterson, "Computer Architecture- A Quantitative Approach," 5 ed., Elsevier, U.S.A, 2012

REFERENCE BOOKS:

1. William Stallings, "Computer Organization and Architecture- Designing for performance," 9 ed., Pearson Education, New Delhi, 2014.
2. Kai Hwang "Advanced Computer Architecture," 1 ed., Tata McGraw Hill, New Delhi, 2001.

SREE VIDYANIKETHAN ENGINEERING COLLEGE (Autonomous)
Department of Computer Science and Engineering
M. Tech (CS) – II Semester
(16MT20502) BIG DATA ANALYTICS
(Common to CS & CNIS)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	--	--	4

PRE-REQUISITES:

Courses on "Data Base Management Systems" & "Data Warehousing and Data Mining".

COURSE DESCRIPTION:

Concepts of Big Data, Types of Data Elements; Introduction to Hadoop, Hadoop Ecosystem; Map Reduce; Building Blocks of Hadoop; Big data analytics applications; Predictive and Descriptive Analytics.

COURSE OUTCOMES:

After successful completion of this course, the student will be able to:

CO-1: Gain knowledge in:

- Big data Characteristics
- Hadoop Framework
- Map Reduce.
- Hadoop Release

CO-2: Analyze and develop solutions for database systems for storing and analyzing the large data.

CO-3: Apply Big Data Analytics for estimating the data sets to solve the real world problems.

CO-4: Design and model for an effective database by using big data tools.

CO-5: Carry out research on Predictive Analysis and Sentiment Analysis

CO-6: Learning advance analytics techniques for effective Database monitoring.

DETAILED SYLLABUS:

UNIT I: INTRODUCTION TO BIG DATA: (10 periods)

Big Data Characteristics: Volume-Variety-Velocity-Veracity, Analytics, Basic Nomenclature, Analytics Process Model, Analytical Model Requirements, Types of Data Sources, Sampling, Types of Data Elements, Missing Values, Standardizing Data, Outlier Detection and Treatment, Categorization.

UNIT II: INTRODUCTION TO HADOOP: (10 periods)

Data, data types, Storage and Analysis, Relational Database Management Systems, Grid Computing, Volunteer Computing, A Brief History of Hadoop, Apache Hadoop and the Hadoop Ecosystem.

UNIT III – MAPREDUCE:**(11 periods)**

A weather Dataset: Data format, Analyzing the data with unix tools, Analyzing the data with Hadoop: MapReduce, Java MapReduce, Scaling Out: Data Flow, Combiner Functions, Running a Distributed MapReduce Job, Hadoop Streaming: Ruby, Python, Hadoop Pipes, Compiling and Running.

UNIT IV – HADOOP RELEASES**(11 Periods)**

The Building Blocks of Hadoop: Name Node-Data Node-Secondary Name Node-Job Tracker-Task Tracker. BIG DATA ANALYTICS APPLICATIONS: Back Testing Analytical Model, Credit Risk Modeling, Fraud Detection, Net Lift Response, Web Analytics, Social Media Analytics, and Business Process Analytics.

UNIT V–PREDICTIVE ANALYTICS AND DESCRIPTIVE ANALYTICS**(11 Periods)**

Predictive Analytics: Target Definition, Linear Regression, Logistic Regression, Decision Trees, Support Vector Machines, Ensemble Methods, Multiclass Classification Techniques, Evaluating Predictive Models.

Descriptive Analytics: Association Rules, Sequence Rules.

Total No. of Periods: 53**TEXT BOOKS:**

1. Bart Baesens, "*Analytics in a Big Data World: The Essential Guide to Data Science and its Applications*," Wiley Publications, 2014.
2. Tom White, "*Hadoop: The Definitive Guide*," 3 ed., O'REILLY Publications, 2012.

REFERENCE BOOKS:

1. Paul Zikopoulos, IBM, Chris Eaton, Paul Zikopoulos "*Understanding Big Data: Analytics for Enterprise Class Hadoop and streaming Data*," The McGraw-Hill Companies, 2012.
2. Chuck Lam "*Hadoop in Action*," Manning Publications, 2011.

SREE VIDYANIKETHAN ENGINEERING COLLEGE (Autonomous)

Department of Computer Science and Engineering

M. Tech (CS) II-Semester

(16MT20503) OBJECT ORIENTED ANALYSIS AND DESIGN

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	--	--	4

PRE-REQUISITES:

A Course on "Object Oriented Programming"

COURSE DESCRIPTION:

Concepts of Unified Modeling language; Sequence and collaboration diagrams; Behavioral Modeling; Unified Process and phases of unified process

COURSE OUTCOMES:

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

CO-1: Gain advanced knowledge in

- Object Oriented Methodologies
- UML Diagrams
- Unified Process

CO-2: Analyze Various UML Models which are required for solving Real World problems.

CO-3: Formulate solutions for engineering problems pertaining to the Object Oriented Analysis and Design

CO-4: Design UML Diagrams Using Visual Modelling Tools

CO-5: Apply unified process models for building of Applications, which is required for effective project management.

DETAILED SYLLABUS:

UNIT – I: INTRODUCTION TO UML (11 Periods)

Introduction To UML: Importance Of Modeling- Principles Of Modeling Object Oriented Modeling- Conceptual Model Of The UML- Architecture.

Basic Structural Modeling: Classes- Relationships- Common Mechanisms - and Diagrams.

Class Diagram: Terms - Concepts- Modeling Techniques for Class Diagram.

UNIT – II: INTERACTION DIAGRAMS AND COLLABORATION DIAGRAMS (11 Periods)

Interaction Diagrams: Sequence Diagrams: Terms - Concepts and Common Modeling Techniques

Collaboration Diagrams: Terms- Concepts and Common Modeling Techniques.

Basic Behavioral Modeling: Use Cases- Use Case Diagrams- Activity Diagrams.

UNIT -III: ADVANCED BEHAVIORAL MODELING (11 Periods)

Advanced Behavioral Modeling: Events And Signals- State Machines - State Chart Diagrams.

Architectural Modeling: Component - Deployment - Component Diagrams and Deployment Diagrams.

Case Studies: Online Bookshop, Point of sales System.

UNIT – IV: THE UNIFIED PROCESS (11 Periods)

The Unified Process: Use Case Driven- Architecture Centric- Iterative and Incremental.

The Four Ps: People- Project- Product- And Process.

Use Case Driven Process: Why Use Case - Capturing Use Cases- Analysis- Design - And Implementation To Realize The Use Cases - Testing The Use Cases.

Architecture-Centric Process: Architecture In Brief- Why We Need Architecture - Use Cases and Architecture- An Architecture Description.

Iterative Incremental Process: Iterative Incremental In Brief- Why Iterative Incremental Development? The Iterative Approach Is Risk Driven- The Generic Iteration.

UNIT – V: PHASES OF UNIFIED PROCESS (11 Periods)

Inception Phase: Early In The Inception Phase- The Archetypal Inception Iteration Workflow- Execute The Core Workflows- Requirements To Test.

Elaboration Phase: Elaboration Phase In Brief- Early In The Elaboration Phase- The Architectural Elaboration Iteration Workflow- Execute The Core Workflows-Requirements to Test.

Construction Phase: Early In The Construction Phase- The Archetypal Construction Iteration Workflow- Execute The Core Workflow.

Transition Phase: Early In the Transition Phase- Activities in Transition Phase.

Total Periods: 55

TEXT BOOKS:

1. Grady Booch, James Rumbaugh, Ivar Jacobson, "*The Unified Modeling Language User Guide*", Pearson Education, 2 ed., 2006
2. Ivar Jacobson, Grady Booch, James Rumbaugh, "*The Unified Software Development Process*", Pearson Education, 1 ed., 2009

REFERENCE BOOKS:

1. Mark Priestley, "*Practical Object-Oriented Design with UML*," Second Edition, Tata McGraw Hill, 2011.
2. Mike O' Docherty, "*Object-Oriented Analysis and Design with UML Version 2.0*," Wiley India Pvt. Ltd, 2012.

SREE VIDYANIKETHAN ENGINEERING COLLEGE (Autonomous)
Department of Computer Science and Engineering
M.Tech (CS) II Semester
(16MT12501) CLOUD COMPUTING
(Common to SE, CS & CNIS)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	-	-	4

PREREQUISITES: *Courses on "Operating Systems" and "Computer Networks"*

COURSE DESCRIPTION:

Virtualization, Case studies – XEN, VMware, Microsoft Hyper-V; Cloud architecture; Services and Applications; Cloud Programming; Industry practices and Case studies –Amazon Web Services, Google App Engine, and Microsoft Azure.

COURSE OUTCOMES:

After successful completion of this course, students will be able to:

- CO1:** Demonstrate knowledge on Virtualization models, Cloud Architecture, Services and Programming concepts.
- CO2:** Analyze the problems in existing cloud architectures.
- CO3:** Apply concurrent programming, throughput computing and Data intensive computing in Cloud programming.
- CO4:** Conduct research on emerging technologies in cloud and energy management in cloud
- CO5:** Apply virtualization techniques to optimize resource sharing.

DETAILED SYLLABUS:

Unit I: Introduction to Virtualization (9 Periods)

Characteristics of Virtualized Environments, Taxonomy of Virtualization Techniques, Virtualization and Cloud Computing, Pros and Cons of Virtualization, Technology Examples – XEN, VMware, Microsoft Hyper-V.

UNIT II: Cloud Architecture (11 Periods)

Introduction to Cloud: Defining Cloud Computing, Cloud Types - The NIST model, The Cloud Cube Model, Deployment models, Service models, Examining the Characteristics of Cloud Computing, Paradigm shift, Benefits of cloud computing, Disadvantages of cloud computing, Assessing the Role of Open Standards.

Cloud Architecture: Exploring the Cloud Computing Stack, Composability, Infrastructure, Platforms, Virtual Appliances, Communication Protocols, and Applications.

UNIT III: Defining Cloud Services (10 Periods)

Defining Infrastructure as a Service (IaaS) – IaaS workloads, Pods, aggregation, and silos, **Defining Platform as a Service (PaaS), Defining Software as a Service (SaaS)** – SaaS characteristics, Open SaaS and SOA, Salesforce.com and CRM SaaS, **Defining Identity as a Service (IDaaS)** – Introduction to identity, Networked identity service classes, Identity system codes of conduct, IDaaS interoperability, **Defining Compliance as a Service (CaaS).**

UNIT IV: Cloud Programming Concepts (12 Periods)

Concurrent Programming – Introduction to Parallelism for Single Machine Computation, Programming Applications with Threads, **High Throughput Computing** – Task Programming, Task based Application Models, **Data Intensive Computing** – Introduction to Data Intensive Computing and Technologies for Data Intensive Computing.

UNIT V: Industrial Platforms and Trending Developments (13 Periods)

Case Studies on Cloud Platforms – Amazon Web Services, Google App Engine, and Microsoft Azure, Case Studies on Cloud Applications – Scientific Applications, Business and Consumer Applications.

Enhancements in Cloud – Energy Efficiency in Clouds, Market based Management of Clouds, Federated Clouds / InterCloud, Third Party Cloud Services.

Total Periods: 55

TEXT BOOKS:

1. Rajkumar Buyya, Christian Vecchiola, S. Thamarai Selvi, "Mastering Cloud Computing: Foundations and Applications Programming," 1st Edition, McGraw Hill, New Delhi, 2013.
2. Barrie Sosinsky, "Cloud Computing Bible," 1st Edition, Wiley India Pvt Ltd, New Delhi, 2011.

REFERENCE BOOKS:

1. Anthony T. Velte, Toby J. Velte Robert Elsenpeter, "Cloud Computing: A Practical Approach," 1st Edition, Tata McGraw Hill, 2010.
2. George Reese, "Cloud Application Architectures," 1st Edition, O'Reilly Publishers, 2010.

SREE VIDYANIKETHAN ENGINEERING COLLEGE (Autonomous)
Department of Computer Science and Engineering
M.Tech (CS) II Semester
(16MT22505) WEB TECHNOLOGIES
(Common to SE and CS)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	-	-	4

PREREQUISITES: A course on "Object Oriented Programming".

COURSE DESCRIPTION: Web Technologies: HTML5, CSS, JavaScript, JQuery; Open source server-side scripting language- PHP; MySQL database concepts; and AJAX.

COURSE OUTCOMES:

On successful completion of this course, the students will be able to:

- CO1:** Gain knowledge on web technologies.
- CO2:** Analyze the functionality of client as well as server side web technologies for validating web pages.
- CO3:** Gain programming skills to design and develop novel web applications
- CO4:** Apply web technologies to make web pages more interactive, scalable and user friendly web applications.

DETAILED SYLLABUS

UNIT-I: HTML5 AND CSS3

(14 Periods)

HTML5: Overview of HTML and XHTML, HTML5 - Introduction, HTML5 Document Structure, Creating Editable Content, Checking Spelling Mistakes, Exploring Custom Data Attributes, Microdata, Client-Side Storage, Drag and Drop Feature, ARIA Accessibility, Offline Web Applications, Web Communications, Cross-Document Messaging and Desktop Notifications, 2D and 3D Graphics; **CSS3:** Introduction, Features of CSS3, Syntax of CSS, Exploring CSS selectors, Inserting CSS in HTML Document, State of CSS3.

UNIT-II: JAVASCRIPT AND JQUERY

(10Periods)

JavaScript: Overview of JavaScript, JavaScript Functions, Events, Image Maps and Animations, JavaScript Objects; **JQuery:** Fundamentals of JQuery, JQuery Selectors, JQuery Methods to Access HTML Attributes and Traversing, JQuery Manipulators, Events and Effects.

UNIT–III: INTRODUCTION TO PHP (10 Periods)

Introduction, Data Types, Variables, Constants, Expressions, String Interpolation, Control Structures, Functions, Arrays, Embedding PHP Code in Web Pages, Object Oriented PHP.

UNIT–IV: PHP AND MYSQL (10Periods)

PHP and Web Forms, Sending Form Data to a Server, Authenticating Users with PHP, Session Handlers, PHP with MySQL, Interacting with the Database, Database Transactions.

UNIT–V: AJAX (08Periods)

Exploring Different Web Technologies, Exploring AJAX, Creating a Sample AJAX Application, Displaying Date and Time using AJAX, Creating the XML HttpRequest Object, Reading a File Synchronously and Asynchronously, Reading Response Headers, Loading List Boxes Dynamically using XML HttpRequest Object, JQuery with AJAX, Validating a Field using AJAX and PHP.

[Total Periods: 52]

TEXT BOOKS:

1. Kogent Learning Solutions Inc, "*HTML 5 Black Book: Covers CSS3, JavaScript, XML, XHTML, AJAX, PHP and JQuery*," 1st Edition, Dreamtech Press, 2011.
2. W. Jason Gilmore, "*Beginning PHP and MySQL*," 4th Edition, APress, 2011.

REFERENCE BOOKS:

1. Andrea Tarr, "*PHP and MySQL*," 1st Edition, Willy India, 2012.
2. Thomas A. Powell, "*The Complete Reference: HTML and CSS*," 5th Edition, Tata McGraw Hill, 2010.
3. Steve Suehring, Tim Converse and Joyce Park, "*PHP6 and MySQL*," 1st Edition, Willy India, 2009.
4. P. J. Deitel and H. M. Deitel, "*Internet & World Wide Web How to Program*," 4th Edition, Pearson, 2009.

SREE VIDYANIKETHAN ENGINEERING COLLEGE (Autonomous)
Department of Computer Science and Engineering
M.Tech (CS) II-Semester
(16MT20504) EMBEDDED SYSTEMS
(PROFESSIONAL ELECTIVE-II)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	--	--	4

PRE-REQUISITES:

Courses on Computer Organization & Operating Systems

COURSE DESCRIPTION:

Concepts of Embedded System components, Micro controller programming; Programming in Embedded Systems, design using hardware and software components; Real-Time Operating systems, Embedded Product Development Life Cycle .

COURSE OUTCOMES:

After successful completion of this course the students will be able to:

CO-1: Gain advanced knowledge in

- Embedded system components.
- Micro controller programming.

CO-2: Analyze critical problems related to programming for hardware and software components by conducting detailed research.

CO-3: Apply and solve issues in computer based systems using a range of solutions provided by Embedded Systems..

CO-5: Use appropriate techniques, tools, resources and usage of modern Embedded Product Development Life Cycle (EDLC) tools for the design and development of Embedded Systems.

DETAILED SYLLABUS

UNIT I - INTRODUCTION TO EMBEDDED SYSTEMS (11 Periods)

Embedded Systems, History, classification, application areas, purpose. Core of Embedded systems, memory, sensors and actuators, communication Interface, firmware, other system components, PCD and Passive components. Embedded systems Applications and domain specific.

UNIT II -MICRO CONTROLLER (11 Periods)

8051 Architecture, Real World Interfacing, Introduction to Advanced Architectures, Processor and Memory Organization, Instruction -level parallelism, memory-types, memory-maps and addresses, processor selection, memory selection.

UNIT III-EMBEDDED SYSTEM DESIGN AND DEVELOPMENT

(11 Periods)

Hardware Design: Analog and Digital components, VLSI circuit Design, EDA tools, PCB Layout design and Fabrication.

Firmware Design and Development: Firmware design approaches, development languages, Programming

UNIT IV-PROCESSES AND REAL - TIME OPERATING SYSTEM

(11 Periods)

OS-basics-types-tasks, process and threads-Multi-processing and Multi-tasking-Task Scheduling-Task communication-Task Synchronization-Device Drivers-Case study: VxWorks and MicroC/OS-II.

UNIT V-EMBEDDED SYSTEM DEVELOPMENT (11 Periods)

Integrated Development Environment, Cross-compilation, De-compiler, simulators, Emulators, Debuggers. **Embedded Product Development**

Life cycle: EDLC-the EDLC Objectives -Phases-Modeling.

TOTAL PERIODS: 55

TEXT BOOKS:

1. SHIBU KV, "Introduction to Embedded Systems", Fifth Edition, McGraw Hill ,2012.
2. Manish K Patel, "Microcontroller based Embedded Systems", McGraw Hill ,2014.

REFERENCE BOOKS:

1. Wayne Wolf, "Computers as Components -Principles of Embedded Computing System Design", Morgan Kaufman Publishers, First Indian Reprint, 2001.
2. Steve Heath, "Embedded Systems Design", Second Edition, Newnes Publications, 2003.
3. David E. Simon, "An Embedded Software Primer", Pearson Education, First Indian Reprint, 2000.

SREE VIDYANIKETHAN ENGINEERING COLLEGE (Autonomous)

Department of Computer Science and Engineering

M. Tech (CS) II-Semester

(16MT20505)INFORMATION SECURITY

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	--	--	4

PRE-REQUISITES:

A Course on "Computer Networks"

COURSE DESCRIPTION

Concepts of cryptographic algorithms, public key and private key encryption; security models, Hash Algorithms; Intrusion Detection, IP Security; analysis of security principles in internet and system security

COURSE OUTCOMES:

After successful completion of this course, students will be able to:

CO1. Gain advanced knowledge in

- Symmetric and Asymmetric Encryption Algorithms
- Key distribution and message Authentication
- Hash algorithms and digital signature techniques
- IP security and Wireless network security
- Intrusion Detection and Firewall configurations

CO2. Analyze the symmetric algorithms, Public-Key Encryption and Hash Algorithms.

CO3. Develop solutions to solve the problems related to Public-Key Encryption, Digital signatures, Secure Hash Functions

CO4. Conduct research to identify efficient ciphers and cryptographic algorithms to provide novel solutions for Real- Time applications

CO5. Apply the appropriate Cryptographic Techniques and security Algorithms in the area of Information Security

DETAILED SYLLABUS

UNIT-I: INTRODUCTION

(10Periods)

Security Attacks, Security Services, Security Mechanisms, Model for Network Security, Mono alphabetic cipher and Poly alphabetic cipher

Symmetric Block Encryption- Symmetric Block Encryption Algorithms-DES, Triple-DES, AES, Cipher Block Modes of Operation

UNIT-II: PUBLIC-KEY ENCRYPTION

(10 Periods)

Message Authentication-Approaches to Message Authentication, Simple hash function, Secure Hash Functions –SHA-1, SHA-512, Message Authentication Codes and HMAC

Public-Key Cryptography-Public-Key Cryptography Algorithms-RSA, Diffie-Hellman Key Exchange, Digital signature standard

UNIT-III: NETWORK SECURITY APPLICATIONS (12 Periods)

Key Distribution and User Authentication-Kerberos, Key Distribution Using Asymmetric Encryption, X.509 Certificates, Public Key Infrastructure

Electronic Mail Security-Pretty Good Privacy, Key Rings, Multipurpose Internet Mail Extensions, S/MIME - Functionality, Messages and certificate processing.

UNIT-IV: INTERNET SECURITY**(11 Periods)**

Transport Level Security- Secure Socket Layer and Transport Layer Security.

IP Security- Overview, policy, Encapsulating Security Payload and IKE.

Wireless Network security- IEEE 802.11 Wireless LAN Overview, IEEE 802.11i Wireless LAN Security

UNIT-V: SYSTEM SECURITY**(10 Periods)**

Intruders-Intrusion Detection, Password Management, Malicious Software - Types, Viruses, Virus Countermeasures, Worms.

Firewalls- Firewall Characteristics, Firewall Basing, Types of Firewalls, Firewall Location and Configurations.

Total number of Periods: 53**TEXTBOOKS:**

- a. William Stallings, "*Network Security Essentials: Applications and Standards*," 4ed, Pearson Education, New Delhi, 2011
- b. Douglas R. Stinson, "*Cryptography – Theory and Practice*," 3ed, CRC Press, 2005

REFERENCE BOOKS:

1. William Stallings, "*Cryptography and Network Security*," 5ed., Pearson education, New Delhi, 2011.
2. Eric Maiwald, "*Fundamentals of Network Security*", 1ed., McGraw-Hill, 2003

SREE VIDYANIKETHAN ENGINEERING COLLEGE (Autonomous)
Department of Computer Science and Engineering
M.Tech (CS) – II Semester
(16MT20506) MOBILE COMPUTING
(Professional Elective-II)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4	--	--	4

PRE-REQUISITES:

A Course on "Computer Networks"

COURSE DESCRIPTION:

GSM architecture, Wireless MAC and CDMA Systems; Mobile IP network layer, Mobile Transport Layer; Databases, Data Dissemination and Broadcasting Systems; Synchronization in Mobile Devices and Mobile Computing Systems; Mobile Application Languages and Mobile Operating Systems.

COURSE OUTCOMES:

After successful completion of this course, students will be able to:

- CO1.** Gain advanced knowledge in
- GSM and CDMA Systems.
 - Mobile IP, and Mobile TCP
 - Databases and Data Dissemination
 - Mobile Data Synchronization
- CO2.** Analyze various methods in data dissemination and broadcasting models
- CO3.** Evaluate and implement novel applications to realize power computing and context-aware computing. .
- CO4.** Contribute positively to multidisciplinary scientific research on mobile application languages and mobile operating systems.
- CO5.** Apply Database Hoarding Techniques, Selective Indexing and Tuning Techniques to solve problems in Mobile Computing

DETAILED SYLLABUS:

UNIT I – GSM AND WIRELESS MEDIUM ACCESS CONTROL

(11 periods)

GSM and Similar Architectures: GSM, Radio Interfaces, Protocols, Localization, Calling, Handover, Security, New Data Services.

Wireless MAC and CDMA – Based Communication: Medium Access control, Introduction to CDMA-based Systems, Spread Spectrum in CDMA Systems, Coding Methods in CDMA.

UNIT II – MOBILE IP NETWORK LAYER AND MOBILE

TRANSPORT LAYER

(11 periods)

Mobile IP Network Layer: IP and Mobile IP Network Layer, Packet Delivery and Handover Management, Location Management, Registration, Tunneling and Encapsulation, Route Optimization, Dynamic Host Configuration Protocol.

Mobile Transport Layer: Conventional Transport Layer Protocols, Indirect TCP, Snooping TCP and Mobile TCP.

UNIT III – DATABASES AND DATA DISSEMINATION

(11 periods)

Databases: Database Hoarding Techniques, Data Caching, Client-Server Computing and Adaptation.

Data Dissemination and Broadcasting Systems: Communication Asymmetry, Classification of Data-Delivery Mechanisms, Data Dissemination Broadcast Models, Selective Tuning and Indexing Techniques.

UNIT IV – DATA SYNCHRONIZATION IN MOBILE COMPUTING

SYSTEMS AND MOBILE DEVICES

(11 periods)

Data Synchronization in Mobile Computing Systems: Synchronization, Synchronization Software for Mobile Devices, Synchronization Protocols, SynML- Synchronization Language for Mobile Computing, Sync4J (Funambol).

Mobile Devices: Server and Management –Mobile Agent, Application Server, Gateways, Portals, Service Discovery, Device Management, Mobile File Systems, Security.

UNIT V – MOBILE APPLICATION LANGUAGES AND MOBILE OPERATING SYSTEMS

(10 periods)

Mobile Application Languages: Introduction, XML, JAVA, Java 2 Micro Edition (J2ME), JavaCard.

Mobile Operating Systems: Operating System, Palm OS, Windows CE, Symbian OS, Linux for Mobile Devices.

[Total Periods: 54]

TEXT BOOK:

1. Raj Kamal, "Mobile Computing," 2 ed., OXFORD University Press, 2007.

REFERENCE BOOKS:

1. Jochen H. Schiller, "Mobile Communications," 2 ed. , Pearson Education, 2004

2. Ashok K Talukder, Roopa R Yavagal, "Mobile Computing," 2 ed., Tata McGraw Hill, 2010

SREE VIDYANIKETHAN ENGINEERING COLLEGE (Autonomous)
Department of Computer Science and Engineering
M. Tech (CS) – II Semester
(16MT20507) SOFTWARE PROJECT MANAGEMENT
(Professional Elective-II)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
40	60	100	4			4

PRE-REQUISITES:

A course on "Software Engineering"

COURSE DESCRIPTION:

Concepts of Software Project Management; Software efforts estimation techniques; Software economics; life cycle phases; model based software architectures; project organizations & responsibilities.

COURSE OUTCOMES:

After successful completion of this course the students will be able to:

- CO-1:** Gain knowledge on project planning and management, client management and project Scheduling and monitoring.
- CO-2:** Analyze the major and minor milestones, artifacts and metrics from management and technical perspective.
- CO-3:** Design software products using conventional and modern principles of software project management.
- CO-4:** Apply Software Metrics for a given Project to calculate Cost estimation models.
- CO-5:** Adopt team effectiveness through Work Breakdown Structures by optimal cost and schedule estimates
- CO-6:** Demonstrate skills of project management and process measurement in software projects.

DETAILED SYLLABUS:

UNIT-I: SOFTWARE EFFORTS ESTIMATION TECHNIQUES

(10 Periods)

Introduction to software project management, An overview of project planning, The Waterfall model, Conventional Software Management Performance, Evolution of Software Economics, Software Economics

UNIT-II: IMPROVING SOFTWARE ECONOMICS

(11 Periods)

Reducing Software product size, improving software processes, improving team effectiveness, improving automation, achieving required quality, peer inspections, the old way and the new, the principles of conventional software Engineering, and principles of modern software management.

UNIT-III: LIFE CYCLE PHASES

(10 Periods)

Engineering and production stages, inception, Elaboration, construction phase, transition phases, ISO 12207 approach to software lifecycle processes, Artifacts of the process, the artifact sets, Management artifacts, engineering artifacts.

UNIT-IV: MODEL BASED SOFTWARE ARCHITECTURES

(10 Periods)

A Management perspective and Technical perspective, Workflows of the process, Software process workflows, Iteration workflows. Checkpoints of the Process- Major mile stones, Minor Milestones, Periodic status assessments, Iterative Process Planning, planning guidelines, cost and schedule estimating, Iteration planning process, Pragmatic planning.

UNIT-V: PROJECT ORGANIZATIONS AND RESPONSIBILITIES

(14 Periods)

Line-of-Business organization, Project organizations- case study, evolution of organizations, Automation building blocks, The project environment, the seven core metrics, Management indicators, quality indicators, life cycle expectations, Software Metrics automation, Tailoring the process discriminates, COCOMO cost estimation model-case study.

[Total Periods: 55]

TEXT BOOKS:

1. Walker Royce, "*Software Project Management*," Pearson Education, 2005.
2. Bob Hughes and Mike Cotterell, "*Software Project Management*," 4 ed., Tata McGraw-Hill Edition, 2006.

REFERENCE BOOKS:

1. Joel Henry, "*Software Project Management*," 1 ed., Pearson Education, 2003.
2. Pankaj Jalote, "*Software Project Management in Practice*," 7 ed., Pearson Education, 2008.

SREE VIDYANIKETHAN ENGINEERING COLLEGE (Autonomous)
Department of Computer Science and Engineering
M. Tech. II-Semester
(16MT20531) CLOUD COMPUTING & BIG DATA ANALYTICS LAB
(Common to CS and CNIS)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
50	50	100	--	--	4	2

PRE-REQUISITES:

Course on "Cloud Computing" and "Operating Systems"

COURSE DESCRIPTION:

Hands-on experience on creating Virtual machines on Windows and Linux platforms, Development of Service based web applications & their deployment and Mobile app development, Designing and implementing Hadoop cluster.

COURSE OUTCOMES:

After successful completion of this course , students will be able to:

- CO-1:** Demonstrate hands-on experience on Virtualization models, Cloud Environment and Hadoop cluster setup.
- CO-2:** Analyze the given experiment and measure the performance of services and datasets.
- CO-3:** Apply API development skills in web applications for Cloud deployment and develop solutions for real time applications using Hadoop.
- CO-4:** Devise virtual environments based on virtualization techniques and processing huge amount of data using Big data tools
- CO-5:** Develop written and oral communications in preparing and presenting reports.

LIST OF PRACTICAL EXERCISES:

- 1 :** Create Virtual machines with given set of configuration on Hyper-V, " Ubuntu 14 LTS OS, with 2 GB RAM and 200 GB HDD". (IaaS)
- 2:** Create Virtual machines with given set of configuration on Ubuntu OS: "Windows 7 OS with 4 GB RAM and 500 GB HDD". (IaaS)
- 3:** Develop a Design document for a web application, to perform operations based on service calls and to be deployed on cloud environment. (Design Doc)
- 4:** Develop a web application for performing Calculator operations by selecting relevant services. Deploy it on cloud platform. (SaaS)
- 5:** Develop a HTTPS web application with social media interfaces (Facebook / Twitter / Instagram / Google+ APIs). (SaaS)
- 6:** Develop a mobile app on Google App Engine for uploading a resume into a website, collaborated with Drop box. The resume should be encrypted. (PaaS)
- 7:** Develop a service call to run on Drop box resumes for picking the resumes of given skill set. (PaaS)
 - i. 6+ years of Exp in Java Development.
 - ii. 10 years of experience in Automation Testing.

- iii. 15+ years of Managerial experience with technical background.
- iv. 5-7 years of on-site experience in .NET support and programming.

8: Install and run Hadoop using Single node Cluster.

9: Install and run Hadoop using Multi node cluster

10: Write a program to count words in a program using map and reduce functions and Hadoop.

11: Illustrate installation and configuring of Hive

REFERENCE BOOKS:

1: Ivanka Menken and Ivanka Menken, "*Cloud Computing Virtualization Specialist Complete Certification Kit - Study Guide Book*," 1 st Edition, Emereo Pty. Ltd., 2009.

2: Barrie Sosinsky, "*Cloud Computing Bible*," 1st Edition, Wiley India Pvt Ltd, 2011.

3: Tom White, "*Hadoop: The Definitive Guide*," 3rd Edition, O'REILLY Publications, 2012.

SREE VIDYANIKETHAN ENGINEERING COLLEGE (Autonomous)

Department of Computer Science and Engineering

M. Tech – II Semester

(16MT20532) OBJECT ORIENTED ANALYSIS & DESIGN LAB

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
50	50	100	--	--	4	2

PRE-REQUISITES:

A Course on "Object Oriented Programming"

COURSE DESCRIPTION:

Concepts of Unified Modeling language; Sequence and collaboration diagrams; Behavioral Modeling; Unified Process and phases of unified process.

COURSE OUTCOMES:

After successful completion of this course the students will be able to:

- CO-1:** Demonstrate knowledge on Object Oriented concepts, project planning and modeling concepts.
- CO-2:** Analyze and understand requirements of given real life problems.
- CO-3:** Design Structural and Behavioral Diagrams to solve real world problems.
- CO-5:** Apply UML to develop blueprints of a given problem.
- CO-6:** Develop written and oral communications in preparing and presenting reports.
- CO-7:** Update knowledge in object oriented analysis and design continuously

LIST OF EXERCISES:

Case Study No: 1

Problem Title: Automated Teller Machine (ATM)

Problem Statement:

Software is designed for supporting a computerized ATM banking network. All the process involved in the bank is computerized these days. All the accounts maintained in the bank and also the transactions effected, including ATM transactions are to be processed by the computers in the bank. An ATM accepts a relevant cash card, interacts with user, communicates with the central system to carry out the transaction, dispenses cash, and prints receipts. The system to be designed and implemented must include appropriate record keeping and security provisions. The system must handle concurrent access to the same account.

Case Study No: 2

Problem Title: Online Ticket Reservation for Railways

Problem Statement:

Computer play an integral part of the day in today's life. It makes the entire job easier and faster, every job is computerized so as the ticket reservation we can book over the online ticket reservation system. During the booking of the ticket reservation passenger has to select origin, data of journey, destination, class of train etc. The

reservation counter keeps track of passenger's information. Thus the system will have all the details about the trains and facilities provided by them. There are various trains with the different level of convenience for the passengers. The whole database will be maintained by database administrator. There are varieties of trains where the passengers can select the train according to the convenience for their destination journey. The journey could be within the state or across the India. Each train has the three types of classes ie Sleeper class, First class and the AC compartment. Design the application for the above problem description.

Case Study No: 3

Problem Title: A Point-of-Sale (POS) System

Problem Statement:

A POS system is a computerized application used to record sales and handle payments, it is typically used in a retail store, it includes hardware components such as a computer and bar code scanner, and software to run the system. It interfaces to various service applications, such as a third-party tax calculator and inventory control. These systems must be relatively fault tolerant, that is, even if remote services are temporarily unavailable they must still be capturing sales and handling at least cash payments. A POS system must support multiple and varied client-side terminals and interfaces such as browser, PDA's, touch-screens.

Case Study No: 4

Problem Title: University Course Information System

Problem Statement:

Each student has access to his or her course and grade information only and must be authenticated prior to viewing or updating the information. A course instructor will use the system to view the list of courses he or she is assigned for a given semester or has taught previously, view the list of students registered for the course(s) he or she is teaching, and record final grades for each student in the course(s). TA assignments will also be viewable through this system. Instructors must also be authenticated prior to viewing or updating any information.

Case Study No: 5

Problem Title: Hospital Management System

Problem Statement:

Hospital Management System (HMS) is state-of-the-art software that offers comprehensive solutions to various segments of Healthcare Industry such as Super Specialty, Multispecialty and General Hospitals of varied capacities, small Nursing Homes, HMOs, Polyclinics and General Practitioners. This HMS solution addresses the issues from multi-discipline angles namely Patients, Doctors, Pharmacy, Hospital Management and Services.

The Software provides both clinical as well as patient care aspects to hospital management. The software is divided into different

modules, each addressing a specific activity of the hospital and there by facilitating better patient care. Each module can be used as a standalone solution or can be integrated in a phased manner. Modules are designed so that they meet the present and future requirements of the hospital.HMS offers various sub-systems and a seamless integration. By being modular, each module can be used as a standalone solution or can be integrated in a phased manner. Modules are also so designed to meet the present as well as future requirements of the organization and process a unique ability with the business growth.HMS consists of the Base modules, Add-on modules and Specialty modules. Additional modules both add-on and specialty modules can be seamlessly integrated to the HMS at any time. The Integration Manager takes care of all the data consistency issues.

Case Study No: 6

Problem Title: Unified Library Application

Problem Statement:

A library lends books and magazines to members, who are registered in the system. Also it handles the purchase of new titles for the library. Popular titles are bought in multiple copies. A member can reserve a book or magazine that is not currently available in the library, so that when it is returned by the library that person is notified. The library can easily create, update and delete information about the titles, members, loans and reservations in the systems.

Case Study No: 7

Problem Title: Online Shopping

Problem Statement:

A POS System is a computerized application used to record sales and handle payments; it is typically used in a retail store. It includes hardware components such as a computer and bar code scanner, and software to run the system. It interfaces to various service applications, such as a third-party tax calculator and inventory control. These systems must be relatively fault tolerant; that is, even if remote services and temporarily unavailable they must still be of capturing sales and handling at least cash payments. A POS system must support multiple and varied client – side terminals and interfaces such as browser, PDA s, touch – screens.

Case Study No: 8

Problem Title: Passport Automation System

Problem Statement:

Passport Automation System (PAS) is used in the effective dispatch of passport to all of the applicants. This system adopts a comprehensive approach to minimize the manual work and schedule resources, time in a cogent manner. The core of the system is to get the online registration form (with details such as name, address etc..) filled by the applicant whose testament is verified for its genuineness by the Passport Automation System with respect to the already existing information in the database.

This forms the first and foremost step in the processing of passport application. After the first round of verification done by the system, the information is in turn forwarded to the regional administrator's (Ministry of External Affairs) office. The application is then processed manually based on the report given by the system, and any forfeiting identified can make the applicant liable to penalty as per the law. The system forwards the necessary details to the police for its separate verification whose report is then presented to the administrator. After all the necessary criteria have been met, the original information is added to the database and the passport is sent to the applicant.

Case Study No: 9

Problem Title: Recruitment Procedure for Software Industry

Problem Statement:

In the software industry the recruitment procedure is the basic thing that goes in the hand with the requirement as specified by the technical management team. HR first gives an advertisement in leading Newspapers, Journals, Weeklies and Websites. The job seekers can apply for it through by Post or by e-mail to the company.

The technical skill and the experience of the candidates are reviewed and the sort listed candidates are called for the interview. There may be different rounds for interview like the written test technical interview, HR interview. After the successful completion of all rounds of interview, the selected candidate's names are displayed. Mean while HR gives all the details about the salary, working hours, terms and conditions and the retirement benefit to the candidate.

REFERENCE BOOKS:

- R1. Mark Priestley, "Practical Object-Oriented Design with UML,"
Second Edition, Tata McGraw Hill, 2011.
- R2. Mike O' Docherty, "Object-Oriented Analysis and Design with UML
Version 2.0," Wiley
India Pvt. Ltd, 2012.

SREE VIDYANIKETHAN ENGINEERING COLLEGE (Autonomous)
Department of Computer Science and Engineering
M. Tech. (CS)-II Semester
(16MT20533) SEMINAR

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
--	100	100	--	--	--	2

PRE-REQUISITES:--

COURSE DESCRIPTION:

Identification of seminar topic; literature survey; preparation of technical report and presentation

COURSE OUTCOMES:

On successful completion of this course, the students will be able to:

- CO1. Demonstrate capacity to identify an advanced topic for seminar in core and allied areas.
- CO2. Extract information pertinent to the topic through literature survey.
- CO3. Comprehend extracted information through analysis and synthesis critically on the topic.
- CO4. Plan, organize, prepare and present effective written and oral technical report on the topic.
- CO5. Adapt to independent and reflective learning for sustainable professional growth in Computer Science and software systems
- CO6. Contribute to multidisciplinary scientific working the field of Computer Science and software systems
- CO7. Understand ethical responsibility towards environment and society in the field of Computer Science and software systems
- CO8. Engage in lifelong learning for development of technical competence in the field of Computer Science and software systems

SREE VIDYANIKETHAN ENGINEERING COLLEGE (Autonomous)
Department of Computer Science and Engineering
M. Tech. – II Semester
(16MT23810) INTELLECTUAL PROPERTY RIGHTS
(Common to all M. Tech. Programs)
(Audit Course)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
-	-	-	-	2	-	-

PRE-REQUISITES: --

COURSE DESCRIPTION:

Introduction to Intellectual Property; Trade Marks; Law of Copy Rights; Law of Patents; Trade Secrets; Unfair Competition; New Development of Intellectual Property.

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

1. Demonstrate in-depth knowledge on
 - a. Intellectual Property
 - b. Trade Marks & Secrets
 - c. Law of Copy Rights, Patents
 - d. New development of Intellectual Property
2. Analyze the different forms of infringement of intellectual property rights.
3. Solve problems pertaining to Intellectual Property Rights.
4. Stimulate research zeal for patenting of an idea or product.
5. Write effective reports required for filing patents.
6. Develop life-long learning capabilities.
7. Develop awareness of the relevance and impact of IP Law on their academic and professional lives.
8. Develop attitude for reflective learning.

DETAILED SYLLABUS:

UNIT - I: Introduction to Intellectual property (5 Periods)

Introduction, types of intellectual property, international organizations, agencies and treaties, importance of intellectual property rights.

UNIT - II: Trade Marks: (5 Periods)

Purpose and function of trademarks, acquisition of trade mark rights, protectable matter, selecting and evaluating trade mark, trade mark registration processes.

UNIT - III: Law of copy rights: (6 Periods)

Fundamental of copy right law, originality of material, rights of reproduction, rights to perform the work publicly, copy right ownership issues, copy right registration, notice of copy right, international copy right law.

Law of patents: Foundation of patent law, patent searching process, ownership rights and transfer

UNIT - IV: Trade Secrets:**(6 Periods)**

Trade secret law, determination of trade secret status, liability for misappropriations of trade secrets, protection for submission, trade secret litigation.

Unfair competition: Misappropriation right of publicity, False advertising.

UNIT - V: New development of intellectual property:**(6 Periods)**

New developments in trade mark law; copy right law, patent law, intellectual property audits.

International overview on intellectual property, international - trade mark law, copy right law, international patent law, international development in trade secrets law.

[Total Periods: 28]**REFERENCE BOOKS:**

1. Deborah, E. Bouchoux, *Intellectual property rights*, Cengage learning.
2. Prabuddha Ganguli, *Intellectual property right - Unleashing the knowledge economy*, Tata Mc Graw Hill Publishing Company Ltd.

SREE VIDYANIKETHAN ENGINEERING COLLEGE (Autonomous)

Department of Computer Science and Engineering

M. Tech. (CS) III & IV Semesters

(16MT30531 & 16MT40531) PROJECT WORK

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
200	200	400	--	--	--	28

PRE-REQUISITES: --

COURSE DESCRIPTION:

Identification of topic for the project work; Literature survey; Collection of preliminary data; Identification of implementation tools and methodologies; Performing critical study and analysis of the topic identified; Time and cost analysis; Implementation of the project work; Writing of thesis and presentation.

COURSE OUTCOMES:

On successful completion of this course, the students will be able to

- CO1. Demonstrate capacity to identify an advanced topic for project work in core and allied areas.
- CO2. Extract information pertinent to the topic through literature survey.
- CO3. Comprehend extracted information through analysis and synthesis critically on the topic.
- CO4. Solve engineering problems in the chosen topic with higher order skill to obtain solutions.
- CO5. Use the techniques, skills and modern engineering tools necessary for project work.
- CO6. Perform time and cost analysis on the project.
- CO7. Plan, prepare and present effective written and oral technical report on the topic.
- CO8. Adapt to independent and reflective learning for sustainable professional growth.
- CO9. Contribute to multidisciplinary scientific working the field of Computer Science and Software Systems
- CO10. Understand ethical responsibility towards environment and society in the field of Computer Science and Software Systems
- CO11. Engage lifelong learning for development of technical competence in the field of Computer Science and Software Systems.