



VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

**(Permanently Affiliated to JNTUH, Approved by AICTE, New Delhi and Accredited by NBA & NAAC)
Shamshabad – 501 218, Hyderabad**

MASTER OF TECHNOLOGY SOFTWARE ENGINEERING

**ACADEMIC REGULATIONS (VCE R-14), COURSE STRUCTURE AND SYLLABI
FOR M.TECH - SOFTWARE ENGINEERING
UNDER AUTONOMOUS STATUS
FOR THE BATCHES ADMITTED FROM THE ACADEMIC YEAR 2014 - 15**

Note: The regulations hereunder are subject to amendments as may be made by the Academic Council of the College from time to time. Any or all such amendments will be effective from such date and to such batches of candidates (including those already undergoing the program) as may be decided by the Academic Council.

PRELIMINARY DEFINITIONS AND NOMENCLATURES

- “Autonomous Institute / College” means an institute / college designated as autonomous institute / college by University Grants Commission (UGC), as per the UGC Autonomous College Statutes.
- “Academic Autonomy” means freedom to a College in all aspects of conducting its academic programs, granted by the University for promoting excellence.
- “Commission” means University Grants Commission.
- “AICTE” means All India Council for Technical Education.
- “University” the Jawaharlal Nehru Technological University, Hyderabad.
- “College” means Vardhaman College of Engineering, Hyderabad unless indicated otherwise by the context.
- “Program” means:
 - Bachelor of Technology (B.Tech) degree program
 - UG Degree Program: B.Tech
 - PG degree Program: M.Tech
- “Branch” means specialization in a program like M.Tech degree program in Power Electronics and Electrical Drives.
- “Course” or “Subject” means a theory or practical subject, identified by its course – number and course-title, which is normally studied in a semester. For example, ABS11T01: Mathematics - I, ACS11T02: Data Structures through C, etc.
- T – Tutorial, P – Practical, D – Drawing, L - Theory, C - Credits

FOREWORD

The autonomy is conferred on Vardhaman College of Engineering by UGC based on its performance as well as future commitment and competency to impart quality education. It is a mark of its ability to function independently in accordance with the set norms of the monitoring bodies like UGC and AICTE. It reflects the confidence of the UGC in the autonomous institution to uphold and maintain standards it expects to deliver on its own behalf and thus awards degrees on behalf of the college. Thus, an autonomous institution is given the freedom to have its own **curriculum, examination system** and **monitoring mechanism**, independent of the affiliating University but under its observance.

Vardhaman College of Engineering is proud to win the credence of all the above bodies monitoring the quality in education and has gladly accepted the responsibility of sustaining, if not improving upon the standards and ethics for which it has been striving for more than a decade in reaching its present standing in the arena of contemporary technical education. As a follow up, statutory bodies like Academic Council and Boards of Studies are constituted with the guidance of the Governing Body of the College and recommendations of the JNTU Hyderabad to frame the regulations, course structure and syllabi under autonomous status.

The autonomous regulations, course structure and syllabi have been prepared after prolonged and detailed interaction with several expertise solicited from academics, industry and research, in accordance with the vision and mission of the college to order to produce a quality engineering graduate to the society.

All the faculty, parents and students are requested to go through all the rules and regulations carefully. Any clarifications needed are to be sought at appropriate time and with principal of the college, without presumptions, to avoid unwanted subsequent inconveniences and embarrassments. The Cooperation of all the stake holders is sought for the successful implementation of the autonomous system in the larger interests of the college and brighter prospects of engineering graduates.

PRINCIPAL



VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

(Permanent Affiliation with JNTUH, Approved by AICTE, New Delhi and Accredited by NBA & NAAC)

ACADEMIC REGULATIONS

M.Tech. Regular Two Year Post-Graduate Programme (For the batches admitted from the academic year 2014–15)

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

1. APPLICABILITY

All the rules specified herein, approved by the Academic Council, will be in force and applicable to students admitted from the academic year 2014-2015 onwards. Any reference to "College" in these rules and regulations stands for Vardhaman College of Engineering.

2. EXTENT

All the rules and regulations, specified herein after 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. As per the requirements of statutory bodies Principal, Vardhaman College of Engineering shall be the Chairman, Academic Council.

3. PROGRAMS OFFERED

Vardhaman College of Engineering, an autonomous college affiliated to JNTUH, offers the following M.Tech programmes of study leading to the award of M.Tech degree under the autonomous scheme.

S. No	M.Tech Courses	Intake
1	Computer Science and Engineering	24
2	Software Engineering	18
3	Digital Electronics and Communication Systems	24
4	Embedded Systems	24
5	Power Electronics and Electrical Drives	18
6	Engineering Design	18
7	Structural Engineering	18

4. ADMISSION

Admission into first year of Two Year M.Tech Program shall be made subject to the eligibility, qualifications and specialization as per the guidelines prescribed by the APSCH and AICTE from time to time.

5. DURATION OF THE PROGRAMS

5.1 Normal Duration

M.Tech degree program extends over a period of two academic years leading to the Degree of Master of Technology (M.Tech) of the Jawaharlal Nehru Technology University, Hyderabad.

5.2 Maximum Duration

5.2.1 The maximum period within which a student must complete a full-time academic program is 4 years for M.Tech. If a student fails to complete the academic program within the maximum duration as specified above, he / she will be required to withdraw from the program.

5.2.3 The period is reckoned from the academic year in which the student is admitted first time into the degree programme.

6. SEMESTER STRUCTURE

The College shall follow semester pattern. An academic year shall consist of a first semester and a second semester and the summer term. Each semester shall be of 23 weeks duration and this period includes time for course work, examination preparation, and conduct of examinations. Each semester shall have a minimum of 90 working days. The academic calendar is shown in Table 1 is declared at the start of the semester. The duration for each semester shall be a minimum of 17 weeks of instruction.

Table 1: Academic Calendar

FIRST SEMESTER (23 weeks)	I Spell Instruction Period	: 9 weeks	19 weeks
	I Mid Examinations	: 1 week	
	II Spell Instruction Period	: 8 weeks	
	II Mid Examinations	: 1 Week	
	Preparation & Practical Examinations		2 weeks
	External Examinations		2 weeks
Semester Break			2 weeks
SECOND SEMESTER (23 weeks)	I Spell Instruction Period	: 9 weeks	19 weeks
	I Mid Examinations	: 1 week	
	II Spell Instruction Period	: 8 weeks	
	II Mid Examinations	: 1 Week	
	Preparation & Practical Examinations		2 weeks
	External Examinations		2 weeks
Summer Vacation			4 weeks
THIRD SEMESTER	Project Work Phase – I		18 Weeks
FOURTH SEMESTER	Project Work Phase – II		18 Weeks

7. CREDIT BASED SYSTEM

All the academic programs under autonomy are based on credit system. Credits are assigned based on the following norms:

7.1. The duration of each semester will normally be 23 weeks with 5 days a week. A working day shall have 6 periods each of 60 minutes duration.

- 1 credit per lecture period per week
 - 2 credits for three (or more) period hours of practicals
 - 2 credits for technical seminar
 - 4 credits for comprehensive viva examination
 - 18 credits for project work phase – I
 - 22 credits for project work phase – II
- 7.2. The two year curriculum of any M.Tech programme of study shall have total of 88 credits. The exact requirements of credits for each course will be as recommended by the Board of Studies concerned and approved by the Academic Council.
- 7.3. For courses like technical seminar / comprehensive viva / Project Work Phases – I and II, where formal contact hours are not specified, credits are assigned based on the complexity of the work to be carried out.

8. METHOD OF EVALUATION

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

8.1 Theory

For all lecture based theory courses, the evaluation shall be for 40 marks through internal evaluation and 60 marks through external end semester examination of three hours duration.

8.1.1. Internal evaluation

For theory subjects, during the semester there shall be 2 midterm examinations. Each midterm examination consists of subjective test. The subjective test is for 40 marks, with duration of 2 hours. The Mid-Term Examination question paper shall be set with **six** questions out of which **four** are to be answered. All questions carry equal marks.

First midterm examination shall be conducted for I – IV units of syllabus and second midterm examination shall be conducted for the remaining portion.

The internal marks shall be computed as the average of the two internal evaluations, of two subjective tests.

8.1.2. External Evaluation

The question paper shall be set externally and valued both internally and externally. The external end semester examination question paper in theory subjects will be for a maximum of 60 marks to be answered in three hours duration. For End-Semester examination, the candidate has to answer any five out of eight questions. Each question carries 12 marks. Each theory course shall consist of eight units of syllabus.

8.2. Practicals

Practicals shall be evaluated for 100 marks, out of which 60 marks are for external examination and 40 marks are for internal evaluation. The 40 internal marks are distributed as 25 marks for day-to-day work and 15 marks for internal examination. The external end - examination shall be conducted by the teacher concerned and an external examiner from outside the college.

8.3. Technical Seminar

The seminar shall have two components, one chosen by the student from the course-work without repetition and approved by the faculty supervisor. The other component is suggested by the supervisor and can be a reproduction of the concept in any standard research paper or an extension of concept from earlier course work. A hard copy of the information on seminar topic in the form of a report is to be submitted for evaluation along with presentation. The presentation of the seminar

topics shall be made before an internal evaluation committee comprising the Head of the Department or his/her nominee, seminar supervisor and a senior faculty of the department. The two components of the seminar are distributed between two halves of the semester and are evaluated for 50 marks each. The average of the two components shall be taken as the final score. A minimum of 50% of maximum marks shall be obtained to earn the corresponding credits.

8.4. **Comprehensive Viva**

The comprehensive Viva will be conducted by a committee comprising Head of the Department or his/her nominee, two senior faculty of the respective department and an external examiner from outside the college. This is aimed at assessing the student's understanding of various subjects studied during the entire program. The comprehensive viva shall be evaluated for 50 marks at the end of III semester. A minimum of 50% of maximum marks shall be obtained to earn the corresponding credits.

8.5. **Project Work**

The project work shall be evaluated for 200 marks out of which 50 marks for phase – I internal evaluation, 50 marks for phase – II internal evaluation and 100 marks for end semester evaluation. A minimum of 50% of marks on the aggregate in the internal evaluation and external end-evaluation taken together shall be obtained to earn the corresponding credits.

Every candidate is required to submit dissertation after taking up a topic approved by the Departmental Committee. The project work shall be spread over in III semester and in IV semester. The project work shall be somewhat innovative in nature, exploring the research bent of mind of the student.

The Departmental Committee (DC) consists of HOD, Supervisor and two senior experts in the department. The committee monitors the progress of Project Work. The DC is constituted by the Principal on the recommendations of the department Head.

Student shall register for the Project work with the approval of Departmental Committee in the III Semester and continue the work in the IV Semester too. The Departmental Committee (DC) shall monitor the progress of the project work. In III Semester, Phase – I of the Project Work is 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 Departmental Committee for evaluation and award of 50 internal marks at the end of Phase – I.

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 Departmental Committee. 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 for 50 internal marks based on the progress, presentations and quality of work.

A candidate shall be allowed to submit the dissertation only after passing all the courses of I and II semesters with the approval of Departmental Committee not earlier than **40 weeks** from the date of registration of the project work and then take viva-voce examination. The viva-voce examination may be conducted once in three months for all the eligible candidates.

Three copies of the dissertation certified in the prescribed form by the supervisor and HOD shall be presented to the Department and one copy is to be submitted to the Controller of Examinations, VCE and one copy to be sent to the examiner.

The department shall submit a panel of three experts for a maximum of 5 students at a time. However, the examiners for conducting viva-voce examination shall be nominated by the Controller of Examinations, VCE. If the report of the examiner is favorable, viva-voce examination shall be conducted by a board consisting of the Supervisor, Head of the Department and the examiner who adjudicated the dissertation. The board shall jointly evaluate the project work for 100 marks. The

candidates who fail in viva-voce examinations shall have to re-appear the viva-voce examination after three months. If he fails again in the second viva-voce examination, the candidate has to re-register for the Project Work.

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

9. ATTENDANCE REQUIREMENTS TO APPEAR FOR THE SEMESTER-END EXAMINATION

- 9.1. 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 subjects in a semester.
- 9.2. Condonation of shortage of attendance in aggregate upto 10% (65% and above and below 75%) in each semester may be granted by the College Academic Committee.
- 9.3. Shortage of attendance below 65% in aggregate shall in no case be condoned.
- 9.4. Students whose shortage of attendance is not condoned in any semester are not eligible to take their semester-end examination of that class and their registration shall stand cancelled.
- 9.5. A student will not be promoted to the next semester unless he satisfies the attendance requirements of the current semester. The student may seek readmission for the semester when offered next. He will not be allowed to register for the subjects of the semester while he is in detention. A student detained due to shortage of attendance, will have to repeat that semester when offered next.
- 9.6. A stipulated fee shall be payable towards condonation of shortage of attendance to the College.
- 9.7. Attendance may also be condoned as per the recommendations of academic council for those who participate in prestigious sports, co-curricular and extra-curricular activities provided as per the Govt. of AP norms in vogue.

10. ACADEMIC REQUIREMENTS FOR PROMOTION / COMPLETION OF REGULAR M.TECH PROGRAMME OF STUDY

The following academic requirements have to be satisfied in addition to the attendance requirements for promotion / completion of regular M.Tech programme of study.

- i. A student shall be deemed to have satisfied the minimum academic requirements for each theory, and practical, if he secures not less than 40% of marks in the semester-end examination and a minimum of 50% of marks in the sum of the internal evaluation and semester - end examination taken together.
- ii. In case of technical seminar and comprehensive viva a student shall be deemed to have satisfied the minimum academic requirements and earned the credits allotted to each of them if he/she secures not less than 50% of marks.
- iii. In case of project work, a student shall be deemed to have satisfied the minimum academic requirements and earned the credits allotted if he/she secures not less than 50% of marks on the aggregate in the internal evaluation and external end-evaluation taken together.
- iv. A student shall register for all the 88 credits and earn all the 88 credits. Marks obtained in all the 88 credits shall be considered for the award of the class based on aggregate of marks.
- v. A student who fails to earn 88 credits as indicated in the course structure within **FOUR** academic years from the year of their admission shall forfeit their seat in M.Tech programme and their admission stands cancelled.

- viii. Students who are detained for want of attendance (or) who have not fulfilled academic requirements (or) who have failed after having undergone the course in earlier regulations (or) have discontinued and wish to continue the course are eligible for admission into the unfinished semester from the date of commencement of class work with the same (or) equivalent subjects as and when subjects are offered, and pursue the remaining course work with the academic regulations of the batch into which such students are readmitted. However, all such readmitted students shall earn all the credits of subjects they have pursued for completion of the course.

11. EVALUATION

Following procedure governs the evaluation.

- 11.1. 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 will be added to the external evaluation marks secured in the semester-end examinations, to arrive at total marks for any subject in that semester.
- 11.2. Performance in all the courses is tabulated course-wise and will be scrutinized by the Examination Committee and moderation is applied if needed, based on the recommendations of moderation committee and course-wise marks lists are finalized.
- 11.3. Student-wise tabulation is done and student-wise memorandum of marks is generated which is issued to the student.

12. SUPPLEMENTARY EXAMINATION

Supplementary examinations for the odd semester shall be conducted with the regular examinations of even semester and vice versa, for those who appeared and failed in regular examinations. Such of the candidates writing supplementary examinations may have to write more than one examination per day.

13. RE-REGISTRATION FOR IMPROVEMENT OF INTERNAL

Following are the conditions to avail the benefit of improvement of internal marks.

- 13.1. The candidate should have completed the course work and obtained examinations results for I & II semesters.
- 13.2. A candidate shall be given one chance for a maximum of Three Theory subjects for Improvement of Internal evaluation marks for which the candidate has to re-register for the chosen subjects and fulfill the academic requirements.
- 13.3. For each subject, 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. in favour of the Principal, Vardhaman College of Engineering payable at Hyderabad along with the requisition through the concerned Head of the Department.
- 13.4. In the event of availing the Improvement of Internal evaluation marks, the internal evaluation marks as well as the End Examinations marks secured in the previous attempt(s) for the re-registered subjects stand cancelled.

14. PERSONAL VERIFICATION

Students shall be permitted for personal verification of the semester-end examination answer scripts within a stipulated period after payment of prescribed fee.

15. TRANSITORY REGULATIONS

Students who are detained for want of attendance (or) who have not fulfilled academic requirements (or) who have failed after having undergone the course in earlier regulations (or) have discontinued and wish to continue the course are eligible for admission into the unfinished semester from the date of commencement of class work with the same (or) equivalent subjects as and when subjects are offered, and pursue the remaining course work with the academic regulations of the batch into which such students are 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. TRANSCRIPTS

After successful completion of the entire programme of study, a transcript containing performance of all academic years will be issued as a final record. 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, after payment of requisite fee.

17. AWARD OF DEGREE

The degree will be conferred and awarded by Jawaharlal Nehru Technological University, Hyderabad on the recommendations of the Chairman, Academic Council.

17.1. Eligibility

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

- i. Registered and successfully completed all the components prescribed in the programme of study to which he is admitted.
- ii. Successfully acquired the minimum required credits as specified in the curriculum corresponding to the branch of study within the stipulated time.
- iii. Obtained not less than 50% of marks (minimum requirement for declaring as passed).
- iv. Has no dues to the college, hostel, and library etc. and to any other amenities provided by the College.
- v. No disciplinary action is pending against him.

17.2. Award of Class

Declaration of Class is based on percentage of marks to be secured.

After a student has satisfied the requirement prescribed for the completion of the programme and is eligible for the award of M.Tech. Degree he shall be placed in one of the following four classes Shown in Table 4:

Table 4: Declaration of Class is based on percentage of marks to be secured

Class Awarded	% of marks to be secured	
First Class with Distinction	70% and above	From the aggregate marks secured for the 88 Credits.
First Class	Below 70% but not less than 60%	
Second Class	Below 60% but not less than 50%	
Fail	Below 50%	

Sometimes, it is necessary to provide equivalence of percentages and/or *Class* awarded with *Grade Point Average (GPA)*. This shall be done by prescribing certain specific thresholds in averages for *Distinction, First Class and Second Class*, as in Table 5.

Table 5: Percentage Equivalence of Grade Points (For a 10-Point Scale)

Grade Point	Percentage of Marks / Class
5.75	50 (Second Class)
6.25	55
6.75	60 (<i>First Class</i>)
7.25	65
7.75	70 (<i>First Class with Distinction</i>)
8.25	75

18. REGISTRATION

Each student has to compulsorily register for course work at the beginning of each semester as per the schedule mentioned in the Academic Calendar. It is absolutely compulsory for the student to register for courses in time.

19. TERMINATION FROM THE PROGRAM

The admission of a student to the program may be terminated and the student is asked to leave the college in the following circumstances:

- i. The student fails to satisfy the requirements of the program within the maximum period stipulated for that program.
- ii. The student fails to satisfy the norms of discipline specified by the institute from time to time.

20. CURRICULUM

- 20.1. For each program being offered by the Institute, a Board of Studies (BOS) is constituted in accordance with AICTE / UGC / JNTUH statutes.
- 20.2. The BOS for a program is completely responsible for designing the curriculum once in three years for that program.

21. WITH-HOLDING OF RESULTS

If the candidate has not paid any dues to the college / if any case of indiscipline / malpractice is pending against him, the results of the candidate will be withheld. The issue of the degree is liable to be withheld in such cases.

22. GRIEVANCES REDRESSAL COMMITTEE

“Grievance and Redressal Committee” (General) constituted by the principal shall deal with all grievances pertaining to the academic / administrative / disciplinary matters. The composition of the complaints cum redressal committee shall be:

- Headed by Senior Faculty member
- Heads of all departments
- A senior lady staff member from each department (if available)

The committee constituted shall submit a report to the principal of the college, the penalty to be imposed. The Principal upon receipt of the report from the committee shall, after giving an opportunity of being heard to the person complained against, submit the case with the committee's recommendation to the Governing Body of the college. The Governing Body shall confirm with or without modification the penalty recommended after duly following the prescribed procedure.

23. MALPRACTICE PREVENTION COMMITTEE

A malpractice prevention committee shall be constituted to examine and punish the students who does malpractice / behaves indiscipline in examinations. The committee shall consist of:

- Principal
- Subject expert of which the subject belongs to
- Head of the department of which the student belongs to
- The invigilator concerned
- In-charge Examination branch of the college

The committee constituted shall conduct the meeting on the same day of examination or latest by next working day to the incidence and punish the student as per the guidelines prescribed by the J N T University, Hyderabad from time to time.

Any action on the part of candidate at the examination like trying to get undue advantage in the performance at examinations or trying to help another, or derive the same through unfair means is punishable according to the provisions contained hereunder. The involvement of the Staff, who are in charge of conducting examinations, valuing examination papers and preparing / keeping records of documents relating to the examinations in such acts (inclusive of providing incorrect or misleading information) that infringe upon the course of natural justice to one and all concerned at the examination shall be viewed seriously and recommended for award of appropriate punishment after thorough enquiry.

24. AMENDMENTS TO REGULATIONS

The Academic Council of Vardhaman College of Engineering 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., without prior notice.

25. STUDENTS' FEEDBACK

It is necessary for the Colleges to obtain feedback from students on their course work and various academic activities conducted. For this purpose, suitable feedback forms shall be devised by the College and the feedback obtained from the students regularly in confidence, by administering the feedback form in print or on-line in electronic form.

The feedback received from the students shall be discussed at various levels of decision making at the College and the changes/ improvements, if any, suggested shall be given due consideration for implementation.

26. GRADUATION DAY

The College shall have its own annual *Graduation Day* for the award of Degrees to students completing the prescribed academic requirements in each case, in consultation with the University and by following the provisions in the Statute.

The College shall institute Prizes and Awards to meritorious students, for being given away annually at the *Graduation Day*. This will greatly encourage the students to strive for excellence in their academic work.

27. AWARD OF A RANK UNDER AUTONOMOUS SCHEME

27.1. One (1) Merit Rank will be declared only for those students who have been directly admitted in VCE under Autonomous Regulations and complete the entire course in VCE only within the minimum possible prescribed time limit, i.e., 2 years for M.Tech.

- 27.2. A student shall be eligible for a merit rank at the time of award of degree in each branch of Master of Technology, provided the student has passed all subjects prescribed for the particular degree program in first attempt only.
- 27.5. Award of prizes, scholarships, or any other Honours shall be based on the rank secured by a candidate, consistent with the guidelines of the Donor, wherever applicable.

28. CONDUCT AND DISCIPLINE

- 28.1 Each student shall conduct himself / herself in a manner befitting his / her association with VCE.
- 28.2 He / she is expected not to indulge in any activity, which is likely to bring disrepute to the college.
- 28.3 He / she should show due respect and courtesy to the teachers, administrators, officers and employees of the college and maintain cordial relationships with fellow students.
- 28.4 Lack of courtesy and decorum unbecoming of a student (both inside and outside the college), wilful damage or removal of Institute's property or belongings of fellow students, disturbing others in their studies, adoption of unfair means during examinations, breach of rules and regulations of the Institute, noisy and unruly behaviour and similar other undesirable activities shall constitute violation of code of conduct for the student.
- 28.5 **Ragging in any form is strictly prohibited and is considered a serious offence. It will lead to the expulsion of the offender from the college.**
- 28.6 Violation of code of conduct shall invite disciplinary action which may include punishment such as reprimand, disciplinary probation, debarring from the examination, withdrawal of placement services, withholding of grades / degrees, cancellation of registration, etc., and even expulsion from the college.
- 28.7 Principal, based on the reports of the warden of Institute hostel, can reprimand, impose fine or take any other suitable measures against an inmate who violates either the code of conduct or rules and regulations pertaining to college hostel.
- 28.8 A student may be denied the award of degree / certificate even though he / she have satisfactorily completed all the academic requirements if the student is found guilty of offences warranting such an action.
- 28.9 Attendance is not given to the student during the suspension period.

29. OTHER ISSUES

The quality and standard of engineering professionals are closely linked with the level of the technical education system. As it is now recognized that these features are essential to develop the intellectual skills and knowledge of these professionals for being able to contribute to the society through productive and satisfying careers as *innovators, decision makers and/or leaders* in the global economy of the 21st century, it becomes necessary that certain improvements are introduced at different stages of their education system. These include:

- i. Selective admission of students to a programme, so that merit and aptitude for the chosen technical branch or specialization are given due consideration.
- ii. Faculty recruitment and orientation, so that qualified teachers trained in good teaching methods, technical leadership and students' motivation are available.
- iii. Instructional/Laboratory facilities and related physical infrastructure, so that they are adequate and are at the contemporary level.
- iv. Access to good library resources and Information & Communication Technology (ICT) facilities, to develop the student's *mind* effectively.

These requirements make it necessary for the College to introduce improvements like:

- i. Teaching-learning process on modern lines, to provide *Add-On* Courses for *audit/credit* in a number of peripheral areas useful for students' self development.
- ii. Life-long learning opportunities for faculty, students and alumni, to facilitate their dynamic interaction with the society, industries and the world of work.
- iii. Generous use of ICT and other modern technologies in everyday activities.

30. GENERAL

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

Note: Failure to read and understand the regulations is not an excuse.

VARDHAMAN COLLEGE OF ENGINEERING (AUTONOMOUS)

SYLLABUS

M. TECH - SOFTWARE ENGINEERING

REGULATIONS: VCE--R14

I SEMESTER							
Code	Subject	Periods per Week		Credits	Scheme of Examination Maximum Marks		
		L	P		Internal	External	Total
B2201	Advanced Data Structures and Algorithms	3	-	3	40	60	100
B2501	Object Oriented Analysis and Design	3	-	3	40	60	100
B2502	Software Requirements and Estimation	3	-	3	40	60	100
B2503	Software Process and Project Management	3	-	3	40	60	100
PROFESSIONAL ELECTIVE - I		3	-	3	40	60	100
PROFESSIONAL ELECTIVE - II		3	-	3	40	60	100
B2210	Advanced Data Structure and Algorithms Laboratory	-	3	2	40	60	100
B2509	Technical Seminar	-	-	2	50	-	50
TOTAL		18	03	22	330	420	750
II SEMESTER							
Code	Subject	Periods per week		Credits	Scheme of Examination Maximum Marks		
		L	P		Internal	External	Total
B2510	Software Testing	3	-	3	40	60	100
B2511	Model Driven Software Development	3	-	3	40	60	100
B2512	Software Metrics	3	-	3	40	60	100
B2513	Software Architecture and Design Patterns	3	-	3	40	60	100
PROFESSIONAL ELECTIVE – III		3	-	3	40	60	100
PROFESSIONAL ELECTIVE - IV		3	-	3	40	60	100
B2519	Software Testing and Case Tools lab	-	3	2	40	60	100
B2520	Technical Seminar	-	-	2	50	-	50
TOTAL		18	03	22	330	420	750
III SEMESTER							
Code	Subject	Periods per week		Credits	Scheme of Examination Maximum Marks		
		L	P		Internal	External	Total
B2521	Comprehensive Viva	-	-	4	-	50	50
B2522	Project Work Phase – I	-	-	18	50	-	50
TOTAL		-	-	22	50	50	100
IV SEMESTER							
Code	Subject	Periods per week		Credits	Scheme of Examination Maximum Marks		
		L	P		Internal	External	Total
B2522	Project Work Phase – II	-	-	22	50	100	150
TOTAL		-	-	22	50	100	150

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

SYLLABUS
M. TECH - SOFTWARE ENGINEERING

REGULATIONS: VCE--R14

ELECTIVES			
PROFESSIONAL ELECTIVE - I		PROFESSIONAL ELECTIVE - II	
Code	Subject	Code	Subject
B2504	Advanced Software Engineering	B2507	Software Configuration Management
B2505	Human Computer Interaction	B2508	Cyber and Information Security
B2506	Grid Computing	B2208	Data warehousing and Mining
PROFESSIONAL ELECTIVE - III		PROFESSIONAL ELECTIVE - IV	
Code	Subject	Code	Subject
B2514	Secure Software Engineering	B2517	Service Oriented Architecture
B2515	Software Reliability	B2217	Information Retrieval Systems
B2516	Cloud Computing	B2518	Scripting Languages

VARDHAMAN COLLEGE OF ENGINEERING (AUTONOMOUS)

I SEMESTER

ADVANCED DATA STRUCTURES AND ALGORITHMS

Course Code: **B2201**

L	P	C
3	-	3

UNIT - I

OVERVIEW OF DATA STRUCTURES: singly linked lists, doubly linked lists, circular list, representing stacks and queues using arrays and linked lists, infix to post fix conversion, postfix expression evaluation. Priority Queues – Realizing a Priority Queue using Heaps, Definition, insertion, Deletion.

UNIT – II

DICTIONARIES HASH TABLES: Dictionaries, linear list representation, operations insertion, deletion and searching, hash table representation, hash functions, collision resolution-separate chaining, open addressing-linear probing, quadratic probing, double hashing, rehashing, extendible hashing.

UNIT - III

TREES AND GRAPHS: Introduction, definition and basic terminologies of trees and binary trees, representation of trees and binary trees, binary tree traversals, binary search trees: definition, operations and applications. threaded binary trees; Graphs basic concepts, representation and traversals.

UNIT - IV

SEARCH TREES: AVL Trees, Definition, Height of an AVL Tree, Operations – Insertion, Deletion and Searching, Red Black and Splay Trees, B- trees: definition, operations and applications. R-trees: Nearest neighbour Query, join and range queries

UNIT - V

ALGORITHM ANALYSIS: Efficiency of algorithms, apriori analysis, asymptotic notations, time complexity of an algorithm using o notation, polynomial vs. exponential algorithms, average, best and worst case complexities, analyzing recursive programs.

UNIT - VI

DIVIDE AND CONQUER & GREEDY METHOD: General method, binary search, finding maximum and minimum, quick sort, merge sort, strassen's matrix multiplication. Greedy method, general method, minimum cost spanning trees, single source shortest path.

UNIT - VII

DYNAMIC PROGRAMMING: General method, all pairs shortest path, single source shortest path, 0/1 knapsack problem, reliability design, travelling sales person's problem.

UNIT - VIII

BACK TRACKING & BRANCH AND BOUND: General method, 8 queen's problem, graph coloring. Branch and bound, the general method, LC search, control abstraction, bounding 0 / 1 knapsack problem.

TEXT BOOKS:

1. Ellis Horowitz, Sartaj Sahni, Sanguthevar Rajasekaran (2008), Fundamentals of Computer Algorithms, 2nd edition, University Press (India) Private Limited, India.
2. G. A. V. Pai (2009), Data Structures and Algorithms, Tata Mcgraw hill, New Delhi.

REFERENCE BOOKS:

1. D. Samanta (2003), Classic Data Structures, Prentice Hall of India Private Limited.
2. Aho, Hopcraft, Ullman (1998), Design and Analysis of Computer Algorithms, Pearson Education India.
3. Goodman, Hedetniemi (2002), Introduction to the Design and Analysis of Algorithms, Tata Mcgraw Hill, New Delhi, India.
4. Adam Drozdek (2005), Data Structures and Algorithms in C++, 3rd Edition, Thomson Course Technology.

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

I SEMESTER

OBJECT ORIENTED ANALYSIS AND DESIGN

Course Code: **B2501**

L	P	C
3	-	3

UNIT - I

INTRODUCTION

Object-Oriented Analysis and Design, Iterative Development and the Unified Process, Case Study: The NextGen POS System.

UNIT - II

INCEPTION

Inception, Understanding Requirements, Use-Case Model: Writing Requirements in Context, Identifying Other Requirements, From Inception to Elaboration.

UNIT - III

ELABORATION ITERATION 1 (ANALYSIS)

Use-Case Model: Drawing System Sequence Diagrams, Domain Model: Visualizing Concepts, Domain Model: Adding Associations, Domain Model: Adding Attributes, Use-Case Model: Adding Detail with Operation Contracts, From Requirements to Design in this Iteration, Interaction Diagram Notation.

UNIT- IV

ELABORATION ITERATION 1 (DESIGN)

GRASP: Designing Objects with Responsibilities, Design Model: Use-Case Realizations with GRASP Patterns, Design Model: Determining Visibility, Design Model: Creating Design Class Diagrams, Implementation Model: Mapping Designs to Code.

UNIT - V

ELABORATION ITERATION 2

Iteration 2 and its Requirements, GRASP: More Patterns for Assigning Responsibilities, Designing Use-Case Realizations with GoF Design Patterns.

UNIT- VI

ELABORATION ITERATION 3

Iteration 3 and Its Requirements, Relating Use Cases, Modeling Generalization, Refining the Domain Model, Adding New SSDs and Contracts, Modeling Behavior in State chart Diagrams.

UNIT- VII

DESIGNING THE LOGICAL ARCHITECTURE WITH PATTERNS

Organizing the Design and Implementation Model Packages, Introduction to Architectural Analysis and the SAD.

UNIT -VIII

SPECIAL TOPICS

Introduction to Iterative Planning and Project Issues, Comments on Iterative Development and the UP.

TEXT BOOK

1. Larman, Craig, Applying UML and Patterns: An Introduction to Object-Oriented Analysis and Design and Iterative Development, Pearson Education, 3rd Ed., 2004.

REFERENCE BOOK S

1. Barclay Savage, Object Oriented Design with UML and JAVA, Elsevier, 2008.
2. Brown, D.W., An Introduction to Object-Oriented Analysis, Wiley, 2nd Ed., 2004
3. Mark Priestley, Practical Object Oriented Design with UML, TMH, 2nd Ed., 2005.
4. Michael Bleha, James Rambaugh, Object-Oriented Modelling & Design with UML, Pearson, 2nd Ed., 2005.
5. Bahrami A., Object Oriented Systems Development using Unified Modeling Language, McGraw Hill, 1999.
6. Grady Booch et al., Unified Modeling Language User Guide, Pearson Education, 1999
7. Martin Fowler et al., UML Distilled, Pearson Education, 2000
8. Rebecca Wirfs-Brock et al., Designing Object-Oriented Software, PHI, 1996
9. Bruegge B., Object-Oriented Software Engineering, Pearson, 2000.

VARDHAMAN COLLEGE OF ENGINEERING (AUTONOMOUS)

I SEMESTER

SOFTWARE REQUIREMENTS AND ESTIMATION

Course Code: B2502

L	P	C
3	-	3

UNIT - I

SOFTWARE REQUIREMENTS: WHAT AND WHY: Essential software requirement, good practices for requirements engineering, improving requirements processes, and software requirements and risk management.

UNIT - II

SOFTWARE REQUIREMENTS ENGINEERING : Requirements elicitation, requirements analysis documentation, review, elicitation techniques, analysis models, software quality attributes, risk reduction through prototyping, setting requirements priorities, and verifying requirements quality.

UNIT - III

SOFTWARE REQUIREMENTS MODELING: Use case modeling, analysis models, dataflow diagram, state transition diagram, class diagrams, object analysis, and problem frames.

UNIT - IV

SOFTWARE REQUIREMENTS MANAGEMENT: Requirements management principles and practices, requirements attributes, change management process, requirements traceability matrix, and links in requirements chain.

UNIT - V

REQUIREMENTS MANAGEMENT TOOLS: Benefits of using a requirements management tool, commercial requirements management tool, rational requisite pro, caliber RM and implementing requirements management automation.

UNIT - VI

SOFTWARE ESTIMATION: Components of software estimations, estimation methods, problems associated with estimation, and key project factors that influence estimation.

UNIT - VII

SIZE ESTIMATION: Two views of sizing, function point analysis, mark II FPA, full function points, LOC estimation and conversion between size measures.

UNIT - VIII

EFFORT, SCHEDULE AND COST ESTIMATION: What is productivity? Estimation factors, approaches to effort and schedule estimation, COCOMO II, Putnam estimation model, algorithmic models, and cost estimation.

SOFTWARE ESTIMATION TOOLS: Desirable features in software estimation tools, IFPUG, USC's COCOMO II, SLIM (software life cycle management) tools.

TEXT BOOKS:

1. Rajesh Naik, Swapna Kishore (2001), *Software Requirements and Estimation*, 1st Edition, Tata Mc Graw Hill, New Delhi, India.

REFERENCE BOOKS:

1. Karl E. Weigers (2003), *Software Requirements*, 2nd Edition, Microsoft Press, India.
2. Dean Leffingwell, Don Widrig (2003), *Managing Software Requirements: A Use Case Approach*, 2nd Edition, Pearson Education, India.
3. Suzanne Robertson, James Robertson (2006), *Mastering the requirements process*, 2nd Edition, Pearson Education, India.
4. Capers Jones (2007), *Estimating Software Costs*, 2nd Edition, Tata Mcgrawhill, India.
5. M.A. Parthasarathy (2007), *Practical Software Estimation*, Pearson Education, India.

VARDHAMAN COLLEGE OF ENGINEERING (AUTONOMOUS)

I SEMESTER

SOFTWARE PROCESS AND PROJECT MANAGEMENT

Course Code: B2503

L	P	C
3	-	3

UNIT - I

SOFTWARE PROCESS MATURITY: Software maturity framework, principles of software process change, software process assessment, the initial process, the repeatable process, the defined process, the managed process, the optimizing process.

UNIT - II

PROCESS REFERENCE MODELS: Capability maturity model (CMM), CMMi, PCMM, PSP, TSP.

UNIT – III

SOFTWARE PROJECT MANAGEMENT RENAISSANCE : Conventional software management, evolution of software economics, improving software economics, the old way and the new way.

UNIT – IV

LIFE CYCLE PHASES: Engineering and production stages, inception phase, elaboration phase, construction phase, transition phase.

SOFTWARE PROCESS ARTIFACTS: Artifact sets, management artifacts, engineering artifacts and pragmatic artifacts, model based software architectures.

UNIT – V

WORKFLOWS OF THE PROCESS: Software process workflows, Iteration workflows

CHECKPOINTS OF PROCESS: Major milestones, minor milestones, periodic status assessments.

UNIT – VI

PROCESS PLANNING AND PROJECT ORGANIZATIONS: Breakdown structures, planning guidelines, cost and schedule estimating process, iteration planning process, pragmatic planning, line of business organizations, project organizations, evolution of organizations, process automation.

UNIT – VII

PROJECT CONTROL AND PROCESS INSTRUMENTATION: The seven core metrics, management indicators, quality indicators, life-cycle expectations, pragmatic software metrics, and metrics automation.

UNIT – VIII

CCPDS-R CASE STUDY AND FUTURE SOFTWARE PROJECT MANAGEMENT PRACTICES: Modern project profiles, next- generation software economics, and modern process transitions.

TEXT BOOKS:

1. Watts S. Humphrey (2004), *Managing the Software Process*, 4th Edition, Pearson Education, USA.
2. Walker Royce (1998), *Software Project Management: A unified Framework*, 1st Edition, Addison Wesley, USA.

REFERENCE BOOKS:

1. Watts S. Humphrey (2008), *Introduction to the Team Software Process*, 3rd Edition, Pearson Education, India.
2. Watts S. Humphrey (1997), *Introduction to the personal Software Process*, Addison Wesley longman, USA.
3. James R. Persse (2006), *Process Improvement essentials*, 1st Edition, O'Reilly, USA.
4. Bill Curtis, William E. hefley and Sally A. Miller (2009), *The people capability maturity model*, 3rd Edition, Pearson Education, India.
5. Cranige Mellon, Mark C. Paulk, Charles C. Weber, Bill Curtis(2004), *The capability Maturity Model*, 2nd Edition, Addison Wesley, USA.

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

I SEMESTER

ADVANCED SOFTWARE ENGINEERING (Professional Elective - I)

Course Code: B2504

L	P	C
3	-	3

UNIT-I

Software and Software Engineering

The Nature of Software, Software Characteristics, The Unique Nature of Webapps, Software Engineering, The Software Process, Software Engineering Practice, Software Myths.

Software Paradigms

Perspective Process Models, Specialized Process Models.

UNIT- II

Unified Process Model

The Unified Process, Personal and Team Process Models, Process Technology, Product and Process.

Agile Development

What is Agility? Agility and The Cost of Change, What is an Agile Process? Extreme Programming (Xp), Other Agile Process Models, A Tool Set For The Agile Process.

UNIT-III

Critical Systems

A Simple Safety-Critical System, System Dependability, Availability and Reliability, Safety, Security.

Critical Systems Specification

Risk-Driven Specification, Safety Specification, Security Specification Software Reliability Specification.

Formal Specification

Formal Specification in the Software Process, Sub-System Interface Specification, Behavioural Specification.

UNIT- IV

Software Reuse

The Reuse Landscape, Design Patterns, Generator-Based Reuse, Application Frameworks, Application System Reuse.

Component-Based Software Engineering

Components and Component Models, The Cbse Process, Component Composition.

UNIT-V

Software Testing

System Testing, Component Testing, Test Case Design, Test Automation.

Software Evolution

Program Evolution Dynamics, Software Maintenance, Evolution Processes, Legacy System Evolution.

UNIT-VI

Aspect Oriented Software Engineering: The Separation of Concerns, Aspects, Join Points and Pointcuts, Software Engineering with Aspect, Using AOSD to Streamline Complex Systems Development without Sacrificing Flexibility or Scalability.

Service Oriented Software Engineering: Service-Based Concepts, Modeling and Documentation, Service Discovery and Composition, Service-Oriented Architecture, Services as Reusable Components, Software Development with Services.

UNIT-VII

Quality Management

Process and Product Quality, Quality Assurance and Standards, Quality Planning, Quality Control, Software Measurement and Metrics.

Process Improvement

Process and Product Quality, Process Classification, Process Measurement, Process Analysis and Modeling, Process Change, The Cmmi Process Improvement Framework.

UNIT-VIII

Verification and Validation

Planning Verification and Validation, Software Inspections, Automated Static Analysis, Verification and Formal Methods.

Security Engineering

Security Concepts, Security Risk Management, Design For Security, System Survivability.

TEXT BOOK

1. **Software Engineering**, by Ian Sommerville, Addison-Wesley, 8th Edition, 2006.
2. **Software Engineering, A Practitioner's Approach**, by Roger S. Pressman, 7th Edition, 2009.

REFERENCE BOOK S

1. **Using UML: Software Engineering with Objects and Components**, by Perdita Stevens, Rob Pooley, Addison-Wesley, 2nd edition, 2006.
2. **The Mythical Man-Month : Essays on Software Engineering**, by Frederick P., Jr.Brooks, Frederick P. Brooks Jr, Addison-Wesley, 1995.
3. **The Future of Software Engineering**, edited by Anthony Finkelstein, ACM Press, 2000.
4. **Aspect-Oriented Software Development**, by Robert E. Filman, Tzilla Elrad, Siobha Jn Clarke, Mehmet Aksit, Addison-Wesley, 1st edition, 2004.
5. **Service-Oriented Software System Engineering by Challenges and Practices**, by Zoran Stojanovic, Ajantha Dahanayake,IGIGlobal,2005.

VARDHAMAN COLLEGE OF ENGINEERING (AUTONOMOUS)

I SEMESTER

HUMAN COMPUTER INTERACTION (Professional Elective - I)

Course Code: B2505

L	P	C
3	-	3

UNIT I

Introduction: Importance of user Interface – definition, importance of good design. Benefits of good design. A brief history of Screen design,

UNIT II

The graphical user interface – popularity of graphics, the concept of direct manipulation, graphical system, Characteristics, Web user – Interface popularity, characteristics- Principles of user interface.

UNIT III

Design process – Human interaction with computers, importance of human characteristics human consideration, Human interaction speeds, understanding business junctions.

UNIT IV

Screen Designing:- Design goals – Screen planning and purpose, organizing screen elements, ordering of screen data and content – screen navigation and flow – Visually pleasing composition – amount of information – focus and emphasis – presentation information simply and meaningfully – information retrieval on web – statistical graphics – Technological consideration in interface design.

UNIT V

Windows – New and Navigation schemes selection of window, selection of devices based and screen based controls.

UNIT VI

Components – text and messages, Icons and increases – Multimedia, colors, uses problems, choosing colors.

UNIT VII

Software tools – Specification methods, interface – Building Tools.

UNIT VIII

Interaction Devices – Keyboard and function keys – pointing devices – speech recognition digitization and generation – image and video displays – drivers.

TEXT BOOKS:

1. The essential guide to user interface design, Wilbert O Galitz, Wiley DreamTech.
2. Designing the user interface. 3rd Edition Ben Shneidermann , Pearson Education Asia.

REFERENCE BOOKS:

1. Human – Computer Interaction. Alan Dix, Janet Fincay, Gre Goryd, Abowd, Russell Bealg, Pearson Education
2. Interaction Design Prece, Rogers, Sharps. Wiley Dreamtech.
3. User Interface Design, Soren Lauesen, Pearson Education.
4. Human –Computer Interaction, D.R.Olsen, Cengage Learning.
5. Human –Computer Interaction, Smith - Atakan, Cengage Learning.

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

I SEMESTER

GRID COMPUTING
(Professional Elective - I)

Course Code: **B2506**

L	P	C
3	-	3

UNIT-I

Grid Computing: Introduction -Definition -Scope of grid computing. Grid computing model- Grid

Unit-II

Protocols – Desktop grids: Characteristics – key elements – Role in enterprise computing infrastructure. Data grids: Avaki Data Grid – Data grid Architecture.

Unit-III

Grid Computing Initiatives: Grid Computing Organizations and their roles – Grid Computing anatomy – Grid Computing road map.

Unit-IV

Grid Computing Applications: Merging the Grid services Architecture with the Web Services Architecture.

Unit-V

Technologies: OGSA – Sample use cases – OGSA platform components – OGSi – OGSA Basic Services.

Unit-VI

Managing Grid Environments: Managing grids – management reporting – monitoring – service level management – data catalogs and replica management.

Unit-VII

Grid Computing Tool Kits: Globus GT3 Toolkit – Architecture, Programming model.

Unit-VIII

High level services – OGSi .Net middleware Solutions.

References:

1. Joshy Joseph & Craig Fellenstein, "Grid Computing", PHI, PTR-2003.
2. Ahmar Abbas, "Grid Computing: A Practical Guide to technology and Applications", Charles River media – 2003.
3. Ian Foster, Carl Kesselman, "The Grid2: Blueprint for a New Computing Infrastructure". Morgan Kaufman, New Delhi, 2004.
4. Fran Bernm, Geoffrey Fox, Anthony Hey J.G., "Grid Computing: Making the Global Infrastructure a Reality", Wiley, USA, 2003.
5. Maozhen Li, Mark Baker, "The Grid: Core Technologies", John Wiley & Sons, 2005.
6. URLs: www.globus.org and glite.web.cern.ch (Unit 5).

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

I SEMESTER

SOFTWARE CONFIGURATION MANAGEMENT (Professional Elective - II)

Course Code: **B2507**

L	P	C
3	-	3

UNIT - I

WHAT IS SOFTWARE CONFIGURATION MANAGEMENT? : SCM Best Practices, SCM Tools and SCM Process. GROWING INTO YOUR SCM SOLUTION: Dealing with Changing Project Requirements, evolution of SCM Tools.

UNIT – II

AN OVERVIEW OF THE UNIFIED CHANGE MANAGEMENT MODEL : What Is UCM? , The Value of UCM, What Is ClearCase? , What Is ClearQuest?, ClearCase UCM Process Overview, The Architect: Defining the Implementation Model, The Configuration Manager: Setting Up the SCM Environment , The Project Manager: Managing a Project, The Developer: Joining a Project and Doing Development, The Integrator: Integration, Build, and Release.

UNIT- III

FUNCTIONAL OVERVIEW OF CLEARCASE OBJECTS The Repository: Versioned Object Base, Workspaces: Snapshot and Dynamic Views, Project Management: Projects, Streams, and Activities , Versioned Objects: Elements, Branches, and Versions, Component Management: Components and Baselines , Process: Labels, Attributes, Hyperlinks, Triggers , Building: Clearmake, Derived Objects, Configuration Records.

ESTABLISHING THE INITIAL SCM ENVIRONMENT ClearCase Architecture Basics , ClearCase Hardware Resource Requirements , Monitoring and Tuning for ClearCase Performance , Defining the Implementation Model , Creating the VOBs , Baseline Promotion Levels.

UNIT – IV

PROJECT MANAGEMENT IN CLEARCASE: What Is a ClearCase Project? , Creating a ClearCase Project **MANAGING AND ORGANIZING YOUR CLEARCASE PROJECTS** : Coordinating Multiple Parallel Releases , Organizing Large Multiproject Development Efforts, Coordinating Cooperating Projects: Independent Components , Coordinating Cooperating Projects: Shared Components, Coordinating IS/IT Development Projects, Coordinating Documentation Projects or Small Teams.

UNIT- V

DEVELOPMENT USING THE CLEARCASE UCM MODEL : A Developer's Perspective of UCM , Working on a Project , Making Changes , Delivering Changes to the Project , Rebasing Your Development Stream , Dealing With Conflicting Changes , Seamlessly Integrating with Developer's IDE .

UNIT - VI

INTEGRATION : Software Integration, Isolation and Integration with ClearCase **BUILDING, BASELINING, AND RELEASE DEPLOYMENT**: Baselining and Building with UCM, Staging, Deployment, and Release.

UNIT- VII

GEOGRAPHICALLY DISTRIBUTED DEVELOPMENT Distributed Development Challenges , How ClearCase Supports Distributed Development , Multiple Teams: Producer/Consumer Scenario, Multiple Teams: Shared Source Code Scenario, Single Team: Distributed Members Scenario , Other Uses for ClearCase MultiSite.

UNIT -VIII

CHANGE REQUEST MANAGEMENT AND CLEARQUEST: What Is Change Request Management?, What Are Change Requests?, The Change Request Management Process , What Is ClearQuest? , How Do I Use ClearQuest Data? How Does ClearQuest Support UCM?, ClearQuest MultiSite.

TEXT BOOK

1. David E. Bellagio, Tom J. Milligan Software Configuration Management Strategies and IBM Rational ClearCase: A Practical Introduction (Visual Quickstart Guides) IBM PRESS May 2005

REFERENCE BOOK

1. Ueli Wahli, Jennie Brown, Matti Teinonen, Leif Trulsson, Software Configuration Management A Clear Case for IBM Rational ClearCase and ClearQuest UCM, IBM December 2004

VARDHAMAN COLLEGE OF ENGINEERING (AUTONOMOUS)

I SEMESTER

CYBER AND INFORMATION SECURITY (Professional Elective - II)

Course Code: B2508

L	P	C
3	-	3

UNIT I

Security Goals, Security Attacks (Interruption, Interception, Modification and Fabrication), Security Services (Confidentiality, Authentication, Integrity, Non-repudiation, access Control and Availability) and Mechanisms, A model for Internetwork security, Internet Standards and RFCs.

UNIT II

Conventional Encryption Principles & Algorithms(DES, AES, RC4), Block Cipher Modes of Operation, Location of Encryption Devices, Key Distribution,

UNIT III

Public key cryptography principles, public key cryptography algorithms(RSA, RABIN, ELGAMAL, Diffie-Hellman, ECC), Key Distribution.

UNIT IV

Approaches of Message Authentication, Secure Hash Functions(SHA-512, WHIRLPOOL) and HMAC
Digital Signatures: Comparison, Process- Need for Keys, Signing the Digest, Services, Attacks on Digital Signatures, Kerberos, X.509 Directory Authentication Service.

UNIT V

Email Security: Pretty Good Privacy (PGP) and S/MIME.
IP Security Overview, IP Security Architecture, Authentication Header, Encapsulating Security Payload, Combining Security Associations and Key Management

UNIT VI

Web Security Requirements, Secure Socket Layer (SSL) and Transport Layer Security (TLS), Secure Electronic Transaction (SET).

UNIT VII

Basic concepts of SNMP, SNMPv1 Community facility and SNMPv3, Intruders, Viruses and related threats, Virus Countermeasures

UNIT VIII

Firewall Design principles, Trusted Systems, Intrusion Detection Systems

TEXT BOOKS :

1. Cryptography and Network Security by William Stallings, Fourth Edition, Pearson Education 2007.
2. Cryptography & Network Security by Behrouz A. Forouzan, TMH 2007.

REFERENCE BOOKS :

3. Information Security by Mark Stamp, Wiley – India, 2006.
4. Information Systems Security, Godbole, Wiley Student Edition.
5. Fundamentals of Computer Security, Springer.
6. Network Security: The complete reference, Robert Bragg, Mark Rhodes, TMH
7. Computer Security Basics by Rick Lehtinen, Deborah Russell & G.T.Gangemi Sr., SPD O'REILLY 2006.

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

I SEMESTER

DATA WAREHOUSING AND DATA MINING (Professional Elective - II)

Course Code: **B2208**

L	P	C
3	-	3

UNIT - I

INTRODUCTION: Data mining, kinds of data, data mining functionalities, classification of data mining systems, data mining primitives, major issues in data mining.

UNIT - II

DATA PREPROCESSING: Descriptive data summarization, data cleaning, data integration and transformation, data reduction, data discretization and concept hierarchy generation.

UNIT - III

DATA WAREHOUSE AND OLAP TECHNOLOGY: What is data warehouse, a multidimensional data model, data warehouse architecture, data warehouse implementation, from data warehouse to data mining.

UNIT - IV

MINING FREQUENT PATTERNS AND ASSOCIATIONS: Basic concepts, efficient and scalable frequent itemset mining methods, mining various kinds of association rules.

UNIT - V

CLASSIFICATION AND PREDICTION: Issues regarding classification and prediction, classification by decision tree induction, bayesian classification, rule based classification, prediction, accuracy and error measures.

UNIT - VI

CLUSTER ANALYSIS: Types of data in cluster analysis, a categorization of major clustering methods, partitioning methods, hierarchical methods, density based methods, grid based methods, model based clustering methods, clustering high dimensional data, outlier analysis.

UNIT - VII

MINING STREAM, TIME SERIES AND SEQUENCE DATA: Mining data streams, mining time series data, mining sequence patterns in biological data.

UNIT - VIII

MINING OBJECT, SPATIAL, MULTIMEDIA, TEXT AND WEB DATA: Multidimensional analysis and descriptive mining of complex data objects, spatial data mining, multimedia data mining, text mining, mining the world wide web.

TEXT BOOKS:

1. Jiawei Han, Micheline Kamber, Jian Pei (2011), *Data Mining Concepts and Techniques*, 3rd edition, Elsevier, India.

REFERENCE BOOKS:

1. Margaret H Dunham (2006), *Data Mining Introductory and Advanced Topics*, 2nd edition, Pearson Education, India.
2. Amitesh Sinha (2007), *Data Warehousing*, Thomson Learning.
3. Arun K Pujari (2004), *Data Mining Techniques*, University Press (India) Private Limited, India

VARDHAMAN COLLEGE OF ENGINEERING (AUTONOMOUS)

I SEMESTER

ADVANCED DATA STRUCTURES AND ALGORITHMS LAB

Course Code: B2211

L	P	C
-	3	2

LIST OF EXERCISES:

Exercise 1:

- Write a C program that implement stack (its operations) using arrays
- Write a C program that uses Stack operations to convert infix expression into postfix expression

Exercise 2:

- Write C programs that implement Queue (its operations) using arrays
- Write C programs that implement Queue (its operations) using linked lists

Exercise 3:

- Write a C program that uses functions to create a singly linked list
- Write a C program that uses functions to perform insertion operation on a singly linked list
- Write a C program that uses functions to perform deletion operation on a singly linked list

Exercise 4:

Write a C program to perform the following operations:

- Insert an element into a binary search tree
- Delete an element from a binary search tree
- Search for a key element in a binary search tree

Exercise 5:

Write a C program to perform the following operations on B -Trees and AVL-trees:

- Insertion
- Deletion

Exercise 6:

Write C programs for the implementation of BFS and DFS for a given graph.

Exercise 7:

Write C programs to implement the following to generate a minimum cost spanning tree:

- Prim's algorithm
- Kruskal's algorithm.

Exercise 8:

Write a C program to solve the single source shortest path problem. (Note: Use Dijkstra's algorithm).

Exercise 9:

Write C program that uses non-recursive functions to traverse a binary tree in:

- Pre-order
- In-order
- Post-order

Exercise 10:

Write a C program to find optimal ordering of matrix multiplication. (Note: Use Dynamic programming method).

Exercise 11:

Consider the problem of eight queens on an (8x8) chessboard. Two queens are said to attack each other if they are on the same row, column, or diagonal. Write a C program that implements backtracking algorithm to solve the problem i.e. place eight non - attacking queens on the board.

Exercise 12:

Write a C program to implement dynamic programming algorithm to solve the all pairs shortest path problem.

Exercise 13:

Write a C program to solve 0/1 knapsack problem using the following:

- Greedy algorithm
- Dynamic programming algorithm
- Backtracking algorithm
- Branch and bound algorithm.

Exercise 14:

Write a C program that uses dynamic programming algorithm to solve the optimal binary search tree problem.

Exercise 15:

Write a C program for solving traveling sales persons problem using the following:

- Dynamic programming algorithm
- The back tracking algorithm
- Branch and Bound

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

II SEMESTER

SOFTWARE TESTING

Course Code: **B2510**

L	P	C
3	-	3

UNIT- I

Fundamentals: What Is Software Verification and Validation? - Verification and Validation Techniques – V-Model of Testing – Software Testing - Purpose of Testing - Taxonomy of Bugs - Defect And Failure Analysis – Types of Testing Techniques – Black Box – White Box – Gray Box Testing Test Adequacy and Coverage.

UNIT -II

Functional Testing: Functional testing - Boundary Value Testing - Equivalence class testing - Decision table based testing - Evaluation of the testing - Assessed exercise: Specify and design test cases.

UNIT- III

Structural Testing: Path testing - Data and Control Flow Testing – Graph Based Testing - Evaluation of the testing and summary

UNIT- IV

Regression Testing: Need for Regression Testing – Impact Analysis – Regression Test Selection Techniques - Code and Model Based Techniques – Test Case Optimization Techniques.

UNIT -V

Other Types Of Testing: GUI Testing – Domain Based Testing – Performance Testing – Stress Testing – Load Testing – Monkey Testing – Acceptance Testing – Alpha, Beta, Gamma Testing – Software Acceptance Plan.

UNIT- VI

Metrics: Importance of Metrics in Testing - Effectiveness of Testing – Defect Density – Defect Leakage Ratio – Residual Defect Density – Test Team Efficiency – Test Case Efficiency – Various Test Reports.

UNIT- VII

Testing Tools: Features of Testing Tools – Guidelines for Selecting Tools – Static Testing Tools – Dynamic Testing Tools – Advantages and Disadvantages of Testing Tools – When to use Test Tools? – Process of Procurement of Tools.

UNIT- VIII

Test Management: Defect Management – Defect Classification – Defect Life Cycle – Defect Management Process– Reporting Defect – Defect Analysis – Fish Bone Techniques – Risk Analysis – Risk Based Testing – Test Plan – Test Strategy – Test Estimation – Code Reviews.

TEXT BOOK:

1. **“Software Testing – Principles, Techniques and Tools”** by M G Limaye, Tata McGraw Hill, 2009.

REFERENCE BOOKS:

1. **“Software Testing Techniques”** by Boris Beizer 2nd Edition, Dream tech press, 2003.
2. **“Software Testing in the Real World - Improving the Process”** by Edward Kit, Pearson Education, 2004.
3. **“Effective methods for software testing”** by William E. Perry, 2nd Edition, John Wiley, 2000.

VARDHAMAN COLLEGE OF ENGINEERING (AUTONOMOUS)

II SEMESTER

MODEL DRIVEN SOFTWARE DEVELOPMENT

Course Code: **B2511**

L	P	C
3	-	3

UNIT-1

MDSB Basic Terminology

Goals of MDSB, MDSB Approach, Overview of MDA concepts, Architecture-Centric MDSB, Common MDSB concepts and terminology, Model-Driven Architecture, Generative Programming, Software factories, Model-Integrated computing, Language-Oriented Programming, Domain specific modeling.

UNIT- 2

Metamodeling

What is Metamodeling?, Metalevels vs. Level of Abstraction, MOF and UML, Extending UML, UML profiles, Metamodeling & OCL, Examples, Tool-supported Model validation, Metamodeling & Behavior, Pitfalls in Metamodeling, MDSB classification.

UNIT- 3

Model Transformation with QVT

History, M2M language requirements, Overall Architecture, An Example Transformation, The OMG standardization Process and Tool Availability, Assessment.

UNIT- 4

MDSB Tools:Roles, Architecture, Selection Criteria, and Pointers

Role of Tools in the Development Process, Tool Architecture and selection criteria, pointers.

The MDA Standard: Goals, Core concepts

UNIT- 5

MDSB Process Building Blocks and Best Practices

Introduction, Separation between Application and domain Architecture Development, Two track Iterative Development, Target Architecture Development Process, Product-line Engineering.

UNIT- 6

Testing

Test Types, Tests in Model-driven Application Development, Testing the Domain Architecture

Versioning

What is Versioned? Projects and Dependencies, The structure of Application Projects, The structure of Application Projects, Version management and Build Process for mixed files, Modeling in a team and versioning of partial models

UNIT- 7

Case study: Embedded Component Infrastructures Overview, Product-Line Engineering, Modeling, Implementation of Components, Generator Adaptation, Code Generation.

UNIT- 8

Quality : Quality in Model Driven Engineering

TEXT BOOKS:

1. Model-Driven Software Development-Technology, Engineering, Management by Thomas Stahl, Markus Volter, Jul 2006, John Wiley & Sons.
2. Model-Driven Software Development: Integrating Quality Assurance by Jorg Rech, Christian Bunse, 2008, Information Science Publishing. (UNIT-8)

REFERENCES:

1. Model-Driven Software Development by Sami Beydeda Matthias Book, Volker Gruhn, Springer.
2. Model Driven Systems Development with Rational Products By Brian Nolan, Barclay Brown, Dr. Laurent Balmelli, Et Al Tim Bohn, 2008, IBM.
3. Model Driven Development with Executable UML by Dragan Milicev, 2009, Wiley India Pvt Ltd.
4. Model Driven Software Development by Kevin Lano, Apr 2009, Ci Business Press.

VARDHAMAN COLLEGE OF ENGINEERING (AUTONOMOUS)

II SEMESTER

SOFTWARE METRICS

Course Code: B2512

L	P	C
3	-	3

UNIT-I:

MEASUREMENT - Measurement in Everyday Life, Measurement in Software Engineering, Scope of Software Metrics.

UNIT-II:

BASICS OF MEASUREMENT - Representational Theory of Measurement, Measurement and Models, Measurement Scales and Scale Types.

UNIT-III:

FRAME WORK FOR SOFTWARE MEASUREMENT - Classifying Software Measures, Applying Frame Work, Software Measurement Validation.

UNIT-IV:

SOFTWARE METHODS IN DATA COLLECTION - Good Data, Definition of Data, Collecting, Storing and Extracting Data.

UNIT-V:

MEASURING INTERNAL PRODUCT ATTRIBUTES - Measuring Size and Structure.

UNIT -VI:

MEASURING EXTERNAL PRODUCT ATTRIBUTES - Modeling Software Quality, Measuring Aspects of Quality.

UNIT-VII:

MEASUREMENT AND MANAGEMENT - Planning a Measurement Program, Measurement in Practice.

UNIT-VIII:

CUSTOMER SATISFACTION - Empirical Research in Software Engineering, Measuring and Analyzing Customer Satisfaction: Customer Satisfaction Surveys, Analyzing Satisfaction Data, Satisfaction with Company.

TEXT BOOKS:

1. Fenton, Pfleeger, "Software Metrics: A Rigorous and Practical Approach", Thomson.
2. Stephen H. Kan: "Metrics & Models in Software Quality Engineering", PEA.

REFERENCES:

1. Sheppard, "Software Engineering Metrics", 1992, MCG.
2. Pertis et al, "Software Metrics: An Analysis and Evaluation", 1981, MIT Press

VARDHAMAN COLLEGE OF ENGINEERING (AUTONOMOUS)

II SEMESTER

SOFTWARE ARCHITECTURE AND DESIGN PATTERNS

Course Code: **B2513**

L	P	C
3	-	3

UNIT - I

ENVISIONING ARCHITECTURE: The architecture business cycle, what is software architecture, architectural patterns, reference models, reference architectures, architectural structures and views.

CREATING ARCHITECTURE: Quality attributes, achieving qualities, architectural styles and patterns, designing the architecture, documenting software architectures, reconstructing software architecture.

UNIT - II

ANALYZING ARCHITECTURES: Architecture evaluation, architecture design decision making, ATAM, CBAM.

UNIT - III

MOVING FROM ONE SYSTEM TO MANY: Software product lines, building systems from off the shelf components, software architecture in future.

UNIT - IV

PATTERNS: Pattern description, organizing catalogs, role in solving design problems, selection and usage.

CREATIONAL PATTERNS: Abstract factory, builder, factory method, prototype, singleton.

UNIT - V

STRUCTURAL PATTERNS: Adapter, bridge, composite, façade, flyweight, proxy.

UNIT - VI

BEHAVIORAL PATTERNS PART-I: Chain of responsibility, command, Interpreter, iterator, mediator, memento.

UNIT - VII

BEHAVIORAL PATTERNS PART-II: observer, state, strategy, template method, visitor.

UNIT - VIII

CASE STUDIES: A-7E - A case study in utilizing architectural structures, the world wide web - a case study in interoperability, air traffic control – a case study in designing for high availability, Celsius tech - a case study in product line development.

TEXT BOOKS:

1. Len Bass, Paul Clements, Rick Kazman (2010), *Software Architecture in Practice*, 9th edition, Pearson Education, South Asia.
2. Erich Gamma, Richard Helm, Ralph Johnson, John Vlissides (2009), *Design Patterns*, Pearson education, 6th Edition, USA.

REFERENCE BOOKS:

1. Luke Hohmann, Addison Wesley (2003), *Beyond Software architecture*, 9th edition, Addison Wesley, USA.
2. David M. Dikel, David Kane and James R. Wilson (2001), *Software architecture*, Prentice Hall PTR, USA.
3. F. Buschmann (2007), *Pattern Oriented Software Architecture*, John Wiley & Sons, England.
4. Eric Freeman, Elisabeth Freeman (2007), *Head First Design patterns*, O'REILLY.
5. Steven John Metsker, William C. Wake (2006), *Design Patterns in Java*, Pearson education, India.

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

II SEMESTER

SECURE SOFTWARE ENGINEERING (Professional Elective - III)

Course Code: B2514

L	P	C
3	-	3

UNIT I:

Why Is Security a Software Issue? Introduction, The problem, Software assurance and software security, Threats to software security, Sources of software insecurity, The benefits of detecting software security defects early, Managing secure software development.

UNIT II:

What Makes Software Secure? Defining properties of secure software, How to influence the security properties of software, How to assert and specify desired security properties.

UNIT III:

Requirements Engineering for Secure Software The SQUARE process model: Identifying security requirements using the security quality requirements engineering (SQUARE) method, SQUARE sample outputs, Requirements elicitation, Requirements prioritization.

UNIT IV:

Secure Software Architecture and Design Introduction, Software security practices for architecture and design: Architectural risk analysis. Software security knowledge for architecture and design: Security principles, Security guidelines, and Attack patterns.

UNIT V:

Considerations for Secure Coding and Testing Introduction, Code analysis, Coding practices, Software security testing, Security testing considerations throughout the SDLC.

UNIT VI:

Security and Complexity: System Assembly Challenges Introduction, Security failures, Functional and attacker perspectives for security analysis, System complexity drivers and security, Deep technical problem complexity.

UNIT VII:

Governance, and Managing for More Secure Software Governance and security, Adopting an enterprise software security framework, How much security is enough?, Security and project management, maturity of practice.

UNIT VIII:

Security metrics Defining security metrics, Diagnosing problems and measuring technical security, Analysis techniques, Organize, aggregate, and analyze data to bring out key insights.

TEXT BOOKS

1. Software Security Engineering: A Guide for Project Managers, by Julia H. Allen, Sean Barnum, Robert J. Ellison, Gary McGraw, Nancy R. Mead, Addison-Wesley, 1st edition, 2008.
2. Security Metrics: Replacing Fear, Uncertainty, and Doubt, by Andrew Jaquith, Addison-Wesley, 1st edition, 2007.

REFERENCES:

1. Integrating Security and Software Engineering: Advances and Future Vision, by Haralambos Mouratidis, Paolo Giorgini, IGI Global, 2006.
2. Software Security: Building Security In, by Gary McGraw, Addison-Wesley, 2006
3. The Art of Software Security Assessment: Identifying and Preventing Software Vulnerabilities, by Mark Dowd, John McDonald, Justin Schuh, Addison-Wesley, 1st edition, 2006
4. Building Secure Software: How to Avoid Security Problems the Right Way by John Viega, Gary McGraw, Addison-Wesley, 2001
5. Writing Secure Code, by M. Howard, D. LeBlanc, Microsoft Press, 2nd Edition, 2003.
6. Exploiting Software: How to break code, by G. Hoglund, G. McGraw, Addison Wesley, 2004

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

II SEMESTER

SOFTWARE RELIABILITY (Professional Elective - III)

Course Code: B2515

L	P	C
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UNIT I: Introduction

The Need for Reliable Software, Software Reliability Engineering Concepts, Basic definitions, Software practitioners biggest problem, software reliability engineering approach, software reliability engineering process, defining the product

UNIT II: The Operational Profile

Reliability concepts, software reliability and hardware reliability, developing operational profiles, applying operational profiles, learning operations and run concepts.

UNIT III: Software Reliability Concepts

Defining failure for the product, common measure for all associated systems, setting system failure intensity objectives, determining develop software failure intensity objectives, software reliability strategies, failures, faults and errors, availability, system and component reliabilities and failure intensities, predicting basic failure intensity.

UNIT IV: Software Reliability Modeling Survey

Introduction, Historical Perspective and Implementation, Exponential Failure Time Class of Models, Weibull and Gamma Failure Time Class of Models, Infinite Failure Category Models, Bayesian Models, Model Relationship, Software Reliability Prediction in Early Phases of the Life Cycle.

UNIT V: Software Metrics for Reliability Assessment

Introduction, Static Program Complexity, Dynamic Program Complexity, Software Complexity and Software Quality, Software Reliability Modeling.

UNIT VI: Software Testing and Reliability

Introduction, Overview of Software Testing, Operational profiles, Time/Structure Based Software Reliability Estimation.

UNIT VII: Best Practice of SRE

Benefits and approaches of SRE, SRE during requirements phase, SRE during implementation phase, SRE during Maintenance phase.

UNIT VIII: Neural Networks for Software Reliability

Introduction, Neural Networks, Neural Networks for software reliability, software reliability growth modeling.

TEXT BOOKS

1. Handbook of Software Reliability Engineering Edited by Michael R. Lyu, published by IEEE Computer Society Press and McGraw-Hill Book Company.
2. Software Reliability Engineering John D. Musa, second edition Tata McGraw-Hill.

REFERENCES

1. Practical Reliability Engineering, Patric D. T. O connor 4th Edition, John Wesley & Sons, 2003.
2. Fault tolerance principles and Practice, Anderson and PA Lee, PHI, 1981.
3. Fault tolerant computing-Theory and Techniques, Pradhan D K (Ed.): Vol 1 and Vol 2, Prentice hall, 1986.
4. Reliability Engineering E. Balagurusamy, Tata McGrawHill, 1994.

VARDHAMAN COLLEGE OF ENGINEERING (AUTONOMOUS)

II SEMESTER

CLOUD COMPUTING (Professional Elective - III)

Course Code: B2516

L	P	C
3	-	3

UNIT - I

CLOUD COMPUTING BASICS: Cloud computing overview, applications, intranets and the cloud, first movers in the cloud.

UNIT - II

YOUR ORGANIZATION AND CLOUD COMPUTING: When you can use cloud computing, benefits, limitations, security concerns, regulatory issues.

CLOUD COMPUTING WITH THE TITANS: Google, EMC, netapp, Microsoft, Amazon, salesforce.com IBM, partnerships.

UNIT - III

THE BUSINESS CASE FOR GOING TO THE CLOUD: Cloud computing services, how those applications help your business, deleting your datacenter, salesforce.com and Thomson reuters.

UNIT - IV

HARDWARE AND INFRASTRUCTURE: Clients, security, network, services.

ACCESSING THE CLOUD: Platforms, web applications, web APIs, web browsers.

UNIT - V

CLOUD STORAGE VENDORS: Overview of cloud storage, cloud storage providers.

STANDARDS: Application, client, infrastructure, service.

UNIT - VI

DEVELOPING CLOUD SERVICES: Types of cloud service development, software as a service: overview, driving forces, company offerings, industries, software plus services: overview, mobile device integration, providers, microsoft online, platform as a service, web services, on-demand computing, discovering cloud services, development services and tools.

UNIT - VII

DEVELOPING APPLICATIONS: Google, Microsoft, intuit quick base, cast iron cloud, bungee connect development, troubleshooting, application management.

LOCAL CLOUDS AND THIN CLIENTS: Virtualization in your organization, server solutions, thin client's case study: Mcneilus steel.

UNIT - VIII

MIGRATING TO THE CLOUD: Cloud services for individuals, cloud services aimed at the mid-market, enterprise-class cloud offerings, migration.

BEST PRACTICES AND THE FUTURE OF CLOUD COMPUTING: Analyze your service, best practices, how cloud computing might evolve.

TEXT BOOKS:

1. Anthony T. Velte, Toby J. Velte, Robert Elsenpeter(2010), *Cloud Computing: A Practical Approach*, Mc Graw hill, New Delhi, India.
2. Michael Miller (2008), *Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Online*, Que Publishing.

REFERENCE BOOKS:

1. Haley Beard (2008), *Cloud Computing Best Practices for Managing and Measuring Processes for On-demand Computing*, Applications and Data Centers in the Cloud with SLAs, 2nd edition, Emereo Pty Limited, USA.
2. Tim Mather, Subra Kumaraswamy, Shahed Latif (2009), *Cloud Security and Privacy: An Enterprise Perspective on Risks and Compliance (Theory in Practice)*, 3rd edition, O'Reilly Media, Inc, India.

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

II SEMESTER

SERVICE ORIENTED ARCHITECTURE (Professional Elective - IV)

Course Code: **B2517**

L	P	C
3	-	3

UNIT I

SOA and Web Services Fundamentals Introducing SOA- Fundamental SOA, Common Characteristics of Contemporary SOA, Common tangible benefits of SOA, Common pitfalls of adopting SOA. The Evolution of SOA – An SOA timeline, The continuing evolution of SOA, The roots of SOA. Web Services and primitive SOA- The Web Services frame work, Services, Service descriptions, Messaging.

UNIT II

Web Services and Contemporary SOA(Part I-Activity management and Composition) Message exchange patterns, Service Activity Coordination, Atomic transactions, Business Activities, Orchestration, Choreography.

UNIT III

Web Services and Contemporary SOA (Part-II-Advanced Messaging , Metadata , and Security) Addressing, Reliable messaging, Correlation, Policies, Metadata exchange, Security, Notification and eventing.

UNIT IV

Principles of Service-Oriented Service – Orientation and the enterprise, Anatomy of SOA, Common Principles of Service – Orientation, interrelation between Principles of Service-Oriented, Service Orientation and Object Orientation, Native Web Services support for Principles of Service-Oriented.

UNIT V

Service Layers

Service-Oriented and Contemporary SOA , Service Layer abstraction , Application Service Layer , Business Service Layer, Orchestration Service Layer, Agnostic Services, Service Layer Configuration Scenarios.

UNIT VI

Building SOA(Planning and Analysis) SOA Delivery Strategies-SOA delivery lifecycle phases, The top-down strategy, The bottom-up strategy, The agile strategy. Service Oriented Analysis(Part I-Introduction)-Introduction to Service Oriented Analysis, Benefits of a Business Centric SOA, Deriving Business Services. Service Oriented Analysis (Part-II-Service Modeling)-Service Modeling, Service Modeling guidelines, Classifying Service model logic, Contrasting Service modeling approaches.

UNIT VII

Building SOA(Technology and Design) Service Oriented Design(Part I-Introduction)-Introduction to Service-Oriented design, WSDL related XML Schema language basics, WSDL language basics, Service interface design tools. Service Oriented Design (Part II-SOA Composition Guidelines)-SOA Composing steps, Considerations for choosing service layers, Considerations for positioning core SOA standards, Considerations for choosing SOA extensions.

UNIT VIII

Service Oriented Design(Part III- Service Design) Service Design overview, Entity-centric business Service Design, Application Service Design, Task-centric business Service Design, Service Design guidelines. Service Oriented Design(Part IV-Business Process Design)-WS-BPEL language basics, WS- Coordination overview, Service Oriented Business process Design. Fundamental WS-* Extensions-WS-Addressing language basics, WS-Reliable Messaging language basics, WS-Policy language basics, WS-Metadata Exchange language basics, WS-Security language basics. SOA Platforms-SOA platform basics, SOA support in J2EE and .NET, integration considerations.

TEXT BOOKS:

1. Service-Oriented Architecture-Concepts, Technology, and Design, Thomas Erl, Pearson Education.
2. Understanding SOA with Web Services, Eric Newcomer, Greg Lomow, Pearson Education.

REFERENCES:

1. The Definitive guide to SOA, Jeff Davies & others, Apress, Dreamtech.
2. Java SOA Cook book, E.Hewitt, SPD.
3. SOA in Practice, N.M.Josuttis, SPD.
4. Applied SOA, M.Rosen and others, Wiley India pvt. Ltd.
5. Java Web Services Architecture, J.Mc Govern, and others, Morgan Kaufmann Publishers, Elsevier.
6. SOA for Enterprise Applications, Shankar.K, Wiley India Edition.
7. SOA-Based Enterprise Integration, W.Roshen, TMH.
8. SOA Security, K.Rama Rao, C.Prasad, dreamtech press.

VARDHAMAN COLLEGE OF ENGINEERING (AUTONOMOUS)

II SEMESTER

INFORMATION RETRIVAL SYSTEMS (Professional Elective - IV)

Course Code: B2217

L	P	C
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UNIT - I

INTRODUCTION TO INFORMATION RETRIEVAL SYSTEMS: Definition, Objectives, Functional Overview, Relationship to Database Management Systems, Digital Libraries and Data Warehouses.

INFORMATION RETRIEVAL SYSTEM CAPABILITIES: Search, Browse and Miscellaneous

UNIT - II

CATALOGING AND INDEXING: Objectives, Indexing Process, Automatic Indexing, Information Extraction.

DATA STRUCTURES: Introduction, Stemming Algorithms, Inverted file structures, N-gram data structure, PAT data structure, Signature file structure, Hidden Markov Models.

UNIT - III

AUTOMATIC INDEXING: Classes of Automatic Indexing, Statistical Indexing, Natural Language, Concept Indexing, Hypertext Linkages.

UNIT - IV

DOCUMENT AND TERM CLUSTERING: Introduction, Thesaurus Generation, Item Clustering, Hierarchy of Clusters.

UNIT -V

USER SEARCH TECHNIQUES: Search Statements and Binding, Similarity Measures and Ranking, Relevance Feedback, Selective Dissemination of Information Search, Weighted Searches of Boolean Systems, Searching the Internet and Hypertext.

UNIT - VI

INFORMATION VISUALIZATION: Introduction, Cognition and Perception, Information Visualization Technologies.

TEXT SEARCH ALGORITHMS: Introduction, Software Text Search Algorithms, Hardware Text Search Systems.

UNIT - VII

INFORMATION SYSTEM EVALUATION: Introduction, Measures used in System Evaluation, Measurement Example - TREC results.

UNIT - VIII

MULTIMEDIA INFORMATION RETRIEVAL: Models and Languages, Data Modeling Query Languages, Indexing and Searching.

LIBRARIES AND BIBLIOGRAPHICAL SYSTEMS: Online IR Systems, OPACs, Digital Libraries.

TEXT BOOKS:

1. Gerald J. Kowalski, Mark T. Maybury (2000), Information Storage and Retrieval Systems: Theory and Implementation, 2nd edition, Springer International Edition, USA.
2. Ricardo Baeza Yates, Berthier Ribeiro Neto (2009), Modern Information Retrieval, Pearson Education, India.

REFERENCE BOOKS:

1. Robert R. Korfhage (1997), Information Storage and Retrieval, John Wiley & Sons, India Edition, India.
2. Frakes W. B, Ricardo Baeza Yates (1992), Information Retrieval Data Structures and Algorithms, Pearson Education / Prentice Hall of India, New Delhi, India.

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

II SEMESTER

SCRIPTING LANGUAGES (Professional Elective - IV)

Course Code: **B2518**

L	P	C
3	-	3

UNIT I

Introduction to PERL and Scripting: Scripts and Programs, Origin of Scripting , Scripting Today, Characteristics of Scripting Languages, Web Scripting, and the universe of Scripting Languages. PERL- Names and Values, Variables, Scalar Expressions, Control Structures, arrays, list, hashes, strings, pattern and regular expressions, subroutines.

UNIT II

Advance perl - finer points of looping, pack and unpack, filesystem, eval, datastructures, packages, modules, objects, interfacing to the operating system, Creating Internet ware applications, Dirty Hands Internet Programming, security Issues.

UNIT III

PHP Basics

PHP Basics- Features, Embedding PHP Code in your Web pages, Outputting the data to the browser, Datatypes, Variables, Constants, expressions, string interpolation, control structure.

UNIT IV

Function, Creating a Function, Function Libraries.

Arrays, Adding and Removing Array Elements, Locating Array Elements, Traversing Arrays, Determining Array size and Uniqueness, Sorting Arrays, Merging, Slicing, Splicing and Dissecting Arrays

UNIT V

strings and Regular Expressions, Regular Expressions, Other String- Specific Functions, Alternative for Regular Expression Functions, Validate_US

UNIT VI

Advanced PHP Programming

PHP and Web Forms, Files, PHP Authentication and Methodologies -Hard Coded, File Based, Database Based, IP Based, Login Administration, Uploading Files with PHP, Sending Email using PHP, PHP Encryption Functions, the Mcrypt package, Building Web sites for the World – Translating Websites- Updating Web sites Scripts, Creating the Localization Repository, Translating Files, text, Generate Binary Files, Set the desired language within your scripts, Localizing Dates, Numbers and Times.

UNIT VII

TCL – Tk

TCL Structure, syntax, Variables and Data in TCL, Control Flow, Data Structures, input/output, procedures , strings , patterns, files, Advance TCL- eval, source, exec and uplevel commands, Name spaces, trapping errors, event driven programs, making applications internet aware, Nuts and Bolts Internet Programming, Security Issues, C Interface. Tk-Visual Tool Kits, Fundamental Concepts of Tk, Tk by example, Events and Binding , Perl-Tk.

UNIT VIII

Python

Introduction to Python language, python-syntax, statements, functions, Built-in-functions and Methods, Modules in python, Exception Handling, Integrated Web Applications in Python – Building Small, Efficient Python Web Systems ,Web Application Framework.

TEXT BOOKS:

1. The World of Scripting Languages , David Barron, Wiley Publications.
2. Python Web Programming , Steve Holden and David Beazley, New Riders Publications.
3. Beginning PHP and MySQL , 3rd Edition , Jason Gilmore, Apress Publications (Dream tech.).

REFERENCES:

- 1.Open Source Web Development with LAMP using Linux ,Apache, MySQL, Perl and PHP, J.Lee and B.Ware(Addison Wesley) Pearson Education.
2. Programming Python,M.Lutz,SPD

VARDHAMAN COLLEGE OF ENGINEERING (AUTONOMOUS)

II SEMESTER

SOFTWARE TESTING AND CASE TOOLS LAB

Course Code: B2519

L	P	C
-	3	2

SOFTWARE TESTING LAB:

LIST OF TASKS:

1. Generate meaningful Unit test cases for the Project module: write and test them for defects, Identify the defects from the code and correct them. Try Identify the various unit test metrics studied already to identify module stability. Fill the unit test report supplied by the instructor.
2. Generate meaningful Integration test cases for the Project and test them for defects, Identify the defects and correct them. Try Identify the various Integration test metrics studied already to identify module stability. Fill the Integration test report supplied by the instructor.
3. Generate meaningful System test cases for the Project and test them for defects, Identify the defects and correct them. Try Identify the various System test metrics studied already to identify system stability. Fill the System test report supplied by the instructor.
4. Generate meaningful User Acceptance cases for the Project and test them for defects, Identify the defects and correct them. Try Identify the various System test metrics studied already to identify system stability. Fill the System test report supplied by the instructor.
5. Test the supplied project/Application through testing tool: Win Runner, by generating appropriate test cases.

CASE TOOLS LAB:

OBJECTIVE

- To inculcate object oriented software design

SYSTEM/ SOFTWARE REQUIREMENT

- Tools Such as Rational Rose.

CASE STUDY 1: LIBRARY INFORMATION SYSTEM

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 2: 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 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 3: 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 4: 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, date 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 i.e. Sleeper class, First class and the AC compartment. Design the application for the above problem description.

CASE STUDY 5: 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 short 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 candidates 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.

Note : The analysis, design, coding, documentation, database design of mini project which will be carried out in 4th year should be done in object oriented approach using UML and by using appropriate software which supports UML, otherwise the mini project will not be evaluated.

1. OBJECTIVE:

Seminar is an important component of learning in an Engineering College, where the student gets acquainted with preparing a report & presentation on a topic.

2. PERIODICITY / FREQUENCY OF EVALUATION: Twice**3. PARAMETERS OF EVALUATION:**

- The seminar shall have two components, one chosen by the student from the course-work without repetition and approved by the faculty supervisor. The other component is suggested by the supervisor and can be a reproduction of the concept in any standard research paper or an extension of concept from earlier course work.
- The two components of the seminar are distributed between two halves of the semester and are evaluated for 50 marks each. The average of the two components shall be taken as the final score.
- The students shall be required to submit the rough drafts of the seminar outputs within one week of the commencement of the class work.
- Supervisor shall make suggestions for modification in the rough draft. The final draft shall be presented by the student within a week thereafter.
- Presentation schedules will be prepared by different Departments in line with the academic calendar.

The Seminars shall be evaluated in two stages as follows:

A. Rough draft

In this stage, the student should collect information from various sources on the topic and collate them in a systematic manner. He/ She may take the help of the concerned supervisor.

The report should be typed in "MS-Word" file with "calibri" font, with font size of 16 for main heading, 14 for sub-headings and 11 for the body text. The contents should also be arranged in Power Point Presentation with relevant diagrams, pictures and illustrations. It should normally contain 18 to 25 slides, consisting of the followings:

1.	Topic, name of the student & guide	1 Slide
2.	List of contents	1 Slide
3.	Introduction	1 - 2 Slides
4.	Descriptions of the topic (point-wise)	7 - 10 Slides
5.	Images, circuits etc.	6 - 8 Slides
6.	Conclusion	1 - 2 Slides
7.	References/Bibliography	1 Slide

The soft copy of the rough draft of the seminar presentation in MS Power Point format along with the draft Report should be submitted to the concerned supervisor, with a copy to the concerned HOD within 30 days of the commencement of class work.

The evaluation of the Rough draft shall generally be based upon the following.

1.	Punctuality in submission of rough draft and discussion	2 Marks
2.	Resources from which the seminar have been based	2 Marks
3.	Report	3 Marks
4.	Lay out, and content of Presentation	3 Marks
5.	Depth of the students knowledge in the subject	5 Marks
Total		15 Marks

After evaluation of the first draft the supervisor shall suggest further reading, additional work and fine tuning, to improve the quality of the seminar work.

Within 7 days of the submission of the rough draft, the students are to submit the final draft incorporating the suggestions made by the supervisor.

B. Presentation:

After finalization of the final draft, the students shall be allotted dates for presentation (in the designated seminar classes) and they shall then present it in presence students, supervisor, faculties of the department and at least one faculty from some department / other department.

The student shall submit 3 copies of the Report neatly bound along with 2 soft copies of the PPT in DVD medium. The students shall also distribute the title and abstract of the seminar in hard copy to the audience. The final presentation has to be delivered with 18-25 slides.

The evaluation of the Presentation shall generally be based upon the following.

1.	Contents	10 Marks
2.	Delivery	10 Marks
3.	Relevance and interest the topic creates	5 Marks
4.	Ability to involve the spectators	5 Marks
5.	Question answer session	5 Marks
Total		35 Marks

4. WHO WILL EVALUATE?

The presentation of the seminar topics shall be made before an internal evaluation committee comprising the Head of the Department or his/her nominee, seminar supervisor and a senior faculty of the department / other department.

1. OBJECTIVE:

- To enable the examiners to assess the candidate's knowledge in his or her particular field of learning.
- To test the student's awareness of the latest developments and relate them to the knowledge acquired during the classroom teaching.

2. PARAMETERS OF EVALUATION:

Subject Knowledge	Current Awareness	Career Orientation	Communication Skills	Total
20	10	10	10	50

3. WHO WILL EVALUATE?

The comprehensive Viva will be conducted by a committee comprising Head of the Department or his/her nominee, two senior faculty of the respective department and an external examiner from outside the college. The comprehensive viva shall be evaluated for 50 marks at the end of III semester. A minimum of 40% of maximum marks shall be obtained to earn the corresponding credits.

4. PERIODICITY / FREQUENCY OF EVALUATION: Once**5. PEDAGOGY:**

- The viva will be held on a face to face basis.
- The students will be expected to answer the questions related to latest developments and all courses taken till date.
- Viva voce will be conducted within week before the beginning of midterm examinations. However, in exceptional circumstances it can be scheduled immediately after the end of midterm examinations.
- Students will have to make themselves available on the date of the viva voce.

M. Tech. SE III/ IV SEMESTER

PROJECT WORK

1. OBJECTIVE:

The main objective of the Project Work is for the students to learn and experience all the major phases and processes involved in solving “real life engineering problems”.

2. EXPECTED OUTCOME:

The major outcome of the M. Tech project must be well-trained students. More specifically students must have acquired:

- System integration skills
- Documentation skills
- Project management skills
- Problem solving skills

3. PROJECT SELECTION:

Projects are suggested by the faculty, with or without collaboration with an industry. All faculty are to suggest projects. Students are also encouraged to give project proposals after identifying a faculty who would be willing to supervise the work. A Project brief is to be given by the faculty to the group defining the project comprehensively.

All M. Tech major projects are to be done in the Institute. For industry specified projects, students will be permitted to spend 1-2 weeks in the industry on recommendation by the supervisor. The number of students per batch should be 1.

4. WHO WILL EVALUATE?

The end semester examination shall be based on the report submitted and a viva-voce exam for 100 marks by committee comprising of the Head of the Department, project supervisor and an external examiner.

5. EVALUATION:

The basic purpose is to assess the student competencies with regard to his project work. More specifically to assess the student’s individual contribution to the project, to establish the level of understanding of basic theoretical knowledge relevant to the project and to ensure that the student has good understanding and appreciation of design and development decisions taken in the course of the project. It is desirable that all faculty members are present for the evaluations as this is a platform to get to know the student projects and to motivate the students to do good projects. The faculty should adopt a clear and consistent pattern of asking questions from general to specific aspects of the project. The presentation and evaluation is open to other students of the department.

The project work shall be evaluated for 150 marks out of which 50 marks for internal evaluation and 100 marks for end-semester evaluation. The evaluation shall be done on the following basis

Semester III	Semester IV
Preliminary Evaluation - 50 marks	Design Evaluation I - 25 marks
	Design Evaluation II - 25 marks
	Final Evaluation – 100 marks

6. GUIDELINES FOR THE PREPARATION OF M. TECH PROJECT REPORTS

1.1. Project reports should be typed neatly only on one side of the paper with 1.5 or double line spacing on a A4 size bond paper (210 x 297 mm). The margins should be: Left - 1.25", Right - 1", Top and Bottom - 0.75".

1.2. The total number of reports to be prepared are:

- One copy to the department

- One copy to the concerned guide(s)
 - One copy to the candidate.
- 1.3. Before taking the final printout, the approval of the concerned guide(s) is mandatory and suggested corrections, if any, must be incorporated.
- 1.4. For making copies dry tone Xerox is suggested.
- 1.5. Every copy of the report must contain
- Inner title page (White)
 - Outer title page with a plastic cover
 - Certificate in the format enclosed both from the college and the organization where the project is carried out.
 - An abstract (synopsis) not exceeding 100 words, indicating salient features of the work.
- 6.6. The organization of the report should be as follows:

1.	Inner title page	Usually numbered in roman
2.	Abstract or Synopsis	
3.	Acknowledgments	
4.	Table of Contents	
5.	List of table & figures (optional)	

- 6.7. Chapters (to be numbered) containing Introduction, which usually specifies the scope of work and its importance and relation to previous work and the present developments, Main body of the report divided appropriately into chapters, sections and subsections.
- The chapters, sections and subsections may be numbered in the decimal form for e.g. Chapter 2, sections as 2.1, 2.2 etc., and subsections as 2.2.3, 2.5.1 etc.
 - The report should be typed in “MS-Word” file with “calibri” font. The chapter must be left or right justified (font size 16). Followed by the title of chapter centered (font size 18), section/subsection numbers along with their headings must be left justified with section number and its heading in font size 16 and subsection and its heading in font size 14. The body or the text of the report should have font size 11.
 - The figures and tables must be numbered chapter wise for e.g.: Fig. 2.1 Block diagram of a serial binary adder, Table 3.1 Primitive flow table, etc.
 - The last chapter should contain the summary of the work carried, contributions if any, their utility along with the scope for further work.
- 6.8. Reference OR Bibliography:** The references should be **numbered serially** in the order of their occurrence in the text and their numbers should be indicated within square brackets for e.g. [3]. The section on references should list them in serial order in the following format.
1. For textbooks - A.V. Oppenheim and R.W. Schafer, Digital Signal Processing, Englewood, N.J., Prentice Hall, 3 Edition, 1975.
 2. For papers - Devid, Insulation design to combat pollution problem, Proc of IEEE, PAS, Vol 71, Aug 1981, pp 1901-1907.
- 6.9. Only SI units are to be used in the report. Important equations must be numbered in decimal form for e.g. $V = IZ$ **(3.2)**
- 6.10. All equation numbers should be right justified.
- 6.11. The project report should be brief and include descriptions of work carried out by others only to the minimum extent necessary. Verbatim reproduction of material available elsewhere should be strictly avoided. Where short excerpts from published work are desired to be included, they should be within quotation marks appropriately referenced.
- 6.12. Proper attention is to be paid not only to the technical contents but also to the organization of the report and clarity of the expression. Due care should be taken to avoid spelling and typing errors. The student should note that report-write-up forms the important component in the overall evaluation of the project

- 6.13. Hardware projects must include: the component layout, complete circuit with the component list containing the name of the component, numbers used, etc. and the main component data sheets as Appendix. At the time of report submissions, the students must hand over a copy of these details to the project coordinator and see that they are entered in proper registers maintained in the department.
- 6.14. Software projects must include a virus free disc, containing the software developed by them along with the read me file. Read me file should contain the details of the variables used, salient features of the software and procedure of using them: compiling procedure, details of the computer hardware/software requirements to run the same, etc. If the developed software uses any public domain software downloaded from some site, then the address of the site along with the module name etc. must be included on a separate sheet. It must be properly acknowledged in the acknowledgments.
- 6.15. Sponsored Projects must also satisfy the above requirements along with statement of accounts, bills for the same duly attested by the concerned guides to process further, They must also produce NOC from the concerned guide before taking the internal viva examination.
- 6.16. The reports submitted to the department/guide(s) must be hard bounded, with a plastic covering.
- 6.17. Separator sheets, used if any, between chapters, should be of thin paper

VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

Shamshabad – 501 218, Hyderabad

Department of

CERTIFICATE

Certified that the project work entitled carried out by Mr./Ms., Roll Number, a bonafide student ofin partial fulfillment for the award of **Master of Technology** in of the Jawaharlal Nehru Technological University, Hyderabad during the year It is certified that all corrections / suggestions indicated for Internal Assessment have been incorporated in the Report deposited in the departmental library. The project report has been approved as it satisfies the academic requirements in respect of Project work prescribed for the said Degree.

Name & Signature of the Guide

Name Signature of the HOD

Signature of the Principal

External Viva

Name of the examiners

Signature with date

- 1.
- 2.

Certificate issued at the Organization where the project was carried out

(On a separate sheet, If applicable)

NAME OF THE INDUSTRY / ORGANIZATION, Address with pin code

CERTIFICATE

Certified that the project work entitled carried out by
Mr./Ms, Roll Number....., a bonafide student of
.....in partial fulfillment for the award of **Master of Technology** in
..... of the Jawaharlal Nehru Technological University, Hyderabad
during the year It is certified that, he/she has completed the project satisfactorily

Name & Signature of the Guide

Name & Signature of the Head of Organization

7. DISTRIBUTION OF MARKS FOR M.TECH DISSERTATION EVALUATION

S No.	Particulars	Max. Marks
1	Relevance of the subject in the present context	10
2	Literature Survey	10
3	Problem formulation	10
4	Experimental observation / theoretical modeling	10
5	Results – Presentation & Discussion	20
6	Conclusions and scope for future work	10
7	Overall presentation of the Thesis / Oral presentation	20
8	Project Report Writing	10
Total Marks		100

MALPRACTICES RULES
DISCIPLINARY ACTION FOR / IMPROPER CONDUCT IN EXAMINATIONS

	Nature of Malpractices/Improper conduct	Punishment
	<i>If the candidate:</i>	
1. (a)	Possesses or keeps accessible in examination hall, any paper, note book, programmable calculators, Cell phones, pager, palm computers or any other form of material concerned with or related to the subject of the examination (theory or practical) in which he is appearing but has not made use of (material shall include any marks on the body of the candidate which can be used as an aid in the subject of the examination)	Expulsion from the examination hall and cancellation of the performance in that subject only.
(b)	Gives assistance or guidance or receives it from any other candidate orally or by any other body language methods or communicates through cell phones with any candidate or persons in or outside the exam hall in respect of any matter.	Expulsion from the examination hall and cancellation of the performance in that subject only of all the candidates involved. In case of an outsider, he will be handed over to the police and a case is registered against him.
2.	Has copied in the examination hall from any paper, book, programmable calculators, palm computers or any other form of material relevant to the subject of the examination (theory or practical) in which the candidate is appearing.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted to appear for the remaining examinations of the subjects of that Semester/year. The Hall Ticket of the candidate is to be cancelled and sent to the University.
3.	Impersonates any other candidate in connection with the examination.	The candidate who has impersonated shall be expelled from examination hall. The candidate is also debarred and forfeits the seat. The performance of the original candidate, who has been impersonated, shall be cancelled in all the subjects of the examination (including practicals and project work) already appeared and shall not be allowed to appear for examinations of the remaining subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all University examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat. If the imposter is an outsider, he will be handed over to the police and a case is registered against him.
4.	Smuggles in the Answer book or additional sheet or takes out or arranges to send out the question paper during the examination or answer book or additional sheet, during or after the examination.	Expulsion from the examination hall and cancellation of performance in that subject and all the other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all University examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.
5.	Uses objectionable, abusive or offensive language in the answer paper or in letters to the examiners or writes to the examiner requesting him to award pass marks.	Cancellation of the performance in that subject.
6.	Refuses to obey the orders of the Chief Superintendent/Assistant – Superintendent / any officer on duty or misbehaves or creates disturbance of any kind in and around the examination hall or organizes a walk out or instigates others to walk out, or threatens the officer:in charge or any person on duty in or outside the examination hall of any injury to his person or to	In case of students of the college, they shall be expelled from examination halls and cancellation of their performance in that subject and all other subjects the candidate(s) has (have) already appeared and shall not be permitted to appear for the remaining examinations of the subjects of that semester/year. The candidates also are debarred and forfeit their

	any of his relations whether by words, either spoken or written or by signs or by visible representation, assaults the officer:in:charge, or any person on duty in or outside the examination hall or any of his relations, or indulges in any other act of misconduct or mischief which result in damage to or destruction of property in the examination hall or any part of the College campus or engages in any other act which in the opinion of the officer on duty amounts to use of unfair means or misconduct or has the tendency to disrupt the orderly conduct of the examination.	seats. In case of outsiders, they will be handed over to the police and a police case is registered against them.
7.	Leaves the exam hall taking away answer script or intentionally tears of the script or any part thereof inside or outside the examination hall.	Expulsion from the examination hall and cancellation of performance in that subject and all the other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all University examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.
8.	Possess any lethal weapon or firearm in the examination hall.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred and forfeits the seat.
9.	If student of the college, who is not a candidate for the particular examination or any person not connected with the college indulges in any malpractice or improper conduct mentioned in clause 6 to 8.	Student of the colleges expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred and forfeits the seat. Person(s) who do not belong to the College will be handed over to police and, a police case will be registered against them.
10.	Comes in a drunken condition to the examination hall.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year.
11.	Copying detected on the basis of internal evidence, such as, during valuation or during special scrutiny.	Cancellation of the performance in that subject and all other subjects the candidate has appeared including practical examinations and project work of that semester/year examinations.
12.	If any malpractice is detected which is not covered in the above clauses 1 to 11 shall be reported to the University for further action to award suitable punishment.	

Frequently asked Questions and Answers about autonomy

- 1. Who grants Autonomy? UGC, Govt., AICTE or University**
In case of Colleges affiliated to a university and where statutes for grant of autonomy are ready, it is the respective University that finally grants autonomy.
- 2. Shall VCE award its own Degrees?**
No. Degree will be awarded by Jawaharlal Nehru Technological University, Hyderabad with a mention of the name Vardhaman College of Engineering on the Degree Certificate.
- 3. What is the difference between a Deemed University and an Autonomy College?**
A Deemed University is fully autonomous to the extent of awarding its own Degree. A Deemed University is usually a Non: Affiliating version of a University and has similar responsibilities like any University. An Autonomous College enjoys Academic Autonomy alone. The University to which an autonomous college is affiliated will have checks on the performance of the autonomous college.
- 4. How will the Foreign Universities or other stake – holders know that we are an Autonomous College?**
Autonomous status, once declared, shall be accepted by all the stake holders. Foreign Universities and Indian Industries will know our status through our college website.
- 5. What is the change of Status for Students and Teachers if we become Autonomous?**
An autonomous college carries a prestigious image. Autonomy is actually earned out of continued past efforts on academic performances, capability of self:governance and the kind of quality education we offer.
- 6. Who will check whether the academic standard is maintained / improved after Autonomy? How will it be checked?**
There is a built in mechanism in the autonomous working for this purpose. An Internal Committee called Academic Programme Evaluation Committee is a Non – Statutory body, which will keep a watch on the academics and keep its reports and recommendations every year. In addition to Academic Council, the highest academic body also supervises the academic matters. At the end of three years, there is an external inspection by the University for this purpose. The standards of our question papers, the regularity of academic calendar, attendance of students, speed and transparency of result declaration and such other parameters are involved in this process.
- 7. Will the students of VCE as an Autonomous College qualify for University Medals and Prizes for academic excellence?**
No. VCE has instituted its own awards, medals, etc. for the academic performance of the students. However for all other events like sports, cultural and co:curricular organized by the University the students shall qualify.
- 8. Can VCE have its own Convocation?**
No, since the University awards the Degree the Convocation will be that of the University.
- 9. Can VCE give a provisional degree certificate?**
Since the examinations are conducted by VCE and the results are also declared by VCE, the college sends a list of successful candidates with their final percentage of marks to the University. Therefore with the prior permission of the University the college will be entitled to give the provisional certificate.
- 10. Will Academic Autonomy make a positive impact on the Placements or Employability?**
Certainly. The number of students qualifying for placement interviews is expected to improve, due to rigorous and repetitive classroom teaching and continuous assessment, besides the autonomous status is more responsive to the needs of the industry. As a result, there will be a lot of scope for

industry oriented skill development built into the system. The graduates from an autonomous college will therefore represent better employability.

- 11. What is the proportion of Internal and External Assessment as an Autonomous College?**
Presently, it is 25 % for internal assessment and 75 % for external assessment. As the autonomy matures the internal assessment component shall be increased at the cost of external assessment.
- 12. Will there be any Revaluation or Re:Examination System?**
No. There will not be any Revaluation system or Re:examination. But, there is a personal verification of the answer scripts.
- 13. How fast Syllabi can be and should be changed?**
Autonomy allows us the freedom to change the syllabi as often as we need.
- 14. Will the Degree be awarded on the basis of only final year performance?**
No. The percentage of marks will reflect the average performance of all the semesters put together.
- 15. Who takes Decisions on Academic matters?**
The Academic Council of College is the top academic body and is responsible for all the academic decisions. Many decisions are also taken at the lower level like the BOS which are like Boards of Studies of the University.
- 16. What is the role of Examination committee?**
The Exam Committee is responsible for the smooth conduct of inter and external examinations. All matters involving the conduct of examinations, spot valuations, tabulations, preparation of Memorandum of Marks etc fall within the duties of the Examination Committee.
- 17. Is there any mechanism for Grievance Redressal?**
Yes, the college has grievance redressal committee, headed by a senior faculty member of the college.
- 18. How many attempts are permitted for obtaining a Degree?**
All such matters are defined in Rules & Regulations.
- 19. Who declares the result?**
The result declaration process is also defined. After tabulation work the entire result is reviewed by the Moderation Committee. Any unusual deviations or gross level discrepancies are deliberated and removed. The entire result is discussed in the College Academic Council for its approval. The result is then declared on the college notice boards as well put on the web site of the college. It is eventually sent to the University.
- 20. What is our relationship with the Jawaharlal Nehru Technological University, Hyderabad?**
We remain an affiliated college of the Jawaharlal Nehru Technological University, Hyderabad. The University has the right to nominate its members on the academic bodies of the college.
- 21. Shall we require University approval if we want to start any New Courses?**
Yes, It is expected that approvals or such other matters from an autonomous college will receive priority.
- 22. Shall we get autonomy for PG and Doctoral Programmes also?**
Yes, presently our PG programmes are also enjoying autonomous status.
- 23. How many exams will be there as an autonomous college?**
This is defined in the Rules & Regulations.



VARDHAMAN COLLEGE OF ENGINEERING, HYDERABAD

Undertaking by Students/Parents

“To make the students **attend** the classes regularly from the first day of starting of classes and be aware of the **College regulations**, the following Undertaking Form is introduced which should be signed by both **student and parent**. The same should be submitted to the College Administrative Office.”

I, Mr. / Ms. ----- joining in I Semester for the academic year 2014-15 in Vardhaman College of Engineering, Hyderabad, do hereby undertake and abide by the following terms, and I will bring the **ACKNOWLEDGEMENT** duly signed by me and my parent and submit it to the Admin Office.

1. I will **attend** all the classes from the **joining day** of the College as per the timetable. In case, I do not turn up even after two weeks of starting of classes, I shall be **ineligible** to continue for the current academic year.
2. I will be regular and punctual to all the classes (theory/practical/drawing) and secure overall attendance of **not less than 75%** as stipulated by College/JNT University Hyderabad. I am fully aware that an overall attendance of less **than 65% will make me lose one year**.
3. I will compulsorily follow the **dress code** prescribed by the college.
4. I will conduct myself in a highly **disciplined** and decent manner both inside the classroom and in the campus, failing which suitable action may be taken against me as per the rules and regulations of the College.
5. I will concentrate on my **studies** without wasting time in the Campus/Hostel/Residence and attend all the **tests** to secure more than the minimum prescribed Class/Sessional Marks in each subject. I will submit the **assignments** given in time to improve my performance.
6. I will not bring **Mobile Phone** to the College campus and also, I will not involve in any form of **ragging** inside or outside the campus. I am fully aware that bringing mobile phone to the campus and involving in Ragging is an **offence** and punishable as per JNTU/UGC rules and law.
7. I will **pay** tuition fees, examination fees and any other **dues** within the stipulated time as required by the Institute authorities failing which I will not be permitted to attend the classes.
8. I will **not cause or involve** in any sort of **violence or disturbance** both within and outside the college campus.
9. If I **absent continuously for 3 days**, my **parents** will have to meet the concerned HOD/Principal.
10. I hereby **acknowledge** that I have **received** the **R14 Academic Rules and Regulations, Syllabus copy** and I shall **abide** by all the rules specified in it.

ACKNOWLEDGEMENT

I have gone through carefully the terms of the above undertaking and understand that following these are for my/his/her own benefit and improvement. I also understand that if I/he/she fail to comply with these terms, will be liable to suitable action as per College/JNT University Hyderabad rules and law. I undertake that I/he/she will strictly follow the above terms.

Signature of Student

Signature of Parent
Name & Address with Phone Number